FINAL REPORT

WO21: Residential On-site Study: California Lighting and Appliance Saturation Study (CLASS 2012)

Prepared for: California Public Utilities Commission, Energy Division
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DNV·GL

Table of Contents

Table of Contents

Table of Contents

Table of Contents

List of Tables

Table of Contents

Table of Contents

Table of Contents

Table of Contents

Table of Contents

Table of Contents

Table of Contents

Table of Contents

List of Figures

Table of Contents

Table of Contents

1 Executive Summary

1.1 Introduction

This is the final report for the 2012 California Residential Lighting and Appliance Efficiency Saturation Study. DNV GL (formerly DNV KEMA) conducted the study on behalf of the four investor owned utilities, including San Diego Gas and Electric, Southern California Gas Company, Southern California Edison and Pacific Gas and Electric. The California Public Utilities Commission managed the study.

The 2012 California Lighting and Appliance Efficiency Saturation Study (CLASS) is a follow-on study to the 2005 CLASS study and the 2000 Statewide Lighting and Appliance Efficiency Saturation Study. Each of these studies were paid for by Public Purpose funds for the purpose of understanding current levels of equipment and lighting saturation and efficiencies in the existing residential sector, as well as future energy savings potential and past accomplishments. The results of the 2012 CLASS are useful to both the Energy Division's (ED) evaluation of residential programs and to the portfolio planning of Investor Owned Utility (IOU) programs that require accurate baseline information.

In addition to updating the information developed from the 2005 and 2000 CLASS studies, the 2012 CLASS expands the body of knowledge acquired through the Energy Commission's 2009 Residential Appliance Saturation Study (RASS), a survey collecting self-reported information from residents, with sample sizes an order of magnitude larger than the CLASS.

The four primary objectives of this study were:

Objective 1: Complete 2000 on-site surveys of single-family, multi-family and mobile home residences in the service territories of the Investor Owned Utilities.

Objective 2: Develop a database of residential building characteristics, lighting and appliance saturations and efficiencies, expanded to represent the population of residential individually-metered population.

Objective 3: Develop a web-based tool to provide utility staff and other parties the ability to conduct "what-if" scenario analyses on the data collected.

Objective 4: Conduct trend and comparison analyses of saturations and efficiencies between the 2012 CLASS data to compare results from the previous CLASS studies.

Key outputs of the study include:

- Distribution of building characteristics such as square footage, room types and window types
- Distribution of type, efficiency, size and age of equipment such as ACs, refrigerators and furnaces
- Distribution of installed watts for lighting by room type and fixture type

- Distribution of household demographic characteristics such as number and ages of occupants

In addition to the direct outputs of the study, several other projects utilized information and resources from the CLASS study for their work as part of the 2010-2012 CPUC Evaluation, Measurement and Verification effort:

- **WO13 Residential Replacement Lamp Market Status Report**[1]: WO13 used CLASS lighting inventory data to assess trends of socket saturation and lamp storage in households compared to the inventory results of the 2006-2008 Residential Lighting Metering Study[2].

- **WO17 Measure Cost Study**[3]: WO32 data mined manufacturer info to provide equipment shares to the measure cost study (WO17).

- **WO28 Upstream and Residential Lighting Impact Evaluation**[4]: CLASS data was used to update key gross savings parameters in the WO028 impact evaluation.

- **WO32 HVAC Impact Evaluation**[5] and **WO54 HVAC Market Effects**[6]: WO32 used CLASS sites to serve as a sample frame for new HVAC installations for a quality installation baseline. The on-site information was reported to both WO32 and WO54 HVAC market effects.

- **WO35 Appliance Recycling Impact Evaluation**[7]: WO35 used CLASS site visits to identify qualifying units and to recruit participants for long-term metering of refrigerators and freezers.

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[1] DNV GL, 2014. California Residential Replacement Lamp Market Status Report: Upstream Lighting Program and Market Activities in California Through 2013. Prepared for the CPUC ED. CALMAC Study ID CPU0091.01.

[2] KEMA, Inc. and Cadmus Group, 2010. Final Evaluation Report: Upstream Lighting Program. Prepared for the CPUC. CALMAC Study ID CPU0015.

[3] Itron,2014. WO17: 2010-2012 WO017 Ex Ante Measure Cost Study Final Report. Prepared for the CPUC ED. CALMAC Study ID CPU0079.01.

[4] DNV GL, 2014. WO28: California Upstream and Residential Lighting Impact Evaluation – Draft Final Report Prepared for the CPUC ED. Final report expected Q4 2014.

[5] DNV GL, 2014. WO32: HVAC Impact Evaluation – Draft Final Report. Prepared for the CPUC ED. August 27, 2014. Final report expected Q4 2014.

[6] Nexus Market Research, 2014. Baseline Characterization Market Effects Study of Investor-Owned Utility Residential and Small Commercial HVAC Quality Installation and Quality Improvement Programs in California (Work Order 054)– Draft Final Report. Prepared for the CPUC ED. August 28, 2014. Final report expected Q4 2014.

[7] DNV GL, 2014. WO35: Appliance Recycling Impact Evaluation –Final Report. Prepared for the CPUC ED. CALMAC Study ID CPU0092.01.

1.2 Approach

The goal of the study was to gather baseline data on California residential building characteristics in addition to the presence, efficiency, and usage of energy consuming devices found therein. Study results will be used to update the residential baseline information upon which program and portfolio planning and program evaluation rely. To achieve the study objectives, the following steps were taken:

- Developed a sample of homes stratified along variables of interest

- Recruited participants and conducted on-site inspections at a sample of homes in California to characterize:

    o residential building configurations (for example, conditioned square footage, room types) and specific construction components (for example, attic insulation)

    o installed appliances and energy-consuming products including electric and gas-powered products with high unit energy consumption (UEC) and high on-peak demand

    o lighting products installed by location in home and in storage

    o demographics of household

- Merged on-site data with information from other database sources to identify attributes specific to the model of equipment observed

- Expanded data from sample to represent residential individually-metered population

Two sets of expansion weights were developed to expand the sample of sites to represent the population. The initial site weights were developed based on the strata of the sample design, following the same general approach as the 2005 and 2000 CLASS studies, as well as the 2009 and 2003 California Residential Appliance Saturation Studies (RASS). These weights are referred to as "strata weights" throughout this report, with resulting saturation and building characterization estimates most appropriate to compare to results from the previous CLASS studies and the RASS studies.

A second set of expansion weights was created to reduce potential bias in estimates that might be attributed to the differences in the distribution of the CLASS participant sample by home ownership and type of residence compared to the U.S. Census population estimates. The population estimates were used in a calibration weight adjustment model that yielded "Census-adjusted weights" for CLASS participants. Study results based on the Census-adjusted weights describe the current state of households with individually-metered electric accounts within the service territory of PG&E, SCE and SDG&E.

1.3 Key Findings

This section summarizes some of the more interesting findings occurring at the statewide level within the electric IOU territories. All results presented in this section were estimated using the Census-adjusted weights, with error bounds presented at the 90% confidence level. Findings are grouped by lighting, appliance and equipment type, and building characteristics. Readers can find additional information and details in the sections of the report that pertain to the topic of discussion in this section.

Following this chapter is a comparison of the 2012 CLASS results to the 2005 CLASS study. Some very interesting trends that have occurred over the past 7 years are highlighted in that section.

1.3.1 Lighting

Every lighting fixture in each residence was inventoried by fixture type, fixture control type, number of lamps, lamp type, and lamp wattage. Fixtures may comprise one or more sockets, each of which could be filled with a different type of lamp. Interior and exterior lighting data for all installed lamps and lamps in storage were collected for this study. A total of 1,987 residences are included in the lighting analysis.

Number of fixtures and lamps - Overall, homes have approximately 31 fixtures and 47 lamps on average, which indicates that on average, fixtures have more than one socket. As might be expected, apartments and duplexes have significantly fewer fixtures and lamps on average than do single family, unattached residences.

Fixture Types - The most common fixture types are recessed cans, ceiling mount and wall mount. Homes have an average of 6.8 recessed cans, 6.5 ceiling mounted and 6.2 wall mounted fixtures. Also, homes have an average of 4.8 floor/table lamps.

Lamps - Suspended fixtures contain more lamps (3.0 lamps) than any other fixture type, followed by track lighting with an average of 2.7 lamps and ceiling fans[8] with an average of 2.3 lamps. Approximately 36% of homes have more than 50 lamps, and about 20% have 20 or fewer lamps in use.

Saturation of CFLs and LEDs - The 2012 CLASS found that nearly all homes have one or more CFL installed (97%). Approximately 33% of fixtures contain a compact fluorescent lamp. Compact fluorescent lamps were found less often in dining rooms, laundry rooms, garages and closets. The 2012 CLASS also found that 9 percent of homes had at least one LED installed; LED lamps were most

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[8] Only ceiling fans with integrated light fixtures are included in this report.

commonly found in kitchens, offices, living rooms, and other exterior areas of homes surveyed. In spite of the growth in saturation of CFLs and LEDs, incandescent lamps continue to have the highest saturation of any lamp type (48%), with CFLs a distant second (29%) and LEDs with 1% saturation.

Fixture Control Types - The most prevalent control type for lamps is a manual switch, with 43% of total lamps in homes being manually controlled incandescent lamps, followed by 28% manually controlled compact fluorescent lamps.

1.3.2 Refrigerators

Data were gathered for all refrigerators accessible at a home, but only the primary and secondary refrigerators are included in the report due to the small number of homes with three or more refrigerators. Only about 4% of homes have three or more refrigerators.

Number of Refrigerators- Twenty-seven percent of households have two or more refrigerators, with 23% having two and 4% having three or more.

Primary Refrigerator Type - All homes that were visited over the course of this study except one have a primary refrigerator. The largest proportions of the primary refrigerators found are the standard top-mounted freezer type, accounting for 49.9% of all the primary refrigerators. The second most prevalent type of refrigerator found was side-by-side type, comprising 35.7% of the sample. Bottom-mounted freezer type refrigerators were found in 12.5% of homes visited.

Primary Refrigerator Size - The sizes of refrigerators were obtained from manufacturer data if the unit is matched to an efficiency database. The average manufacturer reported size for all refrigerators obtained from the efficiency database is 21.1 cubic feet.

Primary Refrigerator Age —The overall average age of the sampled refrigerators is 8.5 years. The manufacture dates range for 2000 to 2005 accounts for about 39% of all refrigerators. No refrigerators were found manufactured prior to1985.

Primary Refrigerator Nameplate Unit Energy Consumption (UEC) – The overall average nameplate UEC for primary refrigerators is 598 kWh/year. This encouraging result is likely due to new federal energy standards and continued utility rebate and recycling programs.

Secondary Refrigerators —Over one-fourth (27%) of homes had two or more refrigerators, with standard top freezer as the most common (44%) as second refrigerators. Compact refrigerators comprised 24% of observed second refrigerators. The average size of all secondary refrigerators sampled is 16.8 cubic feet. The average age of secondary refrigerators is 10 years. The average overall nameplate UEC is 579 kWh/year.

Self-Standing Freezers- Approximately 15% of all homes sampled have one self-standing freezer. The majority of primary freezers found were the chest type (54%), and upright type freezers comprised the remainder. The average size of chest units is approximately 8.0 cubic feet smaller than

the average size of the upright units. The average age of the combined upright and chest freezers was 10.1 years, although the average age of sampled upright freezers (11.1 years) was older than chest freezers (9.0 years).

1.3.3 Heating Systems

Almost two-thirds (65%) of the homes have one heating system, 25% have two systems and 8% have 3 systems or more.

Primary Heating System Type – The largest proportion of all primary heating systems were found to be split forced air furnaces, totaling 40.8% of the population of primary heating systems. Space units used as the primary heating system were far less common than central units.

Primary Heating System Fuel – Among all the system types found, the vast majority (82%) consumed natural gas. Only 13% of all primary heating systems consumed electricity. Among all forced air furnaces, 96% consumed natural gas.

Primary Heating System Age –The estimated ages were obtained from a combination of the dates that were obtained from the manufacturer information and the surveyor estimates during the on-site visit. Overall, all types of primary heating systems were on average 15.5 years old.

Primary Heating System Efficiency – Only the units that matched with one of the efficiency databases were included in the analysis. The average Annual Fuel Utilization Efficiency (AFUE) for central heating systems is much higher than the AFUE for space heating systems at 80.7 and 73.1 AFUE, respectively. Eighty-two percent of central systems are within the 78-84.99 AFUE range, while 87% of space heating systems fall between 66-77.99 AFUE.

1.3.4 Cooling Systems

About two-thirds of homes surveyed have some type of cooling system, with 50% of all homes having a central system and 15% having a space cooling system.

Cooling System Type –Approximately 77% of primary cooling systems surveyed were found to be central systems, and of these, over half of systems (56%) surveyed were central split system ACs. The next most prevalent type of system was the window/wall AC, which were found in 19% of homes surveyed.

Cooling System Age – The average central air conditioning system type is 15.5 years old. The average space air conditioning system is 8.8 years old.

Cooling System Size – The most common central air-conditioner size is the 3-ton category, 20%, and the next most common sizes are the 2.5 ton category (16%) and the 4.5 ton capacity (16%). About 50% of all central air-conditioners fall within the 2.5-3.5 ton capacity range. The majority

(62%) of window/wall space units were in the 0.1 to 0.99 ton range. All fourteen of the central common building cooling systems surveyed were found to be in the range of 1.0-1.49 tons.

Cooling System Efficiency — The largest share of combined central system air conditioners are in the 10 to 11.99 SEER range accounting for 44% of central systems with a 4% error bound. Similarly, 95.3% of all types of space cooling systems are in the 9 to 10.99 EER range. No space cooling systems were found with EER of less than 6 or higher than 12. For split system units above 5 tons, the most saturated capacity range, the efficiency is 13.5 SEER. The most efficient packaged central units in the 4.0 to 4.49 SEER range with an average efficiency of 13.1 SEER.

1.3.5 Water Heaters

Data were gathered on many water heater characteristics, including system type, size, age, efficiency, fuel type, output, and insulation. The following summarizes some of the key findings related to water heating equipment.

Water Heater Type - The heavy majority of water heaters (84%) currently in homes are storage type water heaters, but 4% of homes were found to have instantaneous water heating.

Water Heater Fuel Type - The large majority of water heaters are gas, either natural or propane, totaling 81% of all water heaters found. About 7% of the water heaters are electric, while fuel type is not known for 12%.

Water Heater Size - The average size of all types of water heaters is 42.9 gallons. The largest proportion of gas units are in the 40 to 49 gallon range, whereas electric units have a wide distribution of capacities from 30 to 59 gallons.

Water Heater Age - The average age of all water heaters for which an age was obtained is 8.0 years old.

Water Heater Efficiency- The average energy factor for the popular 40 gallon gas fired water heater is 0.58, which is very near the standard of 0.59 from the National Appliance Energy Conservation Act Standards (NAECA) implemented in 2004. The average energy factors for electric models of the two most popular sizes (40 and 50 gallon), are both 0.89, and are also close to the respective standards of .92 and .90.

1.3.6 Clothes Washers

An estimated 81% of all homes have a clothes washer. Washers are most common in single family detached homes, where about 96% of individual dwelling units have a washing machine.

Clothes Washer Type – Approximately 30% of all washers found were horizontal axis washing machines. Single-family homes were the residence type with the highest proportion of horizontal-axis washers, at 30%.

Clothes Washer Age- Manufacture date was obtained from the nameplate, or when not available, customer-reported age is reported. Approximately 55% of clothes washers were reported to have been manufactured since 2006, with an average age of 7.2 years.

Clothes Washer Efficiency –Current federal standards in effect for clothes washers manufactured beginning in 2007 are the same for horizontal axis and standard axis machines at 1.26 MEF, with the ENERGY STAR minimum set at 2.0 MEF. For washers observed in this study, the average MEF is 1.6 for standard washing machines and 2.2 MEF for horizontal axis washers. Overall, 41% of the combined total standard and horizontal axis washers exceeded the ENERGY STAR minimum requirement of 2.0 MEF.

1.3.7 Clothes Dryers

Overall, 77% of homes have a clothes dryer. As one would expect, this saturation estimate closely compares to the saturation of washing machines. Clothes dryer fuel saturation findings indicate that 62% are gas, 35% are electric and 3% are propane. The average age of clothes dryers is 7.8 years old.

1.3.8 Dishwashers

Approximately 71% of all homes have a dishwasher. Dishwashers are more prevalent in townhomes and single-family detached homes than other residence types.

Dishwasher Age - The largest share of dishwashers (35.4%) was reported to have been manufactured between 2006 and 2009, and about 54% have been manufactured since the year 2006. The average age is 7.7 years.

Dishwasher Efficiency- No dishwashers with energy factors less than 0.275 were found. The majority of dishwashers fall within the range of 0.580 to 0.775 EF, containing 66% of the dishwashers. The average EF is 0.61.

1.3.9 Ranges and Ovens

This was the first time that data was collected on ranges and ovens as part of a CLASS study. Of the 1,987 total ranges sampled, about two-thirds of the ranges used natural gas (67%) as fuel, 30% used electricity and 4% used propane as fuel. Similarly, just over half (57%) of ovens used natural gas as fuel. Electric ovens made up 40% and propane 3% of ovens sampled.

1.3.10   Televisions and Connected Devices

Data on televisions and connected devices were also not covered in previous CLASS studies. In 2012, 99% of households had one or more televisions, with the average of 2.5 televisions per home. Of the single family detached homes surveyed, most (83%) had more than one TV. Although information was collected on all accessible TVs in homes, this section reports on only the most-used TV from each home. Almost half of the most-used televisions surveyed were LCD televisions (48%), followed by Cathode Ray Tube (CRT) televisions at 27%, followed by plasma (9%), LED (9%), and projection (7%). About 57% of the most-used TVs had screen measuring 36 or more inches diagonally. Approximately half of LCD, plasma, and unknown flat panel televisions were manufactured between 2006 and 2009.

The most common peripheral was the DVD player; three-quarters of homes had at least one TV with a DVD player, and it was connected to the most-used TV in over half of the homes. Detached single family homes had the highest average number of peripherals, at 4.7, and apartments in buildings with 5 or more units had on average 3 peripherals, the lowest.

1.3.11   Personal Computers and Connected Devices

Personal computers and their peripherals were also not surveyed in the previous CLASS studies. For this report, only the two most-used PCs available in the home were examined. Most homes were found to have one or more PCs (87%), with 51% of homes having two or more PCs. A larger proportion of households residing in apartment buildings with 2-4 units and in mobile homes were less more likely to not have a PC compared to the other residence types.

Over half (59%) of homes had a multi-function inkjet printer, although a smaller percentage (47%) had it connected to their most-used PC. Overall, surveyed homes had 1.8 computer peripherals on average. Eighty-two percent of all homes have at least one computer connected to the internet.

1.3.12   Building Envelope

The largest share of window frame types in homes was found to be metal, constituting 48% of the homes, followed by 43% of homes having vinyl windows. About one-third of all homes have metal framed, single paned windows. Interestingly, of homes surveyed, 72% of mobile homes and just over half (53%) of apartments in buildings with five or more units have metal framed, single paned windows. A larger percentage of newer homes built have double paned windows than the older homes. This was similar with Low-E glazing; residences built between 2000and 2012 have the highest percentage of low-E glazing, 55%. This is probably due to new construction activity and window upgrade renovations.

Insulation data was collected with some difficulty during the site visits, when the attic was inaccessible due to it being located in another apartment unit, blocked by furniture, etc. Sixty-five percent of all homes have attic insulation, 15% have none and the presence of attic insulation is unknown in 19% of

homes. The average R-Value among all homes with an estimated or verified R-Value for attic insulation is 20.8. Approximately 23% of homes surveyed have no exterior wall insulation, while 49% of homes were found to have all the exterior walls insulated.

1.3.13   Spa and Pool Equipment

During the on-site visits for this study, 9% of homes were found to have spas and 8% of homes had pools. The most prevalent fuel used for spas was electric fuel, accounting for 52% of the sample. Approximately 46% of pools did not use heating fuel; those that did used primarily natural gas (33%) or solar (15%).

1.4 Limitations

Sampling unit bias is a major concern with surveys in general and with on-site surveys in particular. On-site surveys are time-consuming and invasive. Households that agree to participate in these surveys are more likely to include a person that is available to be at home during the day, and/or to be more interested in energy use/energy efficiency than average. While it would be nearly impossible and prohibitively expensive to eliminate all bias, several steps were taken to minimize bias in the study. Sampling techniques were implemented to improve representativeness of the sample for households with individually-metered electric accounts. Recruiting calls and on-site visits were conducted during extended business hours, including early mornings, evenings and weekends. Telephone recruiters and surveyors fluent in Spanish were used when initial contact indicated language was a barrier. All participants received a $100 gift card.

Although these steps most likely reduced bias, the sample as expanded to the population by using strata weights yielded a population profile different from the Census on home ownership and type of residence. An additional set of weights was developed to reduce the potential bias in the study results. Results presented in this report are clearly labeled with the weights that were used to compute the results.

As described in Chapter 3 Study Methodology, the sample design incorporated household average daily consumption as a stratification variable. Note that the use of kWh only, without additional information or normalization, can represent several scenarios. For example, a house with small kWh usage could be a) a house with high conservation and/or high efficiency, b) a small house, c) a house with no air conditioning, or d) a house that uses gas as heating fuel and domestic hot water heating fuel. The sample design did not distinguish between these types of households, so it is possible that households with very different characteristics may be grouped within the same strata.

The information collected on-site, nameplate data such as model number in particular, is likely to be more complete for equipment that is newer and/or more accessible to the surveyor. Nameplate data may be less legible on older equipment. Heating and cooling equipment that is installed on roofs or otherwise inaccessible would have made it impractical, if not impossible, to collect model numbers.

The efficiency information presented in the report was obtained through matching model numbers collected during the on-site visit to reference databases. Newer appliances are more likely to be matched than older equipment. This potentially introduces an unintentional bias towards newer and generally more efficient equipment. More information on matching the model numbers to the databases is reported.

The reference databases used to obtain efficiency information do not account for efficiency degradation over time. Thus, efficiency levels reported for older appliances are likely higher than actual efficiencies of the equipment.

Participants were asked to estimate the total square feet of living space. For sites where the participant was unable to provide an estimate of the total square feet of living space, public real estate records were searched on the address. Single-family homes were more likely to be found in real estate records, as sales transaction data is recorded. Apartments and rental units were less likely to be obtained from public records, unless a description of the specific unit was found in the records.

2 Comparison to Previous CLASS Studies

This section presents a comparison of saturation and efficiency levels to those found in the 2000 and the 2005 CLASS Studies. Overall, the types of information collected during the on-site visit closely followed what had been collected for similar types of equipment in the previous studies.

The comparison analysis is limited to the analysis that was conducted for the 2005 CLASS Study, with the addition of testing differences between the 2012 estimates to the 2005 estimates for statistical significance of at the 90% confidence level. Details about the significance testing can be found in Appendix G. Throughout this section and the rest of the report unless otherwise noted, differences in estimates between 2012 and 2005 found to be statistically significant are noted as such in the text. Shading in tables represents differences identified as significant. Error bounds are presented at the 90% confidence level.

All of the saturation and efficiency-level results presented in this section have been estimated using strata weights, which expanded the sample to the individually-metered electric residential population, without adjusting to the Census. The 2000 and 2005 CLASS studies had followed a similar strategy for computing strata weights and neither previous study adjusted to the Census.

2.1 Sample Size

The 2012 CLASS completed on-site visits at a sample of 1,987 households. This represents a substantially larger sample than the 2005 CLASS study that visited 848 households, and the 2000 CLASS sample of 1,258 households. The larger sample size of households in the 2012 study resulted in a larger number of data points for each equipment category and lighting.

2.2 Equipment Model Information

The field staff of the 2012 CLASS was able to obtain a higher rate of equipment model numbers compared to the 2005 and 2000 CLASS studies, as shown in Table 1. Comprehensive training before going into the field prepared staff on where to look for model numbers and emphasized the importance for the study of collecting as many model numbers as possible.

The percentage of model numbers that were matched to efficiency databases was also higher for many of the equipment categories compared to the previous two studies. Some of the older equipment that was unable to be matched in previous studies probably had been replaced with newer equipment, more likely to be matched in the databases. At the same time, many of the databases have been updated with additional models. Overall, the study team was able to match significantly more model numbers through a combination of automated matching and manual matching to efficiency databases.

Table 1: Equipment Model Numbers Obtained On-site and Rate of Model Matching to Efficiency Databases 2000-2012

Year	% Model Numbers Obtained			% Model Numbers Matched for Model Numbers Obtained		
	2012	2005	2000	2012	2005	2000
Cooling Overall	81%	54%	63%	80%	63%	65%
Cooling Packaged	56%	47%	41%	68%	72%	54%
Cooling Split	93%	82%	82%	85%	63%	82%
Cooling Win/Wall	55%	23%	43%	90%	40%	8%
Heat Pump	76%	48%	72%	68%	77%	50%
Heating	73%	49%	62%	75%	58%	43%
Primary Refrigerators	95%	91%	87%	86%	69%	69%
Primary Freezer	78%	66%	77%	64%	47%	31%
Dishwasher	96%	96%	97%	50%	26%	34%
Washing Machine	92%	86%	90%	44%	18%	18%
Water Heater	81%	67%	77%	64%	49%	53%

This combination of factors resulted in a substantially higher proportion of model numbers being matched to efficiency databases for the **total** number of units, as shown in Figure 1 and Figure 2. Total units include all units observed, with and without model numbers. The model matching task provided model-specific information such as age and efficiency obtained from efficiency databases when not available from the nameplate.

Figure 1: Percentage of Model Numbers Matched to Efficiency Databases,for All Observed Units of HVAC Equipment 2000-2012
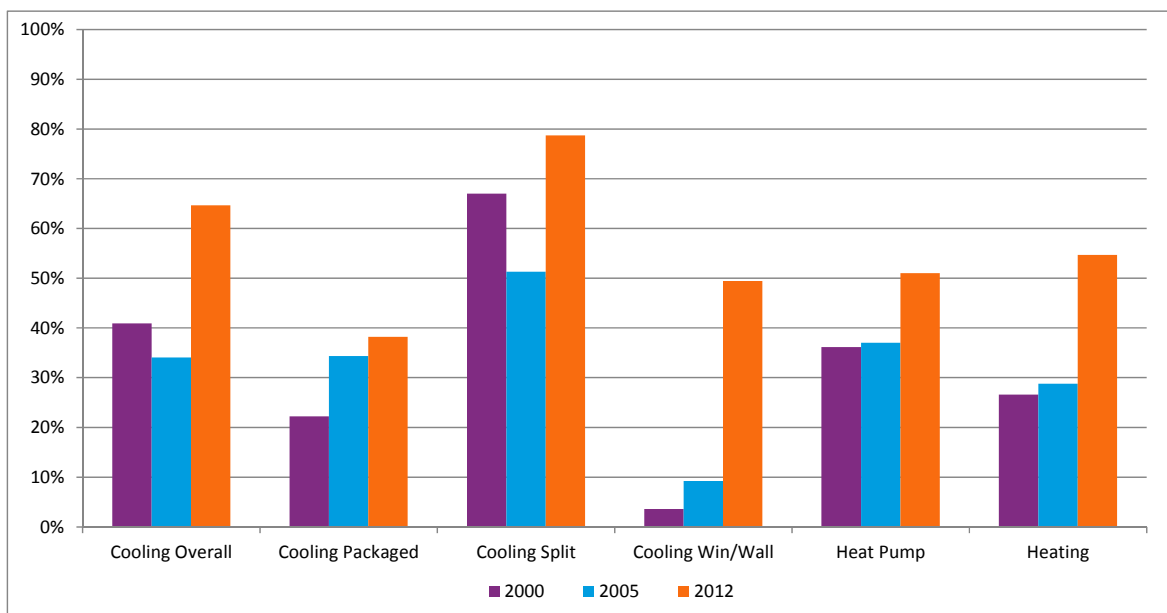
Figure 2: Percentage of Model Numbers Matched to Efficiency Databases, for All Observed Units for Major Appliances 2000-2012
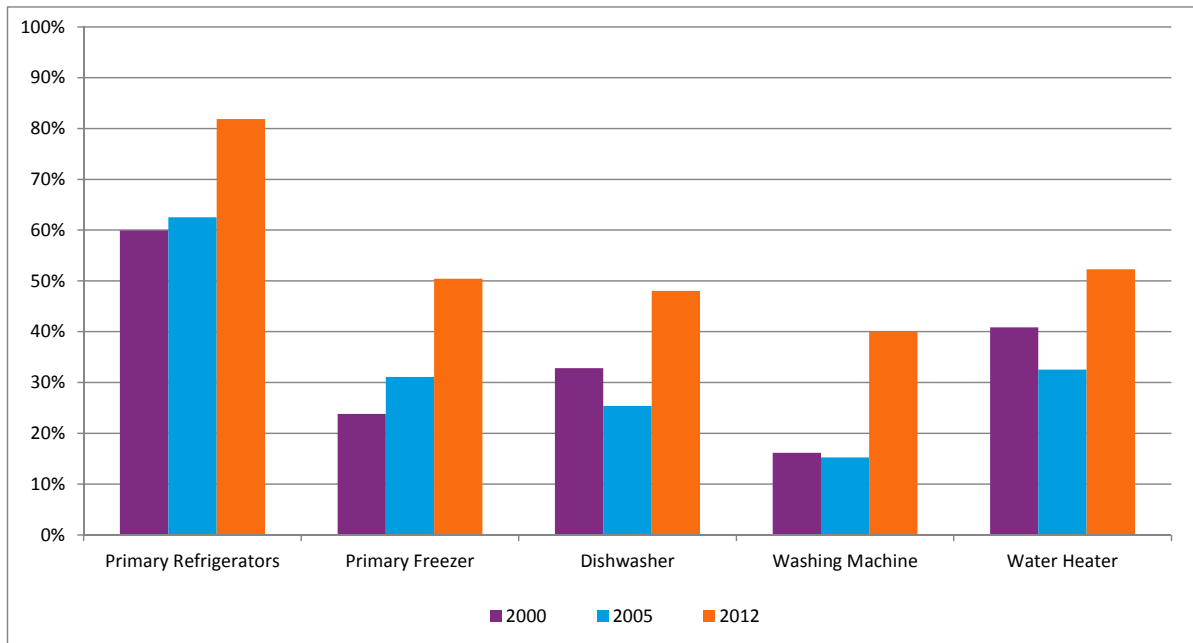
The combination of collecting data from a much larger sample and having matched a larger proportion of units to the efficiency databases resulted in more robust estimates than previous studies, with smaller error bounds. Figure 3 illustrates the significant reduction in average annual unit energy consumption (UEC) for primary and secondary refrigerators in homes, based on data collected from the three CLASS studies from 2000 to 2012. Note the decrease in magnitude of the error bounds for the 2012 study compared to the previous studies.

Figure 3: Comparison of Average Annual Unit Energy Consumption (UEC) for Primary and Secondary Refrigerators 2000-2012, using Strata Weights
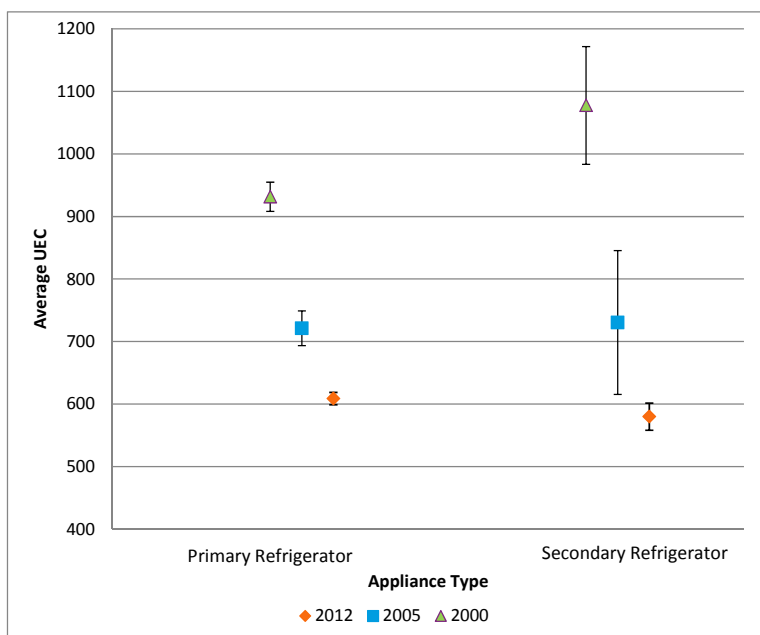
See Appendix G: Statistical Significance Testing for comparison details.

2.3 Demographics

Type of Residence

Table 2 shows the 2012 CLASS had a similar proportion of single-family, detached homes compared to the 2005 CLASS, but had a significantly higher proportion of multi-family residences in buildings of 2-4 units and significantly lower proportions of apartments in buildings with 5 or more units and mobile homes.

Table 2: Type of Residence 2000-2012, using Strata Weights

Type of Residence	2012 CLASS, Strata weights (n=1987)	2005 CLASS (n=848)	2000 CLASS (n=1258)
Single Family Detached	65%	66%	61%
Duplex/Townhouse/Rowhouse/ Apt 2-4 Units	15%	6%	9%
Apt 5+ Units	19%	24%	26%
Mobile Home	2%	3%	2%
Modular/Prefab	NA	<1%	1%
Other	NA	<1%	

See Appendix G: Statistical Significance Testing for comparison details.

Home Ownership

The 2012 CLASS had a significantly lower proportion of owner-occupied households compared to the 2005 CLASS, and a higher proportion than the 2000 CLASS, as shown in Table 3.

Table 3: Home Ownership 2000-2012, using Strata Weights

Home Ownership	2012 CLASS, Strata weights (n=1987)	2005 CLASS (n=848)	2000 CLASS (n=1258)
Population	9,986,616	9,694,996	9,202,918
Own/Buying	67%	70%	61%
Rent/Lease	32%	30%	39%

See Appendix G: Statistical Significance Testing for comparison details.

Year of Home Construction

Table 4 shows the percentage of homes by age of home. The largest proportion of the homes were constructed before 1970, across all three of the studies.

Table 4: Year of Home Construction 2000-2012, using Strata Weights

| Year of Home Construction | Percent of Homes | | |
	2012 CLASS, Strata weights (n=1987)	2005 CLASS (n=848)	2000 CLASS (n=1258)
Before 1970	41.0%	40.9%	35.4%
1970-1979	16.6%	15.9%	18.4%
1980-1989	15.1%	13.5%	16.4%
1990 - 1994	4.1%	4.7%	7.0%
1995 - 1999	3.8%	5.7%	5.8%
2000 or after	13.2%	6.4%	
Unknown	6.1%	12.9%	16.9%

See Appendix G: Statistical Significance Testing for comparison details.

Total Heated Floorspace

Table 5 shows the percentage of homes by the total heated floorspace of the homes. About one-third of the homes surveyed were between 1,000 to 1,599 square feet for the 2012 and 2005 studies. The 2012 CLASS surveyed a higher proportion of homes 2,400 square feet or more. Approximately 90% of

the households in the "Unknown" category are multi-family dwellings that could not be found in public real estate records.

Table 5: Total Heated Floorspace 2000-2012, using Strata Weights

Total Heated Floorspace	Percent of Homes		
	2012 CLASS, Strata weights (n=1987)	2005 CLASS (n=848)	2000 CLASS (n=1258)
Less than 600 sq.ft.	2.9%	4.9%	4.8%
600 to 999 sq.ft.	16.8%	17.4%	23.1%
1,000 to 1,599 sq.ft.	33.6%	32.2%	36.7%
1,600 to 1,999 sq.ft.	15.3%	19.1%	16.4%
2,000 to 2,399 sq.ft.	10.4%	11.2%	7.9%
2,400 to 2,999 sq.ft.	8.7%	6.8%	6.5%
3,000 sq. ft. or more	6.4%	4.8%	2.9%
Unknown	5.8%	3.6%	1.7%

See Appendix G: Statistical Significance Testing for comparison details.

2.4 Lighting Trends

Every lighting fixture in each residence was inventoried for the 2012 CLASS study, including all exterior lighting, to maintain consistency with the 2006-2008 Upstream Lighting Light Metering Study[9]. Each fixture may have one or more sockets either filled with lamps or empty. All fixtures and all sockets were included in the lighting inventory as part of the 2012 CLASS. A total of 1,987 residences are included in the lighting analysis.

The 2005 CLASS limited data collection of exterior lighting to the porch light and limited reporting on interior spaces to four bathrooms and five bedrooms and omitted empty sockets. The analysis presented in this section limits the 2012 CLASS data to the comparable areas of the homes as reported in the 2005 CLASS.

Number of fixtures and lamps - Overall, in the areas of the household that were included in the 2005 study, homes have approximately 30 fixtures and 46 lamps on average, significant increases compared to 23 fixtures and 41 lamps in the 2005 study. Both single family homes and apartments in buildings with 5 or more units had significantly more fixtures and correspondingly higher number of

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[9] WO13 used CLASS lighting inventory data to assess trends of socket saturation and lamp storage in households compared to the inventory results of the 2006-2008 Residential Lighting Metering Study. Results can be found in the report: DNV GL, 2014. California Residential Replacement Lamp Market Status Report – Draft Report. Upstream Lighting Program and Market Activities in California Through 2013. Prepared for the CPUC ED. CALMAC Study ID CPU0091.01.

lamps than found in the 2005 study. Table 6 presents the average number of fixtures and Table 7 presents the average number of lamps, with findings of the 2012 CLASS limited to spaces comparable to spaces of the 2005 CLASS.

Table 6: Average Number of Fixtures by Type of Residence 2005-2012, using Strata Weights

Type of Residence	2012, Strata weights, limited to 2005 CLASS spaces			2005		
	Average #	Error Bound	Sample Size	Average #	Error Bound	Sample Size
Overall	29.6	3.0	1,987	23.5	0.9	847
Single Family Detached	36.0	4.6	1,491	28.3	1.2	560
Townhouse/Rowhouse/Duplex/Triplex/ Quadplex	21.7	3.7	211	19.9	2.4	48
Apt 5+ Units	14.6	2.3	251	12.1	0.8	205
Mobile Home	21.0	13.4	1,987	19.3	3.3	24
Modular/Prefabricated	-	-	-	16.0	1.8	4
Other	-	-	-	28.9	13.1	6

See Appendix G: Statistical Significance Testing for comparison details.

Table 7: Average Number of Lamps by Type of Residence 2005-2012, using Strata Weights

Type of Residence	2012,Strata weights, limited to 2005 CLASS spaces			2005		
	Average #	Error Bound	Sample Size	Average #	Error Bound	Sample Size
Overall	46.1	4.7	1,987	40.6	1.6	847
Single Family Detached	56.8	7.3	1,491	49.6	1.8	560
Townhouse/Rowhouse/Duplex/Triplex/ Quadplex	31.9	5.4	211	32.7	4.3	48
Apt 5+ Units	21.6	3.4	251	19.5	1.3	205
Mobile Home	33.2	21.3	34	34.7	6.7	24
Modular/Prefabricated	-	-	-	23.8	3.6	4
Other	-	-	-	43.1	22.3	6

See Appendix G: Statistical Significance Testing for comparison details.

Fixture Types – Similar to the 2005 study estimates, the most common fixture types from the 2012 study are ceiling mounted and recessed fixtures. Homes have an average of 7.6 recessed fixtures (error bound = 0.4) and an average of 6.4 (error bound 0.4) ceiling mounted fixtures. The average number of recessed fixtures has nearly doubled from the previous study's average of 4.2 recessed cans (error bound = 0.6), but the average number of ceiling fixtures has remained stable (6.5, error bound=0.3 in 2005). The average number of each of the other specific types of fixtures had significantly increased except for the number of garage door fixtures, contributing to the overall

average number of fixtures having increased in the 2012 study compared to the 2005 study. The increase in the number of various fixtures also shifted the distribution of various fixture types within households. Most notably, the proportion of recessed fixtures increased and the proportion of ceiling mounted fixtures decreased, as shown in Figure 4.

Figure 4: Comparison of Proportions of Fixture Types in Households 2000-2012, using Strata Weights
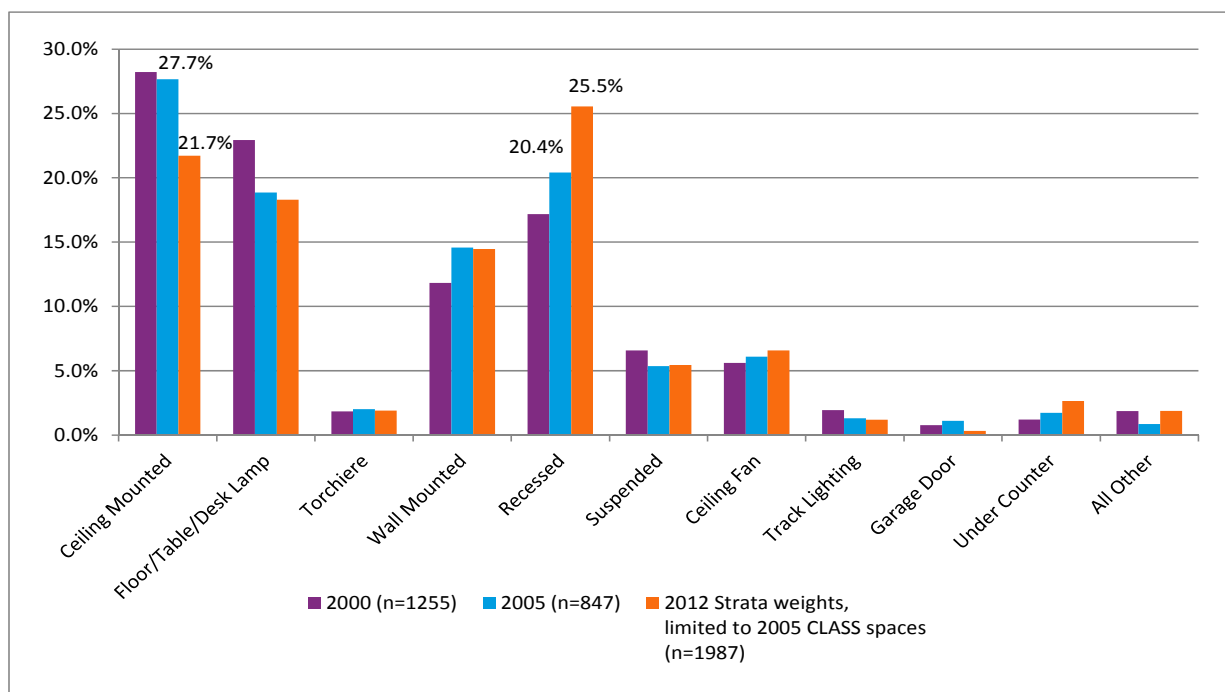
In addition to the average number of these fixtures increasing and the distribution of fixtures shifting, the saturation of homes having the various fixture types also changed. Significantly more households had torchiere fixtures, ceiling fans[10] and track lighting installed compared to the 2005 study. The proportion of homes having ceiling mounted, wall mounted, suspended or under counter fixtures was not significantly different, while the percentage of homes with garage door fixtures decreased.

Saturation of Lamp Types - The 2012 CLASS found a sharp increase in the percentage of homes that have one or more CFL installed (96%) compared to the 2005 CLASS (57%). Significant increases in the number of homes that have one or more fluorescent T8 lamps, halogens and HID lamps were also found, as shown in Table 8. Significant decreases were found in the percent of homes that had

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[10] Only ceiling fans with integrated light fixtures are included.

fluorescent T12 and incandescent lamps installed. About nine percent of homes had at least one LED installed, a presumed increase as the 2005 study did not collect information on LEDs.

Table 8: Percentages of Homes with Lamp Types 2005-2012, using Strata Weights

Lamp Type	2012 Strata weights, limited to 2005 CLASS spaces Percent of Homes (n=1,987)	Error Bound	2005 Percent of Homes (n=847)	Error Bound
Compact Fluorescent	95.9%	2.4%	56.9%	2.8%
Fluorescent T8	18.3%	2.0%	4.4%	1.2%
Fluorescent T12	59.8%	2.9%	65.0%	2.7%
Halogen	46.2%	3.6%	31.3%	2.6%
HID	1.1%	0.7%	0.1%	0.2%
Incandescent	96.7%	2.2%	99.2%	0.5%
LED	8.6%	1.8%	-	-

See Appendix G: Statistical Significance Testing for comparison details.

About 32% of fixtures contain at least one compact fluorescent lamp (error bound=2.2%), a significant increase of more than 20% from the previous CLASS report (11%, error bound=1.1%). Compact fluorescent lamps were most commonly found in fixtures located kitchens, living rooms, exterior entry areas, bedrooms and offices. The 2012 CLASS also found that LED lamps were most commonly installed in fixtures in the kitchens, living rooms, offices and exterior entries of homes surveyed. The percent of homes that have a CFL or LED installed in room types are shown in Table 9.

Table 9: Percent of Homes with CFL or LED Present by Room Types, using Strata Weights

Room Type	CFL Present	LED Present	Sample Size
Living Room	66%	3%	1909
Bedroom - 1	61%	1%	1943
Bathroom - 4	61%	1%	147
Bedroom - 4	58%	1%	471
Bedroom - 2	57%	1%	1719
Bedroom - 3	57%	2%	1211
Exterior - Entry	55%	1%	1237
Kitchen	54%	3%	1977
Office	52%	3%	834
Hallway	51%	2%	1810
Bathroom - 1	50%	1%	1981
Bathroom - 2	47%	1%	1535

Room Type	CFL Present	LED Present	Sample Size
Bathroom - 3	47%	2%	686
Other	45%	1%	304
Closet	39%	1%	1033
Laundry/Utility Room	36%	1%	1040
Garage	34%	-	1324
Dining Room	33%	1%	1288

Along with the increases in the proportions of homes and fixtures that have CFLs installed, a dramatically larger proportion of sockets are filled with a CFL, with a corresponding sharp drop in the proportion of sockets filled with incandescent lamps, as shown in Table 10. Halogens have also significantly increased as a proportion of lamps in sockets. In spite of the growth in saturation of CFLs, incandescent lamps continue to have the highest saturation of installed lamps of any lamp type (48.9%), with CFLs a distant second (28.5%) and LEDs with 1.2% saturation.

Table 10: Percentage of Sockets by Lamp Types 2005-2012, using Strata Weights

Lamp Type	2012 Strata weights, limited to 2005 CLASS spaces		2005	
	Percent of Total Lamps (n=1,987)	Error Bound	Percent of Total Lamps (n=847)	Error Bound
Compact Fluorescent	28.5%	0.4%	8.6%	0.9%
Fluorescent	11.4%	0.4%	11.7%	0.7%
Halogen	7.7%	0.3%	3.8%	1.0%
Incandescent	48.9%	0.6%	75.6%	1.3%
LED	1.2%	0.2%	-	-
Socket Empty	2.2%	0.1%	-	-

See Appendix G: Statistical Significance Testing for comparison details.

Lamp and Fixture Combinations for Specific Home Area Types- All space types had a significant increase in having at least one CFL contained in a fixture in the space. All space types also had a significant increase in saturation of recessed lighting compared to the 2005 study. Appendix A: 2012 CLASS Lighting Results Using Strata Weights contains tables for specific areas in households.

2.5 Appliance and Equipment Trends

2.5.1 Age Trends

The 2005 CLASS results found a trend of average age decreasing and efficiency increasing for appliances and equipment. The 2012 CLASS results do not show as clear of a trend for appliance ages, as average age has significantly increased for some equipment, such as refrigerators, water heaters, washers and central cooling systems, but decreased for others such as freezers, central and space heating and space cooling systems. Figure 5 and Figure 6 show the average age for major appliances and HVAC equipment, respectively, across the three studies.

Figure 5: Comparison of Average Age for Major Appliances 2000-2012, using Strata Weights

	Primary Refrigerators	Secondary Refrigerators	Freezers	Hot Water Heaters	Washers	Dryers	Dishwashers
2000	8.5	12.8	13.6	8.8	7.4	8.4	9.0
2005	6.6	9.0	11.7	7.2	6.7	7.6	7.4
2012	8.4	10.0	10.4	8.0	7.1	6.9	7.6
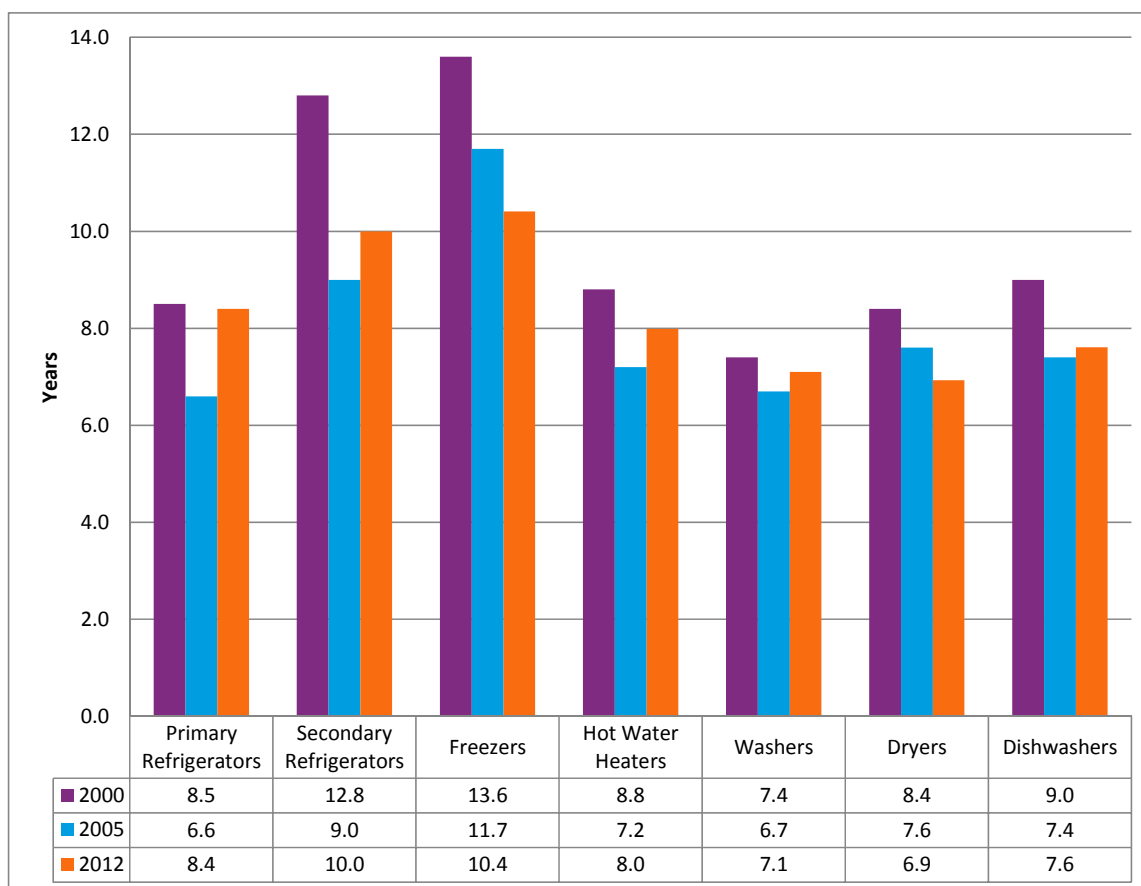
See Appendix G: Statistical Significance Testing for comparison details.

Figure 6: Comparison of HVAC Average Age 2000-2012, using Strata Weights

	Furnace - Central	Furnace - Space	HP- Central	A/C - Central	A/C - Space
■ 2000	20.2	31.3	13.2	12.3	13.0
■ 2005	17.0	29.0	12.2	10.8	11.9
■ 2012	15.5	11.9	15.3	15.1	9.1
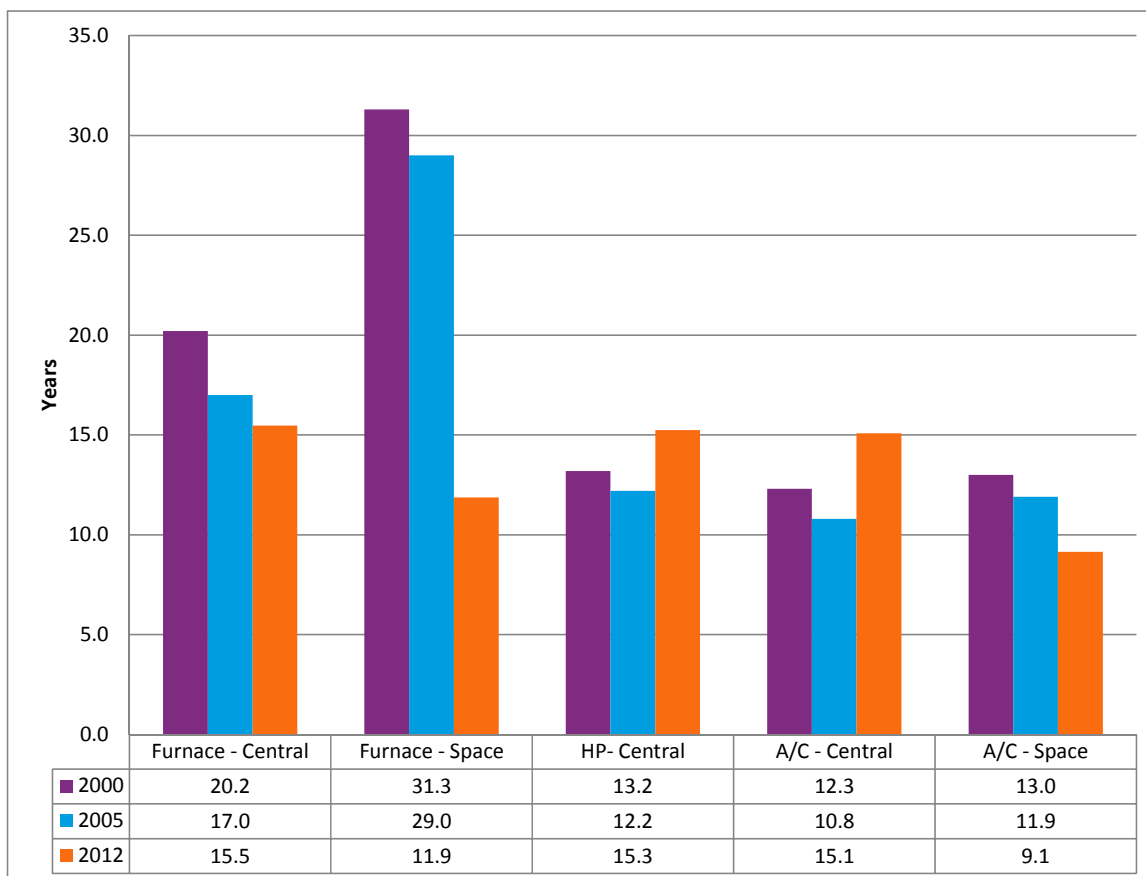
See Appendix G: Statistical Significance Testing for comparison details.

2.5.2 Refrigerator and Stand-alone Freezer Trends

Number of Refrigerators- Significantly more households have multiple refrigerators compared to the 2005 CLASS study. Twenty-five percent of households have a second refrigerator and approximately 5% of homes have a third refrigerator, up from 19% and 1%, respectively, in the 2005 study.

Primary Refrigerator Type -The type of refrigerators found in homes has shifted away from the standard top-freezer style. The proportions of homes having a freezer on bottom and built-in refrigerator styles have both significantly increased since 2005. The percentage of bottom-mounted freezer type refrigerators saw a near 10% increase in sampled homes from 2005 to 2012.

Primary Refrigerator Age —The average age of refrigerators from the 2012 study is 8.4 years, which is significantly older than the average of 6.6 years from 2005. The 2005 CLASS study found 45% of primary refrigerators were manufactured between 1990 and 1999, while this report finds only 17% of primary refrigerators were manufactured in that date range. This is a strong indication that that older

refrigerators have been removed from the market since the previous CLASS study was conducted. No refrigerators were found manufactured prior to 1985.

Primary Refrigerator Size - The average manufacturer reported size for all refrigerators obtained from the efficiency database is 21.5 cubic feet, significantly larger than the average of 21.0 from the 2005 study. Side by side and top freezer with ice and bottom freezer styles are significantly larger than in 2005.

Primary Refrigerator Nameplate Annual Unit Energy Consumption (UEC) – The overall average annual nameplate UEC for primary refrigerators is 609 kWh/year, a significant improvement of about 16% over the findings of the 2005 CLASS report, where the average nameplate UEC was 721 kWh/year. These encouraging results are likely due to new federal energy standards and continued utility rebate and recycling programs. Figure 7 shows the average estimated annual energy consumed (UEC) with the error bars for primary refrigerators for the various size range categories. The improvement in efficiency is significant for all size categories.

Figure 7: Comparison of Primary Refrigerator Annual Unit Energy Consumption (UEC) 2000-2012, using Strata Weights
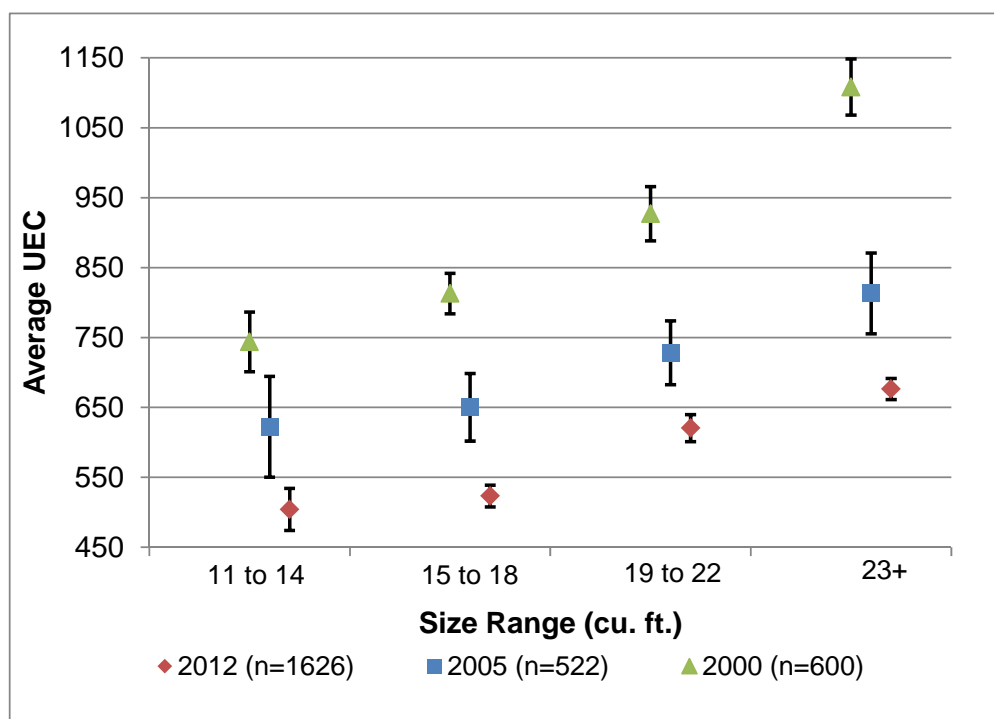
See Appendix G: Statistical Significance Testing for comparison details.

Secondary Refrigerator Age – The average age of secondary refrigerators from the 2012 study is 9.4 years, which is significantly newer than the average of 10.8 years from 2005.

Secondary Refrigerator Size - The average manufacturer reported size for all secondary refrigerators obtained from the efficiency database is 16.8 cubic feet, which is significantly smaller than the average of 17.8 from the 2005 study.

Secondary Refrigerator Nameplate Annual Unit Energy Consumption (UEC) – The average annual overall nameplate UEC is 579.8 kWh/year for secondary refrigerators, significantly down from 731 kWh/year in the 2005 study and 1,034 kWh/year in the 2000 study. Figure 8 presents the average UEC for secondary refrigerators for the various size categories. All size categories except the smallest (1 to 10 cu. Ft.) are significantly more efficient.

Figure 8: Comparison of Secondary Refrigerator Annual Unit Energy Consumption (UEC) 2000-2012, using Strata Weights
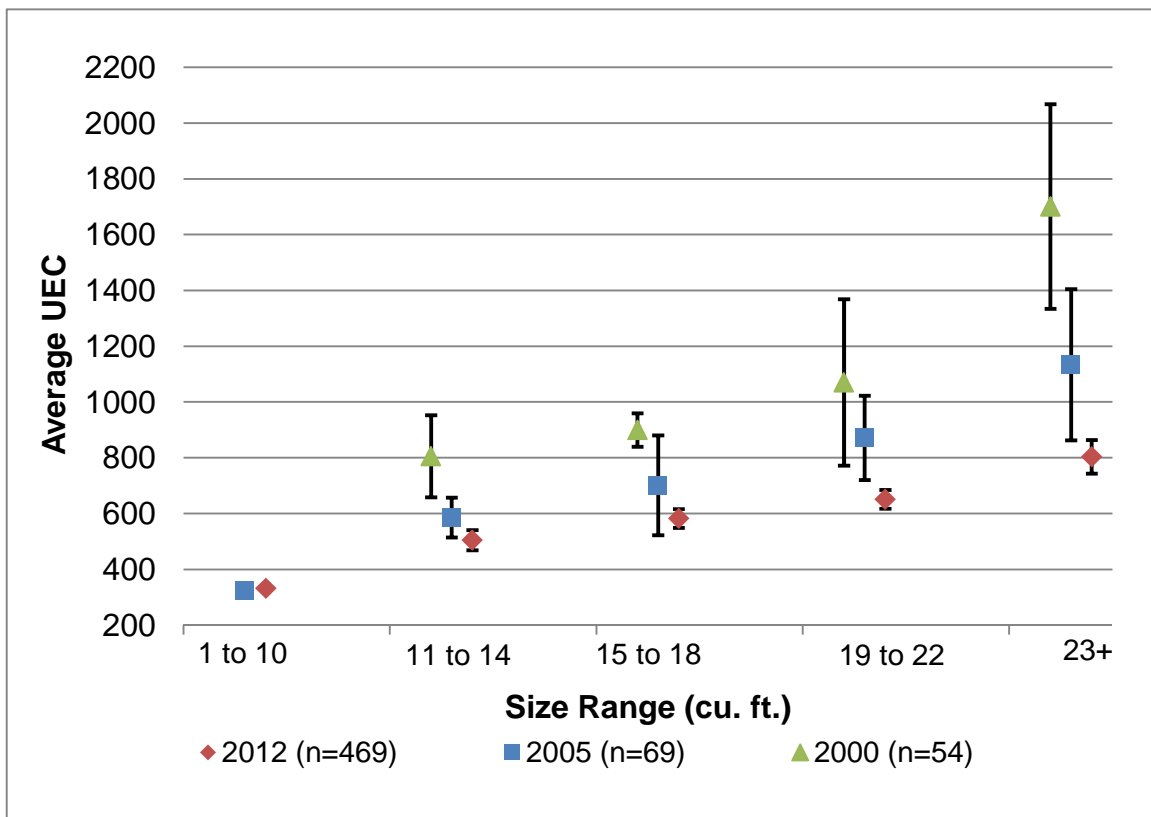
See Appendix G: Statistical Significance Testing for comparison details.

Self-Standing Freezers- Approximately 17% of all homes sampled have one self-standing freezer, which is significantly lower than the 19% from the 2005 study. Figure 9 presents the average annual UEC for stand-alone freezers for the various types. The average UECs for the chest and upright style freezers from the 2012 study are not significantly different from the 2005 study. The 2000 CLASS did not calculate separate average UECs for chest and upright freezers.

**Figure 9: Comparison of Stand-alone Freezer
Annual Unit Energy Consumption (UEC) 2000-2012, using Strata Weights**
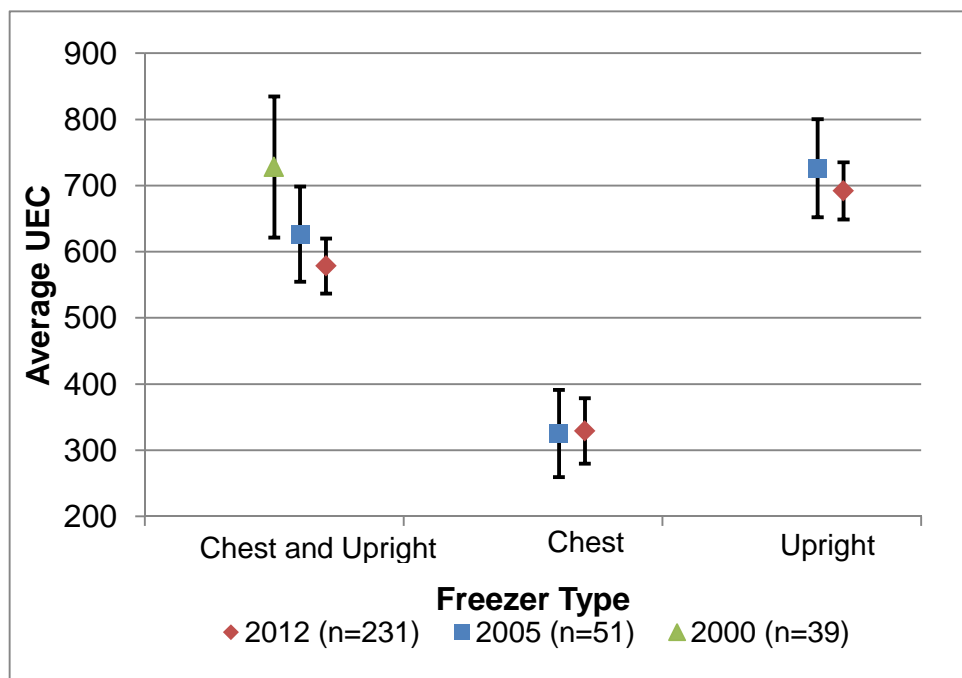
See Appendix G: Statistical Significance Testing for comparison details.

2.5.3 Heating System Trends

Almost all homes (98.2%) have a heating system. A large percentage of homes have one heating system, totaling 62.9% of all homes.

Primary Heating System Age –The estimated ages were obtained from a combination of the dates that were obtained from the manufacturer information and the surveyor estimates during the on-site visit. Overall, all types of primary heating systems were on average 15.2 years old, which is significantly newer than the overall average of 16.7 found in 2005..

Primary Heating System Efficiency –The annual fuel utilization efficiency (AFUE) levels for both central and space heating systems are significantly higher than the levels from the 2005 study. Figure 10 shows the efficiency for AFUE rated heating equipment. Split forced air heating systems are

significantly more efficient, with a higher AFUE than in 2005. Figure 11 illustrates the efficiency for various types of central heating systems.

Figure 10: Comparison of Central and Space Heating System Annual Fuel Utilization Efficiency (AFUE) 2000-2012, using Strata Weights

	Furnace - Central	Furnace - Space
2000 (n=196)	78.7	69.3
2005 (n=246)	80.6	72.2
2012 (n=1067)	81.0	73.2
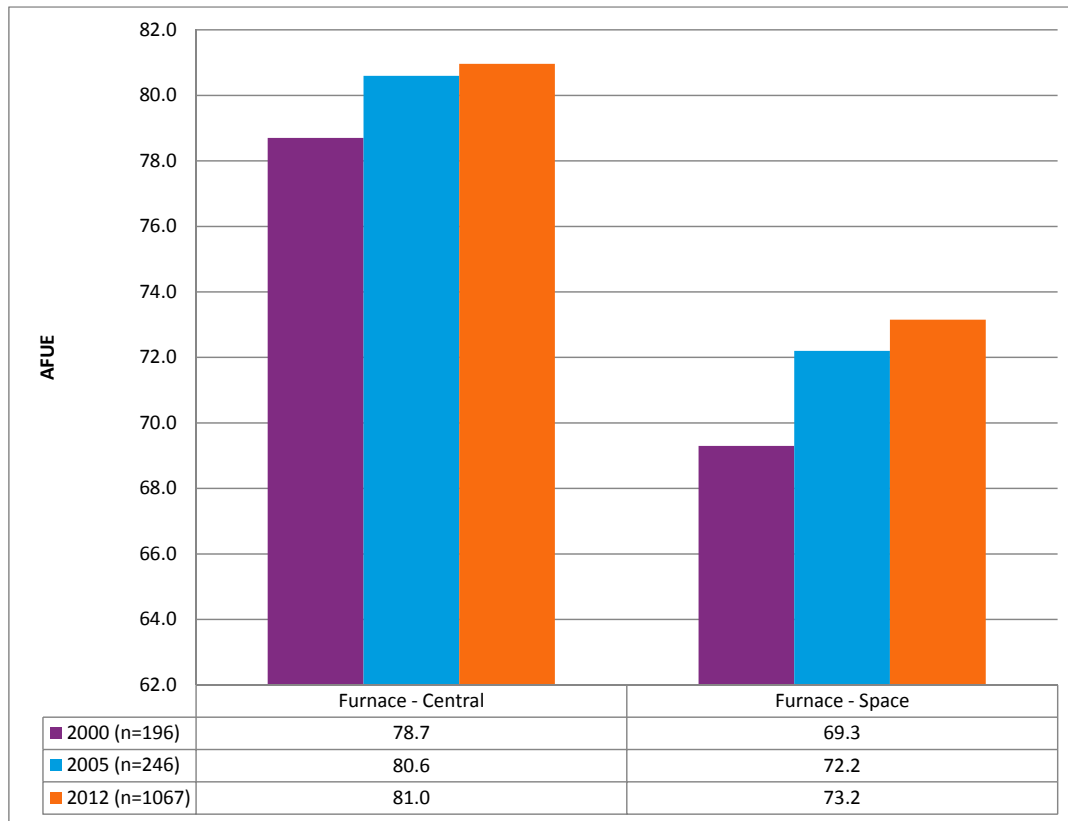
See Appendix G: Statistical Significance Testing for comparison details.

**Figure 11: Comparison of Central Heating System
Annual Fuel Utilization Efficiency (AFUE) 2000-2012, using Strata Weights**
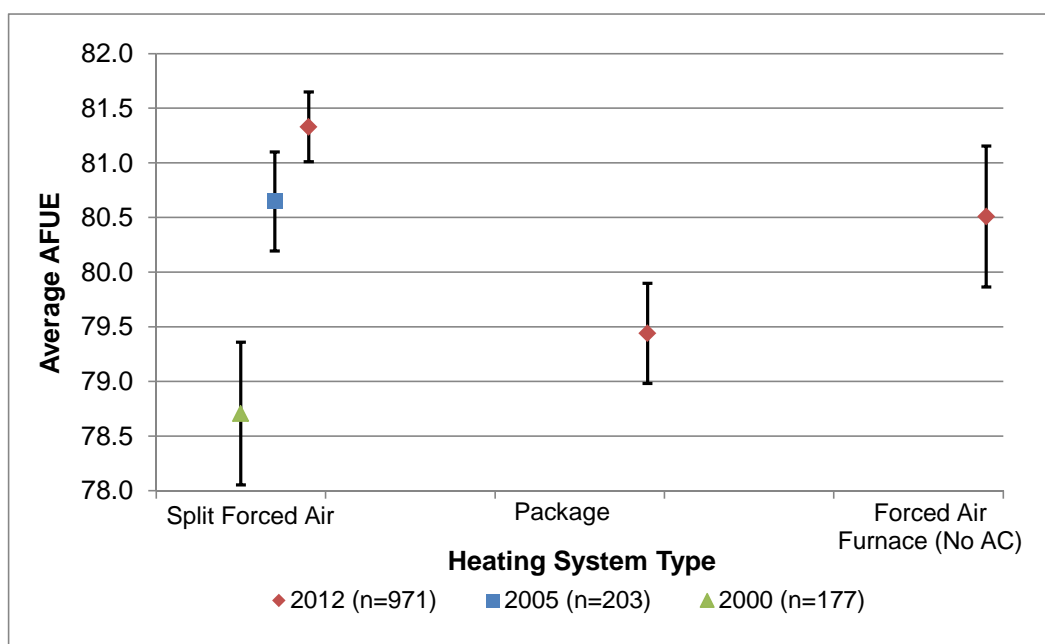
See Appendix G: Statistical Significance Testing for comparison details.

2.5.4 Cooling System Trends

Cooling equipment was found in 65.9% of all homes, with 52.6% having central systems and 13.3% having space systems. These proportions are significantly higher than the 53.3% of all homes found to have cooling systems in 2005, with 45.6% having central systems and 7.7% having space systems.

Cooling System Age – The average central air conditioning system is 15.1 years old, a significant increase from 10.8 in the previous study. The average space air conditioning system is 9.1 years old, significantly newer compared to the previous study which estimated the average age to be 11.9 years old.

Cooling System Efficiency – The largest proportion of all central system air conditioners are in the 10 to 11.99 seasonal energy efficiency ratio (SEER) range, accounting for 42.5% of central systems with a 3.2% error bound. Similarly, 95.3% of all types of space cooling systems are in the 9 to 10.99 energy efficiency ratio (EER) range. No space cooling systems were found with EER of less than 6 or higher than 12. Figure 12 provides the average SEER rating for central cooling equipment and shows a significant improvement in efficiency for the 2012 study over the 2005 study.

Figure 12: Comparison of Seasonal Energy Efficiency Ratios (SEER) for Central Cooling Equipment 2000-2012, using Strata Weights

	HP- Central	A/C - Central
■ 2000	9.5	9.5
■ 2005	10.8	10.3
■ 2012	12.2	11.3
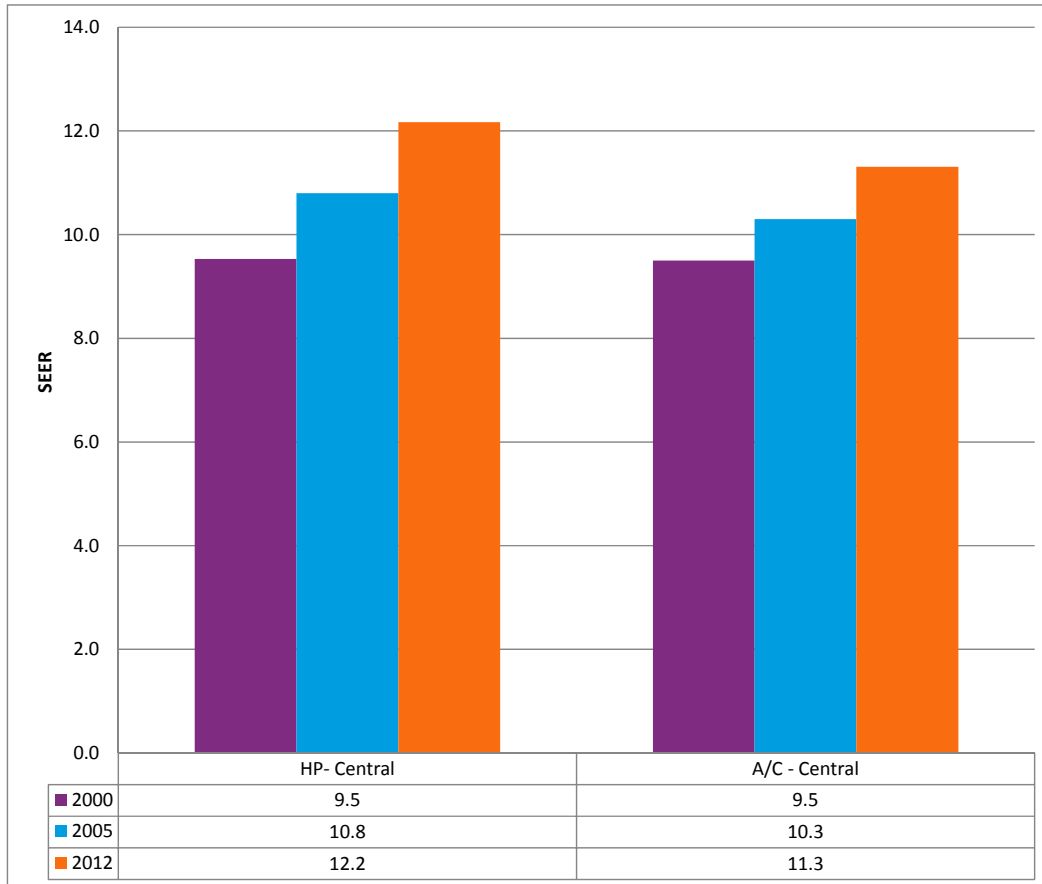
See Appendix G: Statistical Significance Testing for comparison details.

Figure 13 presents the average SEER rating with error bounds for central cooling systems by size categories. The SEER rating has significantly increased in the 2012 study for all size types, compared to the 2005 study.

**Figure 13: Comparison of Central Cooling System
Seasonal Energy Efficiency Ratios (SEER) 2000-2012, using Strata Weights**
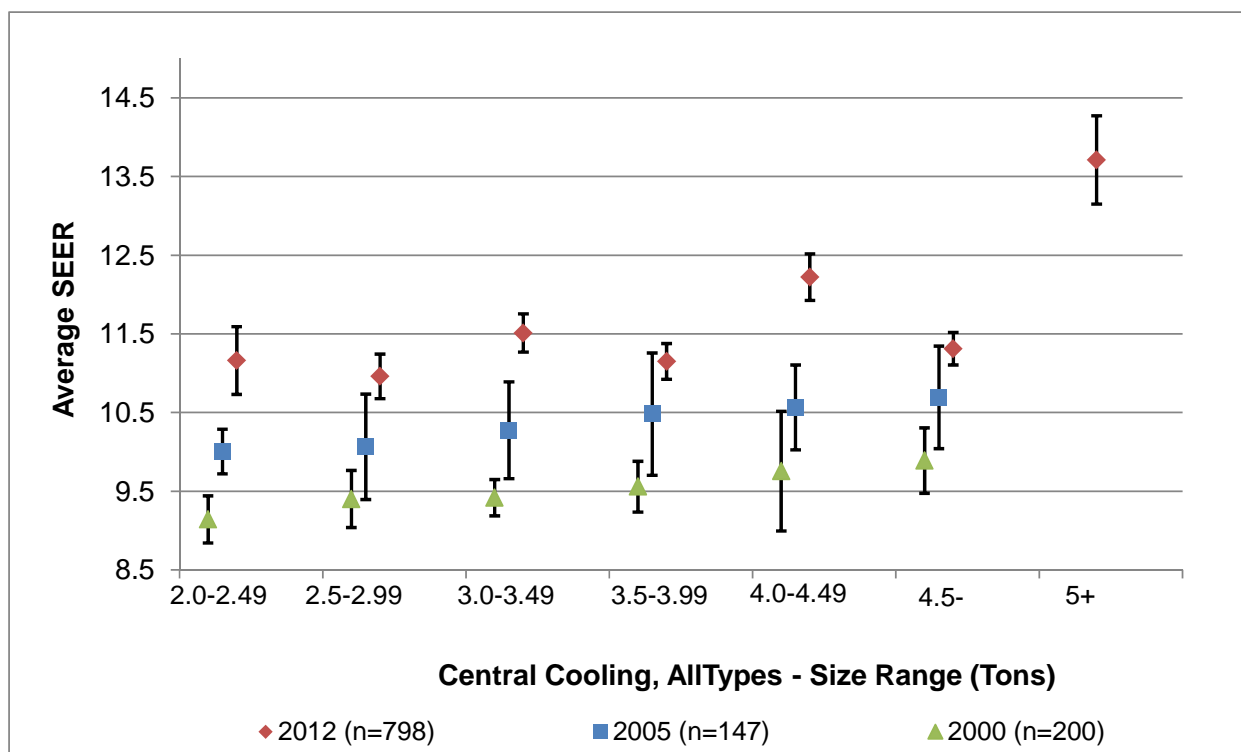
See Appendix G: Statistical Significance Testing for comparison details.

2.5.5 Water Heater Trends

Water Heater Type - The heavy majority (83%) of water heaters currently in homes are storage type water heaters, a significant decrease compared to the 2005 study, but there has been a significant increase of 3.3% in the percentage of instantaneous water heaters.

Water Heater Fuel Type - The large majority of water heaters are gas, either natural or propane, totaling 82% of all water heaters found. About 6% of the water heaters are electric, while fuel type is not known for 12%. Proportions of homes with gas-fueled and solar with electric back-up increased significantly over the 2005 study.

Water Heater Size - The average size of all types of water heaters is 43.5 gallons, significantly up from the 2005 study which found an average size of 42.5 gallons.

Water Heater Age - The average age of all water heaters for which an age was obtained is 8.0 years old, significantly older than the average age of all water heaters of 7.2 years old found in the 2005 study.

Water Heater Efficiency- The average energy factor for the popular 40 gallon gas fired water heater is 0.6, which is slightly above the average of 0.59 from the National Appliance Energy Conservation Act Standards (NAECA) implemented in 2004. The average energy factors for electric models of the two most popular sizes (40 and 50 gallon) are also found to be slightly above standard. The average energy factor from efficiency database-matched gas units is 0.6 while the average energy factor for all electric units is 0.9. Figure 14 presents the average energy factor for the most common residential water heater types for the three CLASS studies. All four water heater types have significantly improved in efficiency levels compared to the 2005 study.

Figure 14: Comparison of Storage Water Heater Energy Factor 2000-2012, using Strata Weights
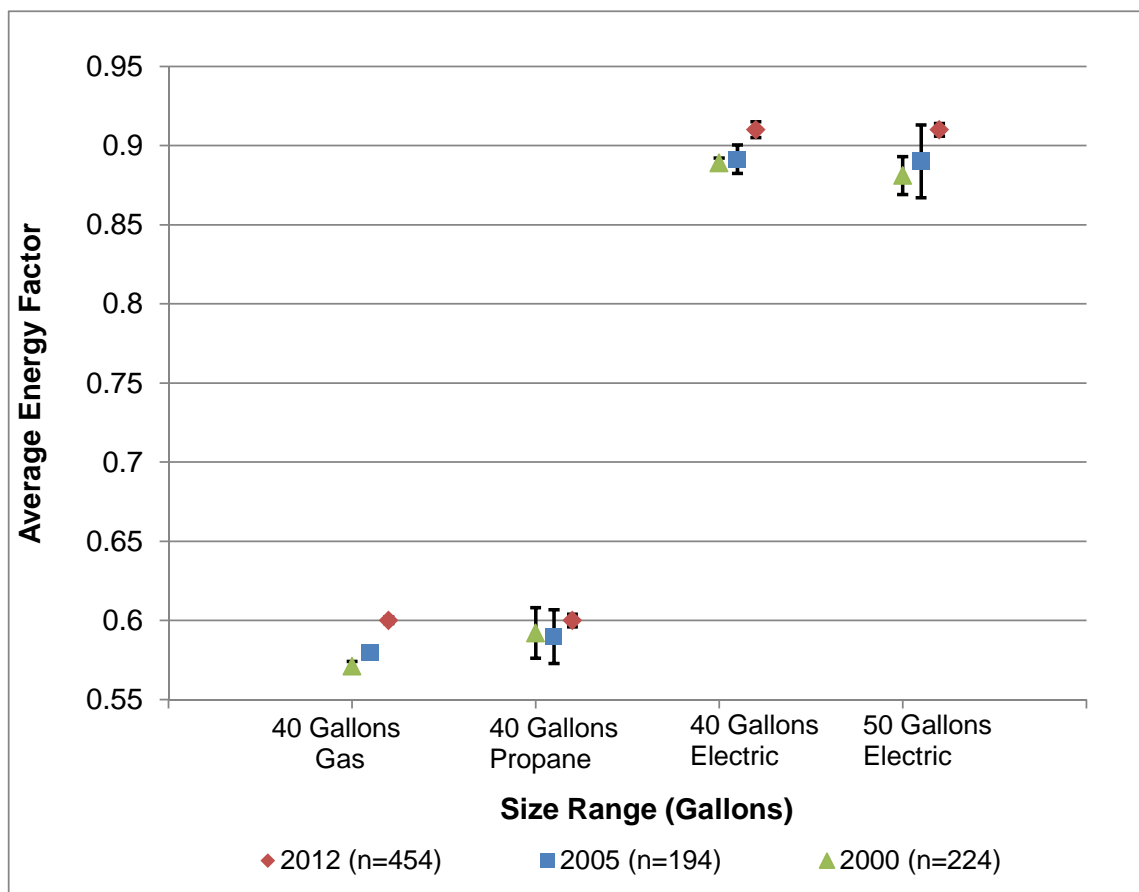
See Appendix G: Statistical Significance Testing for comparison details.

2.5.6 Clothes Washer and Dryer Trends

The proportion of homes with a clothes washer significantly decreased by 1% from 2005; it is now estimated that 81% of all homes have a clothes washer.

Clothes Washer Type – Approximately 30% of all washers found were horizontal axis washing machines; this is a significant increase from 9% in the previous 2005 study.

Clothes Washer Age-- The average age of clothes washers is 7.1 years old, significantly older compared to 2005 when the average age was 6.7 years.

Clothes Washer Efficiency – In 2004 federal standards switched from rating clothes washer efficiencies from Energy Factor (EF) units to Modified Energy Factor (MEF) units. The change was made due to differences in the amount of water extracted from the clothing between different models. The MEF accounts for these differences, which have an impact on the energy consumption of the clothes dryer. The efficiency databases used for the 2005 study to determine model efficiency only had MEF for a very limited number of horizontal-axis washing machines; therefore we compare the efficiency in terms of EF. The average EF for standard washing machines is 2.7, significantly higher compared to the 2005 finding of 1.22. Horizontal-axes washers and stacked washer/dryer combinations also have significantly higher average EF ratings than the ratings for washers in 2005.

Clothes Dryer Fuel Type-- Clothes dryer fuel saturation findings indicate that 62% are gas, 35% are electric and 3% are propane. This is a corresponding significant increase of natural gas dryers and a decrease in electric dryers by 5% from the previous 2005 study.

Clothes Dryer Age-- The average age of clothes dryers is 6.9 years old, significantly newer compared to 2005 when the average age was 7.6 years.

2.5.7 Dishwasher Trends

Approximately 74% of all homes have a dishwasher, which is significantly higher than the 69% of homes sampled in the previous 2005 study.

Dishwasher Age – The average age of dishwashers is 7.6 years old, statistically unchanged from 2005. The largest proportion of dishwashers (35.4%) was reported to have been manufactured between 2006 and 2009, and about 85% have been manufactured within the last 10 years.

Dishwasher Efficiency- The average EF is 0.61, significantly higher than 0.50 in 2005. The majority of dishwashers fall within the range of 0.580 to 0.775 EF, containing over 67% of the dishwashers. No dishwashers with energy factors less than 0.275 were found. . Figure 15 shows the average energy factor for washers and dishwashers for the three CLASS studies.

**Figure 15: Comparison of Energy Factor Ratings
for Clothes Washers and Dishwashers 2000-2012, using Strata Weights**

	Washer - Standard	Washer - Horizontal	Dishwashers
2000	1.31	3.95	0.48
2005	1.22	4.13	0.50
2012	2.73	7.31	0.61
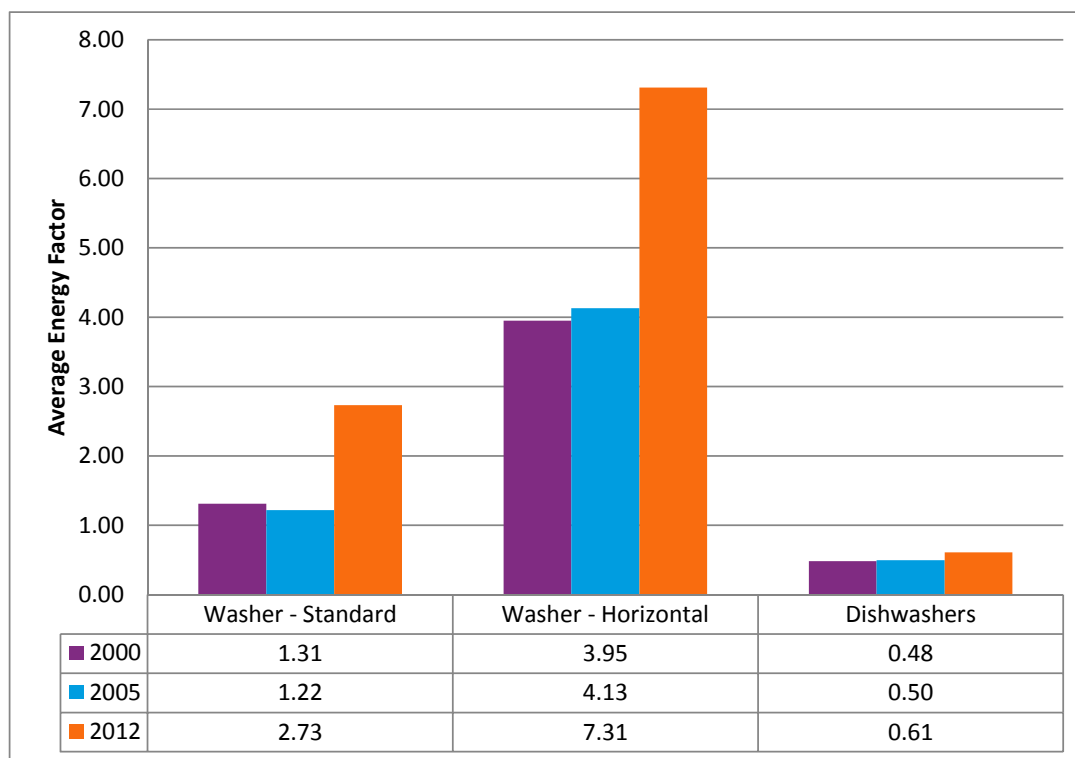
See Appendix G: Statistical Significance Testing for comparison details.

2.5.8 Building Envelope Trends

When compared to the 2005 study, the market share of vinyl window frames has significantly increased by 25% from 20% in 2005 to 45% in 2012. The largest proportion of window frame types found in homes continues to be metal, constituting 46% of the homes but has decreased by 17%. The proportion of homes having wood frame windows has also significantly decreased by 3 %.

Insulation data was collected with some difficulty during the site visits, when the attic was inaccessible due to being located in another apartment unit, blocked by furniture, etc. The average R-Value among all homes with an estimated or verified R-Value for attic insulation is 20.2, significantly up from the 2005 report at 18.2. Approximately 72% of the homes have some type of wall insulation, a significant increase from the 2005 study, which found wall insulation in two-thirds of homes.

2.5.9 Spa and Pool Equipment Trends

During the on-site visits for the 2012 study, 11% of homes were found to have spas and 10% of homes had pools. These proportions of homes are both significant increases from the 2005 study, which found that 6% and 7% of homes had spas and pools, respectively.

3 Study Methodology

3.1 Study Overview

The goal of the 2012 California Lighting and Appliance Saturation Study (CLASS) was to gather information about residential building characteristics in addition to the presence, efficiency and usage of energy-consuming devices found in California households. In addition to updating the information developed from the 2005 and 2000 CLASS studies, the 2012 CLASS expands the body of knowledge acquired through the Energy Commission's 2009 Residential Appliance Saturation Study (RASS), a survey collecting self-reported information from residents, with sample sizes an order of magnitude larger than the CLASS.

The overarching goal for the CLASS studies is to provide an accurate baseline in order to understand the future energy savings potential and past accomplishments in the residential sector. The results of the 2012 CLASS are useful to both the Energy Division's (ED) evaluation of residential programs and to the portfolio planning of Investor Owned Utility (IOU) programs that require accurate baseline information.

The primary objectives for the 2012 CLASS included:

1. Complete 2000 on-site surveys of single-family, multi-family and mobile home residences in the service territories of Pacific Gas and Electric (PG&E), San Diego Gas and Electric (SDG&E), Southern California Edison (SCE) and Southern California Gas (SCG).

2. Develop a database of residential building characteristics, appliance and lighting saturations and efficiency levels by merging the information obtained from the on-site surveys with information from other sources and expanding the sample to represent the residential individually-metered population.

3. Develop a webtool to allow users to construct queries of the database.

4. Analyze the 2012 CLASS data to compare to results from the previous CLASS studies to identify trends in saturations and efficiencies.

Key outputs of the study include:

- Distribution of building characteristics such as square footage, room types and window types

- Distribution of type, efficiency, size and age of equipment such as ACs, refrigerators and furnaces

- Distribution of installed watts for lighting by room type and fixture type

- Distribution of household demographic characteristics such as number and ages of occupants

In addition to the direct outputs of the study, several other projects utilized information and resources from the CLASS study for their work as part of the 2010-2012 CPUC Evaluation, Measurement and Verification effort:

- **WO13 Residential Replacement Lamp Market Status Report**[11]: WO13 used CLASS lighting inventory data to assess trends of socket saturation and lamp storage in households compared to the data collected through the 2006-2008 Residential Lighting Metering Study[12].

- **WO17 Measure Cost Study**[13]: WO32 data mined manufacturer info to provide shares to the measure cost study (WO17), this included furnaces, air conditioners and heat pumps. Data was summarized for newer installations and separated into standard efficiency and high efficiency. Manufacturer name and % of units (count) and % of installed capacity were provided to WO17. This information was provided before CLASS re-weighting to Census in order to meet the WO17 timeline.

- **WO28 Upstream and Residential Lighting Impact Evaluation**[14]: CLASS data was used to update key gross savings parameters in the WO028 impact evaluation. Saturation changes between the 2006-2008 residential lighting metering study and CLASS residential lighting inventory data were calculated. The hours-of-use estimates and peak coincidence factors were updated by applying the 2006-2008 model to the CLASS inventory data. The delta watts baselines were calculated using the CLASS inventory data. Inputs from CLASS were also used in the installation rate analysis.

- **WO32 HVAC Impact Evaluation**[15] and **WO54 HVAC Market Effects**[16]: WO32 used CLASS sites to serve as a sample frame for new HVAC installations for a quality installation baseline. The on-site information was reported to both WO32 and WO54 HVAC market

[11] DNV GL, 2014. California Residential Replacement Lamp Market Status Report – Draft Report. Upstream Lighting Program and Market Activities in California Through 2013. Prepared for the CPUC ED. CALMAC Study ID CPU0091.01.

[12] KEMA, Inc. and Cadmus Group, 2010. Final Evaluation Report: Upstream Lighting Program. Prepared for the CPUC. CALMAC Study ID CPU0015.

[13] Itron,2014. WO17: 2010-2012 WO017 Ex Ante Measure Cost Study Final Report. Prepared for the CPUC ED. CALMAC Study ID CPU0079.01.

[14] DNV GL, 2014. WO28: California Upstream and Residential lighting Impact evaluation – Draft Final Report Prepared for the CPUC ED. Expected Q4 2014.

[15] DNV GL, 2014. WO32: HVAC Impact Evaluation – Draft Final Report. Prepared for the CPUC ED. August 27, 2014. Final report expected Q4 2014.

[16] Nexus Market Research, 2014. Baseline Characterization Market Effects Study of Investor-Owned Utility Residential and Small Commercial HVAC Quality Installation and Quality Improvement Programs in California (Work Order 054)– Draft Final Report. Prepared for the CPUC ED. August 28, 2014. Final report expected Q4 2014.

effects. Older installations were used as a sample frame for non-participants of quality maintenance.

- **WO35 Appliance Recycling Impact Evaluation**[17]: WO35 used CLASS site visits to identify qualifying units and to recruit participants for long-term metering of refrigerators and freezers. Long-term metering data was used to update expansion process calculating annual unit energy consumption from short-term metered data of program participant units. WO35 also used CLASS data to help define typical unit characteristics installed in homes to help in assessing the viability of program participant recycled units in the secondary market.

3.2 Approach

To achieve the study objectives, the following steps were taken:

- Developed a sample of homes stratified along variables of interest
- Recruited participants and conducted on-site inspections at a sample of homes in California to characterize:
  - o residential building configurations (for example, conditioned square footage, room types) and specific construction components (for example, attic insulation)
  - o installed appliances and energy-consuming products including electric and gas-powered products with high unit energy consumption (UEC) and high on-peak demand
  - o lighting products installed by location in home and in storage
  - o demographics of household
- Merged on-site data with information from other database sources to identify attributes specific to the model of equipment observed
- Expanded data from sample to represent residential individually-metered population
- Conduct tests to identify statistically significant differences in the 2012 CLASS results compared to the 2005 CLASS results

Each of these steps is described in greater detail in the sections below.

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[17] DNV GL, 2014. WO35: Appliance Recycling Impact Evaluation – Draft Final Report. Prepared for the CPUC ED. CALMAC Study ID CPU0092.01.

3.2.1 Sample Design

The approved research plan established a target of completing 2000 on-site surveys of households across the service territories of the IOUs. The sample frame comprised 2010 billing data for residential accounts submitted by the electric IOUs.

The previous (2005) CLASS study utilized a sample design with stratification by rate classes known as "long rates" that contained information such as baseline territory, low income status and electric heat. By stratifying along these older rate classes, the sample was implicitly stratified along the attributes contained in the rates.

The current IOU customer information systems (CIS) have some of this information contained in separate variables, so the individual variables were included separately into the sample design to include this information. The stratification for the 2012 CLASS consisted of 42 strata defined by electric utility, climate zone group, participation in a low-income rate program and the daily kWh.

- **Electric utility**: PG&E and SCE were each allocated 40 percent of the sample, with the remaining 20 percent allocated to SDG&E. The 40/40/20 allocation method improved precision for SDG&E, while maintaining a level of precision for PG&E and SCE similar to a proportional allocation by number of customers.

- **Climate zone group**: DNV GL analyzed the cooling degree days (CDD) associated with the 2009 California Residential Appliance Saturation Survey (RASS) to aggregate Title 24 climate zones into three climate zone groups:

    o Mild climate zone group, consisting of the eight T24 climate zones with up to and including 470 Cooling Degree Days (CDD): 1 through 7 and 16.

    o Inland climate zone group, consisting of the seven T24 climate zones with between 720 and 1,930, inclusive, CDDs: 8 through 14.

    o Desert climate zone group, consisting of one T24 climate zone that has 4,015 CDDs: 15. This climate zone only exists within the SCE territory.

- **CARE/FERA[18] status**: The Energy Division and the IOUs expressed interest in obtaining a representation of customers that participate in CARE and FERA programs. The sample stratification incorporated the CARE/FERA status by coding utility customers that participated in CARE and/or FERA in 2010 as Yes and coding all other customers as No.

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[18] CARE, the California Alternate Rates for Energy program, provides a monthly discount on energy bills for income-qualified households and housing facilities. Qualifications are based on the number of persons living in the home and the total annual household income. FERA, the Family Electric Rate Assistance program, provides a monthly discount on electric bills for income-qualified households of three or more persons.

- **Daily kWh:** For each customer, DNV GL summed all of the 2010 kWh and divided by the sum of the number of days in 2010. This produced average daily kWh for each customer that can be compared to other customers even if a customer does not have all of the billing months available in 2010[19]. Within each stratum identified by the variables described above, DNV GL: (a) sorted customers by their average daily consumption, (b) calculated the total average daily consumption in the stratum, and (c) calculated the individual daily average kWh cutoff points that would place approximately one third of the energy in three usage strata within each stratum. These cutoff points define the daily average kWh strata. As the daily usage alone does not distinguish between households with varying characteristics such as presence of air conditioning, type of fuel used for space and hot water heating, amount of heated floorspace, each stratum most likely comprises diverse groups of households.

A sample of 2000 sites was drawn and designated the primary sample. Replacements for the primary sample were selected based on characteristics beyond the sample stratification variables. For example, the sample design was based on utility, climate zone group, CARE/FERA and level of consumption, and the primary sample was randomly selected within each stratum. Replacements for each of the primary sample sites were determined by those four variables and, in addition, were required to be in the same zip code and to have a level of consumption within 5% of the primary sample site they replaced. If replacements were not available that matched this criteria, the zip code was expanded to additional zip code areas. This strategy helped to ensure the replacement sites were similar in the known characteristics to the primary sample.

3.2.2 Sampling Plan

Using the previously described stratification variables, the resulting target sample for each of 42 strata are shown in Table 11.

Table 11: Sample Frame with Strata and Target Sample

Stratum	1 Electric IOU	2 Climate Zone Group	3 CARE and/or FERA	4 Daily Usage Range, kWh	Electric Customer Accounts		
					Number in Sample Frame	Number in Target Sample	Sub-total Target Sample by IOU
1				≤ 20.9	939,212	82	
2	PGE	Inland	No	≤ 33.0	388,491	84	800
3				> 33.0	224,254	84	

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[19] DNV GL recognizes that this is an imperfect way of comparing consumption across all customers. For example, if a customer has only the summer months available, it is likely to have a higher daily average than if the only months available are in the winter. However, in the absence of complete annual consumption for some customers, daily average kWh provides a better way to compare consumption among customers than total annual usage.

Stratum	1 Electric IOU	2 Climate Zone Group	3 CARE and/or FERA	4 Daily Usage Range, kWh	Number in Sample Frame	Number in Target Sample	Sub-total Target Sample by IOU
4			Yes	≤ 20.6	467,446	49	
5			Yes	≤ 32.7	232,332	49	
6			Yes	> 32.7	123,785	50	
7		Mild	No	≤ 14.9	1,533,933	98	
8			No	≤ 25.4	627,322	100	
9			No	> 25.4	304,362	100	
10			Yes	≤ 15.2	465,218	34	
11			Yes	≤ 28.0	209,521	35	
12			Yes	> 28.0	75,015	35	
13	SCE	Desert	No	≤ 27.1	79,399	9	801
14			No	≤ 48.1	26,808	9	
15			No	> 48.1	12,976	9	
16			Yes	≤ 24.2	24,353	3	
17			Yes	≤ 36.9	12,295	3	
18			Yes	> 36.9	7,600	4	
19		Inland	No	≤ 18.2	1,612,167	134	
20			No	≤ 29.7	640,260	135	
21			No	> 29.7	352,762	135	
22			Yes	≤ 15.6	800,106	71	
23			Yes	≤ 24.8	400,663	71	
24			Yes	> 24.8	234,996	72	
25		Mild	No	≤ 14.8	575,692	39	
26			No	≤ 25.5	228,303	40	
27			No	> 25.5	112,420	40	
28			Yes	≤ 12.5	126,138	9	
29			Yes	≤ 20.5	62,214	9	
30			Yes	> 20.5	34,922	9	
31	SDGE	Inland	No	≤ 18.4	219,329	36	399
32			No	≤ 31.1	88,816	37	
33			No	> 31.1	47,423	37	
34			Yes	≤ 14.8	63,893	10	
35			Yes	≤ 25.2	32,483	11	
36			Yes	> 25.2	16,766	11	
37		Mild	No	≤ 13.5	565,791	67	
38			No	≤ 23.5	221,662	68	
39			No	> 23.5	110,076	68	
40			Yes	≤ 11.5	143,281	18	
41			Yes	≤ 18.9	72,179	18	
42			Yes	> 18.9	39,739	18	
TOTAL					12,556,403	2,000	2,000

3.2.3 Final Sample

Once the on-site visits were completed, each site in a given stratum was given a corresponding case weight defined to be the number of sites in the population that the site is thought to represent. The following formula defines the stratum weight to be the ratio of the number of sites in the population in that stratum to the number of sites in the sample in that stratum.

$$w_h = N_h/n_h, \text{ where h is the stratum number}$$

The sample design was based on the population of accounts. For the purpose of constructing the stratum weights, the population was defined by the number of premises. Duplicate premises (based on premise ID by IOU) were removed and the most recent account from a premise was retained, yielding the number of sites per stratum. The resulting sample size and site weights for each of 42 strata are shown in Table 12.

Table 12: Final Sample Sizes and Stratum Weights

		Stratum Variables			Electric Customer Accounts				
Stratum	IOU	Climate Zone Group	CARE and/or FERA	Daily Usage Range, kWh	Number of Sites	Number in Target Sample	Number in Final Sample	Final Site Weight	Number in Final Sample by IOU
1	PGE	Inland	No	≤ 20.9	666,010	82	82	8,122.1	797
2				≤ 33.0	345,101	84	84	4,108.3	
3				> 33.0	204,604	84	83	2,465.1	
4			Yes	≤ 20.6	365,425	49	49	7,457.7	
5				≤ 32.7	196,932	49	49	4,019.0	
6				> 32.7	106,794	50	50	2,135.9	
7		Mild	No	≤ 14.9	1,144,436	98	96	11,921.2	
8				≤ 25.4	556,869	100	100	5,568.7	
9				> 25.4	277,278	100	100	2,772.8	
10			Yes	≤ 15.2	387,769	34	34	11,405.0	
11				≤ 28.0	183,498	35	35	5,242.8	
12				> 28.0	65,969	35	35	1,884.8	
13	SCE	Desert	No	≤ 27.1	59,879	9	8	7,484.9	793
14				≤ 48.1	23,300	9	9	2,588.9	
15				> 48.1	11,356	9	9	1,261.8	
16			Yes	≤ 24.2	19,495	3	3	6,498.3	
17				≤ 36.9	10,006	3	3	3,335.3	
18				> 36.9	5,898	4	4	1,474.5	
19		Inland	No	≤ 18.2	1,121,730	134	131	8,562.8	
20				≤ 29.7	578,337	135	133	4,348.4	
21				> 29.7	326,220	135	134	2,434.5	
22			Yes	≤ 15.6	654,789	71	71	9,222.4	

Stratum	IOU	Stratum Variables			Electric Customer Accounts				
---	---	Climate Zone Group	CARE and/or FERA	Daily Usage Range, kWh	Number of Sites	Number in Target Sample	Number in Final Sample	Final Site Weight	Number in Final Sample by IOU
23				≤ 24.8	344,371	71	71	4,850.3	
24				> 24.8	201,313	72	72	2,796.0	
25			No	≤ 14.8	407,073	39	39	10,437.8	
26			No	≤ 25.5	205,117	40	39	5,259.4	
27		Mild	No	> 25.5	104,432	40	40	2,610.8	
28		Mild	Yes	≤ 12.5	103,743	9	9	11,527.0	
29			Yes	≤ 20.5	53,880	9	9	5,986.7	
30			Yes	> 20.5	30,598	9	9	3,399.8	
31			No	≤ 18.4	154,757	36	36	4,298.8	
32			No	≤ 31.1	79,136	37	39	2,029.1	
33		Inland	No	> 31.1	43,514	37	35	1,243.3	
34		Inland	Yes	≤ 14.8	49,484	10	10	4,948.4	
35			Yes	≤ 25.2	26,895	11	10	2,689.5	
36	SDGE		Yes	> 25.2	14,553	11	11	1,323.0	397
37			No	≤ 13.5	363,967	67	66	5,514.7	
38			No	≤ 23.5	186,358	68	66	2,823.6	
39		Mild	No	> 23.5	99,212	68	69	1,437.9	
40		Mild	Yes	≤ 11.5	112,206	18	18	6,233.7	
41			Yes	≤ 18.9	60,038	18	18	3,335.4	
42			Yes	> 18.9	34,274	18	19	1,803.9	
TOTAL					9,986,616	2,000	1,987		1,987

Figure 16 through Figure 19 present the site locations of the statewide sample and the sample for the three utilities. Each tack represents one or more participating homes within a zip code.

Figure 16: Statewide Final Sample Location
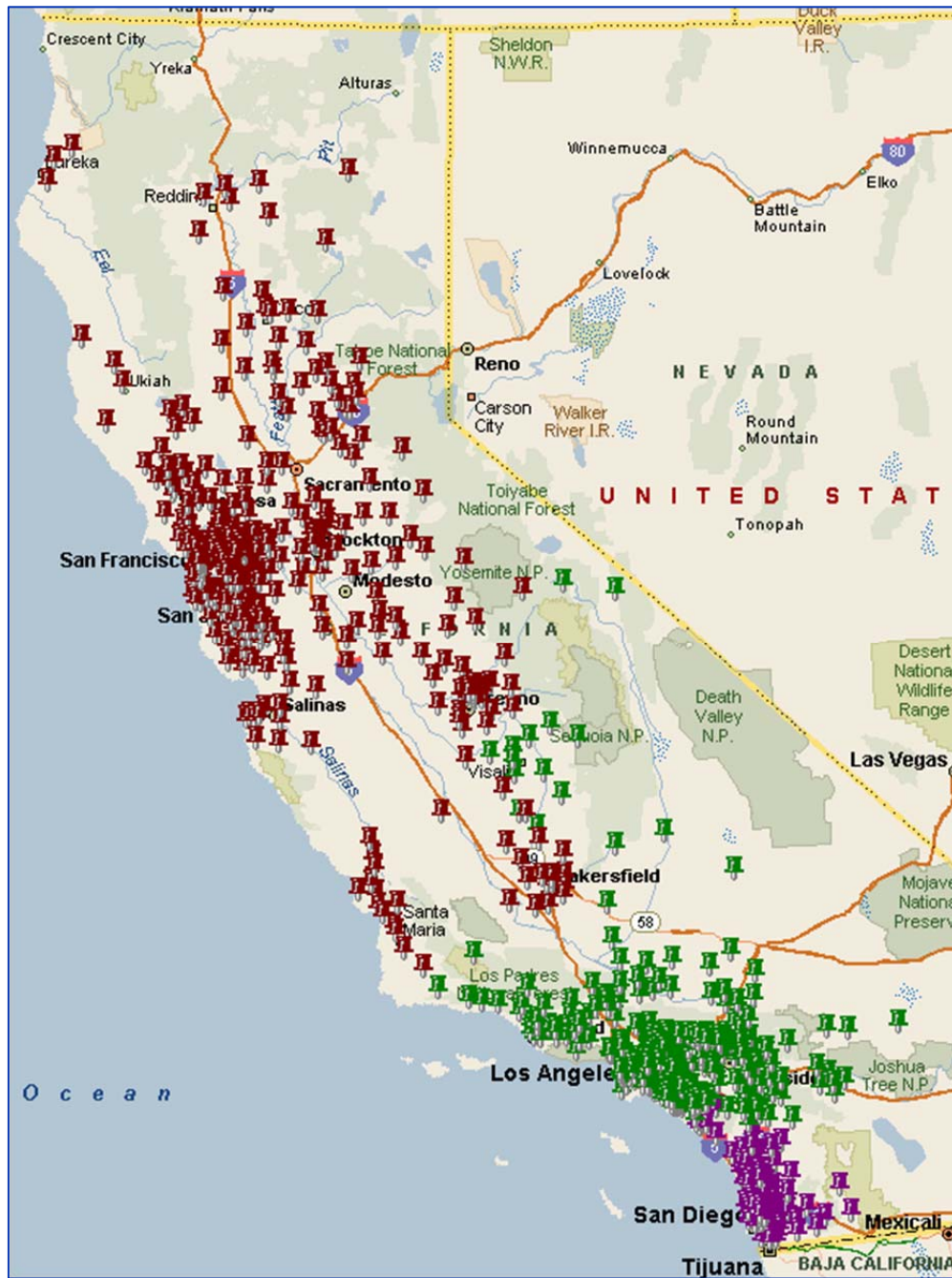
Figure 17: PG&E Final Sample Location

Figure 18: SCE Final Sample Location
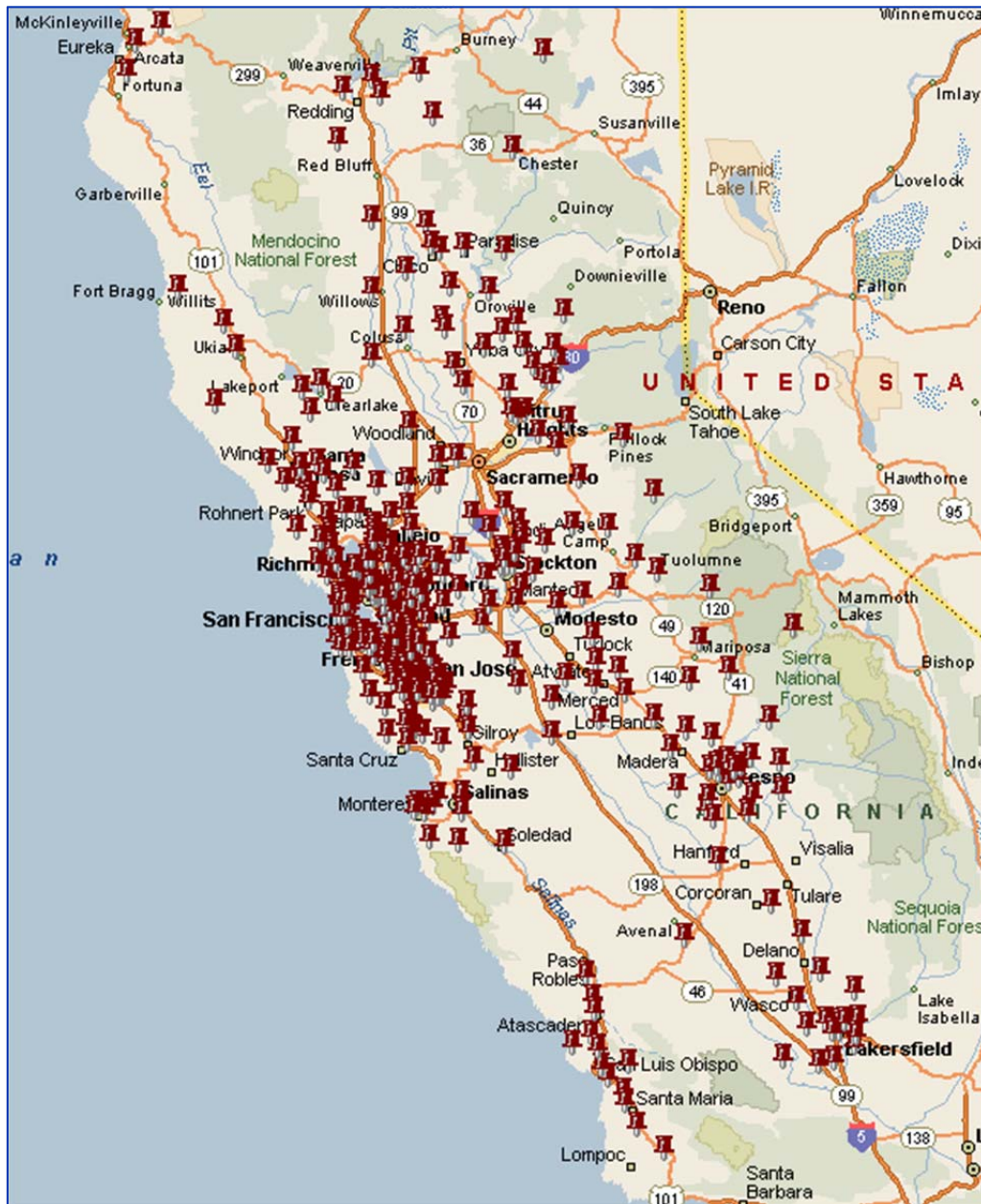
Figure 19: SDG&E Final Sample Location
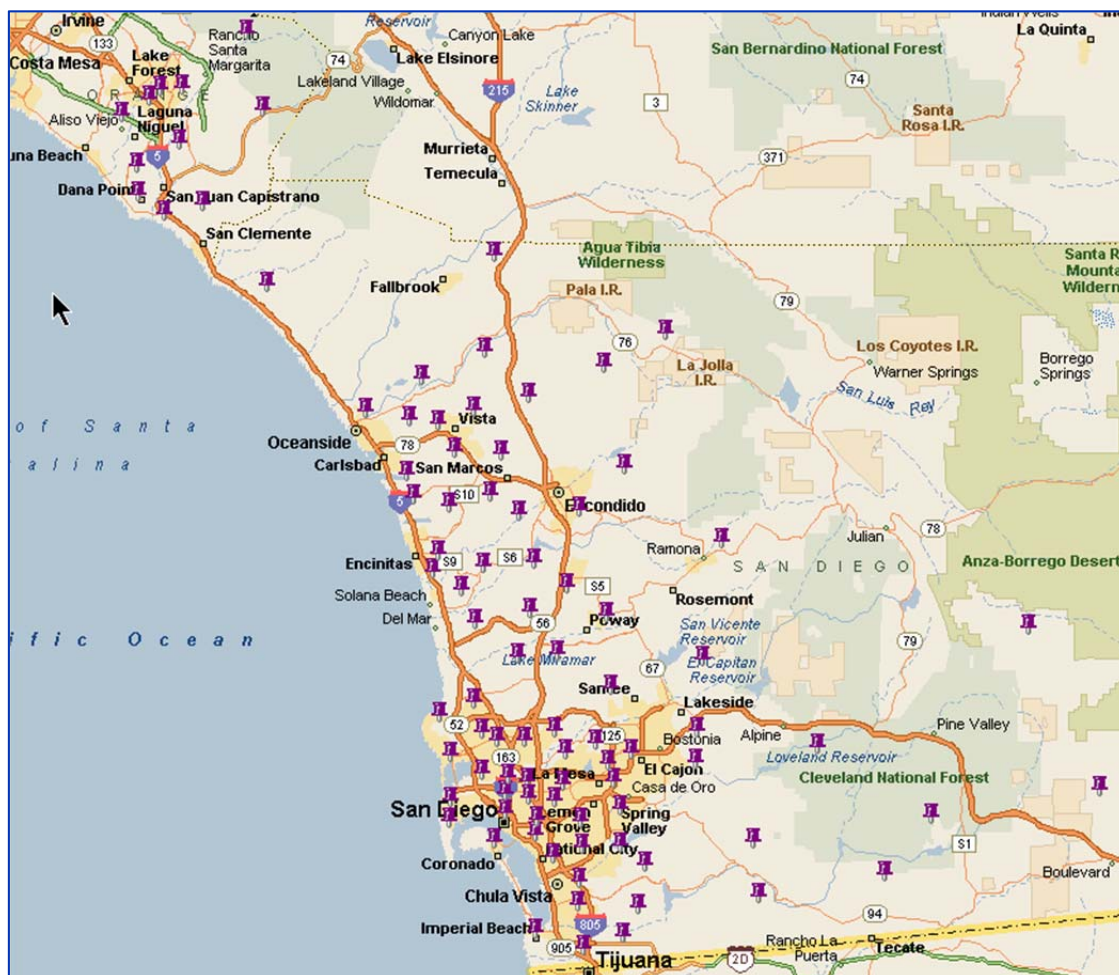
3.3 Recruitment Strategy

As described above, DNV GL used a primary sample approach, attempting to obtain as many of the first set of selected sample points as possible before recruiting sample replacements. The participating utilities provided phone numbers associated with the customer accounts that had been selected in the sample. The phone numbers were a mix of land lines and cell phones, so manual dialing was implemented. DNV GL conducted the recruiting effort and sent postcards to prospective participants at least a week before calling the site. The postcards provided a brief description of the study, alerted them to expect the call and gave them the opportunity to call to schedule an appointment or to decline participation. The recruiting phone script and postcard are presented in Appendix B: Customer Contact Materials.

Five attempts were made to each primary sample site at various times and various days before contacting the replacement sites. If an appointment was not scheduled by the fifth attempt, the site was marked as "max attempts made" and no further calls were made to that site.

Sites were scheduled by geographic location to maximize travel efficiency of field staff. Eight recruiters made phone calls Monday through Saturday between 9AM and 9PM and scheduled appointments at times convenient to participants between 7AM and 8PM weekdays and Saturdays. The schedule of appointments was transmitted securely to the field staff when they synchronized the data from their iPad with the central database. A total of 1,987 sites were scheduled and on-site visits were completed. Table 13 presents the number of sites recruited by service territory.

Table 13: Number of Sites Completed in IOU Electric Service Territories

Service Territory	Number of Sites Visited
PG&E	797
SCE	793
SDG&E	397
Total	1,987

Table 14 summarizes the recruiting outcomes by IOU service territory for the customers that recruiters attempted to contact during the study. The response rate calculation approach (formula and final disposition categories) mirrors the American Association for Public Opinion Research (AAPOR) calculator[20]. The overall response rate (AAPOR RR3) was 11.0%. Response Rate 3 (RR3) provides an estimate of what proportion of sample points of unknown eligibility are actually eligible. This is useful when the sample includes a lot of ineligible sample points.

Ineligible included contacts that had moved to an address different from the service address in the 2010 billing data, contacts no longer at the phone number, and sites that had reached the maximum attempts to reach by phone. Customers cancelling appointments presented another challenge to completing site visits efficiently, with almost 400 sites cancelling their initial appointment. SDG&E had the highest rate of completed sites and the lowest proportion of refusals.

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[20] The American Association for Public Opinion Research. 2011. Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys. 7th edition. AAPOR. AAPOR Response Rate Calculator Overview http://www.aapor.org/Response_Rates_An_Overview1.htm

Table 14: Recruiting Disposition by Service Territory

Description	PGE N	PGE %	SCE N	SCE %	SDGE N	SDGE %	Total N	Total %
Starting Sample	15,351		14,673		6,470		36,494	
Never Called	2,182		1,696		861		4,739	
Sample Used	13,169		12,977		5,609		31,755	
Known Not Eligible	3,784		3,086		1,611		8,481	
Estimated additional not eligible	2,037		2,004		1,182		5,215	
Sample-Valid	7,348		7,887		2,816		18,059	
Complete	797	10.8%	793	10.1%	397	14.1%	1,987	11.0%
Refused	3,820	52.0%	3,819	48.4%	1,166	41.4%	8,805	48.8%
Not Completed - Eligible	159	2.2%	170	2.2%	61	2.2%	390	2.2%
Not Completed - Est. Eligible	2,572	35.0%	3,105	39.4%	1,192	42.3%	6,877	38.1%

3.4 On-Site Data Collection

A total of sixteen different energy surveyors completed 1,987 on-site visits between May and November of 2012. The team of surveyors consisted of ten DNV GL employees and six employees of Redhorse Corporation, a subcontractor for the project.

Figure 20 shows the number of on-site visits completed by month. DNV GL began fieldwork at the beginning of May, followed by Redhorse in mid-May. Once the initial sites were completed, the data collection instrument was reviewed and revised to address experiences in the field. The majority of sites were completed in August and September, with the final sites being completed in November.

Figure 20: 2012 On-site Visits by Month of Completion
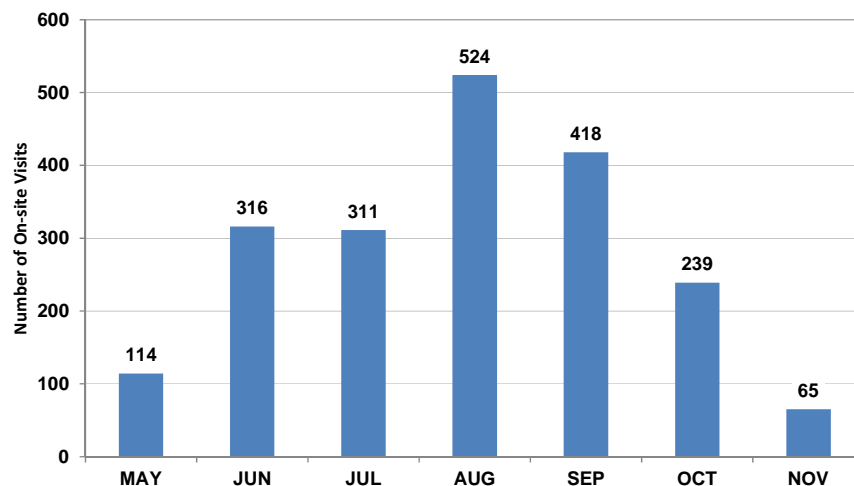
All sixteen field employees participated in a two day training followed by several days of observed site visits prior to completing site visits alone. Two separate trainings were held, the first in Oakland and the second in San Diego. Both trainings entailed one and a half days in the office and a half day "on-site."

The office training covered but was not limited to:

- A general project overview

- On-site etiquette

- Safety protocols

- User interface training of the digital on-site instrument hosted on an Apple iPad

- Receiving schedules and sending completed site files back to the DNV GL server for QA/QC

- Customer data security protocols

- Comprehensive instruction on the on-site data collection protocol found in Appendix C: Digital Data Collection Procedure Guide

- Comprehensive instruction on how to identify and accurately classify:

    o Heating and Air Conditioning Equipment

    o Water heating systems

    o Refrigerators and Freezers

    o Household appliances

    o Residential building types, insulation characteristics, attics, foundations, wall framing and glazing types

    o Televisions and commonly connected entertainment devices

    o Computers and commonly connected office equipment

    o Indoor and outdoor residential lighting fixtures, lamps, and controls

The half day on-site training consisted of:

- Conducting a pilot site visit from start to finish at a single family home

- Allowing for question and answer sessions with the field surveyors in a hands on environment

- Store visits to either a Sears or Best Buy retail location to view and inspect a variety of different appliance types and instruction on how to accurately identify the various features, ratings, and nameplate data of the numerous appliance types observed

After the two day training and the following days of observed site visits, all remaining site visits were completed by a single field surveyor with the average time on-site being 1 hour 37 minutes. A typical site visit consisted of an introduction in the doorway, a 10-20 minute question and answer with the adult site contact, followed by the site appliance, structural, and lighting inventory detailed in the

Appendix C: Digital Data Collection Procedure Guide. At the completion of every site visit the adult site contact received a $100 gift card for their participation in the study and was thanked for his or her time and hospitality.

3.4.1 Data Collection Tool

As with the last CLASS Study in 2005, DNV GL conducted the data collection for the 2012 CLASS Study using a digital input format. To recruit and conduct the on-site audits for this study, DNV GL employed a FileMaker Server Advanced™ database network in conjunction with Apple iPads.

A team of eight recruiters working out of the DNV GL Oakland office made calls to recruit sites for the field staff across the state. After successfully recruiting a customer from the sample, the site was assigned to a field surveyor's calendar on a specific day and time. All call records and the successfully scheduled sites were recorded on DNV GL's secure network. The field staff accessed the recruiting database at the end of every work day and before the start of every work week via their iPad and over an encrypted connection behind the DNV GL firewall. The field staff's access to the recruiting database was limited to their own schedule.

If a member of the field staff had a customer "no-show" or a cancelled site occur that information was transmitted from the iPad to the recruiting database along with any notes the surveyor made about the site. The protocol also stipulated the energy surveyor send an email to the field task manager and recruiting manager informing them of the uncompleted site visit. Following each site visit the surveyor would perform a quality assurance review of their completed digital site form, checking to make sure all "tabs" of the form have been completely populated, elaborating on any site notes made during the visit if needed, and confirming all data was captured accurately. At the end of each day's site visits and QA reviews, the surveyor would upload all of the completed site files to the DNV GL server and download the most recent version of his or her upcoming site schedule

If at any point during a site visit or during a typical work day, the surveyor could contact the DNV GL field data collection task manager with any questions or concerns. For more information about the data collection tools and practices, refer to Appendix C: Digital Data Collection Procedure Guide.

3.4.2 On-Site Data Collected

The field instrument facilitated collecting information about residential building characteristics and the presence, efficiency and usage of energy-consuming devices in California households. The majority of the information was obtained from visual inspection, with some information provided by the resident. Visual inspection entailed locating a nameplate for appliances, if accessible, and recording the information, if readable.

Table 15 provides the specific types of data that were collected for building characteristics and for each equipment type.

Table 15: Building Characteristics Gathered during On-site Visits

Category	Characteristics
General Information	• Type of Residence • Square footage • Types and numbers of spaces within residence • Demographics of residents
Building Envelope	• Windows - frame type, pane configuration, glazing, coating • Wall construction • Insulation - wall, attic, floor
Lighting	• Complete inventory of lamps installed and stored interior and exterior • Fixture location, control type, number fixtures, type, number of lamps per fixture • Lamp type, shape, wattage, base type
Heating Equipment	• Type of Thermostat • Location, manufacturer, model number, manufactured date, supply fan control type, fuel type, type of system, rated input/output, efficiency rating
Cooling Equipment	• Frequency of use during cooling season • Type of system, percent of house served, manufacturer, model number, manufactured date, cooling capacity, efficiency rating, refrigerant type
Water Heaters	• Number, fuel type, type of system, manufacturer, model number, manufactured date, kW/kBtu input value, rated tank size • Tank wrap, pipe insulation present
Refrigerators & Self-standing Freezers	• Location, number, type, size, age, usage frequency, manufacturer, model number, manufactured date, nameplate amps, ENERGY STAR label, additional features present
Dishwashers, Clothes Washers & Dryers	• Age, manufacturer, model number, manufactured date, ENERGY STAR label, fuel type (dryers)
Ranges & Ovens	• Fuel type
Television & Connected Devices	• Televisions- location, number, type, size, age, manufacturer, model number, nameplate amps, ENERGY STAR label, additional features, usage, where TV purchased, primary use of TV • Boxes and entertainment devices – number, types
Personal Computers & Peripherals	• Personal computers- location, number, type, manufacturer, age, ENERGY STAR label, usage • Monitor size, type • Power supply type • Computer peripheral equipment – monitor, modem, device
Spa & Pool Equipment	• Spa fuel type • Pool fuel type, age of pool pump

3.4.3 Demographic Data Collected

A list of demographic data was developed by the CPUC EM&V study team to be collected by the field surveyors. The following demographic data was collected:

- Type of residence

- Year residence was built

- Total heated floor space of the home

- Whether the residence is rented or owner occupied

- Total people in home

- Number of residents by age

- Primary language of residents

- Education level and race of site contact

- Total annual income for the home

Information on age, education, income and race were obtained through a portal the site contact used to respond that was not accessible by the surveyor.

3.5 Expanding the Sample Data

3.5.1 Comparison of CLASS Demographics to Census Data

This section compares the demographics of the CLASS sample to data from other studies along several household attributes: residence type, home ownership, number of occupants and income. The CLASS data (using strata weights) was compared to data obtained from the U.S. Census Bureau website and weighted results from the 2005 CLASS, and the 2003 and 2009 California RASS studies.

The Census Bureau makes available data from the decennial Census and the American Community Survey (ACS). Only ten questions comprised the 2010 Census, including the number of occupants and home ownership, with data available at the Census tract level. The ACS collects more detailed information annually from a smaller sample of households, and provides 5 year average data on type of residence and income ranges, along with additional information, at the Census tract level.

Two levels of comparisons with the Census and ACS data are presented in the tables below, statewide data and data limited to the Census tracts of the IOU residential electric customer population. The latter includes some households that obtain electric service from another provider but are located in the same tract serviced by the IOU, and excludes geographic areas the IOUs do not provide electric service to residential customers such as Sacramento.

The comparison with the 2003 and 2009 California RASS data was restricted to RASS participants with individually-metered electric service to match the sample frame of the 2012 CLASS.

In general, the distributions for the household attributes align pretty well in most cases, with a few differences to note. As shown in Table 16 and Table 17 below, the proportion of single-family detached homes and the proportion of owner-occupied housing units are higher in CLASS than the ACS and Census data, but are similar to the proportions from the 2005 CLASS and the two RASS studies.

Table 16: Comparison of Type of Residence for the Census, CLASS and RASS, using Strata Weights

Type of Residence	CA Statewide (2010 ACS)	IOU Electric Territories (2010 ACS)	2005 CLASS	2012 CLASS, strata weights	2009 RASS	2003 RASS
Single Family Detached	58%	60%	66%	65%	66%	65%
Duplex/Townhouse/Rowhouse	7%	7%	6%	8%	8%	7%
Apt 2-4 Units	8%	8%	-	7%	8%	9%
Apt 5+ Units	23%	20%	24%	19%	16%	17%
Mobile Home	4%	4%	3%	2%	2%	2%
Modular/Prefab			1%			
Other			1%			

Table 17: Comparison of Home Ownership for the Census, CLASS and RASS, using Strata Weights

Home Ownership	CA Statewide (2010 Census)	IOU Electric Territories (2010 Census)	2005 CLASS	2012 CLASS, strata weights	2009 RASS	2003 RASS
Population	12,577,498	10,545,828	9,694,996	9,986,616	9,823,821	9,033,859
Own/Buying	56%	58%	70%	67%	69%	66%
Rent/Lease	44%	42%	30%	32%	29%	33%

Possible reasons for the differences include:
- The ACS surveys all types of housing units, some of which may not be in the residential customer segment, may be master-metered or have electric service through another provider.
- CLASS recruited participants in 2012 based on electric account data from 2010, resulting in a bias towards households remaining at the same address and less likely renter-occupied.
- Market research literature has documented a tendency for renters to have lower response rates to general population surveys, compared to owners.

The distributions of the number of occupants per household are fairly similar, with CLASS having a slightly higher proportion of households with two occupants, as shown in Table 18.

Table 18: Comparison of Number of Occupants for the Census, CLASS and RASS, using Strata Weights

Number of Occupants	CA Statewide (2010 Census)	IOU Electric Territories (2010 Census)	2012 CLASS, strata weights	2009 RASS
1	23%	23%	22%	19%
2	29%	29%	32%	31%
3	16%	16%	16%	16%
4	15%	15%	16%	16%
5	8%	8%	7%	9%
6	4%	4%	4%	4%
7 or more	4%	4%	3%	3%

The ACS uses slightly different income range categories than CLASS and RASS for incomes below $50,000. Table 19 presents the income categories most comparable to each other in adjacent rows for ease of review. For income levels of $50,000 and above, the categories for the studies are the same, except for the highest income category for RASS being expressed as $150,000 or more. The distributions are pretty well aligned.

Table 19: Comparison of Household Income for the Census, CLASS and RASS, using Strata Weights

Annual Income Ranges	CA Statewide (2011 ACS)	IOU Electric Territories (2011 ACS)	2012 CLASS, strata weights	2009 RASS
Up to $14,999	12%	10%		
Less than $20,000			12%	15%
$15,000 to $24,999	10%	9%		
$20,000 to less than $30,000			11%	11%
$25,000 to $34,999	9%	9%		
$30,000 to less than $40,000			9%	11%
$35,000 to $49,999	13%	12%		
$40,000 to less than $50,000			8%	7%
$50,000 to less than $75,000	17%	17%	19%	17%
$75,000 to less than $100,000	12%	13%	14%	12%
$100,000 to less than $150,000	14%	16%	15%	14%
$150,000 to less than $200,000	6%	7%	7%	12%
$200,000 or more	7%	7%	5%	

After examining the results of this analysis, ED requested that the CLASS data be reweighted to the Census for home ownership and type of residence.

3.5.2 Expansion Weights

Two sets of expansion weights were developed to expand the sample of sites to represent the population. The initial site weights were developed based on the strata of the sample design, following the same general approach as the 2005 and 2000 CLASS studies, as well as the 2009 and 2003 California Residential Appliance Saturation Studies (RASS).

For the purpose of constructing the stratum weights, the population was defined by the number of premises. The following formula defines the stratum weight to be the ratio of the number of sites in the population in that stratum to the number of sites in the sample in that stratum.

$$w_h = N_h/n_h, \text{ where h is the stratum number}$$

These weights were used to expand the CLASS sample to the electric IOU population of premises in the sample frame and are referred to as "strata weights" throughout this report, with resulting saturation and building characterization estimates most appropriate to compare to results from the previous CLASS studies and the RASS studies.

A second set of expansion weights was created to reduce potential bias in estimates that might be attributed to the differences in the distribution of the CLASS participant sample by home ownership and type of residence compared to the U.S. Census population estimates. The population estimates were used in a calibration weight adjustment model that yielded "Census-adjusted weights" for CLASS participants. Study results based on the Census-adjusted weights are appropriate to describe the current state of households with individually-metered electric accounts within the service territory of PG&E, SCE and SDG&E. Appendix D: Development of Census-adjusted Weights presents details of the methodology of developing the Census-adjusted weights.

3.6 Testing for Significant Trends

Throughout this report, the results of the 2012 CLASS are compared to the results from the 2005 CLASS. The comparisons primarily address population estimates expressed as averages (i.e. equipment age, efficiency rating, number present, etc.) and proportions (i.e. of homes having specified equipment, % equipment with certain attributes, etc.). The results compiled for this report were obtained through queries of the 2012 CLASS webtool and comprise the population estimates and error bounds calculated at the 90% confidence level. DNV GL leveraged the estimates and error bounds to develop test statistics to determine whether differences between 2012 and 2005 estimates are statistically significant at the 90% confidence level. Details of the approach and a table of the significance testing are presented in Appendix G: Statistical Significance Testing.

Throughout the report, differences in estimates between 2012 and 2005 noted in the text are statistically significant. Shading in tables represents differences found to be significant.

3.7 Summary of Demographics

This section contains tables that summarize the demographic characteristics of the sample. These results have been weighted to reflect the population by applying strata weights and Census-adjusted weights and are labeled accordingly.

Table 20 and Table 21 show the percentage of homes by type of residence and story number, using strata weights and Census-adjusted weights, respectively. Over 40% of all residences visited were single family, detached, 1-story dwellings. The other most commonly visited types of residence were 2-story single-family, detached homes and 1-story apartments with 5 or more units.

Table 20: Percentage of Homes by Type of Residence and Story Number, using Strata Weights

Type of Residence	Strata weights (n=1,987)						
	Percent of Residence Types by Story Number						
	1	1.5	2	2.5	3	Unknown	Subtotal
Single Family, Detached	40.4%	1.8%	20.8%	0.7%	0.9%	0.1%	64.6%
Duplex	3.0%	-	-	-	-	-	3.0%
Town/Row Home, 2-4 units	-	0.3%	3.3%	0.2%	0.6%	0.1%	4.6%
Apartments, 2-4 units	4.0%	0.1%	2.9%	-	0.2%	-	7.3%
Apartments, 5 or more units	10.2%	-	6.4%	0.1%	1.5%	0.5%	18.6%
Mobile Home	1.8%	0.1%	-	-	-	-	1.9%

Table 21: Percentage of Homes by Type of Residence and Story Number, using Census-adjusted Weights

Type of Residence	Census-adjusted weights (n=1,987)						
	Percent of Residence Types by Story Number						
	1	1.5	2	2.5	3	Unknown	Subtotal
Single Family, Detached	40.5%	1.5%	18.9%	0.6%	0.8%	-	62.4%
Duplex	3.2%	-	-	-	-	-	3.2%
Town/Row Home, 2-4 units	-	0.2%	3.0%	0.2%	0.6%	-	4.0%
Apartments, 2-4 units	4.9%	0.1%	3.0%	-	0.4%	-	8.3%
Apartments, 5 or more units	10.6%	-	7.1%	-	1.6%	0.6%	19.9%
Mobile Home	2.0%	0.1%	-	-	-	-	2.1%

Table 22 shows the percentage of homes by number of occupants. The largest percentage of homes, almost one-third, has 2 people occupying the home. However, it was also common to visit homes with 1, 3 or 4 occupants.

Table 22: Percentage of Homes by Number of Occupants in Household

Total Number of Occupants	Percent of Homes	
	Census-adjusted weights	Strata weights
1	22.3%	21.8%
2	32.0%	31.9%
3	15.7%	16.1%
4	16.2%	16.0%
5	6.8%	6.8%
6	3.5%	3.6%
7	1.9%	1.9%
8	0.8%	0.8%
9	0.7%	0.6%
Vacant	0.4%	0.4%

Table 23 shows the percentage of homes by number of adult occupants. Not surprisingly, nearly half of homes have 2 adults present.

Table 23: Percentage of Homes by Number of Adults in Household

Total Number of Adults	Percent of Homes	
	Census-adjusted weights	Strata weights
0	1.6%	1.4%
1	30.1%	28.6%
2	42.9%	43.5%
3	12.2%	12.6%
4	6.0%	6.4%
5	1.8%	2.0%
6	1.2%	1.1%
7	0.2%	0.3%
8	0.3%	0.3%
9+	0.2%	0.3%
Refused	3.5%	3.5%

Table 24 shows the percentage of homes by primary language spoken by its occupants. Not surprisingly, English was the primary language spoken at more than 80% of the homes, while Spanish was the second most common language, with around 10% of respondents speaking Spanish as their primary language.

Table 24: Percentage of Homes by Primary Language of Household

Primary Language	Percent of Homes	
	Census-adjusted weights	Strata weights
English	82.4%	83.5%
Spanish	10.8%	9.5%
Other	2.3%	2.2%
Mandarin	0.8%	0.9%
Tagalog	0.7%	0.8%
Vietnamese	0.7%	0.7%
Cantonese	0.6%	0.6%
Korean	0.1%	0.1%
Japanese	0.1%	0.1%
Unknown	1.1%	1.1%
Refused	0.5%	0.4%

Table 25 shows the percentage of homes by total household income. The largest percentage of residents, almost 25%, has an annual income between $75,000 to less than $150,000.

Table 25: Percentage of Homes by Total Household Income

Total Household Income	Percent of Homes	
	Census-adjusted weights	Strata weights
Less than $20,000	11.0%	10.5%
$20,000 to less than $30,000	10.0%	9.0%
$30,000 to less than $40,000	8.1%	7.9%
$40,000 to less than $50,000	7.1%	6.7%
$50,000 to less than $60,000	7.8%	7.5%
$60,000 to less than $75,000	8.6%	8.5%
$75,000 to less than $100,000	12.6%	12.1%
$100,000 to less than $150,000	11.5%	12.8%
$150,000 to less than $200,000	4.9%	5.8%
$200,000 or more	3.1%	4.0%
Unknown	4.4%	4.2%
Refused	11.0%	11.1%

Table 26 shows the percentage of homes by age of home. Over 40% of the homes were constructed before 1970, and smallest share was homes built between 1990 and 1999.

Table 26: Percentage of Homes by Year of Home Construction

Year of Home Construction	Percent of Homes	
	Census-adjusted weights	Strata weights
Before 1970	41.5%	41.0%
1970-1979	17.2%	16.6%
1980-1989	13.9%	15.1%
1990 - 1994	3.9%	4.1%
1995 - 1999	3.5%	3.8%
2000 or after	12.5%	13.2%
Unknown	7.5%	6.1%

Table 27 shows the percentage of homes by the total heated floorspace of the homes. More than one-third of the homes surveyed were between 1,000 to 1,599 square feet.

Table 27: Percentage of Homes by Total Heated Floorspace

Total Heated Floorspace	Percent of Homes	
	Census-adjusted weights	Strata weights
Less than 600 sq.ft.	2.5%	2.9%
600 to 999 sq.ft.	20.0%	16.8%
1,000 to 1,599 sq.ft.	35.2%	33.6%
1,600 to 1,999 sq.ft.	14.5%	15.3%
2,000 to 2,399 sq.ft.	9.3%	10.4%
2,400 to 2,999 sq.ft.	7.5%	8.7%
3,000 sq. ft. or more	5.1%	6.4%
Unknown	5.9%	5.8%

Table 28 shows the percentage of homes by occupancy type. The majority of homes surveyed were owner-occupied. The proportion of home ownership varies depending on the weighting scheme selected to expand the sample to the population.

Table 28: Percentage of Homes by Occupancy Type

Type of Occupancy	Percent of Homes	
	Census-adjusted weights	Strata weights
Own or Buying	58.5%	67.4%
Rent	41.2%	32.4%
Occupy without payment of rent	0.3%	0.2%

3.8 Comparison of Completed 2012 Sites to the 2005 CLASS Sample

One of the objectives of the 2012 CLASS is to compare the current data to the data collected in the 2005 and 2000 CLASS. The 2005 CLASS utilized a sample design with stratification by rate classes that contained a number of attributes. By stratifying along these "long rates," the sample was implicitly stratified along these attributes. The current IOU customer information systems (CIS) have some of this information stored in separate variables, so the 2012 CLASS was stratified using the electric provider, CARE/FERA status, climate zone group and average daily usage range. The 2012 CLASS expanded the target sample to 2,000 sites compared to 850 sites completed for the participating IOUs in the 2005 CLASS[21]. The sections below present a comparison of how well the 2012 CLASS sample aligns with the 2005 CLASS sample along climate zones and rate classes.

Comparison of Climate Zone Coverage

The 2012 CLASS incorporated a Climate Zone Group (desert, inland, mild) as a stratification variable to ensure study coverage across all climate zones. The 2012 sample provides an increase in the number of sites per climate zone, as shown in Table 29.

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[21] The 2005 CLASS included a sample of 225 sites for SMUD, raising the total number of completed sites to 1,073.

Table 29: Comparison of Sample by Climate Zones for 2012 CLASS and 2005 CLASS

Climate Zone Group	Climate Zone	Premises in 2010	2012 CLASS Completed Sites	2005 CLASS Final Sites
Mild	1	68,817	7	4
	2	360,072	65	33
	3	1,379,688	191	131
	4	609,264	114	51
	5	132,314	16	14
	6	867,380	161	88
	7	789,055	228	61
Inland	8	1,061,427	163	63
	9	876,545	183	82
	10	1,129,439	300	96
	11	317,315	66	24
	12	975,823	201	100
	13	733,605	164	53
	14	307,273	55	30
Desert	15	131,543	35	13
Mild	16	232,699	38	5
Total		9,986,616	1,987	848

Comparison of Rate Class Coverage

The structure of rate classes has changed between the 2005 CLASS and the 2012 CLASS. As mentioned above, the 2012 CLASS did not use rate class as a stratification variable. For comparison, Table 30 and Table 31 present the distribution of completed sites by rate class for the 2012 CLASS and 2005 CLASS, respectively. Table 31 also includes the stratum weights used for the 2005 CLASS.

Table 30: Completed Sites by Rate Class[22] for 2012 CLASS

Electric IOU	Rate Class	Number of Premises	Average Daily kWh	Percent Daily kWh	2012 CLASS Completed Sites
PGE		6	157	0.0%	
PGE	E1	3,116,696	54,624,937	30.7%	508
PGE	E1L	1,224,908	21,890,169	12.3%	220
PGE	E1M	18,592	788,840	0.4%	8
PGE	E1ML	180	76,505	0.0%	
PGE	E1MX	22	998	0.0%	
PGE	E1S	268	75,403	0.0%	
PGE	E1SL	143	84,220	0.0%	
PGE	E1SR	26	3,172	0.0%	
PGE	E1SRL	30	15,588	0.0%	
PGE	E1T	282	48,653	0.0%	
PGE	E1TL	1,085	1,090,215	0.6%	
PGE	E6	11,122	222,236	0.1%	3
PGE	E6L	436	17,340	0.0%	
PGE	E7	64,705	1,823,071	1.0%	33
PGE	E7A	35	1,106	0.0%	
PGE	E7AL	6	351	0.0%	
PGE	E7L	8,457	261,195	0.1%	4
PGE	E8	44,198	1,840,699	1.0%	16
PGE	E8L	9,294	393,259	0.2%	5
PGE	E9A	180	4,786	0.0%	
PGE	E9B	14	159	0.0%	
SCE	D-APS	52,750	1,237,571	0.7%	13
SCE	D-APS-E	195,806	4,633,372	2.6%	78
SCE	D-CARE	1,188,463	17,932,081	10.1%	197
SCE	D-CARE-APS	96,621	2,028,288	1.1%	26
SCE	D-FERA	19,142	375,109	0.2%	2
SCE	D-FERA-APS	2,626	68,013	0.0%	1
SCE	D-PG-S	1	20	0.0%	

[22] Rate class descriptions can be found in the following locations:
- PG&E: http://www.pge.com/nots/rates/tariffs/rateinfo.shtml
- SCE: http://www.sce.com/AboutSCE/Regulatory/tariffbooks/ratespricing/residentialrates.htm
- SDG&E: http://www.sdge.com/electric-tariff-book-residential-rates

Electric IOU	Rate Class	Number of Premises	Average Daily kWh	Percent Daily kWh	2012 CLASS Completed Sites
SCE	D-S	5,493	160,775	0.1%	1
SCE	D-S-CARE	681	19,618	0.0%	
SCE	D-S-FERA	8	240	0.0%	
SCE	DE	10,366	217,978	0.1%	1
SCE	DE-APS	1,100	27,606	0.0%	3
SCE	DE-APS-E	3,160	78,107	0.0%	
SCE	DE-FERA	58	1,388	0.0%	
SCE	DE-FERA-AP	30	977	0.0%	
SCE	DE-G-1	29	0	0.0%	
SCE	DE-S	23	834	0.0%	
SCE	DE-TOU-1	2	38	0.0%	
SCE	DE-TOU-2	28	1,194	0.0%	
SCE	DE-W-1	28	0	0.0%	
SCE	DM	6,088	261,986	0.1%	3
SCE	DM-CARE	2	58	0.0%	
SCE	DMS-1	5	327	0.0%	
SCE	DMS-2	1	25	0.0%	
SCE	DMS-3	1	7	0.0%	
SCE	DOMESTIC	2,666,490	48,386,692	27.2%	466
SCE	DWL-A	4	0	0.0%	
SCE	G-1	1,002	0	0.0%	
SCE	G-1-CARE	206	0	0.0%	
SCE	GM	24	0	0.0%	
SCE	GS-1	7	165	0.0%	
SCE	GS-1-APS	1	9	0.0%	
SCE	TOU-D-1	494	10,767	0.0%	
SCE	TOU-D-1-AP	7	157	0.0%	
SCE	TOU-D-1-CA	31	619	0.0%	
SCE	TOU-D-2	2,555	119,037	0.1%	
SCE	TOU-D-2-AP	17	707	0.0%	
SCE	TOU-D-2-CA	205	7,504	0.0%	
SCE	TOU-D-T	2,655	101,752	0.1%	1
SCE	TOU-D-T-AP	1,637	62,449	0.0%	1
SCE	TOU-D-T-C-	462	18,757	0.0%	
SCE	TOU-D-T-CA	711	27,647	0.0%	
SCE	TOU-D-TEV	304	7,678	0.0%	
SCE	TOU-D-TEV-	76	1,816	0.0%	
SCE	TOU-D1-APS	55	1,334	0.0%	
SCE	TOU-D1-C-A	5	147	0.0%	

Electric IOU	Rate Class	Number of Premises	Average Daily kWh	Percent Daily kWh	2012 CLASS Completed Sites
SCE	TOU-D2-APS	354	14,715	0.0%	
SCE	TOU-D2-C-A	35	1,491	0.0%	
SCE	TOU-DE-1-A	4	71	0.0%	
SCE	TOU-DE-2-A	21	789	0.0%	
SCE	TOU-DE-T	8	311	0.0%	
SCE	TOU-DE-T-A	19	669	0.0%	
SCE	TOU-DE-TEV	8	216	0.0%	
SCE	TOU-DTEV-C	3	52	0.0%	
SCE	TOU-EV-1	78	404	0.0%	
SCE	W-1	1,371	0	0.0%	
SCE	W-1-CARE	176	0	0.0%	
SDGE	A	123	2,121	0.0%	
SDGE	AL	3	1,179	0.0%	
SDGE	ALTO	1	319	0.0%	
SDGE	AYTO	1	1,001	0.0%	
SDGE	DM	6	163	0.0%	
SDGE	DR	1,105,935	17,550,536	9.8%	357
SDGE	DRLI	117,524	1,562,680	0.9%	38
SDGE	DRSE	66	667	0.0%	
SDGE	DRSES	73	873	0.0%	
SDGE	DRTO	308	9,422	0.0%	
SDGE	DRTOU	281	8,748	0.0%	1
SDGE	DS	2	50	0.0%	
SDGE	DT	20	413	0.0%	
SDGE	EV	17	956	0.0%	
SDGE	EVTO	11	324	0.0%	1
SDGE	EVTOU	4	100	0.0%	
SDGE	PA	19	337	0.0%	
Total		9,986,616	178,214,515	100.0%	1987

Table 31: Completed Sites by Rate Class for 2005 CLASS

Stratum Number	Utility	Stratum	Population	Sample	Actual Sample (Appliance)	Actual Sample (Lighting)	Appliance Weight	Lighting Weight
1	SCE	D-APS	75,399	7	7	7	10,771.3	10,771.3
2	SCE	D-CARE	921,494	83	83	83	11,102.3	11,102.3
3	SCE	D-CARE-APS	9,946	1	1	1	9,946.0	9,946.0
4	SCE	DE	10,581	1	1	1	10,581.0	10,581.0
5	SCE	DE-APS	1,550	1	1	1	1,550.0	1,550.0
6	SCE	DOMESTIC	2,879,065	259	258	257	11,159.2	11,202.6
7	SCE	D-S	6,304	1	1	1	6,304.0	6,304.0
8	SCE	TOU-D-1	360	1	1	1	360.0	360.0
9	SCE	TOU-D-2	3,144	1	1	1	3,144.0	3,144.0
	SCE	SUB TOTAL	3,907,843	355	354	353		
10	SDG&E	DR	921,350	84	83	83	11,100.6	11,100.6
11	SDG&E	DRLI	164,631	16	16	16	10,289.4	10,289.4
	SDG&E	SUB TOTAL	1,085,981	100	99	99		
12	PG&E	E1	3,340,434	302	302	302	11,061.0	11,061.0
13	PG&E	E1L	692,810	62	62	62	11,174.4	11,174.4
14	PG&E	E1S	207	1	1	1	207.0	207.0
15	PG&E	E1SL	56	1	1	1	56.0	56.0
16	PG&E	E1T	323	1	1	1	323.0	323.0
17	PG&E	E1TL	842	1	0	0		
18	PG&E	E2A	54	1	1	1	54.0	54.0
19	PG&E	E2AL	12	1	1	1	12.0	12.0
20	PG&E	E2B	58	1	1	1	58.0	58.0
21	PG&E	E2BL	6	1	1	1	6.0	6.0
22	PG&E	E3A	199	1	1	1	199.0	199.0
23	PG&E	E3AL	59	1	1	1	59.0	59.0
24	PG&E	E3B	166	1	1	1	166.0	166.0
25	PG&E	E3BL	64	1	1	1	64.0	64.0
26	PG&E	E7	78,977	7	8	8	9,872.1	9,872.1
27	PG&E	E7A	58	1	1	1	58.0	58.0
28	PG&E	E7AL	3	1	1	1	3.0	3.0
29	PG&E	E7L	4,669	1	1	1	4,669.0	4,669.0
30	PG&E	E8	70,210	6	7	7	10,030.0	10,030.0
31	PG&E	E8L	7,523	1	1	1	7,523.0	7,523.0
32	PG&E	E9A	138	1	1	1	138.0	138.0
33	PG&E	E9AL	1	1	0	0		
	PG&E	SUB TOTAL	4,196,869	395	395	395		
TOTAL			9,190,693	850	848	847		

4 Characterization of Residential Lighting and Appliances Inventory

This chapter presents results of characterization of all residential lighting and appliances including: refrigerators, heating and cooling equipment, water heaters, clothes washers, clothes dryers, dishwashers, ranges and ovens, televisions, personal computers, building shell, and spas. Results presented are labeled with the weighting approach used for each specific analysis and error bounds are presented at the 90% confidence level. In tables presenting results from 2012 and 2005, shading indicates a statistically significant difference between study years The Lighting section presents results based on Census-adjusted weights; lighting results based on strata weights, if not included in this section, are available in Appendix A: 2012 CLASS Lighting Results Using Strata Weights. Appliance results presented in this chapter are based on strata weights for ease of comparison with previous studies, with tables for results based on Census-adjusted weights available in Appendix E: 2012 CLASS Appliance Results Using Census-adjusted Weights.

4.1 Lighting

Every lighting fixture in each residence was inventoried by fixture type, fixture control type, number of lamps, lamp type, and lamp wattage. Fixtures may comprise one or more sockets, each of which could be filled with a different type of lamp. Interior and exterior lighting data for all installed lamps and lamps in storage were collected for this study. A total of 1,987 residences are included in the lighting analysis.

This section of this chapter presents findings from the lighting analysis using Census-adjusted weights for all in-use lighting observed. Results calculated using strata weights are presented in tables where space permitted and are clearly labeled. Results using strata weights are also limited to areas of the household that were included in the 2005 study[23].

This chapter of the report is broken up into the following three subsections that present the analyses shown below.

- Lighting Overview (by home)
  - number of fixtures and lamps per home,
  - average number of lamps per fixture,
  - percentage of homes having a certain lamp type,

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[23] The 2005 CLASS reported on lighting in fewer areas of a household: four bathrooms, five bedrooms and a porch light, omitting other outdoor areas.

- o prevalence of compact fluorescent lamps,

- o lamp wattage, and

- o fixture control types

- Specific Fixture Overviews (by home)

  - o summary of recessed cans, torchiere fixtures, and ceiling fans

  - o these fixtures were selected for further analysis because efficient lighting technologies are currently being developed for these fixture types

- Room Lighting Analysis

  - o percentage of homes with fixture types and lamp types for specific space types

Throughout the lighting analysis, the room type "other" is given as a category of room. The "other" room type includes attics, bars, basements, exercise rooms, music rooms, sewing rooms, as well as pool houses.

4.1.1 Lighting Overview (by Home)

Table 32 presents the average number of fixtures and lamps per home by type of residence. Overall, homes have approximately 31 fixtures and 47 lamps on average, using the Census-adjusted weights. Limiting the spaces to those comparable to the 2005 study, and using strata weights, households averaged 30 fixtures and 46 lamps. As might be expected, for both sets of results, apartments and duplexes have significantly fewer fixtures and lamps on average than do single family, unattached residences.

Table 32: Average Number of Fixtures and Lamps by Type of Residence

| Type of Residence | Census-adjusted weights, all spaces | | | | Strata weights, limited to 2005 CLASS spaces | | | | Sample Size |
| | Fixtures | | Lamps | | Fixtures | | Lamps | | |
	Average #	Error Bound	Average #	Error Bound	Average #	Error Bound	Average #	Error Bound	
Overall	30.6	4.5	46.8	7.0	29.6	3.0	46.1	4.7	1,987
Single Family Detached	37.6	7.1	58.2	11.0	36.0	4.6	56.8	7.3	1,491
Apt 2-4 Units	21.9	11.4	30.3	15.8	19.5	5.3	27.8	7.5	96
Apt 5+ Units	15.1	4.0	22.6	5.9	14.6	2.3	21.6	3.4	251
Duplex (Single Story)	19.0	10.6	27.1	15.3	17.9	8.0	25.9	11.6	45
Mobile Home	22.4	20.8	34.8	32.4	21.0	13.4	33.2	21.3	34
Townhouse/ Rowhouse (2-4 Unit Multi-Story)	29.5	15.7	44.7	23.7	27.2	12.0	41.2	18.3	70

Table 33 displays the average number of fixtures per home by fixture type. The most common fixture types are ceiling mounted and recessed cans, with homes having an average of 6.8 recessed cans using Census-adjusted weights. The average number of recessed cans is 7.6 using strata weights for limited spaces, which is nearly double from the previous study's average of 4.2 recessed cans. Also, homes have an average of about 5 floor/table lamps and 6.2 wall mounted fixtures, using Census-adjusted weights. Table 33 also shows that each home averages two ceiling fan with lights. Shading indicates significant differences between 2012 and 2005 study results.

Table 33: Average Number of Fixtures by Fixture Type, 2000-2012

Fixture Type	2012 Census-adjusted weights, all spaces		2012 Strata weights, limited to 2005 CLASS spaces		2005		2000	
	Average # of Fixtures (n=1,987)	Error Bound	Average # of Fixtures (n=1,987)	Error Bound	Average # of Fixtures (n=847)	Error Bound	Average # of Fixtures (n = 1,255)	Error Bound
All Fixture Types	30.6	4.5	29.6	3.0	23.5	0.9	19.7	0.7
Ceiling Mounted	6.5	0.6	6.4	0.4	6.5	0.3	5.6	0.2
Floor/Table Lamp	4.8	0.3	5.0	0.3	-	-	-	-
Floor Lamp	-	-	-	-	0.9	0.1	0.8	0.1
Table Lamps	-	-	-	-	3.6	0.2	3.7	0.2
Torchiere	0.6	0.0	0.6	0.0	0.5	0.1	0.4	0.0
Wall Mounted	6.2	0.5	4.3	0.2	3.4	0.1	2.3	0.1
Recessed	6.8	0.4	7.6	0.4	-	-	-	-
Recessed Can	-	-	-	-	4.2	0.6	2.4	0.4
Recessed Lighting-Other	-	-	-	-	0.6	0.1	1.0	0.1
Suspended	1.5	0.0	1.6	0.0	1.3	0.1	1.3	0.1
Ceiling Fan	1.9	0.1	1.9	0.0	1.4	0.1	1.1	0.1
Track Lighting	0.3	0.0	0.4	0.0	0.3	0.1	0.4	0.1
Desk Lamp	0.4	0.0	0.4	0.0	-	-	-	-
Architecturally Integrated	-	-	-	-	0.2	0.1	0.3	0.1
Stove Top	0.4	0.0	0.4	0.0	-	-	-	-
Under Counter	0.7	0.1	0.8	0.1	0.4	0.1	0.2	0.0
Garage Door	0.1	0.0	0.1	0.0	0.3	0.0	0.2	0.0
Other Plug-In	0.1	0.0	0.1	0.0	-	-	-	-
Other Hard-Wired	0.3	0.0	0.1	0.0	-	-	-	-
Other	-	-	-	-	0.0	0.0	0.1	0.0

See Appendix G: Statistical Significance Testing for comparison details.

Table 34 displays the percentage of homes having each fixture type. Almost all homes have at least one ceiling mounted fixture and wall mounted fixture. Overall, using Census-adjusted weights, approximately 59% of homes have at least one recessed can fixture. Compared to previous CLASS

studies, about 63%% of homes have recessed cans using strata weights, up from 42% in 2005 and 33% in 2000.

Table 34: Percentage of Homes with Fixture Types, 2000-2012

Fixture Type	2012 Census-adjusted weights, all spaces		2012 Strata weights, limited to 2005 CLASS spaces		2005		2000	
	Percent of Homes (n=1987)	Error Bound	Percent of Homes (n=1987)	Error Bound	Percent of Homes (n=847)	Error Bound	Percent of Homes (n = 1255)	Error Bound
Ceiling Mounted	98.6%	1.4%	98.2%	1.3%	98.7%	0.7%	97.1%	0.8%
Floor/Table Lamp	90.3%	3.1%	91.3%	2.7%	-	-	-	-
Floor Lamp	-	-	-	-	47.2%	2.9%	48.2%	2.5%
Table Lamps	-	-	-	-	83.4%	2.1%	86.8%	1.7%
Torchiere	32.4%	2.9%	32.1%	2.6%	28.6%	2.6%	21.7%	2.1%
Wall Mounted	98.7%	1.3%	96.2%	1.6%	95.2%	1.2%	85.2%	1.8%
Recessed	58.5%	4.9%	63.1%	4.5%	-	-	-	-
Recessed Can	-	-	-	-	41.6%	2.8%	32.8%	2.4%
Recessed Lighting Other	-	-	-	-	18.4%	2.2%	31.9%	2.3%
Suspended	59.1%	3.3%	60.9%	3.0%	61.4%	2.8%	59.8%	2.5%
Ceiling Fan	60.4%	4.0%	60.5%	3.5%	56.0%	2.8%	49.4%	2.5%
Track Lighting	14.0%	2.1%	14.3%	2.0%	12.6%	1.9%	12.3%	1.6%
Desk Lamp	23.0%	2.5%	23.8%	2.5%	-	-	-	-
Architecturally Integrated	-	-	-	-	5.1%	1.2%	11.4%	1.6%
Stove Top	35.9%	2.5%	35.7%	2.2%	-	-	-	-
Under Counter	20.4%	2.2%	22.4%	2.1%	23.0%	2.4%	12.2%	1.6%
Garage Door	8.1%	1.4%	8.2%	1.1%	21.7%	2.4%	14.3%	1.7%
Other Plug-In	4.0%	1.1%	3.5%	0.9%	-	-	-	-
Other Hard-Wired	6.1%	1.2%	3.3%	0.8%	-	-	-	-
Other	-	-	-	-	2.3%	0.9%	2.9%	0.8%

See Appendix G: Statistical Significance Testing for comparison details.

Table 35 shows the distribution of the number of fixtures per home using Census-adjusted weights. About 29% of homes have a total of 11 to 20 fixtures and another 24% of homes have 21to 30 fixtures.

Table 35: Distribution of Number of Fixtures per Home, using Census-adjusted Weights

	Census-adjusted weights, all spaces	
	Percent of Homes (n=1987)	Error Bound
1 to 10	9.3%	1.7%
11 to 20	28.6%	2.5%
21 to 30	23.9%	2.1%
31 to 40	15.6%	1.6%
41 to 50	9.6%	1.2%
51 to 60	4.9%	0.8%
61 to 70	3.3%	0.7%
>71	4.7%	0.7%

Table 36 presents the distribution of the number of fixtures per home by residence type using Census-adjusted weights. As might be expected, apartments, mobile homes and duplexes have substantially fewer fixtures on average than do single family, unattached residences. Shading indicates the largest proportion per row.

Table 36: Distribution of Number of Fixtures per Home by Residence Type, using Census-adjusted Weights

Type of Residence	Census-adjusted weights, all spaces																Sample Size
	1 - 10 Fixtures		11 - 20 Fixtures		21 - 30 Fixtures		31 - 40 Fixtures		41 - 50 Fixtures		51 - 60 Fixtures		61 - 70 Fixtures		>70 Fixtures		
	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	
Overall	9.3%	1.7%	28.6%	2.5%	23.9%	2.1%	15.6%	1.6%	9.6%	1.2%	4.9%	0.8%	3.3%	0.7%	4.7%	0.7%	1,987
Single Family Detached	2.3%	1.1%	16.7%	2.6%	27.1%	2.7%	20.8%	2.3%	13.5%	1.7%	7.6%	1.2%	4.8%	1.1%	7.1%	1.0%	1,491
Apt 2-4 Units	28.1%	10.9%	34.8%	10.1%	19.4%	7.7%	7.5%	4.1%	5.3%	5.4%	0.4%	0.7%	2.0%	2.5%	2.5%	2.9%	96
Apt 5+ Units	25.3%	5.2%	58.4%	6.4%	12.3%	4.4%	2.9%	1.7%	0.7%	0.6%	0.1%	0.2%	0.1%	0.2%	0.2%	0.3%	251
Duplex (Single Story)	9.5%	8.1%	52.0%	14.3%	32.8%	13.7%	1.3%	2.1%	4.4%	4.3%	-	-	-	-	-	-	45
Mobile Home	1.5%	2.5%	46.3%	20.1%	33.6%	15.7%	17.7%	10.8%	0.8%	1.4%	-	-	-	-	-	-	34
Townhouse/ Rowhouse (2-4 Unit Multi-Story)	4.3%	4.0%	24.8%	9.2%	29.6%	9.6%	24.7%	11.5%	11.3%	7.2%	2.2%	2.5%	3.2%	3.7%	-	-	70

Table 37 displays the percentage of fixtures containing a compact fluorescent lamp by fixture type. Using strata weights, approximately 32% of fixtures contain a compact fluorescent lamp, which is significantly up by more than 20% from the previous CLASS report[24]. Floor lamps and torchiere fixtures are most likely to contain a compact fluorescent lamp. Approximately 43% of torchiere fixtures have a compact fluorescent lamp installed using strata weights, up from about 10% in 2005.

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[24] See Appendix G: Statistical Significance Testing for comparison details.

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Table 37: Percent of Fixtures Containing Compact Fluorescent Lamps by Fixture Type, 2000-2012

Fixture Type	2012 Census-adjusted weights, all spaces			2012 Strata weights, limited to 2005 CLASS spaces			2005			2000		
	Percent Fixtures with CFL	Error Bound	Sample Size (# Homes)	Percent Fixtures with CFL	Error Bound	Sample Size (# Homes)	Percent Fixtures with CFL	Error Bound	Sample Size (# Homes)	Percent Fixtures with CFL	Error Bound	Sample Size (# Homes)
Overall	33.2%	0.0%	1,987	32.1%	2.2%	1,987	10.6%	1.1%	847	0.8%	0.1%	1,255
Ceiling Mounted	32.5%	0.7%	1,952	32.4%	0.7%	1,948	10.3%	1.3%	836	1.0%	0.2%	1,211
Floor/Table Lamp	44.0%	0.7%	1,834	43.1%	0.6%	1,834	-	-	-	-	-	-
Floor Lamp	-	-	-	-	-	-	16.3%	2.7%	400	1.0%	0.5%	586
Table Lamps	-	-	-	-	-	-	14.9%	2.0%	709	1.2%	0.3%	1,085
Torchiere	44.2%	0.3%	637	42.6%	0.3%	633	9.5%	3.0%	242	1.5%	1.0%	298
Wall Mounted	35.0%	0.7%	1,970	35.0%	0.6%	1,913	11.0%	1.4%	806	0.6%	0.2%	1,083
Recessed	31.5%	0.5%	1,403	29.9%	0.5%	1,396	-	-	-	-	-	-
Recessed Can	-	-	-	-	-	-	10.3%	2.8%	353	0.4%	0.2%	380
Recessed Lighting-Other	-	-	-	-	-	-	3.9%	2.8%	156	1.1%	0.6%	398
Suspended	22.2%	0.3%	1,342	20.8%	0.3%	1,327	5.7%	1.4%	522	0.4%	0.3%	728
Ceiling Fan	36.0%	0.4%	1,319	35.6%	0.4%	1,307	12.1%	2.6%	476	0.7%	0.4%	644
Track Lighting	17.3%	0.1%	338	17.3%	0.1%	333	4.7%	2.8%	107	0.3%	0.4%	146
Desk Lamp	33.9%	0.2%	467	33.6%	0.2%	465	-	-	-	-	-	-
Architecturally Integrated	-	-	-	-	-	-	2.1%	2.2%	47	0.6%	0.7%	132
Stove Top	19.1%	0.2%	654	18.7%	0.2%	654	-	-	-	-	-	-
Under Counter	0.6%	0.0%	510	0.7%	0.0%	509	3.6%	1.8%	196	0.0%	0.0%	149
Garage Door	21.8%	0.1%	187	21.0%	0.1%	187	2.8%	1.9%	185	0.0%	0.0%	174
Other Plug-In	30.5%	0.1%	77	25.3%	0.1%	65	-	-	-	-	-	-
Other Hard-Wired	8.7%	0.1%	171	7.5%	0.0%	79	-	-	-	-	-	-
Other	-	-	-	-	-	-	4.0%	6.5%	19	0.0%	0.0%	41

Table 38 shows the percentage of homes which had compact fluorescent bulbs in each room type[25]. Over half of kitchens, living rooms, and offices used compact fluorescents in them. Compact fluorescent bulbs were also commonly used in exterior areas, with 57% of entryways and 46% of patios and porches lit by CFLs, using Census-adjusted weights.

Table 38: Percent of Homes with CFL by Room, 2005-2012

Room[a]	2012					2005		
	Census-adjusted weights, all spaces		Strata weights, limited to 2005 CLASS spaces					
	% of Homes	Error Bound	% of Homes	Error Bound	Sample Size	% of Homes	Error Bound	Sample Size
Bathroom - 1	50.8%	2.8%	50.4%	2.5%	1981	13.6%	2.1%	725
Bathroom - 2	46.9%	3.3%	46.7%	2.9%	1535	15.4%	2.5%	589
Bathroom - 3	47.3%	5.5%	46.5%	4.5%	686	15.3%	3.6%	270
Bathroom - 4	64.9%	11.0%	60.7%	9.8%	147	14.3%	8.9%	43
Bathroom - 5	69.7%	14.3%			42	-	-	-
Bedroom - 1	62.0%	3.0%	60.9%	2.7%	1943	14.7%	2.2%	736
Bedroom - 2	58.0%	3.0%	57.4%	2.7%	1719	19.5%	2.6%	649
Bedroom - 3	57.9%	3.6%	56.7%	3.2%	1211	16.8%	2.9%	475
Bedroom - 4	60.7%	5.5%	57.6%	5.1%	471	17.8%	5.0%	166
Bedroom - 5	63.1%	14.4%	63.2%	13.0%	95	25.1%	13.5%	29
Closet	39.1%	3.8%	39.2%	3.4%	1033	10.4%	2.9%	298
Dining Room	34.0%	3.3%	32.8%	2.8%	1288	8.1%	1.9%	581
Exterior - Entry	57.4%	3.5%	54.6%	3.0%	1237	19.0%	2.7%	578
Exterior - Other	46.7%	4.3%			1144	-	-	-
Exterior - Porch/Patio	46.2%	3.8%			1049	-	-	-
Garage	35.2%	3.3%	33.8%	2.8%	1324	11.1%	2.5%	440
Hallway	51.0%	3.2%	51.2%	2.8%	1810	12.8%	2.0%	744
Kitchen	54.2%	3.1%	54.1%	2.7%	1977	14.5%	2.0%	834
Laundry/Utility Room	36.2%	3.6%	35.9%	3.0%	1040	10.7%	2.8%	331
Living Room	67.1%	3.3%	66.3%	2.9%	1909	23.8%	2.7%	672
Office	53.7%	5.0%	51.5%	4.3%	834	18.1%	3.9%	274
Other	43.5%	7.6%	44.5%	7.2%	304	13.8%	5.6%	104

[a] The following Room types had a sample size of less than 20, and are omitted from the table: Bathroom-6, 7 and Master; Bedroom 6, 7, 8 and Master.

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[25] The numbers in the labels for bathrooms and bedrooms indicate the nth room that was observed in a home. The rooms were visited in the order they were accessible to the field surveyor.

Prevalence of LEDs

The following tables demonstrate the prevalence and distribution of homes with light-emitting diodes (LEDs). Information on LEDs was not collected in the 2005 study, so only Census-weighted results are presented in this section.

The usage of LED lights is yet to be widely adopted, as is witnessed in Table 39 below, which shows the percentage of homes with LEDs by room using Census-adjusted weights. LEDs are most commonly used in the kitchen, followed by offices, living rooms, other exterior, and bedrooms.

Table 39: Percent of Homes with LED by Room, using Census-adjusted Weights

Room[a]	Census-adjusted weights, all spaces		
	Percentage of Homes	Error Bound	Sample Size
Bathroom - 1	0.7%	0.3%	1981
Bathroom - 2	1.0%	0.5%	1535
Bathroom - 3	1.4%	0.7%	686
Bathroom - 4	0.7%	0.8%	147
Bathroom - 5	2.0%	3.2%	42
Bedroom - 1	1.3%	0.6%	1943
Bedroom - 2	1.4%	0.6%	1719
Bedroom - 3	1.6%	0.8%	1211
Bedroom - 4	0.8%	0.6%	471
Bedroom - 5	2.5%	2.6%	95
Closet	0.5%	0.5%	1033
Dining Room	0.9%	0.5%	1288
Exterior - Entry	1.1%	0.5%	1237
Exterior - Other	2.5%	1.1%	1144
Exterior - Porch/Patio	1.8%	1.1%	1049
Garage	0.3%	0.3%	1324
Hallway	1.7%	0.7%	1810
Kitchen	3.0%	1.0%	1977
Laundry/Utility Room	0.4%	0.4%	1040
Living Room	2.5%	0.8%	1909
Office	2.8%	1.3%	834
Other	1.4%	1.1%	304

[a] The following Room types had a sample size of less than 20, and are omitted from the table: Bathroom-6, 7 and Master; Bedroom 6, 7, 8 and Master.

Table 40 shows the percentage of homes with LEDs by type of residence. Single family detached residences are most likely to have had one or more LEDs installed, with approximately 12% of homes having them.

Table 40: Percent of Homes with LED by Type of Residence, using Census-adjusted Weights

Type of Residence	Census-adjusted weights, all spaces		
	Percentage of Homes	Error Bound	Sample Size
Single Family Detached	11.7%	2.8%	1491
Apt 2-4 Units	3.4%	5.1%	96
Apt 5+ Units	3.5%	2.7%	251
Duplex (Single Story)	2.6%	3.0%	45
Mobile Home	4.0%	9.2%	34
Townhouse/Rowhouse (2-4 Unit Multi-Story)	4.6%	4.4%	70

General Lamp Types

Table 41 shows the average number of lamps per fixture by fixture type. Suspended fixtures contain more lamps (3.0 lamps) than any other fixture type. Track lighting has an average of 2.7 lamps and ceiling fans contain 2.3 lamps on average.

Table 41: Average Number of Lamps per Fixture, using Census-adjusted Weights

Fixture Type	Census-adjusted weights, all spaces		
	Lamps per Fixture		
	Average # per Fixture	Error Bound	Sample Size (# Homes)
Ceiling-Mounted	1.5	0.8	1,952
Floor/Table Lamp	1.1	0.4	1,834
Torchiere	1.1	0.0	637
Wall Mounted	1.8	0.8	1,970
Recessed	1.1	0.4	1,403
Suspended	3.0	0.1	1,342
Ceiling Fan	2.3	0.1	1,319
Track Lighting	2.7	0.1	338
Desk Lamp	1.0	0.0	467
Garage Door	1.4	0.0	187
Under Counter	1.3	0.1	510
Stove Top	1.3	0.0	654
Other Hard-Wired	1.3	0.1	171
Other Plug-in	1.4	0.0	77

Table 42 presents the average number of lamps per home by general lamp type. Fluorescent lamps include circline , u-bend and linear fluorescent. Overall, homes have 46.7 lamps on average using Census-adjusted weights, and 46.1 using strata weights for limited spaces, a significant increase of

almost ten lamps per home from 2005. Incandescent lamps are still the most prevalent; however, the average home in 2012 was found to have just over 22 incandescent lamps, significantly down from 30.7 in 2005. The number of CFLs has jumped from 0.3 lamps in 2000 and 3.5 lamps per home in 2005 to 13.1 lamps per home in 2012.

Table 42: Average Number of Lamps by General Lamp Type, 2000-2012

Lamp Type	2012		2005	2000
	Census-adjusted weights, all spaces	Strata weights, limited to 2005 CLASS spaces		
	Average # of Lamps (n = 1987)	Average # of Lamps (n = 1987)	Average # of Lamps (n = 847)	Average # of Lamps (n = 1255)
All Lamp Types	46.7	46.1	40.6	33.8
Compact Fluorescent	13.6	13.1	3.5	0.3
Fluorescent	5.1	5.3	4.8	5.2
Halogen	3.9	3.6	1.6	0.9
HID	0.04	0.02	-	-
Incandescent	22.3	22.5	30.7	27.3
LED	0.5	0.5	-	-
Socket Empty	1.1	1.0	-	-

See Appendix G: Statistical Significance Testing for comparison details.

Table 43[26] shows the percentage of all sockets by general lamp type. Almost 49% of all lamps are incandescent lamps using the strata weights with limited spaces, a significant decrease from 76% in 2005. Compact fluorescent lamps have seen a large increase from around 1% from the 2000 study to about 29% presently. Halogen lamps have also grown in popularity, from 4% in 2005 to approximately 8% in 2012. This trend is likely due to the emergence of MR-16 style lamps which are being specified more often in new construction and remodels.

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[26] See Appendix G: Statistical Significance Testing for details on comparison of 2012 to 2005. See Table 10 results for content of Table 43.

Table 43: Distribution of Sockets by Lamp Types, 2000-2012

| Lamp Type | 2012 | | 2005 | 2000 |
| | Census-adjusted weights, all spaces | Strata weights, limited to 2005 CLASS spaces | | |
	Percent of Total Lamps (n=1,987)	Percent of Total Lamps (n=1,987)	Percent of Total Lamps (n=847)	Percent of Total Lamps (n = 1,255)
Compact Fluorescent	29.2%	28.5%	8.6%	0.9%
Fluorescent	10.9%	11.4%	11.7%	15.4%
Halogen	8.4%	7.7%	3.8%	2.8%
HID	0.1%	0.0%	-	-
Incandescent	47.7%	48.9%	75.6%	80.8%
LED	1.1%	1.2%	-	-
Socket Empty	2.4%	2.2%	-	-

Figure 21 presents the proportion of the general lamp types as a percentage of lamps installed for each type of fixture. Despite the increase in the popularity of CFLs, only torchiere fixtures and desk lamps have CFLs as the highest proportion of installed lamps in those fixture types. All of the other fixture types have incandescent lamps as the largest percentage of installed lamps.

Figure 21 Distribution of Lamp Types for Total Lamps Installed by Fixture Type, using Census-adjusted Weights
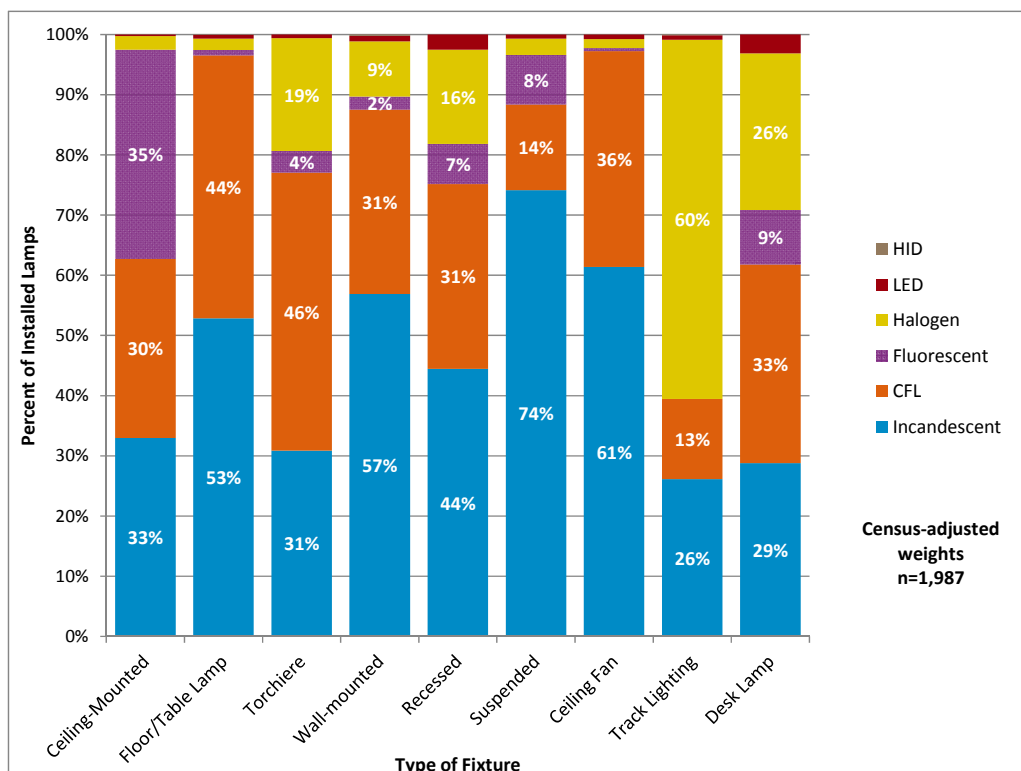
Table 44 shows the percentage of homes where a particular lamp type is present. Virtually all homes are equipped with at least one incandescent lamp and one compact fluorescent lamp. For compact fluorescents, this is a huge jump from the previous 2005 study[27], which found that only 57% of all homes contained a compact fluorescent lamp. Fluorescent T8 and halogens also saw an increase in the percentage of homes in which these lamps were found.

Table 44: Percentage of Homes with General Lamp Types, 2000-2012

| | 2012 | | 2005 | 2000 |
| | Census-adjusted weights, all spaces | Strata weights, limited to 2005 CLASS spaces | | |
Lamp Type	Percent of Homes (n=1,987)	Percent of Homes (n=1,987)	Percent of Homes (n=847)	Percent of Homes (n = 1,255)
Compact Fluorescent	96.8%	95.9%	56.9%	12.4%
Fluorescent T8	17.3%	18.3%	4.4%	4.7%
Fluorescent T12	57.5%	59.8%	65.0%	64.9%
Halogen	52.7%	46.2%	31.3%	32.2%
HID	2.5%	1.1%	0.1%	-
Incandescent	96.5%	96.7%	99.2%	99.9%
LED	8.6%	8.6%	-	-
Socket Empty	37.9%	36.1%	-	-

Table 45 displays the distribution of the number of lamps per home. More than one-third of homes have more than 50 lamps. This finding combined with findings about the number of fixtures per home suggests that most homes are equipped with fixtures containing more than one lamp.

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[27] See Appendix G: Statistical Significance Testing for details on comparison of 2012 to 2005. The results for Table 8 are comparable to the content of Table 44.

Table 45: Distribution of Number of Lamps per Home, using Census-adjusted Weights

Number of Lamps	Census-adjusted weights, all spaces	
	Percentage of Homes (n = 1,987)	Error Bound
1 to 10	2.8%	0.8%
11 to 20	17.7%	2.2%
21 to 30	17.7%	2.3%
31 to 40	13.5%	1.7%
41 to 50	12.0%	1.5%
51 to 60	10.2%	1.3%
61 to 70	8.1%	1.2%
>70	18.0%	1.4%

Table 46 presents the distribution of the number of lamps per home by residence type. As might be expected, apartments, mobile homes, and duplexes/triplexes/quadplexes have substantially fewer fixtures and lamps on average than do single family, unattached residences. Also, single family, unattached residences that are two or more stories contain significantly more lamps than single family, unattached residences that are one story. Shading indicates the largest proportion per row.

Table 46: Distribution Of Number Of Lamps Per Home By Residence Type, using Census-adjusted Weights

Type of Residence	Census-adjusted weights, all spaces																Sample Size
	1 to 10 Lamps		11 to 20 Lamps		21 to 30 Lamps		31 to 40 Lamps		41 to 50 Lamps		51 to 60 Lamps		61 to 70 Lamps		>70 Lamps		
	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	
Overall	2.8%	0.8%	17.7%	2.2%	17.7%	2.3%	13.5%	1.7%	12.0%	1.5%	10.2%	1.3%	8.1%	1.2%	18.0%	1.4%	1,987
Single Family Detached	0.6%	0.4%	6.8%	2.0%	12.4%	2.2%	12.8%	2.0%	15.4%	2.1%	13.3%	1.9%	11.9%	1.7%	26.9%	2.0%	1,491
Apt 2-4 Units	7.0%	4.4%	39.2%	11.2%	17.2%	9.1%	15.8%	7.2%	6.9%	4.2%	8.4%	5.8%	0.5%	0.9%	4.9%	3.8%	96
Apt 5+ Units	8.1%	3.0%	43.7%	5.9%	33.1%	7.0%	9.0%	3.3%	2.0%	1.3%	1.7%	1.2%	0.7%	0.7%	1.7%	1.6%	251
Duplex (Single Story)	6.5%	7.5%	29.1%	12.6%	24.7%	13.9%	26.9%	12.1%	7.4%	6.0%	5.4%	4.6%	0.0%	0.0%	0.0%	0.0%	45
Mobile Home	1.5%	2.5%	15.1%	15.6%	14.4%	12.1%	43.2%	18.8%	15.3%	9.0%	5.3%	6.1%	0.8%	1.4%	4.2%	6.8%	34
Townhouse/ Rowhouse (2-4 Unit Multi-Story)	0.0%	0.0%	6.6%	5.3%	22.3%	9.0%	14.5%	6.3%	20.5%	8.9%	14.8%	6.9%	11.6%	10.6%	9.7%	6.9%	70

Table 47 shows the average number of lamps per home with screw or pin bases. Screw-based lamps are the most prevalent, with 36.5 lamps per home, compared to 8.6 pin-based lamps per home, using Census-adjusted weights. The number of pin-base lamps increased significantly compared to 2005.

Table 47: Average Number of Lamps per Home by Base Type, 2005-2012

| Lamp Base Type | 2012 | | | | 2005 | |
| | Census-adjusted weights, all spaces | | Strata weights, limited to 2005 CLASS spaces | | | |
	Average Number of Lamps per Home (n=1987)	Error Bound	Average Number of Lamps per Home (n=1987)	Error Bound	Average Number of Lamps per Home (n=847)	Error Bound
Screw Base	36.5	4.9	36.0	3.4	34.6	1.3
Pin Base	8.6	0.5	8.8	0.5	6.0	0.5
Missing	1.5	-	1.3	-	-	-

See Appendix G: Statistical Significance Testing for comparison details.

4.1.2 Specific Fixture Overviews

This section presents in-depth overviews for recessed cans, ceiling fans, and torchiere fixtures. These fixture types were selected for further analysis because efficient lighting technologies are currently being developed for these fixture types. For each of these fixture types, the distribution of the number of fixtures as well as the percentage of homes containing these fixtures is presented.

Recessed Cans

About 58% of homes have at least one recessed can. On average, homes contain 6.8 recessed cans. Table 48 presents the distribution of the number of recessed cans per home. Approximately 42% of homes have no recessed cans present. About 23% of home have between of 1- 4 cans and another 15% have between 5 and 10 cans.

Table 48: Distribution of the Number of Recessed Cans per Home, using Census-adjusted Weights

Number of Recessed Cans	Census-adjusted weights, all spaces	
	Percentage of Homes (n = 1,987)	Error Bound
0	41.5%	2.8%
1-4	22.7%	2.0%
5-7	8.9%	1.3%
8-10	6.0%	1.1%
11-20	11.5%	1.4%
21+	9.3%	1.0%

Table 49 shows the percentage of homes with recessed cans by room type. Over 40% of homes had recessed cans in the kitchen. Recessed cans were also commonly found in bathrooms, hallways, and living rooms. Almost all room types had significantly more recessed cans compared to the 2005 study.

Table 49: Percentage of Homes with Recessed Cans by Room, 2005-2012

Room[a]	2012					2005		
	Census-adjusted weights, all spaces		Strata weights, limited to 2005 CLASS spaces					
	% of Homes	Error Bound	% of Homes	Error Bound	Sample Size	% of Homes	Error Bound	Sample Size
Bathroom - 1	23.2%	2.2%	25.1%	2.1%	1981	6.6%	1.5%	725
Bathroom - 2	27.5%	2.7%	29.0%	2.6%	1535	19.5%	2.7%	589
Bathroom - 3	36.8%	4.7%	37.7%	4.2%	686	10.7%	3.1%	270
Bathroom - 4	45.4%	12.9%	45.4%	10.6%	147	21.2%	10.3%	43
Bathroom - 5	67.1%	17.0%			42			
Bedroom - 1	8.5%	1.4%	9.7%	1.4%	1943	2.2%	0.9%	736
Bedroom - 2	6.2%	1.2%	6.7%	1.2%	1719	6.1%	1.6%	649
Bedroom - 3	8.0%	1.7%	8.4%	1.7%	1211	1.5%	0.9%	475
Bedroom - 4	10.5%	3.1%	10.6%	2.9%	471	1.3%	1.4%	166
Bedroom - 5	15.2%	6.6%	17.3%	7.3%	95	7.2%	8.0%	29
Closet	11.2%	1.9%	12.8%	2.0%	1033	7.9%	2.6%	298
Dining Room	12.4%	1.9%	13.3%	1.8%	1288	7.2%	1.8%	581
Exterior - Entry	7.9%	1.5%	8.9%	1.5%	1237	7.1%	1.8%	578
Exterior - Other	7.2%	1.6%			1144			
Exterior - Porch/Patio	5.2%	1.4%			1049			
Garage	1.9%	1.2%	1.8%	0.9%	1324	0.5%	0.5%	440

| Room[a] | 2012 | | | | | 2005 | | |
| | Census-adjusted weights, all spaces | | Strata weights, limited to 2005 CLASS spaces | | | | | |
	% of Homes	Error Bound	% of Homes	Error Bound	Sample Size	% of Homes	Error Bound	Sample Size
Hallway	34.7%	3.2%	38.1%	3.0%	1810	23.7%	2.6%	744
Kitchen	42.5%	2.9%	47.1%	2.7%	1977	25.7%	2.5%	834
Laundry/Utility Room	16.0%	2.3%	17.4%	2.2%	1040	8.4%	2.5%	331
Living Room	20.3%	2.4%	22.8%	2.4%	1909	9.6%	1.9%	672
Office	14.6%	2.8%	15.0%	2.5%	834	8.2%	2.8%	274
Other	19.3%	4.8%	21.8%	5.1%	304	8.9%	4.6%	104

[a] The following Room types had a sample size of less than 20, and are omitted from the table: Bathroom-6, 7 and Master; Bedroom 6, 7, 8 and Master.

See Appendix G: Statistical Significance Testing for comparison details.

Table 50 displays the percentage of homes with recessed cans by age of the home. Homes constructed from 1990 to 1999 are most likely to contain recessed cans.

Table 50: Percentage of Homes with Recessed Cans by Age of Home, using Census-adjusted Weights

| Age of Home | Census-adjusted weights, all spaces | | |
	Percentage of Homes	Error Bound	Sample Size
1969 or Earlier	49.1%	7.3%	742
1970-1979	57.5%	10.2%	365
1980-1989	70.9%	11.3%	315
1990-1999	83.5%	13.4%	190
2000 or Later	79.8%	14.4%	275
Unknown	28.9%	12.3%	100

Table 51 displays the average number of recessed cans per home by age of home. Homes built in 2000 or later contain substantially more recessed cans on average than do homes built prior to 1990.

Table 51: Average Number of Recessed Cans per Home by Age of Home, using Census-adjusted Weights

Age of Home	Census-adjusted weights, all spaces		Sample Size
	Number of Recessed Cans	Error Bound	
1969 or Earlier	5.2	0.4	742
1970-1979	5.6	0.6	365
1980-1989	6.4	1.0	315
1990-1999	11.8	2.9	190
2000 or Later	14.9	3.6	275
Unknown	1.1	0.2	100

Ceiling Fans

Data were only collected and analyzed for ceiling fans that are designed to contain lamps and all further percentages mentioned in this section refer to ceiling fans designed to contain one or more lamps. Approximately 60% of homes have at least one ceiling fan. On average, homes contain 1.9 ceiling fans, using Census-adjusted weights.

Table 52 displays the distribution of the number of ceiling fans per home. Approximately 40% of homes do not have any ceiling fans. Approximately 15% of homes have five or more ceiling fans.

Table 52: Distribution of the Number Of Ceiling Fans Per Home, using Census-adjusted Weights

Number of Ceiling Fans	Census-adjusted weights, all spaces	
	Percent of Homes (n = 1,987)	Error Bound
0	39.6%	2.5%
1	18.5%	2.0%
2	11.2%	1.5%
3	8.2%	1.4%
4	7.7%	1.2%
5+	14.8%	1.5%

Table 53 presents the percentage of homes with ceiling fans by room type. About a third of homes have a ceiling fan in the bedroom, followed by about 30% of homes having one in the office and over 25% have one in the living room or dining room. Significantly more homes have ceiling fans in kitchens, living rooms, bedrooms and offices compared to the 2005 study.

Table 53: Percentage of Homes with Ceiling Fans by Room, 2005-2012

| Room[a] | 2012 | | | | | 2005 | | |
| | Census-adjusted weights, all spaces | | Strata weights, limited to 2005 CLASS spaces | | | | | |
	% of Homes	Error Bound	% of Homes	Error Bound	Sample Size	% of Homes	Error Bound	Sample Size
Bathroom - 1	0.5%	0.3%	0.6%	0.3%	1981	0.7%	0.5%	725
Bathroom - 2	0.8%	0.5%	0.9%	0.4%	1535	2.6%	1.1%	589
Bathroom - 3	0.5%	0.5%	0.6%	0.5%	686	1.5%	1.3%	270
Bathroom - 4	0.2%	0.3%	0.3%	0.5%	147	4.8%	5.5%	43
Bedroom - 1	32.2%	2.4%	33.5%	2.1%	1943	21.9%	2.5%	736
Bedroom - 2	31.7%	2.5%	33.5%	2.2%	1719	33.7%	3.1%	649
Bedroom - 3	37.2%	3.1%	39.1%	2.9%	1211	27.4%	3.4%	475
Bedroom - 4	37.4%	4.7%	38.6%	4.5%	471	31.8%	6.0%	166
Bedroom - 5	29.4%	8.8%	32.8%	9.5%	95	13.9%	10.7%	29
Closet	0.3%	0.2%	0.4%	0.3%	1033	0.7%	0.8%	298
Dining Room	26.9%	3.1%	24.8%	2.5%	1288	23.6%	2.9%	581
Exterior - Entry	0.0%	0.1%	0.1%	0.1%	1237	0.7%	0.6%	578
Exterior - Other	1.4%	0.8%			1144			
Exterior - Porch/Patio	4.1%	1.0%			1049			
Garage	1.5%	0.7%	1.5%	0.7%	1324	0.7%	0.7%	440
Hallway	2.1%	1.0%	1.9%	0.7%	1810	1.7%	0.8%	744
Kitchen	14.9%	1.9%	14.4%	1.7%	1977	7.9%	1.6%	834
Laundry/Utility Room	1.3%	0.7%	1.3%	0.6%	1040	0.3%	0.5%	331
Living Room	27.2%	2.5%	27.9%	2.1%	1909	13.3%	2.2%	672
Office	29.5%	4.5%	28.9%	3.4%	834	19.0%	3.9%	274
Other	13.0%	3.7%	13.8%	3.6%	304	9.9%	4.9%	104

[a] The following Room types had a sample size of less than 20, and are omitted from the table: Bathroom-6, 7 and Master; Bedroom 6, 7, 8 and Master.

See Appendix G: Statistical Significance Testing for comparison details.

Table 54 shows the distribution of the number of lamps per ceiling fan. About one-third of ceiling fans contain a single lamp

Table 54: Distribution of Number of Lamps per Ceiling Fan, using Census-adjusted Weights

Number of Lamps	Census-adjusted weights, all spaces	
	Percent of Fans (n = 1,319 Homes)	Error Bound
1	33.9%	1.6%
2	19.5%	1.3%
3	19.1%	1.3%
4	19.5%	1.3%
5	0.9%	0.2%
6	0.1%	0.0%
7	0.1%	0.1%
Socket Empty	6.8%	0.8%

. Table 55 presents the percent of various lamp types installed in ceiling fan s. More than half of all lamps contained in ceiling fans are incandescent lamps (54%) and over a third are compact fluorescent lamps (36%).

Table 55: Distribution of Lamp Types Installed in Ceiling Fans, using Census-adjusted Weights

Lamp Type	Census-adjusted weights, all spaces	
	Percentage of Ceiling Fans (n = 1,319)	Error Bound
CFL A-Type	1.8%	0.5%
CFL Decorative	0.7%	0.3%
CFL Globe	0.5%	0.2%
CFL Reflector/Flood	0.2%	0.2%
CFL Spiral	32.5%	1.6%
CFL U-Bend	0.3%	0.2%
Compact Fluorescent Total	**36.0%**	**0.0%**
Incandescent A-Type	37.3%	1.6%
Incandescent Decorative	12.4%	1.1%
Incandescent Globe	3.0%	0.6%
Incandescent Reflector/Flood	1.1%	0.4%
Incandescent Total	**53.8%**	**0.0%**
Halogen "G" Type, bi-pin	0.6%	0.2%
Halogen A-Type	0.1%	0.1%
Halogen Decorative	0.1%	0.1%
Halogen Linear tube/Tubular	0.6%	0.2%

	Census-adjusted weights, all spaces	
Lamp Type	Percentage of Ceiling Fans (n = 1,319)	Error Bound
Halogen Low Voltage	0.1%	0.1%
Halogen MR-16 pin Based	0.3%	0.2%
Halogen Reflector/Flood	0.2%	0.1%
Halogen Total	**2.0%**	**0.0%**
LED A-Type	0.3%	0.2%
LED Decorative	0.2%	0.1%
LED Globe	0.1%	0.1%
LED Total	**0.6%**	**0.0%**
Fluorescent Circline	0.5%	0.2%
Fluorescent Linear tube/Tubular	0.2%	0.2%
Fluorescent U-Bend	0.1%	0.0%
Fluorescent Total	**0.8%**	**0.0%**
Socket Empty Total	**6.7%**	**0.0%**

Torchiere Fixtures

About 32% of homes have at least one torchiere fixture. Table 56 shows the distribution of the number of torchiere fixtures per home. Approximately 19% of all homes have only one torchiere fixture.

Table 56: Distribution of the Number of Torchiere Fixtures per Home, using Census-adjusted Weights

Number of Torchiere Fixtures	Census-adjusted weights, all spaces	
	Percent of Homes (n = 1987)	Error Bound
0	67.6%	2.3%
1	19.4%	2.1%
2	7.0%	1.1%
3	3.4%	0.8%
4	1.4%	0.6%
5+	1.2%	0.4%

Table 57 shows the percentage of homes with at least one torchiere fixture by room type. Almost 20% of homes had at least one torchiere in the living room, significantly up from 15% in the previous CLASS study.

Table 57: Percentage of Homes with Torchiere Fixtures by Room, 2005-2012

Room[a]	2012					2005		
	Census-adjusted weights, all spaces		Strata weights, limited to 2005 CLASS spaces					
	% of Homes	Error Bound	% of Homes	Error Bound	Sample Size	% of Homes	Error Bound	Sample Size
Bathroom - 1	0.1%	0.1%	0.1%	0.2%	1981	0.3%	0.3%	725
Bathroom - 2	0.1%	0.1%	0.1%	0.1%	1535	0.2%	0.3%	589
Bathroom - 3	0.2%	0.2%	0.3%	0.3%	686	0.4%	0.6%	270
Bedroom - 1	8.6%	1.7%	8.2%	1.4%	1943	7.3%	1.6%	736
Bedroom - 2	7.1%	1.4%	7.2%	1.3%	1719	6.6%	1.6%	649
Bedroom - 3	7.9%	1.9%	7.7%	1.6%	1211	8.4%	2.1%	475
Bedroom - 4	7.1%	3.2%	5.9%	2.3%	471	5.2%	2.9%	166
Bedroom - 5	13.0%	8.6%	13.6%	8.4%	95	-	-	29
Closet	0.1%	0.1%	0.1%	0.1%	1033	-	-	298
Dining Room	3.2%	1.3%	3.0%	1.1%	1288	1.9%	0.9%	581
Exterior - Entry	0.3%	0.4%	0.2%	0.3%	1237	-	-	578
Exterior - Other	0.3%	0.3%			1144			
Exterior - Porch/Patio	0.5%	0.5%			1049			
Garage	0.5%	0.4%	0.7%	0.5%	1324	-	-	440
Hallway	0.5%	0.4%	0.5%	0.3%	1810	0.1%	0.2%	744
Kitchen	0.3%	0.3%	0.4%	0.3%	1977	0.1%	0.2%	834
Laundry/Utility Room	0.1%	0.2%	0.3%	0.4%	1040	0.3%	0.5%	331
Living Room	19.6%	2.2%	19.4%	2.0%	1909	15.5%	2.3%	672
Office	8.1%	2.1%	8.7%	2.1%	834	11.0%	3.1%	274
Other	3.4%	1.9%	3.8%	2.0%	304	3.9%	3.2%	104

[a] The following Room types had a sample size of less than 20, and are omitted from the table: Bathroom-6, 7 and Master; Bedroom 6, 7, 8 and Master.

See Appendix G: Statistical Significance Testing for comparison details.

Table 58 displays the percentage of torchiere fixtures equipped with each lamp type. About 45% of all torchiere fixtures contain a compact fluorescent lamp and about 30% have an incandescent lamp. The compact fluorescents found were primarily of the spiral shape.

Table 58: Distribution of Lamp Types Installed in Torchiere Fixtures, using Census-adjusted Weights

Lamp Type	Census-adjusted weights, all spaces	
	Percentage of Torchieres of Lamps (n = 637)	Error Bound
CFL A-Type	1.3%	0.7%
CFL Globe	0.1%	0.2%
CFL Linear tube/Tubular	0.1%	0.2%
CFL Reflector/Flood	0.8%	0.6%
CFL Spiral	41.5%	3.4%
CFL U-Bend	0.9%	0.6%
Compact Fluorescent Total	**44.7%**	**5.7%**
Incandescent A-Type	24.2%	2.6%
Incandescent Bullet or Post	0.1%	0.1%
Incandescent Decorative	3.8%	3.2%
Incandescent Globe	1.2%	0.9%
Incandescent Reflector/Flood	0.5%	0.3%
Incandescent Total	**29.8%**	**7.1%**
Halogen "G" Type, bi-pin	1.3%	0.8%
Halogen A-Type	1.5%	0.8%
Halogen Linear tube/Tubular	15.0%	2.1%
Halogen Low Voltage	0.1%	0.1%
Halogen MR-16 pin Based	0.1%	0.2%
Halogen Reflector/Flood	0.1%	0.2%
Halogen Total	**18.1%**	**4.2%**
LED A-Type	0.3%	0.2%
LED Reflector/Flood	0.3%	0.3%
LED Total	**0.6%**	**0.6%**
Fluorescent Circline	3.0%	0.8%
Fluorescent Linear tube/Tubular	0.2%	0.4%
Fluorescent U-Bend	0.2%	0.1%
Fluorescent (Other)	0.1%	0.1%
Fluorescent Total	**3.5%**	**1.4%**
Socket Empty Total	**3.2%**	**1.1%**

4.1.3 Room Lighting Analysis

This section contains lighting results by room type. Room types that were found in at least one hundred surveyed homes are shown here. For each room type, the percentage of homes with a given

fixture type and lamp type are shown. Shading in these tables indicate the most prevalent fixture types overall, lamp types overall and combination lamp and fixture type.

The results presented in this section have all been produced using Census-adjusted weights.
Results using strata weights are presented in
Table 155 through Table 172 in 6 Appendix A: 2012 CLASS Lighting Results Using Strata Weights.

 The following fixture types were surveyed:

- Ceiling-Mounted
- Floor/Table Lamp
- Torchiere
- Wall-Mounted
- Recessed
- Suspended
- Ceiling Fan
- Track Lighting
- Desk Lamp
- Garage Door
- Under Counter
- Stove Top
- Other Hard-Wired
- Other Plug-In

Kitchen

Table 59 presents the percentage of homes with a given fixture type and lamp type in the kitchen along with the associated error bound. The most predominant fixture and lamp type combinations are ceiling mounted, recessed, and stove top fixtures. Ceiling-mounted fluorescent lights are the most common fixture.

Table 59: Percentage Of Homes With Fixture Type And Lamp Type In Kitchen, using Census-adjusted Weights

Fixture Type	Census-adjusted weights (n= 1,977)															
	Lamp Type															
	Overall		Incandescent		CFL		LED		Fluorescent		Halogen		HID		Socket Empty	
	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB
Overall	-	-	58.5%	3.0%	54.2%	3.1%	3.0%	1.0%	49.9%	2.7%	17.8%	2.2%	0.2%	0.2%	6.8%	1.7%
Ceiling-Mounted	60.7%	3.1%	14.5%	1.9%	23.8%	2.7%	0.2%	0.2%	32.0%	2.5%	1.1%	0.5%	-	-	3.4%	1.2%
Floor/Table Lamp	3.7%	1.0%	1.8%	0.6%	1.6%	0.7%	0.1%	0.2%	-	0.1%	0.2%	0.2%	-	-	0.3%	0.4%
Torchiere	0.3%	0.3%	-	-	0.1%	0.2%	-	-	0.1%	0.1%	0.1%	0.2%	-	-	-	-
Wall-Mounted	3.7%	1.0%	1.2%	0.5%	1.8%	0.8%	-	-	0.4%	0.3%	0.1%	0.1%	-	-	0.1%	0.1%
Recessed	42.5%	2.9%	19.7%	2.0%	18.7%	2.1%	1.6%	0.7%	6.8%	1.2%	6.2%	1.3%	-	-	0.6%	0.4%
Suspended	20.2%	2.2%	12.4%	1.8%	6.8%	1.2%	0.4%	0.3%	0.1%	0.1%	1.8%	0.6%	-	-	0.3%	0.2%
Ceiling Fan	14.9%	1.9%	9.0%	1.5%	6.5%	1.3%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	-	-	1.2%	0.5%
Track Lighting	3.9%	1.0%	1.1%	0.6%	1.0%	0.6%	-	-	-	-	1.9%	0.7%	0.1%	0.1%	0.1%	0.2%
Desk Lamp	0.6%	0.5%	0.1%	0.1%	0.3%	0.2%	-	-	0.1%	0.1%	0.2%	0.4%	-	-	-	-
Under Counter	16.8%	2.0%	0.5%	0.2%	0.2%	0.2%	0.9%	0.5%	11.9%	1.7%	3.8%	1.0%	-	-	0.2%	0.1%
Stove Top	35.9%	2.5%	19.4%	2.0%	7.2%	1.3%	0.1%	0.2%	0.7%	0.3%	7.0%	1.2%	0.1%	0.1%	1.6%	1.0%
Other Hard-Wired	0.5%	0.3%	0.1%	0.1%	-	-	-	-	0.4%	0.3%	0.1%	0.1%	-	-	-	-
Other Plug-In	0.1%	0.1%	-	-	0.1%	0.1%	-	0.1%	-	-	0.1%	0.1%	-	-	-	-

Bedrooms

Table 60, Table 61, Table 62, and Table 63 present the percentage of homes with a given fixture type and lamp type in the bedrooms, as well as the error bounds associated with these estimates. The most predominant fixture and lamp type combinations are floor/table lamps with incandescents and compact fluorescents, ceiling fans with incandescents, as well as ceiling mounted incandescents and compact fluorescents.

Table 60: Percentage of Homes with Fixture Type and Lamp Type in Bedroom 1, using Census-adjusted Weights

Fixture Type	Census-adjusted weights (n= 1,943)															
	Lamp Type															
	Overall		Incandescent		CFL		LED		Fluorescent		Halogen		HID		Socket Empty	
	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB
Overall	-	-	63.7%	3.1%	62.0%	3.0%	1.3%	0.6%	3.5%	0.8%	8.5%	1.5%	0.1%	0.1%	8.5%	1.5%
Ceiling-Mounted	26.3%	2.6%	12.5%	1.9%	12.6%	1.7%	0.2%	0.2%	1.2%	0.5%	0.5%	0.4%	-	-	2.6%	0.9%
Floor/Table Lamp	64.8%	3.1%	37.8%	2.8%	35.7%	2.8%	0.3%	0.2%	0.7%	0.4%	1.3%	0.6%	0.0%	0.1%	2.5%	0.9%
Torchiere	8.6%	1.7%	2.9%	0.9%	4.4%	1.3%	-	-	0.4%	0.4%	1.3%	0.5%	-	-	0.5%	0.4%
Wall-Mounted	7.0%	1.5%	3.0%	1.0%	3.2%	0.9%	0.3%	0.4%	0.3%	0.3%	0.7%	0.5%	-	-	0.6%	0.4%
Recessed	8.5%	1.4%	4.8%	0.9%	2.6%	0.9%	0.1%	0.1%	0.1%	0.1%	1.7%	0.6%	-	-	0.1%	0.1%
Suspended	3.4%	0.9%	1.9%	0.6%	1.5%	0.6%	0.1%	0.1%	0.1%	0.1%	-	-	-	-	0.2%	0.2%
Ceiling Fan	32.2%	2.4%	19.6%	2.0%	12.5%	1.7%	0.1%	0.1%	0.3%	0.2%	0.8%	0.4%	-	-	2.4%	0.7%
Track Lighting	0.9%	0.4%	0.4%	0.3%	0.2%	0.2%	0.0%	0.1%	-	-	0.3%	0.2%	-	-	-	-
Desk Lamp	7.0%	1.4%	2.0%	0.8%	2.6%	0.8%	0.3%	0.3%	0.4%	0.3%	2.2%	0.8%	-	-	-	-
Under Counter	0.4%	0.3%	0.2%	0.1%	-	-	-	0.1%	0.1%	0.1%	0.2%	0.3%	-	-	-	-
Other Hard-Wired	0.2%	0.2%	0.1%	0.2%	0.0%	0.1%	-	-	-	-	-	-	0.0%	0.1%	-	-
Other Plug-In	0.1%	0.1%	0.0%	0.1%	0.1%	0.1%	-	-	-	-	-	-	-	-	-	-

Table 61: Percentage of Homes with Fixture Type and Lamp Type in Bedroom 2, using Census-adjusted Weights

Fixture Type	Census-adjusted weights (n= 1,719)													
	Lamp Type													
	Overall		Incandescent		CFL		LED		Fluorescent		Halogen		Socket Empty	
	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB
Overall	-	-	**59.1%**	3.2%	58.0%	3.0%	1.4%	0.6%	3.5%	1.0%	8.4%	1.5%	6.8%	1.3%
Ceiling-Mounted	27.6%	2.7%	12.4%	1.9%	13.7%	1.9%	0.4%	0.4%	1.3%	0.6%	0.8%	0.6%	1.9%	0.7%
Floor/Table Lamp	**57.4%**	3.2%	**32.1%**	3.0%	30.2%	2.7%	0.6%	0.4%	0.8%	0.4%	1.5%	0.6%	1.7%	0.7%
Torchiere	7.1%	1.4%	2.0%	0.8%	3.4%	1.0%	-	-	0.2%	0.2%	1.7%	0.6%	0.3%	0.3%
Wall-Mounted	7.4%	1.6%	3.7%	1.2%	3.1%	0.9%	-	-	0.2%	0.1%	0.7%	0.5%	0.2%	0.2%
Recessed	6.2%	1.2%	3.1%	0.8%	2.2%	0.7%	0.1%	0.1%	0.2%	0.1%	1.3%	0.6%	-	-
Suspended	2.9%	0.9%	1.8%	0.7%	0.9%	0.4%	-	-	-	-	0.1%	0.2%	0.2%	0.3%
Ceiling Fan	**31.7%**	2.5%	19.0%	2.0%	13.0%	1.7%	0.1%	0.1%	0.1%	0.1%	0.7%	0.4%	2.4%	0.7%
Track Lighting	1.6%	0.6%	0.6%	0.4%	0.4%	0.2%	-	-	-	-	0.7%	0.4%	0.1%	0.2%
Desk Lamp	6.0%	1.3%	1.8%	0.7%	2.5%	0.8%	0.2%	0.1%	0.3%	0.3%	1.6%	0.7%	0.1%	0.1%
Under Counter	0.6%	0.4%	0.2%	0.2%	0.1%	0.3%	-	-	0.3%	0.2%	0.1%	0.1%	-	-
Other Hard-Wired	0.4%	0.5%	0.1%	0.1%	-	-	-	-	0.4%	0.5%	-	-	-	-
Other Plug-In	0.6%	0.7%	0.1%	0.1%	0.5%	0.7%	-	-	-	-	-	-	-	-

Table 62: Percentage Of Homes With Fixture Type And Lamp Type In Bedroom 3, using Census-adjusted Weights

Fixture Type	Census-adjusted weights (n= 1,211)													
	Lamp Type													
	Overall		Incandescent		CFL		LED		Fluorescent		Halogen		Socket Empty	
	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB
Overall	-	-	60.8%	3.5%	57.9%	3.6%	1.6%	0.8%	4.6%	1.6%	7.0%	1.8%	8.1%	1.7%
Ceiling-Mounted	26.4%	3.1%	11.5%	2.0%	12.6%	2.3%	0.2%	0.4%	2.1%	1.0%	0.7%	0.8%	2.5%	1.0%
Floor/Table Lamp	53.4%	3.7%	31.3%	3.2%	27.1%	3.1%	0.4%	0.3%	1.0%	0.8%	0.8%	0.4%	1.7%	0.8%
Torchiere	7.9%	1.9%	1.5%	0.7%	4.2%	1.3%	-	-	0.4%	0.4%	1.9%	1.1%	0.5%	0.5%
Wall-Mounted	6.0%	1.5%	3.2%	1.1%	2.4%	0.9%	-	-	0.3%	0.3%	0.2%	0.3%	0.3%	0.3%
Recessed	8.0%	1.7%	4.9%	1.2%	3.3%	1.1%	0.1%	0.1%	-	0.1%	1.3%	0.6%	0.2%	0.2%
Suspended	2.8%	1.0%	2.1%	0.8%	0.8%	0.5%	-	-	-	-	-	-	-	-
Ceiling Fan	37.2%	3.1%	22.4%	2.4%	14.7%	2.2%	0.4%	0.4%	0.1%	0.1%	0.8%	0.4%	3.2%	1.0%
Track Lighting	1.2%	0.6%	0.5%	0.5%	0.3%	0.2%	-	-	-	-	0.5%	0.3%	-	-
Desk Lamp	5.6%	1.7%	1.0%	0.5%	3.1%	1.2%	0.4%	0.4%	0.6%	0.6%	1.4%	0.7%	-	-
Under Counter	0.6%	0.4%	0.4%	0.3%	-	-	-	-	0.1%	0.1%	0.2%	0.2%	-	-
Stove Top	0.1%	0.1%	0.1%	0.1%	-	-	-	-	-	-	-	-	-	-
Other Plug-In	0.8%	0.6%	0.3%	0.2%	-	0.1%	-	-	0.3%	0.4%	-	0.1%	0.2%	0.3%

Table 63: Percentage Of Homes With Fixture Type And Lamp Type In Bedroom 4, using Census-adjusted Weights

Fixture Type	Census-adjusted weights (n= 471)															
	Lamp Type															
	Overall		Incandescent		CFL		LED		Fluorescent		Halogen		HID		Socket Empty	
	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB
Overall	-	-	57.2%	5.8%	60.7%	5.5%	0.8%	0.6%	2.6%	1.7%	3.5%	1.3%	0.3%	0.3%	8.5%	3.2%
Ceiling-Mounted	25.1%	4.6%	10.4%	2.6%	14.4%	4.0%	-	-	0.9%	0.8%	0.1%	0.2%	-	-	1.7%	1.3%
Floor/Table Lamp	49.1%	5.8%	24.3%	5.0%	26.7%	4.6%	0.3%	0.3%	1.1%	1.1%	1.6%	0.9%	0.3%	0.3%	1.7%	1.2%
Torchiere	7.1%	3.2%	3.1%	2.0%	3.6%	2.1%	-	-	0.6%	1.1%	0.3%	0.3%	-	-	0.7%	0.9%
Wall-Mounted	7.5%	3.1%	4.9%	2.1%	2.5%	1.9%	-	-	0.1%	0.2%	0.1%	0.2%	-	-	1.0%	1.5%
Recessed	10.5%	3.1%	7.1%	2.4%	3.5%	1.9%	0.1%	0.2%	-	-	0.4%	0.5%	-	-	0.1%	0.2%
Suspended	3.0%	1.4%	2.0%	1.1%	1.0%	0.9%	-	-	-	-	-	-	-	-	0.2%	0.3%
Ceiling Fan	37.4%	4.7%	21.2%	3.8%	16.8%	3.4%	0.3%	0.3%	-	-	0.6%	0.5%	-	-	3.6%	1.9%
Track Lighting	0.9%	0.7%	0.4%	0.6%	0.3%	0.3%	-	-	-	-	0.3%	0.3%	-	-	-	-
Desk Lamp	5.1%	2.2%	2.4%	1.5%	2.3%	1.6%	0.2%	0.3%	-	-	0.3%	0.3%	-	-	-	-
Under Counter	0.4%	0.5%	0.3%	0.4%	-	-	-	-	-	-	0.1%	0.2%	-	-	-	-
Other Plug-In	1.2%	1.1%	0.7%	0.7%	0.2%	0.3%	-	-	-	-	-	-	-	-	0.5%	0.9%

Living Room

Table 64 shows the percentage of homes with a given fixture type and lamp type in the living rooms surveyed, along with the error bounds associated with these estimates. The most commonly found fixture and lamp type combinations are floor/table lamps with incandescent and compact fluorescent lamps. Incandescent bulbs and compact fluorescents are almost equally prevalent, at 68% and 67%, respectively.

Table 64: Percentage of Homes with Fixture Type and Lamp Type in Living Room, using Census-adjusted Weights

	Census-adjusted weights (n= 1909)															
	Lamp Type															
	Overall		Incandescent		CFL		LED		Fluorescent		Halogen		HID		Socket Empty	
Fixture Type	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB
Overall	-	-	68.1%	3.5%	67.1%	3.3%	2.5%	0.8%	5.5%	1.0%	15.5%	2.0%	0.2%	0.2%	8.6%	1.4%
Ceiling-Mounted	13.5%	1.7%	5.4%	1.0%	6.3%	1.2%	0.1%	0.1%	1.6%	0.5%	0.7%	0.4%	-	-	1.3%	0.6%
Floor/Table Lamp	75.2%	3.3%	45.4%	3.4%	48.1%	3.3%	1.0%	0.5%	1.0%	0.4%	2.5%	0.8%	-	-	3.5%	0.9%
Torchiere	19.6%	2.2%	6.3%	1.2%	9.4%	1.7%	0.2%	0.2%	0.4%	0.3%	5.1%	1.1%	-	-	0.7%	0.4%
Wall-Mounted	9.0%	1.5%	5.3%	1.1%	2.5%	0.9%	0.2%	0.2%	0.8%	0.5%	0.9%	0.4%	-	-	0.3%	0.3%
Recessed	20.3%	2.4%	12.3%	1.8%	6.3%	1.4%	0.4%	0.3%	0.5%	0.3%	4.3%	1.2%	-	-	0.4%	0.4%
Suspended	13.0%	1.9%	9.7%	1.6%	3.8%	1.0%	0.0%	0.1%	0.1%	0.1%	0.4%	0.3%	-	-	0.6%	0.3%
Ceiling Fan	27.2%	2.5%	17.0%	2.0%	10.1%	1.7%	0.1%	0.1%	0.2%	0.2%	0.9%	0.4%	-	-	2.4%	0.7%
Track Lighting	4.9%	1.1%	1.9%	0.8%	0.5%	0.3%	-	-	-	-	2.7%	0.7%	-	-	0.1%	0.2%
Desk Lamp	5.7%	1.2%	2.5%	0.8%	1.8%	0.7%	0.3%	0.3%	0.4%	0.3%	1.3%	0.5%	-	-	-	-
Under Counter	2.7%	0.8%	1.4%	0.6%	-	-	0.3%	0.5%	0.4%	0.3%	0.5%	0.2%	0.1%	0.2%	-	-
Stove Top	0.0%	0.1%	0.0%	0.1%	-	-	-	-	-	-	-	-	-	-	-	-
Other Hard-Wired	0.3%	0.3%	0.1%	0.1%	-	-	-	-	0.2%	0.2%	-	-	-	-	-	-
Other Plug-In	0.8%	0.5%	0.4%	0.4%	0.2%	0.2%	-	-	0.2%	0.2%	-	-	-	-	-	-

Bathrooms

Table 65, Table 66, Table 67, and Table 68 show the percentage of homes with a given fixture type and lamp type in bathrooms. The most predominate fixture was wall-mounted, with approximately three-quarters of homes surveyed found to have them. The next most prevalent types were ceiling mounted and recessed fixture types. Incandescent and compact fluorescent lights were the most prevalent lamp types found. No HID lamps were found in any bathrooms surveyed.

Table 65: Percentage Of Homes With Fixture Type And Lamp Type In Bathroom 1, using Census-adjusted Weights

Fixture Type	Census-adjusted weights (n= 1,981)													
	Lamp Type													
	Overall		Incandescent		CFL		LED		Fluorescent		Halogen		Socket Empty	
	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB
Overall	-	-	61.5%	2.8%	50.8%	2.8%	0.7%	0.3%	14.1%	1.8%	5.7%	1.2%	7.3%	1.7%
Ceiling-Mounted	40.3%	2.6%	14.7%	1.8%	17.2%	2.0%	-	-	8.9%	1.6%	0.8%	0.4%	1.1%	0.5%
Floor/Table Lamp	1.1%	0.5%	0.7%	0.5%	0.3%	0.2%	-	-	-	-	0.1%	0.1%	0.1%	0.1%
Torchiere	0.1%	0.1%	0.1%	0.1%	-	-	-	-	-	-	-	-	-	-
Wall-Mounted	77.9%	2.4%	45.6%	2.6%	32.9%	2.5%	0.4%	0.2%	2.5%	0.7%	2.0%	0.6%	6.1%	1.6%
Recessed	23.2%	2.2%	12.6%	1.6%	7.4%	1.3%	0.3%	0.2%	2.6%	0.7%	3.1%	0.9%	0.3%	0.3%
Suspended	2.6%	0.8%	1.7%	0.6%	1.1%	0.6%	-	-	0.1%	0.2%	-	-	-	-
Ceiling Fan	0.5%	0.3%	0.2%	0.2%	0.2%	0.2%	-	-	0.1%	0.1%	-	-	-	-
Track Lighting	0.7%	0.4%	0.5%	0.4%	-	0.1%	-	-	-	-	0.2%	0.1%	-	-
Desk Lamp	0.2%	0.2%	0.1%	0.2%	-	-	-	-	-	-	-	0.1%	-	-
Under Counter	0.1%	0.1%	-	-	-	-	-	-	0.1%	0.1%	-	-	-	-

Table 66: Percentage of Homes with Fixture Type and Lamp Type in Bathroom 2, using Census-adjusted Weights

Fixture Type	Census-adjusted weights (n= 1,535)														
	Lamp Type														
	Overall		Incandescent		CFL		LED		Fluorescent		Halogen		Socket Empty	
	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB
Overall	-	-	65.0%	3.1%	46.9%	3.3%	1.0%	0.5%	14.1%	2.0%	6.2%	1.3%	7.9%	1.6%
Ceiling-Mounted	37.5%	3.0%	14.1%	2.1%	16.9%	2.2%	0.2%	0.3%	8.8%	1.6%	0.7%	0.5%	1.1%	0.5%
Floor/Table Lamp	1.1%	0.6%	0.5%	0.4%	0.6%	0.4%	-	-	-	-	-	-	-	-
Torchiere	0.1%	0.1%	-	-	-	0.1%	-	-	-	-	-	-	-	-
Wall-Mounted	77.6%	2.6%	48.3%	2.9%	28.3%	2.7%	0.5%	0.4%	2.4%	0.9%	2.1%	0.6%	6.6%	1.4%
Recessed	27.5%	2.7%	13.6%	1.9%	10.9%	1.7%	0.3%	0.2%	3.1%	1.0%	3.0%	1.0%	0.2%	0.2%
Suspended	2.9%	1.0%	2.1%	0.8%	0.8%	0.4%	-	-	-	0.1%	0.2%	0.2%	-	-
Ceiling Fan	0.8%	0.5%	0.3%	0.2%	0.2%	0.2%	-	-	0.1%	0.1%	-	-	0.3%	0.4%
Track Lighting	0.4%	0.3%	0.2%	0.2%	0.1%	0.1%	-	-	-	-	0.3%	0.2%	-	-
Desk Lamp	0.2%	0.3%	-	-	-	-	-	-	-	-	0.2%	0.3%	-	-
Under Counter	0.1%	0.1%	-	0.1%	-	-	-	-	-	-	0.1%	0.1%	-	-
Other Hard-Wired	0.2%	0.3%	-	-	0.2%	0.3%	-	-	-	-	-	-	-	-

Table 67: Percentage of Homes with Fixture Type and Lamp Type in Bathroom 3, using Census-adjusted Weights

Fixture Type	Census-adjusted weights (n= 686)													
	Lamp Type													
	Overall		Incandescent		CFL		LED		Fluorescent		Halogen		Socket Empty	
	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB
Overall	-	-	67.6%	4.6%	47.3%	5.5%	1.4%	0.7%	16.2%	3.3%	6.7%	1.9%	8.3%	2.7%
Ceiling-Mounted	39.7%	4.8%	14.1%	3.0%	18.0%	3.8%	-	-	9.4%	2.5%	1.0%	0.7%	2.0%	1.8%
Floor/Table Lamp	0.6%	0.5%	0.3%	0.3%	0.4%	0.4%	-	-	-	-	-	-	-	-
Torchiere	0.2%	0.2%	0.1%	0.1%	0.1%	0.2%	-	-	-	-	-	-	-	-
Wall-Mounted	73.7%	4.3%	47.9%	4.3%	24.5%	4.6%	1.0%	0.7%	1.8%	1.1%	3.0%	1.3%	5.4%	2.0%
Recessed	36.8%	4.7%	20.7%	3.6%	14.4%	3.1%	0.5%	0.3%	5.0%	2.1%	2.8%	1.1%	0.7%	0.8%
Suspended	2.6%	1.4%	2.2%	1.3%	0.4%	0.4%	-	-	-	-	0.1%	0.1%	-	-
Ceiling Fan	0.5%	0.5%	0.2%	0.3%	0.1%	0.2%	-	-	0.2%	0.2%	-	-	0.2%	0.3%
Track Lighting	0.8%	0.7%	-	-	-	-	-	-	-	-	0.8%	0.7%	-	-
Under Counter	0.1%	0.1%	-	-	-	-	-	-	0.1%	0.1%	0.1%	0.1%	-	-

Table 68: Percentage of Homes with Fixture Type and Lamp Type in Bathroom 4, using Census-adjusted Weights

Fixture Type	Census-adjusted weights (n= 147)															
	Lamp Type															
	Overall		Incandescent		CFL		LED		Fluorescent		Halogen		HID		Socket Empty	
	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB
Overall	-	-	64.0%	9.3%	64.9%	11.0%	0.7%	0.8%	9.7%	3.8%	13.3%	6.6%	0.2%	0.3%	2.5%	2.1%
Ceiling-Mounted	38.8%	9.2%	9.2%	4.9%	24.0%	8.5%	-	-	5.2%	3.0%	1.6%	2.1%	0.2%	0.3%	0.9%	1.1%
Floor/Table Lamp	0.4%	0.7%	0.4%	0.7%	-	-	-	-	-	-	-	-	-	-	-	-
Wall-Mounted	65.5%	8.6%	38.7%	7.8%	26.3%	8.7%	0.3%	0.5%	1.0%	1.1%	3.4%	2.5%	-	-	1.6%	1.8%
Recessed	45.4%	12.9%	21.2%	9.5%	30.0%	10.1%	0.4%	0.7%	3.0%	2.0%	8.7%	5.9%	-	-	-	-
Suspended	1.4%	1.3%	0.5%	0.8%	-	-	-	-	-	-	0.9%	1.0%	-	-	-	-
Ceiling Fan	0.2%	0.3%	0.2%	0.3%	-	-	-	-	-	-	-	-	-	-	-	-
Track Lighting	0.5%	0.9%	0.5%	0.9%	-	-	-	-	-	-	-	-	-	-	-	-
Desk Lamp	0.5%	0.7%	-	-	-	-	-	-	0.5%	0.7%	-	-	-	-	-	-

Hallway

Table 69 presents the percentage of homes with a given fixture type and lamp type in hallways and the error bounds associated with these estimates. The most commonly found fixture and lamp type combinations are ceiling mounted and recessed incandescent and compact fluorescent lamps.

Table 69: Percentage of Homes with Fixture Type and Lamp Type in Hallway, using Census-adjusted Weights

Fixture Type	Census-adjusted weights (n= 1810)													
	Lamp Type													
	Overall		Incandescent		CFL		LED		Fluorescent		Halogen		Socket Empty	
	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB
Overall	-	-	66.8%	3.1%	51.0%	3.2%	1.7%	0.7%	4.6%	1.2%	6.5%	1.4%	5.7%	1.4%
Ceiling-Mounted	64.8%	3.0%	37.7%	3.0%	29.3%	2.6%	0.2%	0.2%	3.8%	1.1%	0.8%	0.4%	3.4%	1.1%
Floor/Table Lamp	5.9%	1.3%	3.7%	0.9%	2.3%	0.9%	0.2%	0.2%	-	-	0.1%	0.1%	0.1%	0.1%
Torchiere	0.5%	0.4%	0.3%	0.3%	0.1%	0.2%	-	-	-	-	0.1%	0.1%	-	-
Wall-Mounted	19.9%	2.2%	10.8%	1.7%	8.6%	1.4%	0.1%	0.1%	0.1%	0.1%	1.0%	0.5%	0.7%	0.4%
Recessed	34.7%	3.2%	22.5%	2.4%	15.4%	2.2%	1.1%	0.5%	0.4%	0.5%	3.5%	1.0%	0.9%	0.6%
Suspended	17.7%	2.0%	14.0%	1.6%	4.3%	1.2%	0.3%	0.3%	-	-	0.2%	0.1%	0.6%	0.4%
Ceiling Fan	2.1%	1.0%	1.7%	0.8%	0.5%	0.3%	-	-	-	-	0.1%	0.1%	0.4%	0.5%
Track Lighting	2.2%	0.8%	0.3%	0.2%	0.2%	0.2%	-	-	-	-	1.7%	0.7%	-	-
Desk Lamp	0.3%	0.2%	0.1%	0.1%	0.1%	0.1%	-	-	-	-	0.1%	0.1%	-	-
Under Counter	0.6%	0.3%	0.1%	0.2%	-	-	0.1%	0.1%	0.3%	0.2%	0.1%	-	-	-
Stove Top	0.1%	0.2%	0.1%	0.1%	-	-	-	-	-	-	0.1%	0.1%	-	-
Other Hard-Wired	0.3%	0.2%	0.1%	0.1%	-	-	-	-	-	0.1%	0.1%	0.1%	-	-
Other Plug-In	0.0%	0.1%	-	-	-	-	-	-	-	-	-	-	-	-

Dining Room

Table 70 shows the percentage of homes with a given fixture type and lamp type in the dining room of surveyed homes as well as the error bounds associated with these estimates. Suspended fixtures with incandescent bulbs and ceiling fans with incandescent and compact fluorescent lamps were the most common fixture types.

Table 70: Percentage of Homes with Fixture Type and Lamp Type in Dining Room, using Census-adjusted Weights

Fixture Type	Census-adjusted weights (n= 1288)															
	Lamp Type															
	Overall		Incandescent		CFL		LED		Fluorescent		Halogen		HID		Socket Empty	
	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB
Overall	-	-	72.2%	3.0%	34.0%	3.3%	0.9%	0.5%	2.2%	0.9%	8.7%	1.9%	0.1%	0.1%	5.9%	1.3%
Ceiling-Mounted	13.0%	2.2%	6.3%	1.6%	5.7%	1.5%	0.0%	0.1%	0.8%	0.5%	0.5%	0.4%	-	-	0.6%	0.4%
Floor/Table Lamp	15.5%	2.5%	8.8%	1.8%	7.0%	1.8%	0.1%	0.2%	0.2%	0.2%	0.1%	0.1%	0.0%	0.1%	0.5%	0.5%
Torchiere	3.2%	1.3%	0.7%	0.6%	1.2%	0.7%	-	-	-	-	1.6%	1.0%	-	-	0.2%	0.2%
Wall-Mounted	2.7%	0.8%	1.9%	0.6%	0.6%	0.5%	-	-	0.0%	0.1%	0.1%	0.1%	-	-	0.1%	0.2%
Recessed	12.4%	1.9%	7.2%	1.4%	2.9%	1.1%	0.1%	0.1%	0.5%	0.6%	2.5%	0.8%	-	-	0.1%	0.2%
Suspended	53.6%	3.1%	44.1%	3.0%	9.2%	1.8%	0.5%	0.4%	0.1%	0.1%	1.2%	0.5%	0.0%	0.1%	1.9%	0.7%
Ceiling Fan	26.9%	3.1%	15.5%	2.4%	11.5%	2.2%	0.1%	0.1%	0.2%	0.3%	0.8%	0.6%	-	-	2.5%	0.9%
Track Lighting	3.1%	1.5%	0.7%	0.8%	0.4%	0.3%	0.0%	0.1%	-	-	2.1%	1.2%	-	-	-	-
Desk Lamp	0.8%	0.4%	0.5%	0.4%	0.2%	0.2%	-	-	0.0%	0.1%	-	-	-	-	-	-
Under Counter	1.9%	0.7%	1.1%	0.5%	-	-	-	-	0.3%	0.2%	0.5%	0.4%	-	-	-	-
Stove Top	0.3%	0.4%	0.2%	0.4%	-	-	-	-	-	-	-	-	-	-	0.0%	0.1%
Other Plug-In	0.1%	0.1%	-	-	-	-	-	-	0.1%	0.1%	0.1%	0.1%	-	-	-	-

Home Office

Table 71 shows the percentage of homes with a given fixture type and lamp type in home offices. Approximately half of homes were found to have floor/table lamps in the home office. Of these, incandescent and compact fluorescent lamps were most commonly used. Ceiling-mounted, ceiling fans and desk lamps were also each found in approximately a quarter of homes surveyed.

Table 71: Percentage of Homes with Fixture Type and Lamp Type in Home Office, using Census-adjusted Weights

Fixture Type	Census-adjusted weights (n= 834)															
	Lamp Type															
	Overall		Incandescent		CFL		LED		Fluorescent		Halogen		HID		Socket Empty	
	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB
Overall	-	-	63.5%	4.7%	53.7%	5.0%	2.8%	1.3%	10.1%	2.5%	20.9%	3.2%	0.3%	0.4%	6.0%	2.2%
Ceiling-Mounted	25.0%	3.8%	11.1%	2.8%	9.3%	2.3%	0.1%	0.1%	3.6%	1.3%	1.4%	1.0%	-	-	1.6%	1.2%
Floor/Table Lamp	51.5%	4.7%	30.0%	4.0%	24.2%	3.8%	0.8%	0.7%	1.9%	0.9%	2.9%	1.1%	0.3%	0.4%	1.0%	0.8%
Torchiere	8.1%	2.1%	3.1%	1.3%	2.0%	1.0%	0.3%	0.3%	0.3%	0.5%	2.8%	1.2%	-	-	0.4%	0.6%
Wall-Mounted	7.0%	2.2%	3.4%	1.3%	3.1%	1.7%	-	-	0.7%	0.6%	0.5%	0.5%	-	-	0.1%	0.1%
Recessed	14.6%	2.8%	7.2%	1.6%	5.2%	2.2%	0.7%	0.6%	0.4%	0.3%	2.5%	1.0%	-	-	-	-
Suspended	6.1%	1.9%	3.3%	1.3%	2.1%	1.1%	0.1%	0.1%	0.3%	0.6%	0.5%	0.4%	-	-	0.2%	0.3%
Ceiling Fan	29.5%	4.5%	17.8%	3.1%	12.4%	3.4%	0.5%	0.6%	0.4%	0.3%	0.3%	0.2%	-	-	2.4%	1.6%
Track Lighting	5.0%	1.9%	2.0%	1.2%	1.6%	1.1%	0.1%	0.1%	-	-	2.4%	1.0%	-	-	0.3%	0.3%
Desk Lamp	24.2%	3.8%	7.6%	2.4%	8.0%	2.0%	0.7%	0.7%	2.1%	1.1%	8.9%	2.4%	-	-	0.1%	0.2%
Under Counter	2.2%	1.2%	-	-	-	-	0.2%	0.2%	1.4%	1.0%	0.6%	0.7%	-	-	-	-
Other Hard-Wired	0.4%	1.0%	-	-	-	-	-	-	0.4%	1.0%	-	-	-	-	-	-

Laundry Room

Table 72 shows the percentage of homes with a given fixture type and lamp type in laundry rooms. Ceiling-mounted fixtures with incandescent, compact fluorescent and fluorescent lamps were most commonly found in the homes surveyed.

Table 72: Percentage of Homes with Fixture Type and Lamp Type in Laundry Room, using Census-adjusted Weights

Fixture Type	Census-adjusted weights (n= 1040)												
	Lamp Type												
	Overall		Incandescent		CFL		LED		Fluorescent		Halogen		Socket Empty	
	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB
Overall	-	-	**45.4%**	3.7%	36.2%	3.6%	0.4%	0.4%	21.6%	2.5%	2.5%	0.9%	1.4%	0.8%
Ceiling-Mounted	**75.0%**	3.1%	**30.8%**	3.4%	26.7%	3.4%	-	-	18.7%	2.4%	0.3%	0.2%	1.2%	0.8%
Floor/Table Lamp	1.0%	0.7%	0.7%	0.6%	0.4%	0.4%	0.1%	0.2%	-	-	-	-	-	-
Torchiere	0.1%	0.2%	0.1%	0.2%	-	-	-	-	-	-	-	-	-	-
Wall-Mounted	10.0%	2.5%	4.3%	1.7%	3.7%	1.7%	0.1%	0.2%	1.7%	0.8%	0.4%	0.4%	0.1%	0.2%
Recessed	16.0%	2.3%	9.1%	1.9%	5.2%	1.3%	0.3%	0.3%	0.6%	0.3%	1.0%	0.6%	-	-
Suspended	2.2%	1.0%	1.0%	0.7%	0.8%	0.6%	-	-	0.4%	0.5%	0.1%	0.2%	-	-
Ceiling Fan	1.3%	0.7%	0.9%	0.6%	0.5%	0.4%	-	-	-	-	-	-	0.1%	0.1%
Track Lighting	0.5%	0.3%	0.2%	0.2%	0.1%	0.2%	-	-	-	-	0.2%	0.2%	-	-
Desk Lamp	0.3%	0.3%	0.1%	0.1%	-	-	-	-	-	-	0.2%	0.3%	-	-
Under Counter	0.9%	0.4%	-	-	-	-	-	-	0.8%	0.4%	0.2%	0.3%	-	-
Other Plug-In	0.4%	0.4%	0.1%	0.1%	-	-	-	-	0.1%	0.2%	0.2%	0.3%	-	-

Closets

Table 73 shows the percentage of homes with a given fixture type and lamp type in the closets of surveyed homes. Over 80% of homes had ceiling-mounted fixtures in their closets, primarily with incandescent lamps and compact fluorescent lamps.

Table 73: Percentage of Homes with Fixture Type and Lamp Type in Closets, using Census-adjusted Weights

Fixture Type	Census-adjusted weights (n= 1033)													
	Lamp Type													
	Overall		Incandescent		CFL		LED		Fluorescent		Halogen		Socket Empty	
	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB
Overall	-	-	65.2%	4.0%	39.1%	3.8%	0.5%	0.5%	12.2%	2.5%	2.4%	0.8%	3.4%	1.4%
Ceiling-Mounted	81.2%	3.4%	50.8%	4.2%	30.4%	3.5%	0.3%	0.5%	9.4%	1.9%	0.5%	0.3%	2.9%	1.4%
Floor/Table Lamp	3.5%	1.9%	1.7%	1.4%	1.6%	1.3%	-	-	-	0.1%	-	-	0.3%	0.3%
Torchiere	0.1%	0.1%	0.1%	0.1%	-	-	-	-	-	-	-	-	-	-
Wall-Mounted	19.9%	3.1%	11.0%	2.3%	6.6%	1.7%	0.1%	0.1%	4.0%	1.7%	0.1%	0.2%	0.2%	0.2%
Recessed	11.2%	1.9%	7.4%	1.5%	3.9%	1.3%	0.1%	0.1%	-	-	1.1%	0.5%	-	-
Suspended	0.8%	0.4%	0.6%	0.3%	0.2%	0.2%	-	-	-	-	-	-	-	-
Ceiling Fan	0.3%	0.2%	0.2%	0.2%	0.1%	0.2%	-	-	-	-	-	-	-	-
Track Lighting	1.2%	0.7%	0.4%	0.3%	0.3%	0.3%	-	-	-	-	0.7%	0.5%	-	-
Desk Lamp	0.1%	0.1%	0.1%	0.1%	-	0.1%	-	-	-	-	-	-	-	-
Under Counter	0.3%	0.3%	-	-	-	-	-	-	0.2%	0.3%	0.1%	0.1%	-	-
Other Hard-Wired	0.1%	0.1%	0.1%	0.1%	-	-	-	-	-	-	-	-	-	-
Other Plug-In	0.1%	0.2%	0.1%	0.2%	-	-	-	-	-	-	-	-	-	-

Garage

Table 74 shows the percentage of homes with a given fixture type and lamp type in the garages of surveyed homes. Approximately three-quarters of homes were found to have ceiling-mounted fixtures in their garages; over 50% of homes had ceiling-mounted fluorescent lamps. Other prominent fixtures included wall-mounted fixtures with incandescents and compact fluorescent lights. Only 14% of garages surveyed had garage door lights.

Table 74: Percentage of Homes with Fixture Type and Lamp Type in Garage, using Census-adjusted Weights

Fixture Type	Census-adjusted weights (n= 1324)															
	Lamp Type															
	Overall		Incandescent		CFL		LED		Fluorescent		Halogen		HID		Socket Empty	
	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB
Overall	-	-	37.6%	3.4%	35.2%	3.3%	0.3%	0.3%	**64.7%**	3.5%	2.9%	1.0%	0.2%	0.3%	5.4%	1.5%
Ceiling-Mounted	**74.9%**	3.3%	16.5%	2.6%	17.2%	2.4%	-	-	**50.1%**	3.6%	0.7%	0.5%	-	-	2.9%	1.1%
Floor/Table Lamp	2.5%	0.9%	0.6%	0.3%	1.3%	0.7%	0.2%	0.3%	0.5%	0.5%	0.2%	0.2%	-	-	-	-
Torchiere	0.5%	0.4%	0.2%	0.2%	0.3%	0.3%	-	-	-	-	0.1%	0.2%	-	-	-	-
Wall-Mounted	28.2%	3.0%	11.2%	1.8%	13.7%	2.3%	-	-	3.4%	1.3%	0.8%	0.6%	0.2%	0.3%	1.2%	0.7%
Recessed	1.9%	1.2%	0.9%	0.6%	0.5%	0.9%	-	-	0.3%	0.3%	0.2%	0.4%	-	-	0.2%	0.2%
Suspended	14.9%	2.4%	1.0%	0.7%	0.7%	0.4%	-	-	13.8%	2.3%	-	0.1%	-	-	0.4%	0.3%
Ceiling Fan	1.5%	0.7%	0.5%	0.4%	0.9%	0.5%	0.1%	0.1%	-	-	-	-	-	-	0.4%	0.3%
Track Lighting	0.7%	0.6%	0.5%	0.4%	0.3%	0.3%	-	-	-	-	0.1%	0.1%	-	-	0.2%	0.2%
Desk Lamp	1.6%	0.8%	0.9%	0.5%	0.5%	0.4%	-	-	0.3%	0.2%	0.2%	0.3%	-	-	-	-
Garage Door	14.7%	2.4%	11.2%	2.1%	3.5%	1.2%	-	0.1%	-	-	-	-	-	-	0.4%	0.3%
Under Counter	1.0%	0.5%	-	0.1%	-	-	-	-	0.7%	0.4%	0.3%	0.4%	-	-	-	-
Stove Top	0.1%	0.1%	-	-	-	-	-	-	0.1%	0.1%	-	-	-	-	-	-
Other Hard-Wired	0.2%	0.2%	0.1%	0.1%	-	-	-	0.1%	-	-	-	-	-	-	-	-
Other Plug-In	2.2%	1.1%	0.8%	0.5%	0.9%	0.7%	-	-	0.5%	0.6%	0.3%	0.3%	-	-	-	-

Other Room Types

Table 75 shows the percentage of homes with a given fixture type and lamp type in "other" rooms. Other rooms include non-typical room types such as weight rooms, libraries, attics, basements and dens. Prevalent fixture types include ceiling-mounted incandescent and compact fluorescent lamps, as well as wall-mounted and recessed fixtures.

Table 75: Percentage of Homes with Fixture Type and Lamp Type in Other Room Type, using Census-adjusted Weights

Fixture Type	Census-adjusted weights (n= 304)												
	Lamp Type												
	Overall		Incandescent		CFL		LED		Fluorescent		Halogen		Socket Empty	
	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB
Overall	-	-	63.5%	8.1%	43.5%	7.6%	1.4%	1.1%	19.6%	5.3%	10.9%	3.8%	7.2%	3.7%
Ceiling-Mounted	56.0%	8.7%	24.1%	7.8%	24.4%	6.7%	-	-	15.3%	4.9%	2.3%	1.7%	1.7%	1.5%
Floor/Table Lamp	21.9%	5.7%	12.5%	4.0%	10.6%	3.6%	0.2%	0.3%	0.9%	0.9%	1.2%	1.0%	3.1%	2.7%
Torchiere	3.4%	1.9%	1.2%	1.4%	0.7%	0.9%	0.2%	0.3%	0.1%	0.2%	1.2%	0.8%	-	-
Wall-Mounted	22.3%	5.8%	16.1%	5.3%	5.8%	2.3%	-	-	0.7%	0.8%	0.5%	0.6%	1.3%	1.5%
Recessed	19.3%	4.8%	11.3%	3.6%	3.6%	2.0%	0.3%	0.5%	0.8%	0.8%	4.9%	2.5%	1.0%	1.6%
Suspended	9.0%	3.5%	6.1%	3.0%	2.4%	1.7%	-	-	0.8%	0.9%	0.1%	0.2%	-	-
Ceiling Fan	13.0%	3.7%	7.4%	2.6%	4.6%	2.6%	-	-	0.8%	1.1%	0.2%	0.4%	0.2%	0.3%
Track Lighting	5.2%	2.5%	1.7%	1.3%	0.5%	0.8%	0.2%	0.5%	-	-	3.5%	2.0%	-	-
Desk Lamp	4.4%	3.4%	1.6%	1.7%	2.8%	2.5%	0.4%	0.7%	1.4%	1.5%	0.3%	0.3%	-	-
Under Counter	0.7%	0.7%	-	-	-	-	-	-	0.7%	0.7%	-	-	-	-
Other Plug-In	3.0%	3.1%	2.6%	3.0%	-	-	-	-	0.2%	0.4%	0.2%	0.2%	-	-

Exteriors

Table 76, Table 77, and Table 78 show the percentage of homes with a given fixture type and lamp type found on the exteriors of homes surveyed. Exteriors included the entryway, porches and patios, as well as other exterior lights such as driveway and landscape lighting. Unsurprisingly, wall-mounted fixtures were overwhelmingly the most common fixture type found on exteriors. The most common lamp types were incandescents and compact fluorescent lamps.

Table 76: Percentage of Homes with Fixture Type and Lamp Type in Exterior - Entry, using Census-adjusted Weights

Fixture Type	Census-adjusted weights (n= 1237)															
	Lamp Type															
	Overall		Incandescent		CFL		LED		Fluorescent		Halogen		HID		Socket Empty	
	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB
Overall	-	-	47.7%	3.2%	**57.4%**	3.5%	1.1%	0.5%	0.8%	0.5%	8.5%	1.6%	0.5%	0.4%	3.0%	1.0%
Ceiling-Mounted	13.1%	2.3%	6.3%	1.7%	6.2%	1.6%	-	-	0.3%	0.2%	0.4%	0.4%	0.1%	0.1%	0.2%	0.3%
Floor/Table Lamp	0.5%	0.3%	0.1%	0.1%	0.4%	0.3%	-	-	-	-	-	-	-	-	-	-
Torchiere	0.3%	0.4%	-	-	0.3%	0.4%	-	-	-	-	-	-	-	-	-	-
Wall-Mounted	**84.5%**	2.6%	40.0%	3.0%	**47.0%**	3.5%	0.9%	0.5%	0.5%	0.4%	6.6%	1.4%	0.4%	0.4%	2.7%	0.9%
Recessed	7.9%	1.5%	2.7%	0.9%	4.4%	1.2%	0.1%	0.1%	-	-	1.0%	0.5%	-	-	-	-
Suspended	2.7%	1.0%	1.7%	0.8%	0.9%	0.6%	-	-	-	-	-	-	-	-	-	-
Ceiling Fan	-	0.1%	-	0.1%	-	-	-	-	-	-	-	-	-	-	-	-
Other Hard-Wired	1.9%	0.6%	1.0%	0.4%	0.4%	0.3%	0.1%	0.1%	-	-	0.6%	0.4%	-	-	0.1%	0.1%

Table 77: Percentage of Homes with Fixture Type and Lamp Type in Exterior - Porch/Patio, using Census-adjusted Weights

Fixture Type	Census-adjusted weights (n= 1049)															
	Lamp Type															
	Overall		Incandescent		CFL		LED		Fluorescent		Halogen		HID		Socket Empty	
	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB
Overall	-	-	54.4%	3.8%	46.2%	3.8%	1.8%	1.1%	4.6%	1.5%	21.5%	3.0%	1.1%	0.8%	5.3%	1.4%
Ceiling-Mounted	13.0%	2.6%	5.4%	1.6%	4.7%	1.7%	-	-	2.8%	1.1%	1.1%	0.8%	-	-	0.5%	0.5%
Floor/Table Lamp	1.2%	0.5%	0.7%	0.4%	0.4%	0.3%	-	-	-	-	0.1%	0.2%	-	-	-	-
Torchiere	0.5%	0.5%	-	-	0.5%	0.4%	-	-	-	-	0.2%	0.3%	-	-	-	-
Wall-Mounted	88.9%	2.6%	45.5%	3.8%	39.9%	3.6%	0.9%	0.6%	1.0%	0.7%	19.3%	2.9%	1.0%	0.8%	4.5%	1.4%
Recessed	5.2%	1.4%	3.1%	1.0%	1.6%	0.8%	0.2%	0.2%	-	-	0.9%	0.5%	-	-	-	-
Suspended	3.3%	1.3%	1.5%	0.7%	0.6%	0.5%	0.6%	0.8%	0.6%	0.6%	-	-	-	-	0.1%	0.1%
Ceiling Fan	4.1%	1.0%	2.9%	0.8%	1.0%	0.5%	0.2%	0.3%	-	-	0.2%	0.1%	-	-	0.1%	0.1%
Track Lighting	0.1%	0.1%	0.1%	0.1%	-	-	-	-	-	-	-	-	-	-	-	-
Desk Lamp	0.1%	0.1%	0.1%	0.1%	-	-	-	0.1%	-	-	-	-	-	-	-	-
Under Counter	0.1%	0.2%	-	-	-	-	-	-	0.1%	0.2%	-	-	-	-	-	-
Other Hard-Wired	1.8%	1.1%	1.2%	0.9%	0.2%	0.2%	-	-	-	-	0.6%	0.4%	0.1%	0.2%	0.1%	0.2%
Other Plug-In	0.8%	0.6%	0.4%	0.4%	0.1%	0.1%	-	-	0.3%	0.5%	0.1%	0.1%	-	-	0.1%	0.1%

Table 78: Percentage of Homes with Fixture Type and Lamp Type in Exterior - Other, using Census-adjusted Weights

Fixture Type	Census-adjusted weights (n= 1144)															
	Lamp Type															
	Overall		Incandescent		CFL		LED		Fluorescent		Halogen		HID		Socket Empty	
	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB
Overall	-	-	57.3%	4.1%	46.7%	4.3%	2.5%	1.1%	4.5%	1.4%	32.5%	3.9%	2.5%	1.2%	5.2%	1.6%
Ceiling-Mounted	12.3%	2.1%	5.2%	1.3%	4.7%	1.3%	-	0.1%	2.6%	1.0%	1.1%	0.5%	-	0.1%	-	-
Floor/Table Lamp	0.9%	0.8%	0.2%	0.2%	0.7%	0.8%	-	-	-	-	-	-	-	-	-	-
Torchiere	0.3%	0.3%	0.2%	0.3%	-	-	-	-	-	-	-	-	-	-	-	-
Wall-Mounted	94.7%	2.2%	52.1%	4.0%	42.1%	4.1%	2.2%	1.1%	1.5%	0.9%	30.3%	3.8%	2.2%	1.2%	5.1%	1.6%
Recessed	7.2%	1.6%	4.5%	1.3%	2.3%	0.8%	-	0.1%	-	-	0.8%	0.4%	-	-	-	0.1%
Suspended	3.3%	1.2%	1.5%	0.7%	1.5%	1.0%	0.1%	0.1%	0.1%	0.1%	0.1%	0.2%	-	-	0.1%	0.1%
Ceiling Fan	1.4%	0.8%	0.8%	0.4%	0.3%	0.2%	-	-	0.4%	0.6%	-	-	-	-	-	-
Track Lighting	0.3%	0.2%	0.1%	0.1%	-	0.1%	-	-	-	-	0.2%	0.2%	-	-	-	-
Desk Lamp	0.4%	0.4%	0.2%	0.3%	0.1%	0.2%	-	-	-	-	0.1%	0.2%	-	-	-	-
Other Hard-Wired	5.6%	1.6%	2.9%	1.0%	1.2%	0.7%	0.3%	0.2%	-	-	1.5%	1.1%	0.2%	0.2%	-	-
Other Plug-In	0.4%	0.3%	0.1%	0.1%	0.3%	0.2%	-	-	0.1%	0.2%	0.1%	0.1%	-	-	-	-

Fixture Control Types

Table 79 shows the percentage of lamps by control type among all lamps in the whole house. About 43% of homes are using a standard incandescent lamp controlled manually. The next most prevalent lamp types found in manual controls were compact fluorescents at 28%and fluorescent lamps at about 11%.

Table 79: Percent Of Installed Lamps By Control Types, using Census-adjusted Weights

Lamp Type	Census-adjusted weights, all spaces (n= 1,987)															
	Percent of Lamps by Control Type															
	Manual		Dimmer		Motion Sensor		Photocell		Timer		3 way		Lit Switch		Multi-switch	
	%	Error Bound	%	Error Bound	%	Error Bound	%	Error Bound	%	Error Bound	%	Error Bound	%	Error Bound	%	Error Bound
CFL	27.8%	0.5%	0.2%	0.0%	0.1%	0.0%	0.1%	0.0%	0.1%	0.0%	0.7%	0.1%	-	-	0.2%	0.1%
Fluorescent	10.7%	0.4%	-	-	0.1%	0.0%	-	-	-	-	0.1%	0.0%	-	-	-	-
Halogen	7.1%	0.3%	0.6%	0.1%	0.4%	0.1%	0.1%	0.0%	0.1%	0.0%	0.1%	0.0%	-	-	0.1%	0.0%
Incandescent	43.0%	0.6%	2.4%	0.2%	0.3%	0.1%	0.1%	0.0%	0.1%	0.0%	1.5%	0.1%	0.1%	0.0%	0.3%	0.1%
LED	1.1%	0.2%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Socket empty	2.4%	0.2%	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Wattage

Table 80 presents the average wattage per fixture, inclusive of all lamp technology types found in the fixtures, and number of lamps found in the fixture. Suspended lighting fixtures (123 W) and track lighting fixtures (121 W) were found to have the highest overall wattage (using Census-adjusted weights). These fixture types commonly have multiple lamps per fixture, explaining the high wattage for these fixtures. In the 2005 study, torchiere fixtures were found to have the highest average wattage (165W), however, these results show the average wattage has significantly gone down to 93 W (using strata weights). Under counter fixture types again have the lowest average wattage (30W, using strata weights), also significantly down from an average of 42 watts in the previous study. These fixtures are more commonly located in kitchens and are usually equipped with fluorescent tubes.

Table 80: Average Wattage by Fixture Type, 2005-2012

| | 2012 | | | | | | 2005 | | |
| | Census-adjusted weights, all spaces | | | Strata weights, limited to 2005 CLASS spaces | | | | | |
Fixture Type	Average Fixture Wattage	Error Bound	Sample Size	Average Fixture Wattage	Error Bound	Sample Size	Average Fixture Wattage	Error Bound	Sample Size
Ceiling Mounted	60.0	33.0	1952	60.4	26.9	1948	80.2	4.8	846
Floor/Table Lamp	48.6	16.9	1827	49.4	15.7	1827			
Floor Lamp							90.3	11.3	617
Table Lamp							66.7	5.1	831
Torchiere	89.5	3.9	635	92.8	3.6	631	165.1	30.6	409
Wall Mounted	81.5	40.5	1967	84.2	21.2	1909	118.6	7.8	846
Recessed	50.8	18.7	1402	51.5	20.0	1395			
Recessed Can							62.7	11.4	555
Recessed Lighting Other							69.9	18.2	283
Suspended	123.0	6.5	1341	126.3	6.5	1326	149.9	15.6	722
Ceiling Fan	86.3	6.3	1314	89.6	5.7	1301	125.8	13.5	680
Track Lighting	120.6	2.9	338	120.0	2.7	333	117.6	34.1	198
Desk Lamp	37.1	1.0	464	37.4	1.1	462			
Architecturally Integrated							43.9	25.8	92
Garage Door Opener	67.8	1.0	185	69.6	1.0	185	77.8	16.0	325
Under Counter	29.5	2.4	509	29.5	2.6	508	42.1	8.7	341
Stove Top	53.0	1.3	634	55.3	1.4	634			
Other Hard-Wired	49.9	2.5	170	38.5	1.1	79			
Other Plug-In	57.7	0.9	75	63.9	0.8	63			
Other							50.8	30.9	37

See Appendix G: Statistical Significance Testing for comparison details.

Table 81 presents the average wattage by room type, when considering all fixtures and lamp within the specific room. The room types are sorted with lowest average wattage at the top, using the Census-adjusted weights. These numbers do vary dramatically when considering size of home, type of home, and income. Other exterior areas, living rooms and kitchens have the highest overall installed wattage, most likely a result of multiple fixtures with multiple lamps. Conversely, on the low end of wattages are laundry/utility rooms, exterior entries and closets. These areas commonly have a single fixture and a single lamp.

Table 81: Average Wattage By Room Type, 2005-2012

| Room[a] | 2012 | | | | | 2005 | | |
| | Census-adjusted weights, all spaces | | Strata weights, limited to 2005 CLASS spaces | | Sample Size | | | Sample Size |
	Watts	Error Bound	Watts	Error Bound		Watts	Error Bound	
Laundry/Utility Room	70.7	3.7	72.5	3.3	1039	82.4	4.6	331
Exterior - Entry	93.3	4.9	101.2	4.7	1226	96.3	11.2	578
Closet	99.3	4.8	105.6	4.3	1028	113.3	7.9	298
Bedroom - 4	116.2	9.2	121.6	8.3	469	141.5	12.0	166
Bedroom - 2	119.4	5.1	124.7	4.5	1716	207.3	9.5	649
Bedroom - 3	121.4	6.6	127.1	5.7	1206	133.7	7.3	475
Bedroom - 5	128.9	26.7	137.7	23.9	95	168.8	54.3	29
Bedroom - 1	136.9	6.0	145.0	5.2	1936	142.1	6.2	736
Breakfast Nook						152.1	13.7	150
Exterior - Porch/Patio	155.9	9.1			1042			
Bathroom - 1	157.2	6.9	164.8	5.9	1977	184.1	7.7	725
Office	166.7	11.9	174.2	10.1	834	197.5	17.3	274
Bathroom - 2	176.4	9.6	183.2	9.2	1534	274.4	14.2	589
Hallway	180.2	7.9	198.5	7.2	1806	206.4	12.2	744
Garage	193.1	9.7	201.4	8.4	1321	232.2	16.1	440
Bathroom - 4	199.9	30.7	203.8	27.1	147	228.3	39.8	43
Bathroom - 3	203.6	21.6	214.7	22.4	686	192.6	13.4	270
Dining Room	204.6	9.4	214.7	8.4	1287	215.1	10.8	581
Bathroom - 5	213.3	42.8			42			
Rec Room						228.9	52.6	72
Other	214.6	23.5	229.7	21.7	301	267.6	49.9	104
Family Room						252.6	16.1	362
Kitchen	241.0	11.5	256.5	9.5	1977	245.2	11.5	834
Living Room	266.2	13.9	286.3	11.4	1904	253.5	14.2	672
Exterior - Other	270.6	17.1			1138			

[a] The following Room types had a sample size of less than 20, and are omitted from the table: Bathroom-6, 7 and Master; Bedroom 6, 7, 8 and Master.

See Appendix G: Statistical Significance Testing for comparison details.

4.2 Refrigerators and Freezers

The following section describes the refrigerators and freezers found at the surveyed households. In total, 1,986 households that were surveyed in this study have at least one refrigerator, 24.8% have a second, and 5.2% of all homes have three or more. Compared to the 2005 CLASS study[28], this is a significant increase in secondary refrigerators by 5.8% and in third and more refrigerators by 4.1%. For this analysis any refrigerator with a capacity under 13 cubic feet is considered a "very small" refrigerator, while any refrigerator with a capacity of 13 cubic feet and above is referred to as "full-size."

Table 82 below summarizes second and third refrigerators by the residence types where they were found. As expected, it is more common to find second and third refrigerators in single family dwellings than apartments.

Table 82: Percentage of Homes with Second or Third Refrigerator by Type of Residence, using Strata Weights

Type of Residence	Strata weights								Sample Size
	Secondary Refrigerator				Third Refrigerator				
	Full or Very Small		Full Only		Full or Very Small		Full Only		
	%	Error Bound	%	Error Bound	%	Error Bound	%	Error Bound	
Overall	8.3%	1.1%	16.5%	1.4%	2.9%	0.6%	1.0%	0.4%	1,987
Single Family Detached	10.0%	1.4%	23.2%	1.9%	4.2%	0.8%	1.6%	0.6%	1,491
Apt 2-4 Units	6.0%	4.4%	3.0%	2.1%	-	-	-	-	96
Apt 5+ Units	3.7%	2.1%	1.2%	1.2%	0.5%	0.6%	-	-	251
Duplex (Single Story)	1.1%	1.9%	12.7%	8.4%	-	-	-	-	45
Mobile Home	18.3%	14.1%	10.2%	8.4%	-	-	-	-	34
Townhouse/Rowhouse (2-4 Unit Multi-Story)	7.2%	5.4%	11.9%	6.3%	2.0%	3.3%	-	-	70

Due to the small number of homes with third refrigerators, the following summary information is only based upon the primary and secondary refrigerators. This refrigerator/freezer section of the report first summarizes the analysis conducted on the primary refrigerators, and then summarizes the secondary refrigerators.

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[28] See Appendix G: Statistical Significance Testing for comparison details.

The primary and secondary refrigerators are summarized by type, size, age and energy consumption. Because the amount of data for each of the aforementioned characteristics differs, the number of sites in each of the analyses will differ. The data used in the refrigerator analyses are described below.

- ♦ Type-The type of each refrigerator was obtained from the site visit.

- ♦ Size-The size of the refrigerators, in cubic feet, was first obtained from the efficiency databases (CEC and AHAM) if the model number successfully matched a model in the database. In the event that the models were not matched, the data on the size collected on-site were used.

- ♦ Age-The age of the freezer was also obtained from the efficiency databases if a match was made, otherwise the age from the on-site visit was used in the analysis.

- ♦ Usage (nameplate UEC)-The usage data was obtained exclusively from the efficiency databases.

4.2.1 Primary Refrigerators

Type

All homes that were visited over the course of this study except one have a primary refrigerator. The classification of the refrigerators is by size, configuration and existence of a through-the-door ice dispenser. As Figure 22 shows, the largest proportion of the primary refrigerators found is the standard top-mounted freezer type, for both Census-adjusted weighted and strata-weighted results. The second most prevalent type of refrigerator found was side-by-side type, comprising 35.7% and 39.6%, respectively.

Figure 22: Distribution of Primary Refrigerators by Type
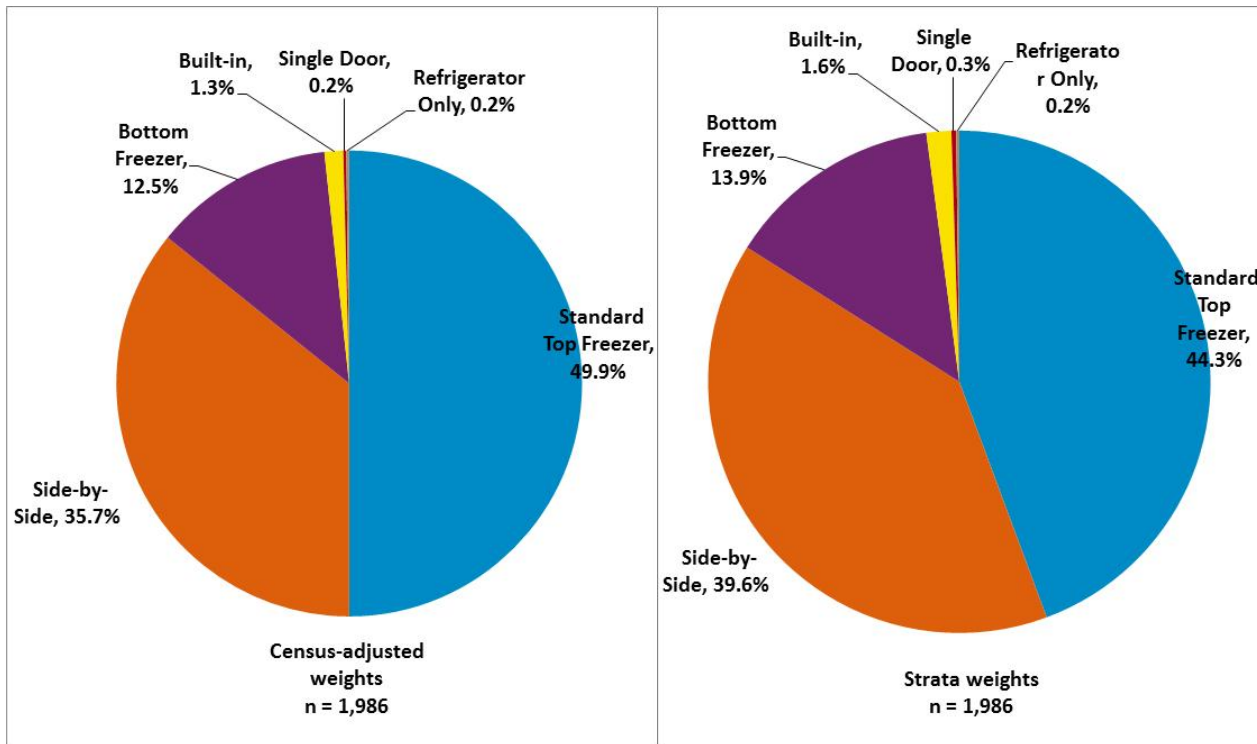
As shown in Figure 23, the percentages of standard top-mounted freezer and side-by side types of refrigerators sampled have decreased 7.7% and 3.6%, respectively, while the percentage of bottom-mounted freezer type refrigerators has increased by nearly 10%, in the time between 2005 and 2012.

Figure 23: Market Share Comparison of Primary Refrigerator Type 2000 to 2012, using Strata Weights

	Standard Top Freezer	Side-by-Side	Bottom Freezer	Built-in	Half or Quarter Size	Refrigerator Only	Single Door
2000 (n=1000)	59.7%	34.1%	4.6%	0.0%	0.2%	1.4%	0.0%
2005 (n=848)	52.0%	43.2%	3.8%	0.5%	0.1%	0.4%	0.0%
2012 Strata weights (n=1986)	44.3%	39.6%	13.9%	1.6%	0.2%	0.2%	0.3%
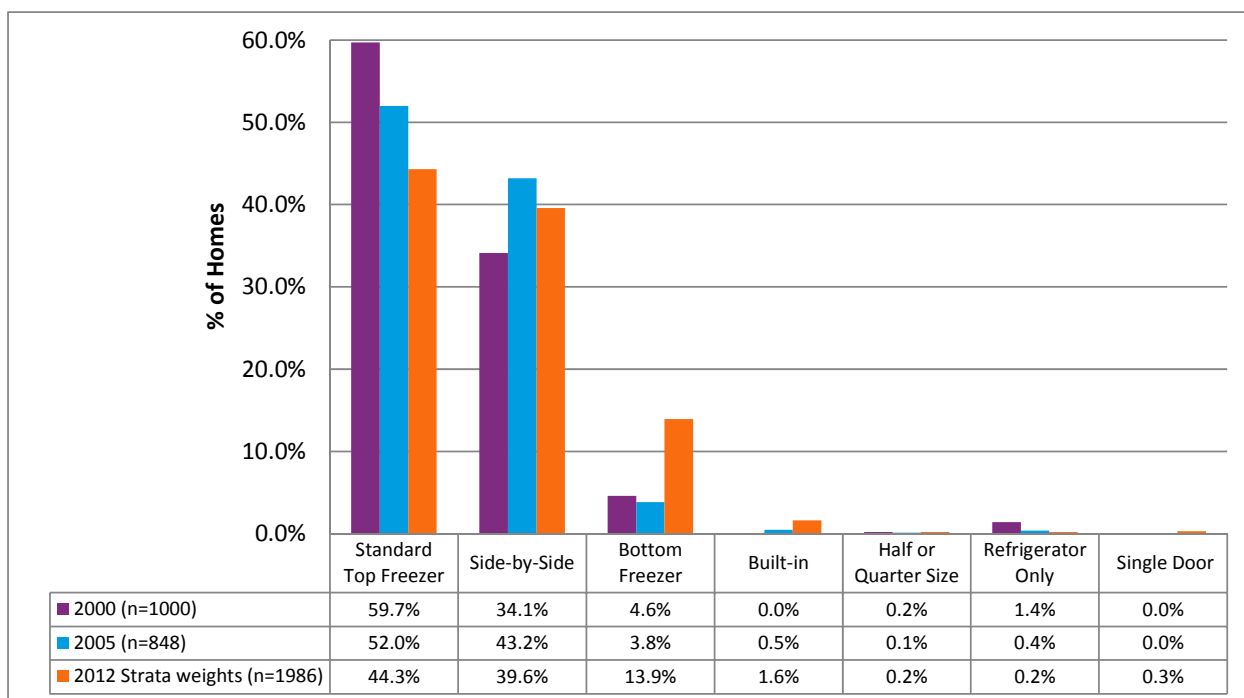
See Appendix G: Statistical Significance Testing for comparison details.

Size

The sizes of refrigerators were obtained from manufacturer data if the unit is matched, or else from survey data if not matched. The following summary of the sizes of the refrigerators recaps both the matched and unmatched units, or the manufacturer reported and surveyor estimated sizes. The manufacturer reported average overall size is not significantly different from the estimated overall sizes.

As shown in Table 83, the sample size that summarizes the average size of the refrigerator is 1,626. This is the number of full size refrigerators for which we obtained size data from the efficiency databases. The average manufacturer reported size for all refrigerators obtained from the efficiency database is 21.1 cubic feet using Census-adjusted weights (21.5 cubic feet using strata weights).

Table 83: Average Estimated Size of Primary Refrigerators by Type

Refrigerator Type	Census-adjusted weights		Strata weights		Sample Size
	Manufacturer Reported Size	Error Bound	Manufacturer Reported Size	Error Bound	
All Types	21.1	0.2	21.5	0.2	1,626
Standard Top Freezer	18.1	0.2	18.2	0.2	548
Standard Top Freezer Water & Ice in-door	20.6	0.8	20.5	0.8	18
Side-by-Side	22.6	0.6	22.8	0.6	58
Side-by-Side Water & Ice in-door	24.7	0.2	24.7	0.1	703
Single Door	21.4	0.0	20.7	0.0	3
Single Door Water & Ice in-door	25.5	0.0	25.6	0.0	3
Bottom Freezer	22.0	0.4	21.8	0.4	166
Bottom Freezer Water & Ice in-door	24.5	0.6	24.6	0.6	100
Built-in	22.1	0.3	22.2	0.3	16
Built-in Water & Ice in-door	25.1	0.8	25.2	0.7	7
Refrigerator Only	17.2	0.0	17.3	0.0	4

Table 84 shows the distribution of the sizes of the refrigerators including matched and unmatched units. The largest percentage of the refrigerators found is in size range above 23.00 cubic feet at 39.3%. Top mounted refrigerators with water and ice in-door are the most prevalent refrigerators surveyed that have sizes less than 10 cubic feet at 17.1%.

Table 84: Distribution of Primary Refrigerators within Estimated Size Ranges within Type, using Strata Weights

Refrigerator Type		Strata weights				
		Estimated Size Range (cu. ft.)				
		1 to 10	11 to 14	15 to 18	19 to 22	23+
All Types (n=835)	%	0.7%	6.4%	24.9%	28.7%	39.3%
	EB	0.5%	1.4%	2.2%	2.1%	2.1%
Top Freezer (n=548)	%	1.1%	14.7%	54.2%	27.7%	2.3%
	EB	0.9%	3.0%	3.9%	3.4%	1.1%
Top Freezer Water & Ice in-door (n=18)	%	17.1%	-	4.8%	21.8%	56.4%
	EB	16.4%	-	5.6%	16.1%	1.1%
Side-by-Side (n=58)	%	-	-	5.0%	61.7%	33.4%
	EB	-	-	6.8%	12.9%	10.1%
Side-by-Side Water & Ice in-door (n=703)	%	-	-	-	18.1%	81.9%
	EB	-	-	-	2.7%	2.8%
Single Door (n=3)	%	-	-	57.1%	-	42.9%
	EB	-	-	45.6%	-	53.3%
Single Door Water & Ice in-door (n=3)	%	-	-	-	-	100.0%
	EB	-	-	-	-	0.0%
Bottom Freezer (n=166)	%	1.3%	1.3%	8.9%	62.1%	27.7%
	EB	2.1%	0.0%	4.4%	7.4%	6.4%
Bottom Freezer Water & Ice in-door (n=100)	%	-	-	-	26.3%	73.7%
	EB	-	-	-	9.0%	7.9%
Built-in (n=16)	%	-	-	6.0%	73.3%	20.8%
	EB	-	-	9.5%	26.2%	14.2%
Built-in Water & Ice in-door (n=7)	%	-	-	-	19.3%	80.7%
	EB	-	-	-	20.8%	28.5%
Refrigerator Only (n=4)	%	-	-	81.9%	18.1%	-
	EB	-	-	35.3%	27.0%	-

Age

During the on-site survey, surveyors examined the refrigerator nameplate for a manufactured date and residents were asked for the approximate age of their refrigerators. If the resident was unable to provide an age, or the nameplate didn't provide a manufactured date, the surveyor estimated the age of the refrigerators whenever possible. The nameplate manufactured date, resident reported age, and surveyor estimated ages were used for refrigerators when no age data from manufacturers was available for the following estimated age analysis.

The bias in this data results from a customer or surveyor reported age, which will inherently have some amount of incorrect information. However, it is our judgment that the latter of the two, the

estimated ages, will be more accurate because there is much less bias towards newer refrigerators and the total number of respondents is higher. However, in order to give the reader an idea of the ages of the matched refrigerators that are used in the UEC analysis, the average manufacturer reported ages are also presented in this section.

Table 85 summarizes the data that resulted from the matches of the refrigerator/freezer model numbers collected from on-sites with manufacturer data to obtain an approximate manufacture date. The ages of 930 primary refrigerator/freezers were obtained in this manner. Based on this sample, the overall average age of these refrigerators is 8.4 years with an error bound of 0.3 years, significantly older than the previous study. The average life expectancy of refrigerators is 14 years. The 2005 CLASS study reported the average age was 6.6 years with an error bound of 0.3 years. The manufacture dates range for 2006 to 2012 accounts for about 42% of all refrigerators. The 2005 CLASS study found 45% of primary refrigerators were manufactured between 1990 and 2000, while this report finds only 20% of primary refrigerators were manufactured between 1990 and 2000. This is a strong indication that that older refrigerators have been removed from the market since the previous CLASS study was conducted.

Table 85: Average Age and Distribution of Manufacturer Reported Ages within Size Ranges of Primary Refrigerators, using Strata Weights

Ref Type	Size Range (cu. ft.)	Avg Mfg. Age	Avg. Mfg. Age EB	1985-1989	1990-1994	1995-1999	2000-2005	2006-2009	2010-2012	Sample Size
						Strata weights				
All Types	Overall	8.4	0.3	1.8%	6.2%	11.6%	38.4%	28.9%	13.1%	930
	1 to 10	6.4	0.0	-	-	-	68.4%	31.6%	-	2
	11 to 14	7.9	1.7	8.5%	6.2%	-	26.2%	45.9%	13.2%	33
	15 to 18	8.2	0.7	1.0%	6.2%	9.7%	41.1%	28.6%	13.3%	176
	19 to 22	8.6	0.7	1.8%	5.8%	15.2%	36.2%	24.4%	16.6%	225
	23+	7.7	0.5	1.9%	3.7%	8.0%	39.7%	33.7%	12.9%	371
	Unknown	10.7	0.8	-	12.6%	22.3%	38.8%	18.5%	7.7%	123
Top Freezer	Overall	8.7	0.5	2.1%	7.2%	12.1%	36.6%	29.0%	12.9%	369
	1 to 10	6.4	0.0	-	-	-	68.4%	31.6%	-	2
	11 to 14	7.9	1.7	8.5%	6.2%	-	26.2%	45.9%	13.2%	33
	15 to 18	8.3	0.7	1.0%	6.4%	9.8%	41.5%	28.8%	12.5%	169
	19 to 22	8.8	1.0	2.3%	6.3%	15.2%	34.1%	24.7%	17.4%	112
	23+	4.0	0.0	-	-	-	-	100.0%	-	1
	Unknown	10.5	1.1	-	12.8%	23.9%	33.4%	23.5%	6.4%	52
Top Freezer Water & Ice in-door	Overall	8.2	0.2	-	9.4%	-	68.9%	-	21.6%	9
	15 to 18	4.1	0.0	-	-	-	38.2%	-	61.8%	2
	19 to 22	7.0	0.0	-	-	-	100.0%	-	-	1
	23+	9.1	0.0	-	12.7%	-	67.7%	-	19.6%	6

Ref Type	Size Range (cu. ft.)	Avg Mfg. Age	Avg. Mfg. Age EB	Strata weights						Sample Size
				1985-1989	1990-1994	1995-1999	2000-2005	2006-2009	2010-2012	
Side-by-Side	Overall	12.3	1.2	2.5%	24.0%	8.9%	46.7%	8.6%	9.3%	25
	15 to 18	2.0	0.0	-	-	-	-	-	100.0%	1
	19 to 22	13.2	0.6	4.4%	19.8%	11.6%	57.4%	6.8%	-	12
	23+	15.4	0.0	-	56.0%	9.7%	24.4%	9.9%	-	8
	Unknown	10.4	0.0	-	-	-	76.7%	23.3%	-	4
Side-by-Side Water & Ice in-door	Overall	8.4	0.4	1.5%	4.7%	11.8%	42.4%	29.0%	10.6%	451
	19 to 22	8.3	0.9	0.8%	3.6%	15.9%	41.2%	24.9%	13.6%	78
	23+	7.9	0.5	2.0%	3.0%	8.8%	42.5%	33.1%	10.6%	318
	Unknown	11.3	0.9	0.0%	15.4%	22.2%	43.4%	12.4%	6.6%	55
Single Door	Overall	6.0	0.0	-	-	-	-	100.0%	-	1
	15 to 18	6.0	0.0	-	-	-	-	100.0%	-	1
Single Door Water & Ice in-door	Overall	23.0	0.0	-	-	-	-	-	-	1
	23+	23.0	0.0	-	-	-	-	-	-	1
Bottom Freezer	Overall	6.2	0.9	-	-	15.8%	20.7%	41.5%	22.0%	27
	15 to 18	11.0	0.0	-	-	-	100.0%	-	-	1
	19 to 22	6.6	0.6	-	-	22.2%	19.1%	47.4%	11.4%	12
	23+	3.1	0.0	-	-	-	5.2%	56.1%	38.7%	11
	Unknown	12.0	0.0	-	-	44.9%	41.4%	-	13.6%	3
Bottom Freezer Water & Ice in-door	Overall	2.8	0.4	-	-	-	7.1%	37.6%	55.3%	36
	19 to 22	5.0	0.4	-	-	-	-	100.0%	-	7
	23+	11.0	0.5	-	-	33.8%	66.2%	-	-	22
	Unknown	12.0	0.1	-	-	-	100.0%	-	-	7
Built-in	Overall	10.6	0.0	-	-	7.7%	75.1%	17.2%	-	5
	19 to 22	5.0	0.0	-	-	-	-	100.0%	-	1
	23+	11.0	0.0	-	-	33.8%	66.2%	-	-	2
	Unknown	12.0	0.0	-	-	-	100.0%	-	-	2
Built-in Water & Ice in-door	Overall	6.8	0.7	-	-	-	83.0%	17.0%	-	3
	19 to 22	5.0	0.0	-	-	-	-	100.0%	-	1
	23+	7.2	0.0	-	-	-	100.0%	-	-	2
Refrigerator Only	Overall	9.3	0.0	-	-	45.3%	-	54.7%	-	3
	15 to 18	7.6	0.0	-	-	26.4%	-	73.6%	-	2
	19 to 22	14.0	0.0	-	-	100.0%	-	-	-	1

The sample size of 1,902 primary refrigerator ages represents all full size primary refrigerator ages obtained in this study. The average manufacturer and surveyor reported age and error bound along with the distribution of manufacturing date range by type and size range are presented in the following table. Table 86 below shows the average age of the refrigerators is 8.1 years with an error bound of 0.3 years. No refrigerators were found manufactured prior to1985.

Table 86: Average Age and Distribution of Manufacturer Reported Ages and On-site Estimated Ages within Size Ranges of Primary Refrigerators, using Strata Weights

Ref Type	Size Range (cu. ft.)	Avg. Est Age.	Avg. Est. Age EB	Strata weights						Sample Size
				1985-1989	1990-1994	1995-1999	2000-2005	2006-2009	2010-2012	
All Types	Overall	8.1	0.3	2.2%	5.8%	10.7%	33.9%	32.8%	14.6%	1,902
	1 to 10	7.0	0.0	-	-	24.4%	27.9%	28.1%	19.7%	8
	11 to 14	9.2	1.6	8.4%	6.8%	8.1%	29.1%	38.9%	8.7%	52
	15 to 18	8.1	0.6	2.1%	6.5%	8.5%	37.5%	29.4%	16.1%	292
	19 to 22	8.4	0.5	2.2%	6.5%	12.8%	33.3%	29.4%	15.8%	452
	23+	6.9	0.3	1.1%	3.2%	6.6%	33.8%	38.8%	16.5%	760
	Unknown	9.9	0.6	2.8%	9.0%	18.5%	32.1%	28.5%	9.1%	338
Top Freezer	Overall	9.0	0.4	3.0%	7.4%	13.7%	34.0%	28.4%	13.4%	615
	1 to 10	6.8	0.0	-	-	24.4%	30.2%	13.9%	31.5%	4
	11 to 14	9.2	1.6	8.4%	6.8%	8.1%	29.1%	38.9%	8.7%	52
	15 to 18	8.2	0.6	2.2%	6.8%	8.9%	37.1%	29.7%	15.3%	268
	19 to 22	9.6	0.9	3.0%	8.2%	17.3%	36.3%	21.4%	13.9%	163
	23+	11.2	2.6	-	10.2%	46.1%	21.5%	8.1%	14.2%	17
	Unknown	9.6	0.9	2.4%	8.4%	19.9%	27.8%	31.8%	9.6%	111
Top Freezer Water & Ice in-door	Overall	10.2	1.9	3.9%	10.3%	14.7%	44.9%	16.6%	9.6%	19
	1 to 10	10.7	0.0	-	-	44.9%	44.5%	10.7%	-	3
	15 to 18	4.1	0.0	-	-	-	38.2%	-	61.8%	2
	19 to 22	7.8	5.4	-	-	27.6%	27.3%	45.2%	-	4
	23+	12.2	3.4	9.0%	24.0%	-	52.0%	-	15.0%	8
	Unknown	9.2	0.0	-	-	-	59.7%	40.3%	-	2
Side-by-Side	Overall	10.4	1.2	6.1%	14.2%	6.5%	37.5%	27.2%	8.5%	80
	15 to 18	2.2	0.0	-	-	-	-	15.3%	84.7%	2
	19 to 22	12.1	1.4	11.8%	13.9%	10.2%	42.4%	20.8%	0.9%	30
	23+	9.7	0.9	0.0%	20.0%	5.4%	27.0%	38.8%	8.7%	26
	Unknown	9.3	1.4	3.2%	11.4%	2.5%	43.4%	28.9%	10.6%	22
Side-by-Side Water & Ice in-door	Overall	8.0	0.3	1.1%	4.8%	10.3%	38.8%	34.6%	10.5%	832
	19 to 22	8.4	0.8	0.5%	4.1%	13.4%	44.5%	25.6%	11.8%	125
	23+	7.3	0.4	1.3%	2.9%	6.8%	38.2%	39.3%	11.5%	568
	Unknown	10.8	0.8	0.5%	13.3%	22.4%	35.9%	23.1%	4.7%	139

Ref Type	Size Range (cu. ft.)	Avg. Est Age.	Avg. Est. Age EB	Strata weights						Sample Size
				1985-1989	1990-1994	1995-1999	2000-2005	2006-2009	2010-2012	
Single Door	Overall	12.4	0.0	37.2%	-	-	9.9%	44.3%	8.7%	6
	15 to 18	3.4	0.0	0.0%	-	-	-	34.1%	65.9%	2
	23+	8.0	0.0	0.0%	-	-	100.0%	-	-	1
	Unknown	14.5	0.0	48.3%	-	-	-	51.7%	-	3
Single Door Water & Ice in-door	Overall	11.6	0.0	42.2%	-	-	-	34.5%	23.2%	3
	23+	11.6	0.0	42.2%	-	-	-	34.5%	23.2%	3
Bottom Freezer	Overall	5.9	0.6	-	3.2%	5.5%	26.1%	42.5%	22.6%	177
	1 to 10	3.0	0.0	-	-	-	-	100.0%	-	1
	15 to 18	5.8	1.6	-	-	-	61.5%	18.3%	20.2%	14
	19 to 22	6.3	1.0	-	5.8%	7.4%	18.0%	47.0%	21.8%	95
	23+	4.5	0.4	-	-	-	27.5%	45.9%	26.7%	49
	Unknown	7.7	1.0	-	-	13.4%	39.9%	24.7%	22.0%	18
Bottom Freezer Water & Ice in-door	Overall	2.8	0.3	-	-	-	4.9%	43.8%	51.3%	114
	19 to 22	2.8	0.4	-	-	-	3.5%	45.5%	51.0%	22
	23+	2.8	0.4	-	-	-	4.6%	44.7%	50.7%	78
	Unknown	2.7	0.2	-	-	-	10.7%	32.4%	57.0%	14
Compact	Overall	25	0.0	100.0%	-	-	-	-	-	1
	Unknown	25.0	0.0	100.0%	-	-	-	-	-	1
Built-in	Overall	9.0	1.2	4.2%	-	12.5%	51.6%	27.1%	4.6%	32
	15 to 18	2.0	0.0	-	-	-	-	-	100.0%	1
	19 to 22	6.0	0.5	-	-	-	54.1%	41.8%	4.1%	10
	23+	8.4	1.5	-	-	12.6%	74.8%	12.6%	-	5
	Unknown	11.9	1.6	8.5%	-	22.8%	47.9%	20.8%	-	16
Built-in Water & Ice in-door	Overall	7.8	1.0	-	-	16.9%	43.4%	34.9%	4.8%	18
	19 to 22	6.9	0.0	-	-	-	63.2%	36.8%	-	2
	23+	8.3	0.0	-	-	15.1%	68.0%	-	17.0%	5
	Unknown	7.8	0.4	-	-	19.4%	30.9%	49.8%	-	11
Refrigerator Only	Overall	7.5	0.0	-	-	27.1%	-	72.9%	-	5
	15 to 18	6.3	0.0	-	-	16.9%	-	83.1%	-	3
	19 to 22	14.0	0.0	-	-	100.0%	-	-	-	1
	Unknown	6.0	0.0	-	-	-	-	100.0%	-	1

Energy Consumption

The average annual nameplate unit energy consumption (UEC) for refrigerator/freezers was obtained from the model number matches to manufacturer data. A sample of 1,626 nameplate UECs were obtained for the analysis below. Table 87 shows the average nameplate UEC by type of refrigerator and size range.

The average overall nameplate UEC for all types of refrigerators is 608.8 kWh/year, with an error bound of 9.7 kWh/year. This is a significant improvement over the findings of the 2005 CLASS report, which found that the average nameplate UEC was 720.7 kWh/year, with an error bound of 27.8 kWh/year. The most efficient units on average are single door only refrigerators, which have the lowest nameplate UEC at 478.4 kWh/year, followed by bottom-freezer refrigerators that have an average nameplate UEC of 535.9 kWh/year.

Table 87: Average Nameplate Unit Energy Consumption (UEC) by Type of Primary Refrigerator

Refrigerator Type	Size Range (cu. ft.	Census-adjusted weights		Strata weights		Sample Size
		Average UEC	Error Bound	Average UEC	Error Bound	
All Types	Overall	597.8	9.5	608.8	9.7	1,626
	1 to 10	335.8	0.0	349.6	0.0	8
	11 to 14	501.6	26.3	504.2	30.0	64
	15 to 18	515.0	15.3	523.3	15.6	317
	19 to 22	616.2	19.3	620.4	19.3	467
	23+	674.5	14.4	676.3	15.2	770
Top Freezer	Overall	536.3	12.9	545.7	13.2	548
	1 to 10	414.6	0.0	425.5	0.0	4
	11 to 14	501.6	26.3	504.2	30.0	64
	15 to 18	517.2	15.7	527.2	16.2	293
	19 to 22	580.1	28.9	585.4	27.5	170
	23+	764.7	59.1	775.1	56.5	17
Top Freezer Water & Ice in-door	Overall	738.5	82.4	821.9	71.3	18
	1 to 10	21.7	0.0	21.7	0.0	3
	15 to 18	410.7	0.0	409.5	0.0	2
	19 to 22	561.6	78.1	619.8	113.1	4
	23+	1101.6	103.5	1212.2	110.2	9
Side-by-Side	Overall	777.2	54.0	799.1	65.9	58
	15 to 18	370.9	0.0	357.6	0.0	2
	19 to 22	811.5	39.8	857.6	86.0	30
	23+	748.4	21.5	748.1	28.3	26

Refrigerator Type	Size Range (cu. ft.	Census-adjusted weights		Strata weights		Sample Size
		Average UEC	Error Bound	Average UEC	Error Bound	
Side-by-Side Water & Ice in-door	Overall	693.4	13.7	690.4	12.5	703
	19 to 22	696.5	26.1	693.7	24.7	128
	23+	692.6	15.4	689.6	14.1	575
Single Door	Overall	504.7	0.0	479.4	0.0	3
	15 to 18	334.2	0.0	336.8	0.0	2
	23+	657.0	0.0	657.0	0.0	1
Single Door Water & Ice in-door	Overall	914.9	0.0	965.3	0.0	3
	23+	914.9	0.0	965.3	0.0	3
Bottom Freezer	Overall	541.8	29.7	535.9	27.2	166
	1 to 10	500.0	0.0	500.0	0.0	1
	15 to 18	491.1	10.6	485.5	14.7	14
	19 to 22	568.4	46.6	558.8	42.1	100
	23+	501.2	3.4	501.6	3.6	51
Bottom Freezer Water & Ice in-door	Overall	549.9	8.7	551.2	8.7	100
	19 to 22	531.9	13.1	534.8	15.1	22
	23+	556.3	7.0	557.1	7.2	78
Built-in	Overall	569.5	14.9	570.4	17.9	16
	15 to 18	319.0	0.0	319.0	0.0	1
	19 to 22	553.5	8.8	552.5	7.0	10
	23+	693.6	66.7	696.3	73.6	5
Built-in Water & Ice in-door	Overall	777.7	181.3	785.1	194.4	7
	19 to 22	676.4	0.0	678.5	0.0	2
	23+	804.0	0.0	809.7	0.0	5
Refrigerator Only	Overall	391.3	0.0	391.5	0.0	4
	15 to 18	397.1	0.0	400.4	0.0	3
	19 to 22	358.0	0.0	358.0	0.0	1

The bin distribution of unit energy consumption, grouped by type and size, of all successfully matched full size primary refrigerators is shown below in Table 88. The nameplate UEC range that makes up the largest percentage of all refrigerators is the range between 550 and 749.9 kWh/year, which covers 43% of all types of refrigerators.

Table 88: Distribution of Nameplate UEC Ranges within Size Ranges and Type of Primary Refrigerators, using Strata Weights

Ref Type	Size Range (cu. ft.)	Strata weights - Unit Energy Consumption Ranges (kWh/Year)										
		Less than 350	350 to 549.9	550 to 749.9	750 to 949.9	950 to 1149.9	1150 to 1349.9	1350 to 1549.9	1550 to 1749.9	1750 to 1949.9	1950 to 2150	More than 2150
All Types	Overall	0.7%	41.7%	43.0%	8.6%	3.7%	1.3%	0.6%	0.3%	0.1%	0.0%	0.1%
	1 to 10	21.7%	78.3%	-	-	-	-	-	-	-	-	-
	11 to 14	-	67.5%	29.9%	2.6%	-	-	-	-	-	-	-
	15 to 18	2.2%	69.3%	18.0%	8.7%	1.7%	-	-	-	-	-	-
	19 to 22	-	47.1%	34.2%	11.5%	4.0%	1.8%	0.6%	0.5%	0.2%	-	-
	23+	-	15.2%	68.2%	7.5%	5.4%	1.9%	1.1%	0.3%	-	-	0.3%
Top Freezer	Overall	0.7%	64.3%	22.7%	9.6%	2.1%	0.5%	0.1%	-	-	-	-
	1 to 10	-	100.0%	-	-	-	-	-	-	-	-	-
	11 to 14	-	67.5%	29.9%	2.6%	-	-	-	-	-	-	-
	15 to 18	1.4%	69.2%	18.4%	9.2%	1.8%	-	-	-	-	-	-
	19 to 22	-	57.4%	25.6%	12.2%	3.9%	0.4%	0.4%	-	-	-	-
	23+	-	4.5%	48.4%	31.1%	-	16.0%	-	-	-	-	-
Top Freezer Water & Ice in-door	Overall	18.5%	14.1%	26.4%	17.1%	-	10.4%	-	-	-	-	13.4%
	1 to 10	100.0%	-	-	-	-	-	-	-	-	-	-
	15 to 18	-	100.0%	-	-	-	-	-	-	-	-	-
	19 to 22	-	42.5%	25.4%	32.0%	-	-	-	-	-	-	-
	23+	-	-	38.0%	18.3%	-	19.1%	-	-	-	-	24.7%
Side-by-Side	Overall	3.8%	14.5%	41.0%	19.6%	2.9%	11.6%	-	5.0%	1.6%	-	-
	15 to 18	84.3%	15.7%	-	-	-	-	-	-	-	-	-
	19 to 22	-	16.6%	39.7%	16.0%	4.7%	12.4%	-	8.0%	2.6%	-	-
	23+	-	10.3%	49.1%	29.0%	0.0%	11.6%	-	-	-	-	-
Side-by-Side Water & Ice in-door	Overall	-	7.3%	74.2%	8.9%	6.6%	1.6%	1.0%	0.3%	-	-	-
	19 to 22	-	13.5%	61.7%	17.1%	4.2%	3.5%	-	-	-	-	-
	23+	-	5.9%	77.0%	7.1%	7.1%	1.2%	1.2%	0.4%	0.1%	-	-

Strata weights - Unit Energy Consumption Ranges (kWh/Year)												
Ref Type	Size Range (cu. ft.)	Less than 350	350 to 549.9	550 to 749.9	750 to 949.9	950 to 1149.9	1150 to 1349.9	1350 to 1549.9	1550 to 1749.9	1750 to 1949.9	1950 to 2150	More than 2150
Single Door	Overall	36.1%	19.4%	44.5%	-	-	-	-	-	-	-	-
	15 to 18	65.1%	34.9%	-	-	-	-	-	-	-	-	-
	23+	-	-	100.0%	-	-	-	-	-	-	-	-
Single Door Water & Ice in-door	Overall	-	-	53.9%	-	-	-	46.1%	-	-	-	-
	23+	-	-	53.9%	-	-	-	46.1%	-	-	-	-
Bottom Freezer	Overall	-	78.6%	13.7%	3.3%	3.3%	-	1.2%	-	-	-	-
	1 to 10	-	100.0%	-	-	-	-	-	-	-	-	-
	15 to 18	-	84.5%	15.5%	-	-	-	-	-	-	-	-
	19 to 22	-	70.8%	16.8%	5.2%	5.3%	-	1.9%	-	-	-	-
	23+	-	93.5%	6.5%	-	-	-	-	-	-	-	-
Bottom Freezer Water & Ice in-door	Overall	-	48.5%	51.5%	-	-	-	-	-	-	-	-
	19 to 22	-	62.5%	37.5%	-	-	-	-	-	-	-	-
	23+	-	43.5%	56.5%	-	-	-	-	-	-	-	-
Built-in	Overall	5.6%	23.1%	68.1%	3.2%	-	-	-	-	-	-	-
	15 to 18	100.0%	-	-	-	-	-	-	-	-	-	-
	19 to 22	-	31.7%	68.3%	-	-	-	-	-	-	-	-
	23+	-	-	85.1%	14.9%	-	-	-	-	-	-	-
Built-in Water & Ice in-door	Overall	-	-	65.5%	20.1%	-	-	14.5%	-	-	-	-
	19 to 22	-	-	100.0%	-	-	-	-	-	-	-	-
	23+	-	-	57.5%	24.7%	-	-	-	-	-	-	-
Refrigerator Only	Overall	27.3%	72.7%	-	-	-	-	-	-	-	-	-
	15 to 18	34.5%	65.5%	-	-	-	-	-	-	-	-	-
	19 to 22	-	100.0%	-	-	-	-	-	-	-	-	-

4.2.2 Secondary Refrigerators

Type

Of the 12.2% of homes with second refrigerator/freezers, approximately 44% have top-mounted freezers as their secondary refrigerator type. Other prominent secondary refrigerator types include compact and side-by-side. A complete breakdown of secondary refrigerator/freezer by type, comparing Census and strata weights, is shown below in Figure 24.

Figure 24: Distribution of Secondary Refrigerators by Type
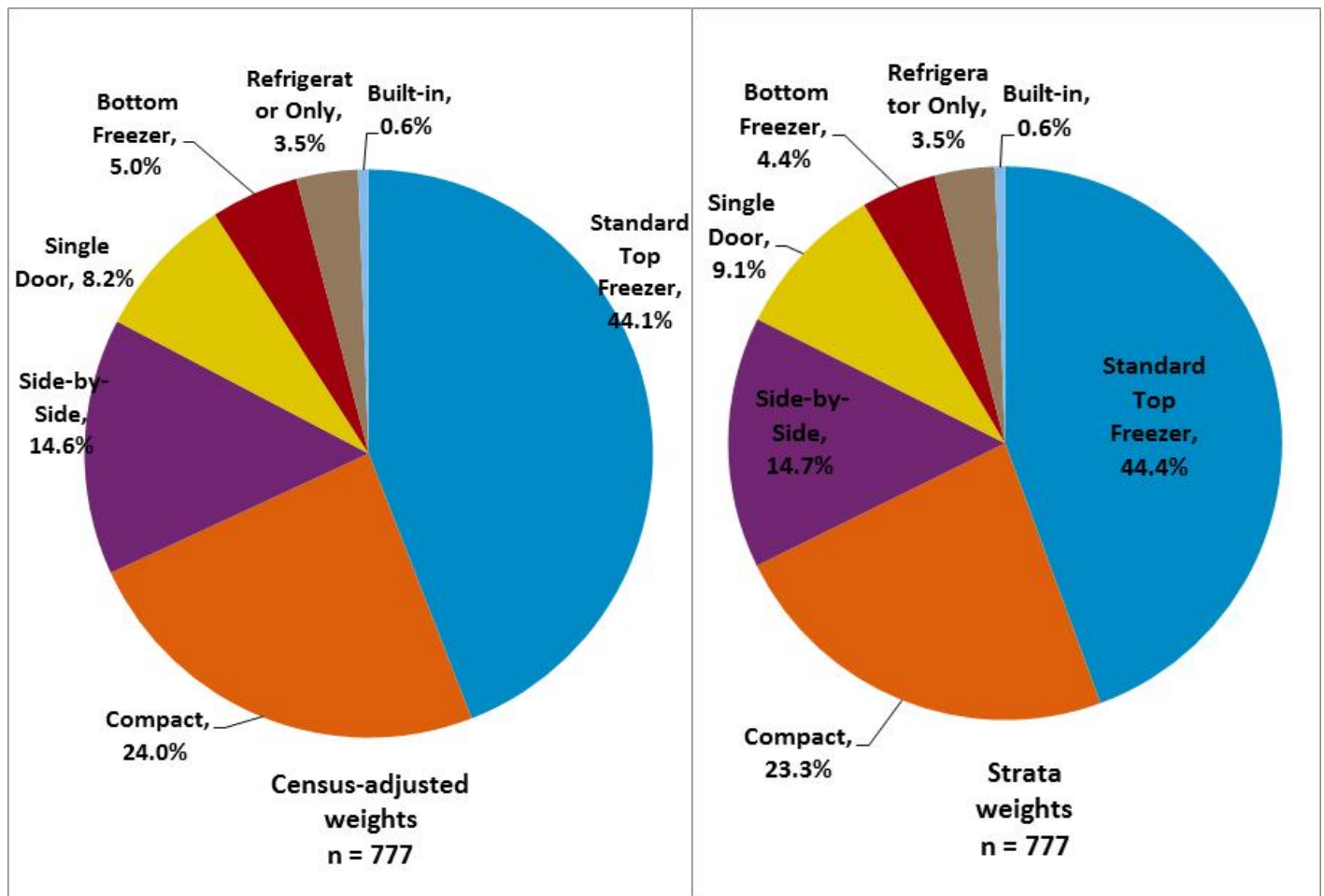
Size

The sample size that is used in the following analysis of the secondary refrigerators by size of the unit is 469. Size data for secondary refrigerators was obtained from the manufacturer data and the surveyor estimate.

Table 89 shows the average estimated size of the refrigerators by type. The average of all types of refrigerators is 16.8 cubic feet, for both Census-adjusted and strata weights. The side-by-side water and ice in-door were the largest of all the types, at 24.9 and 24.8 cubic feet on average, for Census-adjusted and strata weights, respectively.

Table 89: Average Estimated Size of Secondary Refrigerators by Type

Refrigerator Type	Census-adjusted weights		Strata weights		Sample Size
	Ave Est Size (cu. ft.)	Error Bound	Ave Est Size (cu. ft.)	Error Bound	
All Types	16.8	0.7	16.8	0.6	469
Standard Top Freezer	18.1	0.4	18.1	0.3	249
Standard Top Freezer Water & Ice in-door	21.6	0.1	21.7	0.1	6
Side-by-Side	21.8	0.9	21.9	1.0	9
Side-by-Side Water & Ice in-door	24.9	0.3	24.8	0.3	85
Single Door	3.9	0.7	3.9	0.7	23
Bottom Freezer	20.6	0.5	20.6	0.5	27
Bottom Freezer Water & Ice in-door	24.9	0.0	24.9	0.0	4
Compact	4.0	0.2	4.0	0.3	60
Built-in	5.2	0.0	5.2	0.0	2
Refrigerator Only	9.5	0.0	9.6	0.0	4

Table 90 shows the distribution of the sizes of the secondary refrigerators sampled. The largest percentage of the secondary refrigerators surveyed (31.0%) fall in the size range of 15 to 18 cubic feet.

Table 90: Distribution of Estimated Size Ranges within Type of Secondary Refrigerators, using Strata Weights

Refrigerator Type		Strata weights - Size Range (cu. ft.)				
		1 to 10	11 to 14	15 to 18	19 to 22	23+
All Types (n=469)	%	20.3%	7.4%	31.0%	23.2%	18.0%
	Error Bound	3.6%	2.2%	4.3%	3.5%	3.4%
Top Freezer (n=249)	%	2.4%	12.3%	54.4%	27.3%	3.6%
	Error Bound	1.6%	3.8%	6.2%	5.1%	1.8%
Top Freezer Water & Ice in-door (n=6)	%	-	-	-	81.7%	18.3%
	Error Bound	-	-	-	27.5%	27.2%
Side-by-Side (n=9)	%	-	-	-	87.9%	12.1%
	Error Bound	-	-	-	20.8%	13.3%

Refrigerator Type		Strata weights - Size Range (cu. ft.)				
		1 to 10	11 to 14	15 to 18	19 to 22	23+
Side-by-Side Water & Ice in-door (n=85)	%	-	-	-	16.7%	83.3%
	Error Bound	-	-	-	7.5%	8.2%
Single Door (n=23)	%	97.4%	-	2.6%	-	-
	Error Bound	6.2%	-	4.2%	-	-
Bottom Freezer (n=27)	%	-	3.3%	15.0%	72.1%	9.6%
	Error Bound	-	5.3%	11.4%	16.8%	9.5%
Bottom Freezer Water & Ice in-door (n=4)	%	-	-	-	-	100.0%
	Error Bound	-	-	-	-	0.0%
Compact (n=60)	%	99.4%	0.6%	-	-	-
	Error Bound	2.0%	1.1%	-	-	-
Built-in (n=2)	%	100.0%	-	-	-	-
	Error Bound	0.0%	-	-	-	-
Refrigerator Only (n=4)	%	57.9%	42.1%	-	-	-
	Error Bound	54.2%	38.7%	-	-	-

Age

Similar to the primary refrigerator, this analysis attempts to match the refrigerator/freezer model numbers collected from on-sites with manufacturer data to obtain an approximate manufacture date. The ages of the 270 sampled secondary refrigerators were obtained in this manner. Based on this sample, the overall average age of secondary refrigerators is 10 years with an error bound of 0.7 years. This is considerably older than the average age of primary refrigerators, which is 8.1 years. The largest percentage (27.5%) of secondary refrigerators sampled fell into the manufacture date range of 2000 through 2005. There were no secondary refrigerators found manufactured prior to 1980.

Table 91: Average Age and Distribution of Manufacturer Reported Ages within Size Ranges of Secondary Refrigerators, using Strata Weights

Ref Type	Size Range (cu. ft.)	Avg Mfg. Age	Avg. Mfg. Age EB	Strata weights							
				Manufactured Date Ranges							
				1980-1984	1985-1989	1990-1994	1995-1999	2000-2005	2006-2009	2010-2012	Sample Size
All Types	Overall	10.0	0.7	0.3%	3.0%	10.9%	21.7%	27.5%	24.1%	12.4%	270
	1 to 10	11.8	0.3	7.2%	8.5%	5.2%	19.5%	15.9%	43.8%	-	-
	11 to 14	7.0	1.9	-	4.4%	5.0%	7.2%	26.0%	33.3%	24.1%	-
	15 to 18	9.3	1.0	-	1.5%	11.4%	14.4%	34.1%	27.8%	10.7%	-
	19 to 22	11.1	1.1	-	3.0%	12.4%	33.3%	20.8%	20.4%	10.1%	-
	23+	12.7	1.8	-	6.2%	15.8%	25.4%	37.6%	12.1%	3.0%	-
	Unknown	8.5	1.1	-	0.7%	8.1%	24.7%	18.4%	23.9%	24.2%	-
Top Freezer	Overall	9.4	0.9	-	3.1%	9.9%	18.3%	30.0%	24.3%	14.4%	167
	1 to 10	8.5	0.0	-	-	-	-	100.0%	-	-	3
	11 to 14	7.2	2.1	-	4.9%	5.6%	8.0%	28.8%	26.2%	26.6%	23
	15 to 18	9.3	1.0	-	1.5%	11.5%	14.6%	34.4%	28.0%	10.0%	72
	19 to 22	9.5	1.0	-	1.7%	8.3%	25.6%	27.4%	23.7%	13.3%	40
	23+	24.4	0.0	-	100.0%	-	-	-	-	-	2
	Unknown	10.1	1.3	-	1.3%	12.6%	30.1%	18.7%	15.0%	22.2%	27
Top Freezer Water & Ice in-door	Overall	16.7	0.0	-	16.3%	26.8%	31.4%	25.5%	-	-	6
	1 to 10	11.5	1.3	-	-	-	60.3%	26.3%	13.4%	-	4
	19 to 22	17.9	0.0	-	-	46.1%	53.9%	-	-	-	4
	23+	23.0	0.0	-	100.0%	-	-	-	-	-	1
	Unknown	10.0	0.0	-	-	-	-	100.0%	-	-	1
Side-by-Side	Overall	12.5	1.6	-	1.9%	15.7%	37.2%	32.6%	10.3%	2.4%	58
	19 to 22	11.4	0.0	-	-	-	77.8%	-	22.2%	-	2
	23+	13.0	0.0	-	-	-	100.0%	-	-	-	1
	Unknown	11.0	0.0	-	-	-	-	100.0%	-	-	1

Ref Type	Size Range (cu. ft.)	Avg Mfg. Age	Avg. Mfg. Age EB	Manufactured Date Ranges							Sample Size
				1980-1984	1985-1989	1990-1994	1995-1999	2000-2005	2006-2009	2010-2012	
Side-by-Side Water & Ice in-door	Overall	8.2	0.6	-	-	-	29.9%	-	61.0%	9.1%	7
	19 to 22	15.8	1.7	-	11.2%	11.9%	69.3%	7.6%	-	-	8
	23+	12.3	1.8	-	-	18.1%	28.3%	43.2%	7.0%	3.5%	42
	Unknown	9.6	0.8	-	-	8.1%	42.7%	9.6%	39.6%	-	8
Single Door	Overall	8.1	5.4	-	-	24.0%	-	-	52.0%	24.0%	8
	1 to 10	9.7	0.6	-	-	-	42.5%	-	57.5%	-	4
	15 to 18	2.0	0.0	-	-	-	-	-	-	100.0%	1
	Unknown	6.0	0.0	-	-	-	-	-	100.0%	-	2
Bottom Freezer	Overall	6.0	0.0	-	-	-	-	-	100.0%	-	2
	11 to 14	3.0	0.0	-	-	-	-	-	100.0%	-	1
	19 to 22	12.0	2.4	-	-	43.5%	-	-	46.6%	9.9%	5
	Unknown	3.3	0.0	-	-	-	-	-	45.9%	54.1%	2
Bottom Freezer Water & Ice in-door	Overall	8.4	1.3	6.7%	8.0%	4.9%	5.6%	11.0%	29.0%	34.8%	15
	23+	6.0	0.0	-	-	-	-	-	100.0%	-	2
Compact	Overall	7.0	0.0	-	-	-	-	100.0%	-	-	1
	1 to 10	15.9	0.2	18.7%	22.2%	13.6%	-	-	45.5%	-	6
	Unknown	4.2	1.8	-	-	-	8.7%	17.2%	19.7%	54.4%	9
Built-in	Overall	7.0	0.0	-	-	-	-	100.0%	-	-	1
	1 to 10	7.0	0.0	-	-	-	-	100.0%	-	-	1
Refrigerator Only	Overall	6.0	0.0	-	-	-	-	-	100.0%	-	2
	11 to 14	6.0	0.0	-	-	-	-	-	100.0%	-	2

During the on-site visit, residents were asked for the approximate age of their refrigerators. If the resident was unable to provide an age, surveyors estimated the age of the refrigerators whenever possible. These estimated ages were used for refrigerators when no age data from manufacturers was available for the following analysis. The sample size of 270 secondary refrigerator ages represents all full size secondary refrigerator age data obtained in this study. The average age and error bound along with the distribution of manufacturing date range by type and size range are presented in

Table 92 below. The average age of the refrigerators is 9.4 years with an error bound of 1.0 years. No secondary refrigerators were found manufactured prior to 1980.

Similar to the primary refrigerator age estimates, both of the secondary refrigerator manufactured and estimated ages have some bias. These biases are explained in the primary refrigerator section. It is likely that less bias exists in the estimated age analysis, though we thought it important to report both.

Table 92: Average Age and Distribution of Manufacturer Reported Ages and On-site Estimated Ages within Size Ranges of Secondary Refrigerators, using Strata Weights

Ref Type	Size Range (cu. ft.)	Avg Est. Age	Ave Est.. Age EB	Strata weights							
				1980-1984	1985-1989	1990-1994	1995-1999	2000-2005	2006-2009	2010-2012	Sample Size
All Types	Overall	9.4	1.0	0.3%	3.0%	10.9%	21.7%	27.5%	24.1%	12.4%	270
	1 to 10	7.7	1.0	7.2%	8.5%	5.2%	19.5%	15.9%	43.8%	-	80
	11 to 14	8.0	1.6	-	4.4%	5.0%	7.2%	26.0%	33.3%	24.1%	34
	15 to 18	9.6	1.0	-	1.5%	11.4%	14.4%	34.1%	27.8%	10.7%	120
	19 to 22	10.9	1.0	-	3.0%	12.4%	33.3%	20.8%	20.4%	10.1%	107
	23+	11.8	1.2	-	6.2%	15.8%	25.4%	37.6%	12.1%	3.0%	91
	Unknown	8.7	0.8	-	0.7%	8.1%	24.7%	18.4%	23.9%	24.2%	285
Top Freezer	Overall	9.9	0.7	-	5.4%	9.2%	15.9%	33.7%	23.1%	12.7%	305
	1 to 10	4.2	0.0	-	-	-	-	26.8%	30.3%	43.0%	7
	11 to 14	8.3	1.8	-	3.8%	10.0%	13.1%	27.2%	22.8%	23.1%	30
	15 to 18	9.7	1.0	-	3.9%	9.1%	15.5%	33.3%	30.2%	8.0%	114
	19 to 22	10.1	1.0	-	3.1%	10.3%	20.0%	37.3%	18.1%	11.1%	67
	23+	14.4	2.0	-	22.8%	-	28.2%	42.0%	7.0%	-	13
	Unknown	10.6	1.5	-	8.9%	9.8%	14.1%	33.5%	16.5%	17.1%	74
Top Freezer Water & Ice in-door	Overall	15.4	1.7	-	13.3%	21.9%	25.6%	39.3%	-	-	8
	19 to 22	16.4	2.9	-	-	37.0%	43.3%	19.7%	-	-	5
	23+	23.0	0.0	-	100.0%	-	-	-	-	-	1
	Unknown	9.8	0.0	-	-	-	-	100.0%	-	-	2
Side-by-Side	Overall	16.8	2.2	-	21.1%	23.9%	32.6%	18.1%	4.4%	-	12
	19 to 22	15.9	3.5	-	-	42.3%	50.0%	-	7.7%	-	6
	23+	12.5	0.0	-	-	-	46.4%	53.6%	-	-	2
	Unknown	19.5	0.0	-	61.9%	-	-	38.1%	-	-	4

Ref Type	Strata weights										
	Size Range (cu. ft.)	Avg Est. Age	Ave Est.. Age EB	1980-1984	1985-1989	1990-1994	1995-1999	2000-2005	2006-2009	2010-2012	Sample Size
Side-by-Side Water & Ice in-door	Overall	12.4	1.2	-	3.5%	15.8%	33.5%	31.5%	11.0%	4.7%	108
	19 to 22	15.2	1.4	-	15.0%	9.5%	55.5%	14.4%	5.6%	-	13
	23+	11.7	1.4	-	-	15.2%	29.3%	39.9%	8.3%	7.2%	68
	Unknown	13.2	0.9	-	7.5%	20.6%	33.8%	16.8%	21.3%	-	27
Single Door	Overall	8.5	1.5	-	5.4%	9.6%	9.0%	18.3%	41.7%	16.0%	53
	1 to 10	7.6	0.8	-	-	-	12.1%	31.5%	53.2%	3.2%	17
	15 to 18	2.0	0.0	-	-	-	-	-	-	100.0%	1
	Unknown	9.1	1.9	-	8.2%	14.5%	7.7%	12.1%	36.8%	20.8%	35
Bottom Freezer	Overall	10.1	3.3	-	11.8%	11.4%	2.3%	28.2%	30.7%	15.4%	31
	11 to 14	3.0	0.0	-	-	-	-	-	100.0%	-	1
	15 to 18	10.0	0.0	-	-	11.2%	-	69.6%	19.2%	-	5
	19 to 22	8.4	0.7	-	-	19.1%	4.4%	17.3%	38.7%	20.5%	16
	23+	13.0	0.0	-	29.6%	-	-	52.9%	17.5%	-	3
	Unknown	13.4	0.0	-	38.9%	-	-	26.4%	15.9%	18.8%	6
Bottom Freezer Water & Ice in-door	Overall	5.5	1.9	-	-	-	-	15.1%	56.6%	28.3%	5
	23+	4.7	0.0	-	-	-	-	-	66.7%	33.3%	4
	Unknown	10.0	0.0	-	-	-	-	100.0%	-	-	1
Compact	Overall	6.9	0.9	0.6%	4.6%	4.0%	3.8%	25.1%	31.3%	30.6%	161
	1 to 10	8.2	0.9	1.7%	4.1%	7.5%	5.0%	24.4%	36.3%	21.0%	52
	11 to 14	5.0	0.0	-	-	-	-	-	100.0%	-	1
	Unknown	6.2	0.8	-	4.8%	2.4%	3.3%	25.5%	28.6%	35.3%	108
Built-in	Overall	8.2	0.0	-	-	-	14.9%	46.4%	7.2%	31.5%	6
	1 to 10	6.0	0.0	-	-	-	-	49.6%	50.4%	-	2
	Unknown	8.6	0.0	-	-	-	17.4%	45.9%	-	36.7%	4

Ref Type	Strata weights										
	Size Range (cu. ft.)	Avg Est. Age	Ave Est.. Age EB	1980-1984	1985-1989	1990-1994	1995-1999	2000-2005	2006-2009	2010-2012	Sample Size
Built-in Water & Ice in-door	Overall	14.0	0.0	-	-	-	100.0%	-	-	-	1
	Unknown	14.0	0.0	-	-	-	100.0%	-	-	-	1
Refrigerator Only	Overall	6.2	1.1	-	-	-	4.1%	40.6%	40.5%	14.9%	27
	1 to 10	8.9	0.0	-	-	-	-	100.0%	-	-	2
	11 to 14	6.0	0.0	-	-	-	-	-	100.0%	-	2
	Unknown	5.9	1.2	-	-	-	4.8%	37.4%	40.2%	17.6%	23

Energy Consumption

The average annual nameplate unit energy consumption (UEC) data for refrigerator/freezers is obtained from the model number matches to manufacturer data. A sample of 470 nameplate UECs were obtained for the analysis below. The bin distribution and the average of nameplate annual energy consumption based upon the sample of all successfully matched secondary refrigerators is shown below grouped by type and size.

As shown in Table 93 below, the average overall nameplate UEC is 579.8 kWh/year, with an error bound of 21.6 kWh/year. The largest percentage of refrigerators (38.5%) is within the range from 350 to 549.99 kWh/year. No refrigerators were found to have a UEC of larger than 1550 kWh/year.

Table 93: Distribution of Nameplate UEC Ranges within Size Ranges and Type of Secondary Refrigerators, using Strata Weights

Ref Type	Size Range (cu.ft.)	Average UEC	EB	Unit Energy Consumption Ranges (kWh/Year)						
				<350	350 to 549.9	550 to 749.9	750 to 949.9	950 to 1149.9	1150 to 1349.9	1350 to 1549.9
All Types	Overall	579.8	21.6	18.7%	38.5%	22.2%	11.0%	4.8%	4.2%	0.5%
	1 to 10	331.8	4.9	84.5%	14.8%	0.7%	-	-	-	-
	11 to 14	504.6	35.8	-	78.1%	12.4%	7.9%	1.6%	-	-
	15 to 18	582.0	33.6	4.1%	57.5%	22.2%	8.1%	5.3%	2.7%	-
	19 to 22	651.1	33.7	-	41.8%	28.0%	23.4%	1.9%	4.4%	0.5%
	23+	803.4	59.9	-	11.3%	44.1%	14.4%	14.8%	13.1%	2.4%
	Unknown	275.0	0.0	100.0%	-	-	-	-	-	-
Top Freezer	Overall	579.5	26.3	4.5%	55.6%	21.7%	12.2%	3.9%	2.2%	-
	1 to 10	334.5	0.0	77.9%	22.1%	-	-	-	-	-
	11 to 14	508.1	38.5	-	77.4%	12.4%	8.5%	1.7%	-	-
	15 to 18	578.5	34.7	4.3%	57.3%	22.6%	8.4%	5.5%	1.9%	-
	19 to 22	598.2	28.1	-	51.5%	25.7%	21.5%	1.3%	-	-
	23+	890.4	65.5	-	9.7%	27.6%	20.8%	9.2%	32.7%	-
Top Freezer Water & Ice in-door	Overall	893.0	84.8	-	-	23.1%	51.5%	-	25.4%	-
	19 to 22	750.8	109.6	-	-	31.0%	69.0%	-	-	-
	23+	1310.0	0.0	-	-	-	-	-	100.0%	-
Side-by-Side	Overall	975.6	256.5	-	6.6%	27.8%	16.6%	-	37.6%	11.4%
	19 to 22	1002.8	299.5	-	7.6%	23.6%	12.4%	-	43.3%	13.1%
	23+	796.4	0.0	-	-	55.5%	44.5%	-	-	-
Side-by-Side Water & Ice in-door	Overall	820.4	56.6	-	3.5%	46.9%	21.8%	14.7%	10.6%	2.6%
	19 to 22	853.3	88.5	-	-	31.4%	56.9%	-	11.7%	-
	23+	813.9	66.4	-	4.2%	49.9%	14.9%	17.6%	10.4%	3.1%
Single Door	Overall	331.0	10.3	87.8%	12.2%	-	-	-	-	-
	1 to 10	326.5	7.7	91.5%	8.5%	-	-	-	-	-

Ref Type	Size Range (cu.ft.)	Average UEC	EB	Strata weights — Unit Energy Consumption Ranges (kWh/Year)						
				<350	350 to 549.9	550 to 749.9	750 to 949.9	950 to 1149.9	1150 to 1349.9	1350 to 1549.9
	15 to 18	438.0	0.0	-	100.0%	-	-	-	-	-
Bottom Freezer	Overall	617.2	58.1	-	56.5%	27.2%	-	5.0%	11.3%	-
	11 to 14	443.1	0.0	-	100.0%	-	-	-	-	-
	15 to 18	777.0	0.0	-	51.8%	10.3%	-	-	37.9%	-
	19 to 22	609.4	78.8	-	49.1%	35.8%	-	6.9%	8.2%	-
	23+	506.1	0.0	-	100.0%	-	-	-	-	-
Bottom Freezer Water & Ice in-door	Overall	520.7	0.0	-	72.7%	27.3%	-	-	-	-
	23+	520.7	0.0	-	72.7%	27.3%	-	-	-	-
Compact	Overall	334.1	7.1	82.0%	16.3%	1.7%	-	-	-	-
	1 to 10	333.5	6.4	82.2%	16.7%	1.1%	-	-	-	-
	11 to 14	601.0	0.0	-	-	100.0%	-	-	-	-
	Unknown	275.0	0.0	100.0%	-	-	-	-	-	-
Built-in	Overall	342.8	0.0	48.7%	51.3%	-	-	-	-	-
	1 to 10	342.8	0.0	48.7%	51.3%	-	-	-	-	-
Refrigerator Only	Overall	379.5	0.0	57.0%	43.0%	-	-	-	-	-
	1 to 10	331.7	0.0	100.0%	-	-	-	-	-	-
	11 to 14	442.7	0.0	-	100.0%	-	-	-	-	-

4.2.3 Self-Standing Freezers

The following section describes self-standing freezers. Approximately 17% of all homes sampled have one or more self-standing freezers Less than 1% of all homes sampled have a second self-standing freezer. Since the number of homes with more than one freezer is statistically insignificant, the following summary will be based strictly upon primary freezers.

This section summarizes the freezers by type, size, age, and usage. The type of the freezers was obtained from the site visit. The size of the freezers was first obtained from efficiency databases (CEC and AHAM) if the model number successfully matched a model in the database. For the models that were not matched, the information on the size collected on-site by the surveyor was used. The age of the freezer was also obtained from the efficiency databases if a match was made; otherwise the age from the on-site visit was used in the age analysis. The usage data were obtained exclusively from the efficiency databases. Due to the fact that some ages and sizes were not obtained during the site visit, the number of sites in each of the following analyses will differ.

Type

Figure 25 below shows the percentage breakdown of primary freezers by freezer type. The majority of primary freezers found were the chest type, totaling 54% and 56% of all the primary freezers for Census-adjusted weighted and strata-weighted results, respectively. Upright type freezers accounted for the remaining percentage of primary freezers.

Figure 25: Distribution of Primary Freezers by Type

Census-adjusted weights
n = 458

Strata weights
n = 458
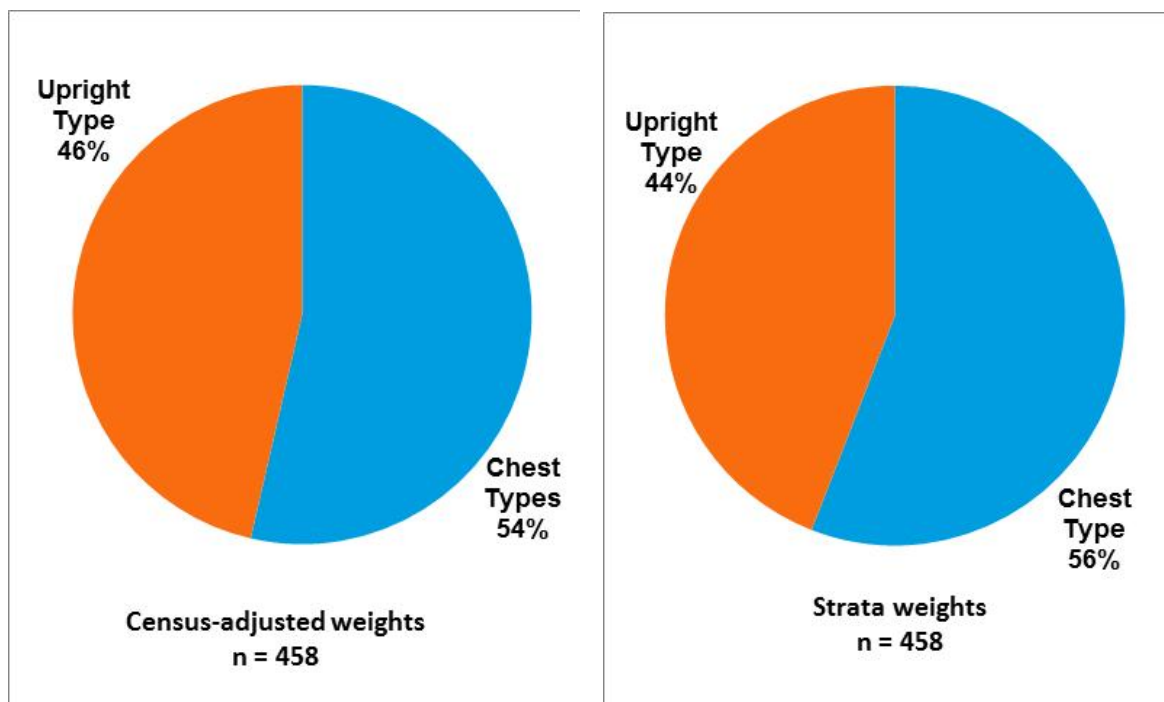
Size

Table 94 shows the average size of the chest and upright freezers for both Census-adjusted and strata weights. The error bound and sample sizes for the freezers used in this analysis are also presented in the following table. The average size of all freezers was found to be 13.4 cubic feet using Census-adjusted weights (13.6 cubic feet using strata weights). The average size of chest units is found to be approximately 8.0 cubic feet smaller than the average size of the upright units. The number of chest units in the sample is less than half of upright units.

Table 94: Average Size of Primary Freezers by Type

	Census-adjusted weights		Strata weights		Sample Size
	Average Size (cu.ft.)	Error Bound	Average Size (cu. ft.)	Error Bound	
All	13.4	0.7	13.6	0.7	231
Chest	8.0	0.7	8.2	0.8	78
Upright	16.0	0.8	16.2	0.7	153

Table 95 shows the distribution of sizes of the primary freezers by type of freezer. The largest percentage of chest freezers is in the size range of 1.00 to 10.00 cubic feet, totaling 86.8% of the sample. The largest percentage of upright freezers is in the size range of 11.00 to 14.00 cubic feet and 19.00 to 22.00 cubic feet, each comprising approximately a third of all upright freezers.

Table 95: Distribution of Size of Primary Freezers by Type, using Strata Weights

Size Range (cu. ft.)	Strata weights					
	All Stand Alone Freezers (n=231)		Chest (n=78)		Upright (n=153)	
	%	Error Bound	%	Error Bound	%	Error Bound
1.00-10.00	35.4%	6.4%	86.8%	7.6%	5.4%	3.3%
11.00-14.00	24.2%	4.9%	4.1%	2.7%	35.9%	7.1%
15.00-18.00	16.1%	4.7%	0.9%	1.5%	24.9%	7.0%
19.00-22.00	24.3%	5.6%	8.2%	7.1%	33.8%	7.5%

Energy Consumption

Table 96 shows the nameplate average annual usage of the primary freezers by type. The highest percentage of chest freezers sampled was in the range between 225.00 and 424.99 kWh/year (84.6%), while the highest percentage of upright freezers was in the range between 425.00 and 624.99 kWh/year (37.4%).

Table 96: Distribution of Nameplate Annual Energy Usage (AEC) of Primary Freezers by Type, using Strata Weights

Annual Usage Range (kWh/year)	Strata weights					
	Chest and Upright (n=231)		Chest (n=78)		Upright (n=153)	
	%	EB	%	EB	%	EB
Less than 225 AEC	1.9%	1.8%	5.9%	5.5%	-	-
225-424.99 AEC	30.6%	6.1%	84.6%	8.5%	5.8%	3.7%
425-624.99 AEC	26.7%	5.1%	3.5%	4.0%	37.4%	6.7%
0625-824.99 AEC	26.3%	6.6%	2.2%	3.5%	37.4%	8.8%
825-1024.99 AEC	6.4%	5.4%	2.2%	3.6%	8.3%	7.7%
1025-1224.99 AEC	5.5%	3.4%	-	-	8.0%	4.9%
1225+ AEC	2.7%	3.6%	1.6%	2.7%	3.1%	5.1%

Age

Table 97 shows the average age of the primary freezers by type. The average age of chest type freezers is on average lower than that of upright freezers. The average age of all freezers is 10.1 years using Census-adjusted weights (10.4 years using strata weights). The 2005 study found the average age of all freezers to be significantly older[29], at 11.7 years. The average age of the sampled upright freezers was 11.1 years, while the average age of the chest freezers was 9.5 years.

Table 97: Average Manufacture Date of Primary Freezers by Type

Freezer Type	Census-adjusted weights		Strata weights		Sample Size
	Estimated and Manufacturer Reported Average Age	Error Bound	Estimated and Manufacturer Reported Average Age	Error Bound	
All	10.1	0.8	10.4	0.7	437
Chest	9.0	1.4	9.5	1.3	180
Upright	11.1	0.8	11.1	0.8	257

Table 98 shows the distribution of the age of the primary freezers within 5 year age ranges. The largest percentage of all the primary freezers fell in the range of manufactured years from 2000 to 2005 (31.8%). Primary freezers manufactured between 2000 and 2012 make up approximately 70%

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[29] See Appendix G: Statistical Significance Testing for details on comparison of 2012 to 2005.

of the sample. The 2005 study found that primary freezers manufactured before 1979 made up 11.6% of the sample; however, in this study, primary freezers manufactured before 1979 comprised only 0.5% of the sample.

Table 98: Distribution of Manufacture Date of Primary Freezers by Type, using Strata Weights

| Estimated and Manufacturer Reported Age Bins | Strata weights | | | | | |
| | Chest and Upright (n=437) | | Chest (n=257) | | Upright (n=180) | |
	%	Error Bound	%	Error Bound	%	Error Bound
2010 to 2012	16.6%	3.6%	25.0%	6.5%	10.2%	3.6%
2006 to 2009	19.9%	3.6%	21.9%	5.8%	18.4%	4.5%
2000 to 2005	31.8%	4.2%	23.1%	5.5%	38.5%	5.9%
1995 to 1999	11.0%	2.9%	11.6%	4.8%	10.5%	3.6%
1990 to 1994	9.8%	2.4%	6.7%	3.1%	12.1%	3.6%
1985 to 1989	10.3%	3.1%	10.4%	5.5%	10.1%	3.4%
1980 to 1984	0.2%	0.3%	-	-	0.3%	0.4%
1979 and older	0.5%	0.8%	1.2%	1.9%	-	-

4.3 Heating Equipment

This section presents the summary analysis of the primary heating systems found during the site visits. The heating systems were linked with efficiency databases from the CEC and the Carrier Bluebook in order to obtain manufacture date, input, output, capacity, and annual fuel utilization efficiency (AFUE, expressed as a percentage). The efficiency of gas units is shown in AFUE, and no distribution of electric unit efficiencies is given due to the fact that all electric units are assumed to be 100% efficient. Heat pumps are included in the next several tables due to the heat pump may be the only heating system at the home. They are excluded from the efficiency tables due to low efficiency matching rates.

Table 99 shows the percentage of homes that have one or more heating system, using both Census-adjusted and strata weights. Approximately two-thirds of all homes have one heating system. The percentage of homes is smaller with each additional heating system. For the homes with more than one heating system, the surveyor determined which system was primary and noted accordingly.

Table 99: Percentage of Homes with Number of Heating Systems

Number of Heating Systems	Census-adjusted weights		Strata weights	
	% of Homes (n=1987)	Error Bound	% of Homes (n=1987)	Error Bound
0	1.8%	0.6%	1.8%	0.6%
1	65.0%	2.5%	62.9%	2.1%
2	24.8%	2.0%	26.3%	1.9%
3	5.1%	0.9%	5.6%	0.9%
4	2.0%	0.7%	1.9%	0.6%
5	1.0%	0.4%	1.1%	0.4%
6	0.2%	0.1%	0.2%	0.2%
7	0.1%	0.1%	0.1%	0.1%

Type

Table 100 shows the primary heating system type among all houses with heating systems, for Census-adjusted and strata weights. The greatest portion of all primary heating systems was found to be split forced air furnaces. Space heating units used as the primary heating system were far less common than central units.

Table 100: Distribution of Primary Heating Systems by Type of System

	System Type (n=1987)	Census-adjusted weights		Strata weights	
		% of Primary Heating Systems	Error Bound	% of Primary Heating Systems	Error Bound
Central	Split Forced Air Furnace	40.8%	2.2%	43.7%	2.0%
	Package Furnace/AC	8.0%	1.3%	7.8%	1.1%
	Hydronic System	1.5%	0.6%	1.5%	0.6%
	Split Heat pump w/ electronic supplement	0.4%	0.2%	0.5%	0.3%
	Split Heat pump w/o electronic supplement	0.9%	0.5%	0.9%	0.4%
	Package Heat Pump	0.7%	0.4%	0.7%	0.4%
	Forced Air furnace (No AC)	17.9%	2.0%	17.8%	1.7%
	Common Building	1.1%	0.7%	0.9%	0.5%

	System Type (n=1987)	Census-adjusted weights		Strata weights	
		% of Primary Heating Systems	Error Bound	% of Primary Heating Systems	Error Bound
Space	Wall Furnace	13.9%	1.9%	12.9%	1.6%
	Electronic Resistance Wall Unit	1.0%	0.5%	1.1%	0.5%
	Gravity Furnace	3.1%	0.9%	2.6%	0.7%
	Ceiling Cable	1.5%	0.7%	1.2%	0.5%
	Electronic Baseboards	1.5%	0.7%	1.2%	0.5%
	Pellet Stove	0.2%	0.3%	0.1%	0.2%
	Fireplace	1.0%	0.5%	0.7%	0.3%
	Electric Space Heater	3.5%	1.0%	3.3%	0.8%
	Wood Stove	1.0%	0.4%	1.0%	0.4%
	Window Wall Heat Pump	0.2%	0.2%	0.2%	0.2%
	Other	0.1%	0.2%	0.1%	0.1%
n/a	None	1.8%	0.6%	1.8%	0.6%

Fuel Type

Table 101 shows the percentage of heating systems by fuel type and system type. These fuel types were taken from surveyor information. Among all the system types found, the vast majority consumed natural gas. Only 12.1% of all primary heating systems consumed electricity. Interestingly, among all forced air furnaces, 95.7% consumed natural gas.

Table 101: Distribution of Fuel Type within Type of Heating System, using Strata Weights

	System Type	Strata weights										Sample Size
		Gas		Electricity		Propane		Wood		Other		
		%	EB	%	EB	%	EB	%	EB	%	EB	
	All Types	82.6%	1.6%	12.1%	1.5%	4.1%	0.8%	1.1%	0.4%	0.1%	0.1%	1949
Central	All Central	89.7%	1.5%	5.6%	1.1%	4.7%	0.9%	-	-	-	-	1578
	Split Forced Air Furnace	92.4%	1.6%	3.0%	1.0%	4.6%	1.1%	-	-	-	-	1011
	Package Furnace/AC	86.7%	4.9%	4.5%	2.9%	8.8%	4.4%	-	-	-	-	165
	Hydronic System	78.1%	15.9%	9.0%	8.5%	12.9%	11.0%	-	-	-	-	25
	Split Heat pump w/ electronic supplement	-	-	100.0%	0.0%	-	-	-	-	-	-	14
	Split Heat pump w/o electronic supplement	-	-	100.0%	0.0%	-	-	-	-	-	-	21
	Package Heat Pump	-	-	100.0%	0.0%	-	-	-	-	-	-	10
	Forced Air furnace (No AC)	95.7%	2.2%	1.2%	0.9%	3.0%	1.7%	-	-	0.2%	0.3%	323
	Common Building	84.7%	21.7%	15.3%	23.2%	-	-	-	-	-	-	9
Space	All Space	61.4%	4.8%	31.5%	4.3%	2.3%	1.3%	4.5%	1.6%	0.4%	0.5%	371
	Wall Furnace	93.0%	3.5%	4.6%	2.7%	2.2%	1.6%	-	-	0.1%	0.2%	175
	Electronic Resistance Wall Unit	-	-	100.0%	0.0%	-	-	-	-	-	-	16
	Gravity Furnace	97.4%	4.6%	1.1%	1.8%	1.6%	2.6%	-	-	-	-	42
	Ceiling Cable	-	-	100.0%	0.0%	-	-	-	-	-	-	22
	Electronic Baseboards	-	-	100.0%	0.0%	-	-	-	-	-	-	19
	Pellet Stove	-	-	15.2%	23.0%	-	-	84.8%	54.4%	-	-	2
	Fireplace	43.5%	24.8%	6.3%	10.0%	5.4%	6.4%	44.8%	19.5%	-	-	18
	Electric Space Heater	-	-	100.0%	0.0%	-	-	-	-	-	-	52
	Wood Stove	10.2%	11.4%	-	-	20.4%	21.7%	69.4%	18.1%	-	-	21
	Window Wall Heat Pump	-	-	100.0%	0.0%	-	-	-	-	-	-	3
	Other	-	-	-	-	-	-	-	-	100.0%	0.0%	1

Age

Table 102 shows the average estimated age of each type of heating system, and the percentage of each type of heating systems in various manufacture date ranges. As explained previously, the estimated ages were obtained from a combination of the dates that were obtained from the manufacturer information and the surveyor estimates during the on-site visit. On average, all types were 15.2 years old.

Table 102: Average Estimated Age and Distribution of Heating Systems across Age Ranges within Type, using Strata Weights

	System Type	Avg Mfg. Age	Avg Mfg. Age EB	1979 and Older %	1979 and Older EB	1980-1984 %	1980-1984 EB	1985-1989 %	1985-1989 EB	1990-1994 %	1990-1994 EB	1995-1999 %	1995-1999 EB	2000-2005 %	2000-2005 EB	2006-2009 %	2006-2009 EB	2010-2012 %	2010-2012 EB	Sample Size
All Types		15.2	0.9	9.1%	2.6%	4.0%	1.5%	16.4%	3.3%	9.4%	2.6%	7.1%	1.9%	29.8%	3.8%	17.2%	3.2%	7.0%	2.2%	506
Central	All Central	15.5	0.9	9.1%	2.7%	4.0%	1.6%	17.2%	3.5%	9.1%	2.6%	7.5%	2.0%	30.1%	3.9%	16.8%	3.2%	6.2%	2.1%	480
	Split Forced Air Furnace	13.7	1.0	5.5%	2.5%	4.3%	2.0%	13.4%	3.5%	10.5%	3.4%	6.6%	2.3%	34.3%	5.0%	18.4%	4.1%	6.9%	2.9%	319
	Package Furnace/AC	13.3	2.8	5.9%	9.4%	-	-	9.7%	10.0%	15.5%	12.8%	16.8%	9.8%	25.7%	13.1%	16.0%	12.6%	10.4%	9.3%	33
	Hydronic System	5.0	0.0	-	-	-	-	-	-	-	-	-	-	100.0%	0.0%	-	-	-	-	1
	Split Heat pump w/ electronic supplement	2.1	2.3	-	-	-	-	-	-	-	-	11.3%	17.4%	-	-	-	-	88.7%	43.2%	3
	Split Heat pump w/o electronic supplement	8.6	0.0	-	-	-	-	-	-	-	-	-	-	69.2%	63.2%	-	-	30.8%	42.1%	2
	Package Heat Pump	25.5	0.0	-	-	-	-	100.0%	0.0%	-	-	-	-	-	-	-	-	-	-	2
	Forced Air furnace (No AC)	19.6	1.8	17.8%	6.9%	4.5%	3.1%	25.1%	8.3%	5.3%	4.4%	7.7%	4.1%	23.5%	7.3%	13.8%	5.6%	2.4%	2.2%	120
Space	All Space	11.9	1.9	8.1%	10.5%	3.0%	4.8%	6.4%	6.3%	14.0%	13.3%	1.3%	2.2%	25.7%	16.9%	22.6%	15.9%	18.8%	13.4%	26
	Wall Furnace	11.4	4.3	-	-	-	-	16.1%	18.0%	24.0%	34.4%	-	-	17.2%	25.8%	42.6%	37.8%	-	-	6
	Gravity Furnace	12.2	2.5	-	-	-	-	7.9%	12.4%	17.0%	25.5%	-	-	67.2%	45.0%	7.9%	12.4%	-	-	5
	Ceiling Cable	21.8	0.0	53.1%	59.8%	-	-	-	-	-	-	-	-	-	-	-	-	46.9%	56.2%	2
	Electronic Base-boards	10.6	0.0	15.1%	22.9%	-	-	-	-	-	-	-	-	44.3%	54.4%	30.3%	41.7%	10.3%	16.0%	4
	Pellet Stove	15.0	0.0	-	-	-	-	-	-	-	-	100.0%	0.0%	-	-	-	-	-	-	1
	Fireplace	7.0	0.0	-	-	-	-	-	-	-	-	-	-	100.0%	0.0%	-	-	-	-	1
	Electric Space Heater	2.5	0.0	-	-	-	-	-	-	-	-	-	-	-	-	27.7%	38.8%	72.3%	36.3%	5
	Wood Stove	22.7	0.0	-	-	46.6%	56.0%	-	-	53.4%	60.0%	-	-	-	-	-	-	-	-	2

Capacity

Table 103 shows the percentage of all furnaces by fuel type and capacity range. The capacity of the furnaces was obtained from manufacturer information if the model number was linked to one of the databases. The on-site estimation of the capacity of the furnaces was used if the model number did not link with the database. About one-quarter of all units were gas units between 70 to 84.99 kBtu.

Table 103: Distribution of Furnaces by Capacity Ranges and Fuel Type

	Capacity Ranges (n=1360)	Census-adjusted weights		Strata weights	
		% of Furnaces with Capacity	Error Bound	% of Furnaces with Capacity	Error Bound
Gas (kBtuh)	1 to 9.99	-	-	-	-
	10 to 24.99	1.2%	0.8%	0.9%	0.6%
	25 to 39.99	10.0%	2.0%	9.1%	1.7%
	40 to 54.99	13.8%	2.4%	12.6%	1.8%
	55 to 69.99	18.1%	2.3%	18.2%	2.0%
	70 to 84.99	26.0%	2.7%	25.6%	2.2%
	85 to 99.99	7.7%	1.3%	8.9%	1.4%
	100 to 114.99	11.7%	1.6%	13.3%	1.6%
	115 to 129.99	3.1%	0.8%	3.6%	0.9%
	>129.99	0.9%	0.4%	0.9%	0.4%
Electric (kW)	0.1 to 0.99	6.4%	1.6%	5.9%	1.3%
	1 to 2.99	-	-	-	-
	3 to 4.99	-	-	-	-
	5 to 6.99	-	-	-	-
	7 to 8.99	-	-	-	-
	9 or Greater	1.2%	0.7%	0.9%	0.4%

AFUE Ranges

Table 104 shows the average AFUE by system type for both Census-adjusted and strata weights. Only the units that matched with one of the efficiency databases were included in the analysis below. The average AFUE for all types of systems was 79.6 using Census-adjusted weights (80.0 for strata weights). As one would expect, the average AFUE for central systems is significantly higher than the AFUE for all heat systems.

Table 104: Average AFUE by System Type

System Type		Census-adjusted weights		Strata weights		Sample Size
		Average AFUE	Error Bound	Average AFUE	Error Bound	
All Types		79.6	0.3	80.0	0.3	1,067
Central	All Central	80.7	0.3	81.0	0.3	976
	Split Forced Air Furnace	81.1	0.3	81.3	0.3	664
	Package Furnace /AC	79.7	0.6	79.4	0.5	71
	Hydronic System	84.7	0.0	84.5	0.0	5
	Forced Air furnace (No AC)	80.2	0.7	80.5	0.6	236
Space	All Space	73.1	0.6	73.2	0.6	91
	Wall Furnace	73.5	0.7	73.6	0.7	71
	Gravity Furnace	71.7	1.0	71.5	0.9	18
	Fireplace	64.0	0.0	64.0	0.0	1
	Wood Stove	76.7	0.0	76.7	0.0	1

Table 105 shows the percentage of heating systems with an AFUE by type and AFUE range. The large majority of the forced air furnaces have an AFUE between 78 and 84.99. No heating systems, either central or space, were found to have an AFUE within the range of 85-89.99.

Table 105: Distribution of AFUE Ranges within Heating System Type, using Strata Weights

	AFUE Range		Strata weights						
			Less than 66	66 - 71.99	72 - 77.99	78 - 84.99	85 - 89.99	90 - 96.99	97 +
Central	All Central (n=976)	%	0.0%	2.4%	7.0%	81.4%	-	8.7%	0.6%
		EB	1.3%	47.6%	39.7%	11.1%	-	0.3%	0.0%
	Split Forced Air Furnace (n=664)	%	-	1.1%	5.3%	83.8%	-	9.5%	0.4%
		EB	-	0.8%	1.5%	2.8%	-	2.2%	0.6%
	Package Furnace/AC (n=71)	%	-	2.1%	8.4%	89.6%	-	-	-
		EB	-	3.4%	7.2%	6.5%	-	-	-
	Hydronic System (n=5)	%	-	-	-	69.1%	-	30.9%	-
		EB	-	-	-	32.1%	-	42.3%	-
	Forced Air furnace (No AC) (n=236)	%	-	5.2%	10.5%	74.4%	-	8.8%	1.2%
		EB	-	3.1%	4.6%	5.4%	-	3.2%	1.5%
Space	All Space (n=91)	%	1.3%	47.6%	39.7%	11.1%	-	0.3%	-
		EB	1.6%	9.2%	9.6%	6.2%	-	0.5%	-
	Wall Furnace (n=71)	%	1.1%	43.5%	41.2%	13.8%	-	0.4%	-
		EB	1.9%	10.2%	10.9%	7.6%	-	0.6%	-

Strata weights								
AFUE Range		**Less than 66**	**66 - 71.99**	**72 - 77.99**	**78 - 84.99**	**85 - 89.99**	**90 - 96.99**	**97 +**
Gravity Furnace (n=18)	%	-	67.4%	32.6%	-	-	-	-
	EB	-	20.1%	20.7%	-	-	-	-
Fireplace (n=1)	%	100.0%	-	-	-	-	-	-
	EB	0.0%	-	-	-	-	-	-
Wood Stove (n=1)	%	-	-	100.0%	-	-	-	-
	EB	-	-	0.0%	-	-	-	-

4.4 Cooling Equipment

About two-thirds of homes surveyed have some type of cooling system, with 50% of homes having a central system and 15% having a space cooling system based on the Census-adjusted weights (53% central and 13% space systems, using strata weights).

Type of System

The primary cooling equipment identified during this study was of nine distinct types:

- o Split System AC
- o Package System AC
- o Split System Heat Pump
- o Package System Heat Pump
- o Common Building
- o Evaporative Cooler
- o Window/Wall AC
- o Window/Wall Heat Pump
- o Portable/Stand Alone AC

The distribution of these cooling equipment types is shown below in Table 106. Over half of systems surveyed were central split system ACs. The next most prevalent type of system was the window/wall AC.

Table 106: Distribution of Cooling System Types in Residences with Cooling Equipment

	System Type (n=1433)	Census-adjusted weights		Strata weights	
		% of Primary Cooling Types	Error Bound	% of Primary Cooling Types	Error Bound
Central	Split System AC	56.3%	2.8%	60.7%	2.3%
	Package System AC	12.3%	2.0%	11.8%	1.6%
	Split System Heat Pump	1.8%	0.6%	1.9%	0.6%
	Package System Heat Pump	1.0%	0.7%	1.0%	0.6%
	Common Building	1.1%	0.9%	0.6%	0.5%
	Evaporative Cooler	4.1%	1.2%	3.8%	1.0%
Space	Window/Wall AC	18.5%	2.5%	16.1%	2.0%
	Window/Wall Heat Pump	0.6%	0.6%	0.5%	0.4%
	Portable/Stand Alone AC	4.3%	1.3%	3.6%	1.0%

The analysis of cooling equipment is presented in this section and will consider heat pumps the same as air conditioners. This is because the cooling section of the heat pump is very similar in terms of energy use to a standard A/C.

From our analysis of the surveyed residences, approximately 60% of homes have a split system A/C unit. Of the homes that have primary cooling equipment, the distribution of central systems versus space cooling systems is shown below in Figure 26. Using strata weights, almost 80% of primary cooling systems surveyed were central systems. When Census-adjusted weights were used, only 76.6% of cooling systems were central.

Figure 26: Distribution of Primary Cooling Systems
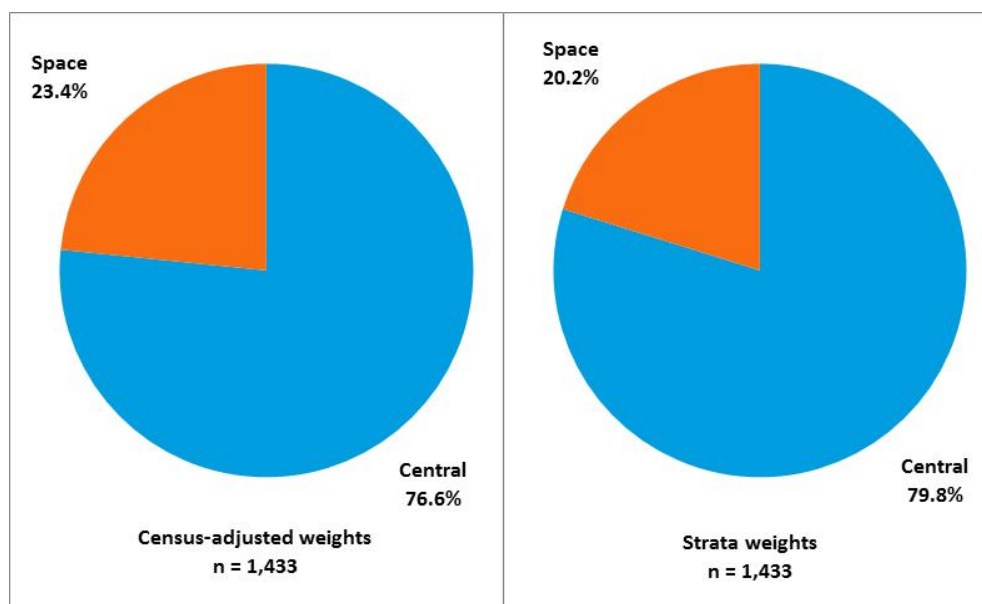
Cooling equipment was classified into nine types: split system AC, package system AC, split system heat pump, package system heat pump, common building, evaporative cooler, window/wall AC, window/wall heat pump and portable/stand-alone AC. Table 107 shows that the majority of systems are split system AC, which corresponds to common building practices. The second most predominant systems were packaged AC systems.

Table 107: Distribution of Primary Cooling System Types by Classes

Equipment Type	Census-adjusted weights				Strata weights			
	Central (n=1207)		Space (n=226)		Central (n=1207)		Space (n=226)	
	Percentage of System Class	Error Bound	Percentage of System Class	Error Bound	Percentage of System Class	Error Bound	Percentage of System Class	Error Bound
Split System AC	73.5%	2.2%	-	-	76.1%	1.9%	-	-
Package System AC	16.0%	1.3%	-	-	14.8%	1.1%	-	-
Split System Heat Pump	2.4%	0.4%	-	-	2.4%	0.4%	-	-
Package System Heat Pump	1.3%	0.4%	-	-	1.2%	0.4%	-	-
Common Building	1.4%	0.6%	-	-	0.8%	0.3%	-	-
Evaporative Cooler	5.4%	0.8%	-	-	4.7%	0.7%	-	-
Window/Wall AC	-	-	79.1%	1.7%	-	-	79.8%	1.4%
Window/Wall Heat Pump	-	-	2.5%	0.4%	-	-	2.3%	0.3%
Portable/Stand Alone AC	-	-	18.4%	0.9%	-	-	17.8%	0.7%

Age

Table 108 below shows the average estimated age of the primary system found at a residence. The estimated ages were obtained from a combination of dates that were gathered from the manufacturer nameplate and the surveyor estimates during the on-site visit. The sample size of 380 (summing central and space units) represents all sites that were found with some type of cooling equipment and age estimate. The average central air conditioning system type is 15.5 years old using Census-adjusted weights (15.1 using strata weights), significantly up from 10.8 in the previous study[30]. The average space air conditioning system is 8.8 or 9.1 years old using Census-adjusted or strata weights, respectively, which is down significantly from the previous study which estimated the average age to be 11.9 years old.

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[30] See Appendix G: Statistical Significance Testing for details on comparison of 2012 to 2005.

Table 108: Average Age of Primary Cooling Equipment

Air Conditioning System Type		Census-adjusted weights		Strata weights		Sample Size
		Primary Cooling System Estimated Age	Error Bounds	Primary Cooling System Estimated Age	Error Bounds	
Central	All Types	15.5	0.9	15.1	0.8	380
	Split System AC	15.9	2.6	15.6	2.6	325
	Package System AC	13.1	1.3	13.0	1.2	33
	Split System Heat Pump	12.4	0.0	10.5	0.0	14
	Package System Heat Pump	25.6	0.0	25.5	0.0	2
	Evaporative Cooler	4.5	0.0	4.8	0.0	6
Space	All Types	8.8	1.5	9.1	1.6	24
	Window/Wall AC	10.0	2.1	10.5	2.2	18
	Portable/Stand Alone AC	5.0	0.0	5.3	0.0	6

Table 109 shows the percentage distribution for each type of cooling system by manufacture date range. Approximately 42% of all primary central and space type air conditioners have been manufactured since 2000. No space heaters manufactured before 1979 were found.

Table 109: Distribution of Cooling System Manufacture Date Ranges within Types, using Strata Weights

Age Range			Strata weights							
			1979 and Older	1980-1984	1985-1989	1990-1994	1995-1999	2000-2005	2006-2009	2010-2012
Central	All Types (n=380)	%	1.9%	3.5%	16.9%	18.0%	17.7%	23.8%	12.0%	6.1%
		EB	1.4%	1.7%	4.1%	3.8%	3.5%	3.9%	3.2%	2.2%
	Split System A/C (n=325)	%	1.6%	3.8%	17.0%	19.7%	18.8%	23.6%	11.5%	4.0%
		EB	1.2%	2.0%	4.5%	4.2%	4.0%	4.3%	3.4%	2.0%
	Package System A/C (n=33)	%	5.9%	-	10.2%	12.6%	16.7%	28.3%	15.9%	10.3%
		EB	9.3%	-	10.3%	12.2%	9.7%	13.4%	12.6%	9.2%
	Split System Heat Pump (n=14)	%	-	8.7%	15.1%	4.8%	2.9%	22.5%	-	46.0%
		EB	-	10.1%	18.4%	7.7%	4.8%	21.5%	-	30.2%
	Package System Heat Pump (n=2)	%	-	-	100.0%	-	-	-	-	-
		EB	-	-	0.0%	-	-	-	-	-
	Evaporative Cooler (n=6)	%	-	-	-	-	-	28.5%	43.3%	28.1%
		EB	-	-	-	-	-	28.1%	38.5%	28.2%
Space	All Types (n=24)	%	-	4.4%	6.1%	-	12.4%	35.6%	28.7%	12.8%
		EB	-	7.1%	9.7%	-	12.5%	18.3%	16.8%	13.1%
	Window/Wall AC (n=3)	%	-	6.0%	8.2%	-	16.8%	35.5%	23.4%	10.0%
		EB	-	9.6%	13.0%	-	16.5%	20.1%	15.9%	15.7%
	Portable/Stand Alone AC (n=6)	%	-	-	-	-	-	35.7%	43.7%	20.6%
		EB	-	-	-	-	-	41.0%	42.1%	23.3%

Size

Table 110 below shows bin distributions of capacities for cooling system types. The capacities were obtained from a combination of manufacturer information and the surveyor estimates during the on-site visit. The sample size of 227 represents all cooling equipment for which capacity data was obtained. Nearly all capacities were found to be between 1.5 and 5.0 tons. The largest percentage bin of combined central air conditioning types is 20.8% found in the 3.0 to 3.49 ton range. The largest percentage bin of space air conditioning type window/wall units is 63.9% and falls in the 0.1 to 0.99 ton range. All fourteen of the central common building cooling systems surveyed were found to be in the range of 1.0-1.49 tons.

Table 110: Distribution of Cooling System Size Ranges within Type, using Strata Weights

Type of System			Strata weights									
			0.1-0.99	1.0-1.49	1.5-1.99	2.0-2.49	2.5-2.99	3.0-3.49	3.5-3.99	4.0-4.49	4.5-5.00	>5.01
Central Type	All Central HP and A/C Types (n=1,010)	%	0.1%	0.9%	5.4%	8.5%	15.8%	20.8%	14.7%	13.9%	18.3%	1.6%
		EB	0.1%	0.7%	1.5%	1.8%	2.3%	2.5%	2.0%	2.0%	2.1%	0.7%
	Split System A/C (n=876)	%	0.1%	0.8%	5.2%	7.9%	16.1%	21.0%	13.7%	13.5%	20.1%	1.7%
		EB	0.1%	0.6%	1.7%	1.9%	2.5%	2.7%	2.0%	2.1%	2.4%	0.8%
	Package System A/C (n=97)	%	-	-	2.9%	13.3%	12.7%	20.2%	23.4%	19.1%	7.8%	0.5%
		EB	-	-	3.4%	7.0%	6.1%	7.5%	7.8%	7.5%	4.1%	0.9%
	Package System Heat Pump (n=3)	%	-	-	51.3%	-	-	-	13.5%	35.2%	-	-
		EB	-	-	58.9%	-	-	-	20.7%	46.6%	-	-
	Common Building (n=1)	%	-	100.0%	-	-	-	-	-	-	-	-
		EB	-	0.0%	-	-	-	-	-	-	-	-
	Split System HP (n=33)	%	-	-	16.1%	10.1%	20.9%	22.8%	16.6%	5.6%	5.8%	2.1%
		EB	-	-	12.2%	9.7%	17.1%	16.7%	9.5%	6.0%	6.3%	3.4%
Space Type	All Space Types (n=153)	%	62.9%	29.0%	4.0%	1.3%	1.3%	0.5%	0.7%	-	0.3%	-
		EB	7.3%	6.7%	2.9%	1.7%	1.8%	0.8%	1.1%	-	0.5%	-
	Window/Wall AC (n=118)	%	63.9%	26.8%	5.0%	1.7%	1.4%	-	0.8%	-	0.4%	-
		EB	8.3%	7.3%	3.6%	2.2%	2.2%	-	1.3%	-	0.7%	-
	Window/Wall Heat Pump (n=1)	%	-	100.0%	-	-	-	-	-	-	-	-
		EB	-	0.0%	-	-	-	-	-	-	-	-
	Portable/Stand Alone AC (n=34)	%	62.7%	33.4%	-	-	1.3%	2.6%	-	-	-	-
		EB	16.1%	15.2%	-	-	2.1%	4.2%	-	-	-	-

Table 111 shows the number of cooling systems by type and capacity within age ranges. Approximately 31% of all types of central cooling units in the range of 4.0 and 4.49 tons were built between 2006 and 2012. The highest concentration of central units with a known tonnage built between 2000 and 2005, at 38.9%, is the units in the 3.5 to 3.99 ton range.

Table 111: Distribution of Manufacture Date Ranges for Central Cooling Systems within Capacity Ranges and Types, using Strata Weights

| System Type | Ton Range | Strata weights – Age Range | | | | | | | | | | | | | | | | Sample Size |
| | | 1979 and Older | | 1980-1984 | | 1985-1989 | | 1990-1994 | | 1995-1999 | | 2000-2005 | | 2006-2009 | | 2010-2012 | | |
		%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	
All Types	All Ranges	1.9%	1.4%	3.5%	1.7%	16.9%	4.1%	18.0%	3.8%	17.7%	3.5%	23.8%	3.9%	12.0%	3.2%	6.1%	2.2%	380
	1.0 to 1.49	-	-	-	-	33.3%	44.8%	66.7%	44.8%	-	-	-	-	-	-	-	-	3
	1.5 to 1.99	-	-	-	-	35.8%	20.0%	13.1%	14.6%	14.2%	13.6%	27.5%	20.1%	5.5%	8.8%	3.9%	6.2%	18
	2.0 to 2.49	6.4%	7.3%	14.5%	12.5%	24.3%	15.6%	12.8%	11.7%	12.9%	11.7%	12.8%	10.2%	9.5%	10.7%	6.9%	8.5%	27
	2.5 to 2.99	1.6%	2.0%	6.3%	5.1%	14.8%	9.2%	32.5%	11.4%	21.4%	10.6%	15.3%	8.3%	3.7%	6.0%	4.4%	5.8%	60
	3.0 to 3.49	6.2%	6.3%	0.9%	1.5%	8.8%	6.8%	15.3%	8.8%	26.7%	9.5%	24.6%	9.2%	10.7%	7.3%	6.9%	5.9%	67
	3.5 to 3.99	-	-	5.3%	4.9%	14.8%	10.4%	12.3%	6.4%	13.5%	6.7%	38.9%	10.8%	13.3%	9.0%	1.9%	3.0%	65
	4.0 to 4.49	-	-	1.5%	2.5%	12.1%	10.2%	8.0%	9.4%	28.3%	12.8%	18.8%	10.2%	20.1%	10.7%	11.2%	7.9%	47
	4.5 to 5.00	-	-	-	-	16.1%	9.5%	26.6%	10.4%	13.7%	7.3%	30.6%	11.1%	8.8%	5.5%	4.1%	3.3%	69
	>5.00	-	-	-	-	-	-	-	-	11.2%	17.3%	23.6%	24.0%	57.6%	32.0%	7.5%	11.9%	9
	Unknown	-	-	-	-	31.2%	24.7%	9.9%	15.4%	-	-	13.7%	11.4%	26.3%	20.1%	18.9%	17.2%	15
Split System AC	All Ranges	1.6%	1.2%	3.8%	2.0%	17.0%	4.5%	19.7%	4.2%	18.8%	4.0%	23.6%	4.3%	11.5%	3.4%	4.0%	2.0%	325
	1.0 to 1.49	-	-	-	-	33.3%	44.8%	66.7%	44.8%	-	-	-	-	-	-	-	-	3
	1.5 to 1.99	-	-	-	-	34.3%	21.1%	14.2%	15.8%	15.5%	14.8%	30.0%	21.5%	6.0%	9.6%	-	-	16
	2.0 to 2.49	7.8%	8.9%	17.6%	15.0%	28.0%	18.4%	7.8%	10.7%	15.8%	14.0%	9.1%	10.1%	11.6%	12.9%	2.3%	3.7%	21
	2.5 to 2.99	1.8%	2.2%	6.9%	5.6%	15.8%	10.1%	36.0%	12.3%	21.7%	11.3%	13.7%	8.6%	4.1%	6.6%	-	-	54
	3.0 to 3.49	3.4%	4.2%	1.0%	1.7%	10.0%	7.7%	16.2%	9.8%	27.5%	10.3%	24.3%	9.8%	12.1%	8.2%	5.5%	6.0%	59
	3.5 to 3.99	-	-	4.8%	5.8%	11.8%	10.9%	15.7%	8.1%	12.7%	7.3%	41.3%	12.5%	11.4%	9.2%	2.4%	3.9%	52
	4.0 to 4.49	-	-	1.7%	2.8%	13.8%	11.6%	9.1%	10.6%	27.7%	13.9%	14.5%	7.4%	21.3%	11.9%	11.9%	8.9%	41
	4.5 to 5.00	-	-	-	-	16.8%	9.9%	27.7%	10.8%	14.3%	7.5%	30.9%	11.4%	8.2%	5.5%	2.1%	2.4%	65
	>5.00	-	-	-	-	-	-	-	-	11.2%	17.3%	23.6%	24.0%	57.6%	32.0%	7.5%	11.9%	9
	Unknown	-	-	-	-	43.2%	53.6%	-	-	-	-	14.8%	16.2%	8.4%	13.2%	33.6%	45.1%	5
Package System AC	All Ranges	5.9%	9.3%	-	-	10.2%	10.3%	12.60%	12.2%	16.7%	9.7%	28.3%	13.4%	15.9%	12.6%	10.3%	9.2%	33
	2.0 to 2.49	-	-	-	-	9.8%	15.3%	38.7%	49.9%	-	-	12.8%	19.7%	-	-	38.7%	49.9%	4
	2.5 to 2.99	-	-	-	-	-	-	-	-	31.2%	42.6%	51.3%	42.6%	-	-	17.5%	26.1%	4

System Type	Ton Range	Strata weights – Age Range															Sample Size
		1979 and Older		1980-1984		1985-1989		1990-1994		1995-1999		2000-2005		2006-2009		2010-2012		
		%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	
	3.0 to 3.49	33.3%	44.8%	-	-	-	-	9.5%	14.8%	25.2%	26.1%	32.0%	30.7%	-	-	-	-	6
	3.5 to 3.99	-	-	-	-	30.2%	30.3%	-	-	16.6%	18.1%	29.3%	23.4%	23.9%	28.1%	-	-	9
	4.0 to 4.49	-	-	-	-	-	-	-	-	37.0%	35.1%	48.9%	57.5%	14.1%	21.5%	-	-	4
	4.5 to 5.00	-	-	-	-	-	-	-	-	-	-	24.2%	34.7%	24.2%	34.7%	51.5%	41.8%	4
	Unknown	-	-	-	-	-	-	51.3%	58.9%	-	-	-	-	48.7%	57.4%	-	-	2
Split System HP	All Ranges	-	-	8.7%	10.1%	15.1%	18.4%	4.80%	7.7%	2.9%	4.8%	22.5%	21.5%	-	-	46.0%	30.2%	14
	1.5 to 1.99	-	-	-	-	53.2%	59.9%	-	-	-	-	-	-	-	-	46.8%	56.1%	2
	2.0 to 2.49	-	-	-	-	-	-	26.9%	37.8%	-	-	73.1%	62.4%	-	-	-	-	2
	2.5 to 2.99	-	-	-	-	14.4%	21.9%	-	-	-	-	-	-	-	-	85.6%	53.4%	2
	3.0 to 3.49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0%	0.0%	2
	3.5 to 3.99	-	-	47.7%	42.2%	-	-	-	-	16.1%	24.3%	36.2%	47.6%	-	-	-	-	4
	4.0 to 4.49	-	-	-	-	-	-	-	-	-	-	50.0%	58.2%	-	-	50.0%	58.2%	2
Package System HP	Unknown					100.0%	0.0%											2
Evap Cooler	Unknown	-	-	-	-	-	-	-	-	-	-	28.5%	28.1%	43.3%	38.5%	28.1%	28.2%	6

Table 112 shows the size distributions by age range for space system types. From the table, we can see that approximately half of all window/wall units surveyed were manufactured between 2006 and 2012. No space systems of any type were found that were manufactured prior to 1979 or between the years 1990-1994.

Table 112: Distribution of Manufacture Date Ranges for Space Cooling Systems within Capacity Ranges and Types, using Strata Weights

| System Type | Cooling Tons | Strata weights – Age Range | | | | | | | | | | | | | | Sample Size |
| | | 1980-1984 | | 1985-1989 | | 1990-1994 | | 1995-1999 | | 2000-2005 | | 2006-2009 | | 2010-2012 | | |
		%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	
All Types	All Ranges	4.4%	7.1%	6.1%	9.7%	-	-	12.4%	12.5%	35.6%	18.3%	28.7%	16.8%	12.8%	13.1%	24
	0.1 to 0.99	9.8%	15.4%	13.5%	20.7%	-	-	14.0%	18.3%	7.8%	12.3%	29.6%	23.4%	25.2%	26.5%	11
	1.0 to 1.49	-	-	-	-	-	-	-	-	68.9%	33.5%	31.1%	42.4%	-	-	5
	2.0 to 2.49	-	-	-	-	-	-	75.4%	61.5%	-	-	24.6%	35.2%	-	-	2
	2.5 to 2.99	-	-	-	-	-	-	-	-	-	-	-	-	100.0%	0.0%	1
	3.0 to 3.49	-	-	-	-	-	-	-	-	-	-	100.0%	0.0%	-	-	1
	3.5 to 3.99	-	-	-	-	-	-	-	-	100.0%	0.0%	-	-	-	-	1
	4.5 to 5	-	-	-	-	-	-	-	-	-	-	100.0%	0.0%	-	-	1
	Unknown	-	-	-	-	-	-	-	-	100.0%	0.0%	-	-	-	-	2
Window/ Wall Air Conditioner	All Ranges	6.0%	9.6%	8.2%	13.0%	-	-	16.8%	16.5%	35.5%	20.1%	23.4%	15.9%	10.0%	15.7%	18
	1.0 to 1.49	10.8%	16.8%	14.8%	22.5%	-	-	15.4%	19.9%	8.6%	13.5%	32.4%	25.1%	18.1%	26.9%	10
	1.5 to 1.99	-	-	-	-	-	-	-	-	100.0%	0.0%	-	-	-	-	4
	2.0 to 2.49	-	-	-	-	-	-	75.4%	61.5%	-	-	24.6%	35.2%	-	-	2
	3.5 to 3.99	-	-	-	-	-	-	-	-	100.0%	0.0%	-	-	-	-	1
	4.5 to 5	-	-	-	-	-	-	-	-	-	-	100.0%	0.0%	-	-	1
Portable/ Stand Alone Air Conditioner	All Ranges	-	-	-	-	-	-	-	-	35.7%	41.0%	43.7%	42.1%	20.6%	23.3%	6
	0.1 to 0.00	-	-	-	-	-	-	-	-	-	-	-	-	100.0%	0.0%	1
	1.0 to 1.49	-	-	-	-	-	-	-	-	-	-	100.0%	0.0%	-	-	1
	2.5 to 2.99	-	-	-	-	-	-	-	-	-	-	-	-	100.0%	0.0%	1
	3.0 to 3.49	-	-	-	-	-	-	-	-	-	-	100.0%	0.0%	-	-	1
	Unknown	-	-	-	-	-	-	-	-	100.0%	0.0%	-	-	-	-	2

Seasonal energy efficiency ratio (SEER) is a measure of air conditioning efficiency given in kBtu of cooling delivered per kWh of electrical energy consumed. The SEER data for this analysis were obtained strictly from the manufacturer data of matched model numbers. The sample size of 913 (765 central and 148 space units) represents all the cooling systems that were successfully matched with manufacturer data.

The distribution of SEER range by cooling system type is shown below in Table 113. The largest proportion of combined central system cooling systems are in the 10 to 11.99 SEER range accounting for 42.5% of central systems with a 3.2% error bound. Similarly, 95.3% of all types of space cooling systems are in the 9 to 10.99 SEER range. No space cooling systems were found with EER of less than 6 or higher than 12.

Table 113: Distribution of Cooling Systems by SEER/EER Ranges within Cooling System Type, using Strata Weights

			Strata weights											
Efficiency Range			Less than 10 SEER	10-11.99 SEER	12-12.99 SEER	13-13.99 SEER	14-15.99 SEER	16 or Higher SEER	Less than 6 EER	06-08.99 EER	09-10.99 EER	11-11.99 EER	12-13.99 EER	14 or Higher EER
Central	All Types (n=830)	%	11.9%	42.5%	13.0%	24.9%	6.7%	1.0%						
		EB	2.4%	3.2%	2.2%	2.9%	1.6%	0.6%						
	Split System A/C (n=743)	%	12.5%	42.8%	11.9%	25.7%	6.2%	0.9%						
		EB	2.6%	3.3%	2.2%	3.1%	1.6%	0.6%						
	Package System A/C (n=63)	%	5.4%	40.8%	26.5%	19.2%	8.1%	0.0%						
		EB	6.3%	11.1%	10.1%	8.4%	6.4%	0.0%						
	Split System Heat Pump (n=23)	%	11.3%	36.4%	2.0%	17.1%	24.7%	8.4%						
		EB	13.5%	18.0%	3.3%	13.7%	21.6%	10.6%						
	Package System Heat Pump (n=1)	%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%						
		EB	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%						
Space	All Types (n=97)	%							0.0%	4.0%	95.3%	0.7%	0.0%	0.0%
		EB							0.0%	3.1%	4.3%	0.8%	0.0%	0.0%
	Window/Wall AC (n=87)	%							0.0%	1.6%	97.9%	0.4%	0.0%	0.0%
		EB							0.0%	1.9%	3.0%	0.7%	0.0%	0.0%
	Window/Wall HP (n=1)	%							0.0%	0.0%	100.0%	0.0%	0.0%	0.0%
		EB							0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Portable/Stand Alone AC (n=9)	%							0.0%	37.9%	57.2%	4.9%	0.0%	0.0%
		EB							0.0%	32.2%	31.5%	7.8%	0.0%	0.0%

Table 114 shows the average SEER values across the system capacity ranges, using both Census-adjusted and strata weights. The average SEER capacity range can be found in the table below.

Table 114: Average Efficiency of Cooling Systems by Type and Tonnage Range

System Type	Ton Range	Census-adjusted weights		Strata weights		Sample Size
		Average Efficiency	Error Bounds	Average Efficiency	Error Bounds	
Central All Types (SEER)	1.0-1.49	10.0	0.0	10.0	0.0	4
	1.5-1.99	10.0	0.2	10.0	0.3	28
	2.0-2.49	11.1	0.5	11.2	0.4	52
	2.5-2.99	10.9	0.3	11.0	0.3	123
	3.0-3.49	11.5	0.2	11.5	0.2	161
	3.5-3.99	11.2	0.3	11.2	0.2	154
	4.0-4.49	12.3	0.3	12.2	0.3	108
	4.5-5	11.3	0.2	11.3	0.2	182
	5+	13.6	0.5	13.7	0.6	18
Split System AC (SEER)	1.0-1.49	10.0	0.0	10.0	0.0	4
	1.5-1.99	9.9	0.2	9.9	0.3	24
	2.0-2.49	11.4	0.6	11.3	0.5	42
	2.5-2.99	10.9	0.3	10.9	0.3	110
	3.0-3.49	11.4	0.3	11.4	0.3	145
	3.5-3.99	11.1	0.2	11.1	0.2	128
	4.0-4.49	12.2	0.3	12.2	0.3	101
	4.5-5	11.2	0.2	11.3	0.2	173
	5+	13.5	0.6	13.7	0.6	16
Package System AC (SEER)	1.5-1.99	10.5	0.0	10.5	0.0	1
	2.0-2.49	10.5	0.7	10.7	0.9	8
	2.5-2.99	10.7	0.3	10.9	0.5	12
	3.0-3.49	12.0	0.3	12.0	0.3	11
	3.5-3.99	11.6	0.9	11.3	0.7	18
	4.0-4.49	13.1	0.7	13.0	0.7	6
	4.5-5	12.8	0.1	12.8	0.0	6
	5+	13.0	0.0	13.0	0.0	1
Split System Heat Pump (SEER)	1.5-1.99	10.6	0.0	10.6	0.0	3
	2.0-2.49	10.2	0.0	10.1	0.0	2
	2.5-2.99	15.0	0.0	15.0	0.0	1
	3.0-3.49	14.3	0.0	14.7	0.0	5
	3.5-3.99	10.7	0.0	10.5	0.0	7
	4.0-4.49	12.0	0.0	12.0	0.0	1

System Type	Ton Range	Census-adjusted weights		Strata weights		Sample Size
		Average Efficiency	Error Bounds	Average Efficiency	Error Bounds	
	4.5-5	13.5	0.1	12.8	0.2	3
	5+	15.3	0.0	15.3	0.0	1
Package System Heat Pump (SEER)	3.5-3.99	12.0	0.0	12.0	0.0	1
Space AC, All Types (EER)	0.1-0.99	10.0	0.2	10.0	0.1	64
	1.0-1.49	9.9	0.2	9.9	0.2	28
	1.5-1.99	9.7	0.0	9.7	0.0	2
	2.0-2.49	9.1	0.0	9.1	0.0	2
	2.5-2.99	9.4	0.0	9.4	0.0	1
Window/Wall AC (EER)	0.1-0.99	10.1	0.1	10.1	0.1	56
	1.0-1.49	10.0	0.2	10.0	0.3	26
	1.5-1.99	9.7	0.0	9.7	0.0	2
	2.0-2.49	9.1	0.0	9.1	0.0	2
	2.5-2.99	9.4	0.0	9.4	0.0	1
Window Wall Heat Pump (EER)	1.0-1.49	9.0	0.0	9.0	0.0	1
Portable/ Stand Alone AC (EER)	0.1-0.99	9.0	0.4	9.0	0.4	8
	1.0-1.49	9.0	0.0	9.0	0.0	1

4.5 Water Heaters

Type

The following section summarizes the data on the water heaters that were collected during on-site visits. As can be seen in

Figure 27, the heavy majority of water heaters currently in homes are storage type water heaters. This indicates a significant increase of 3.3% in the percentage of instantaneous water heaters since the 2005 CLASS study[31]. Using Census-adjusted weights, instantaneous units represent a smaller percentage of water heaters than strata-weighted results.

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[31] See Appendix G: Statistical Significance Testing for comparison details.

Figure 27: Distribution of Water Heater Type

Instan-taneous 4.1%
Un-known 12.2%
Storage 83.7%
Census-adjusted weights
n = 1,987

Instan-taneous 4.7%
Un-known 12.0%
Storage 83.3%
Strata weights
n = 1,987
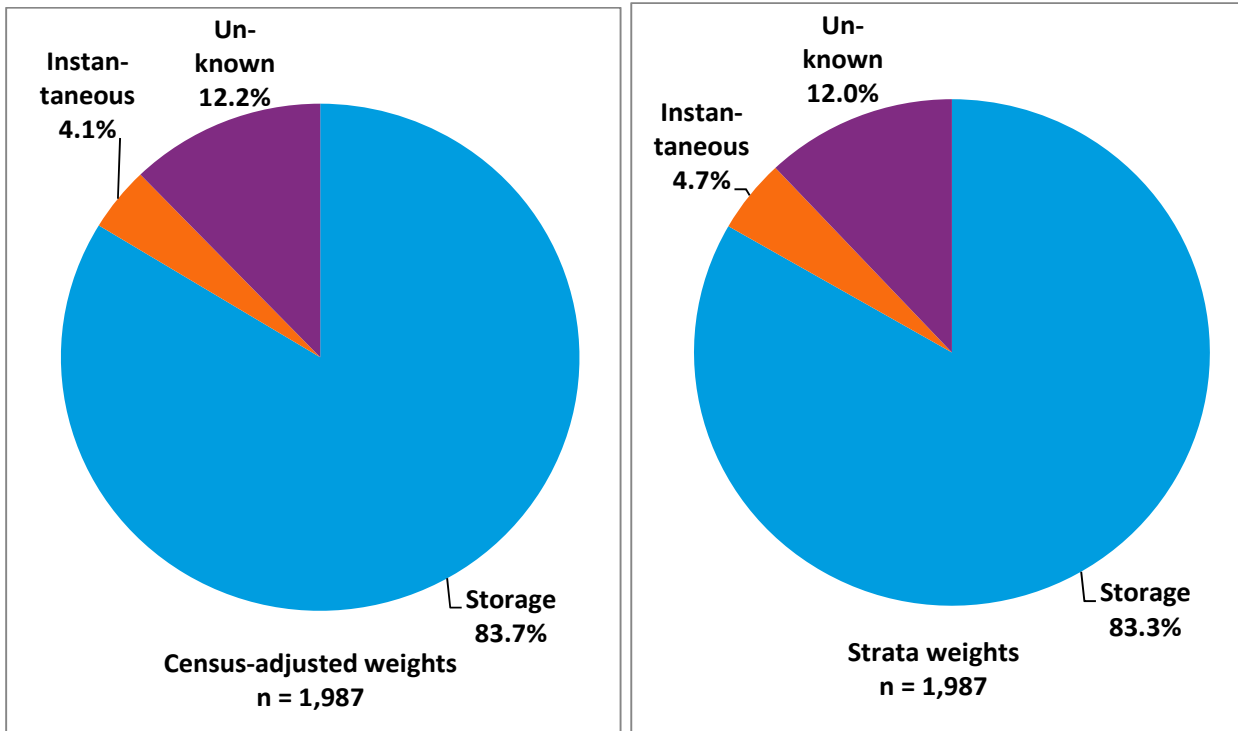
Fuel Type

Figure 28 shows the breakdown of water heaters by fuel type. The large majority of water heaters are gas, either natural or propane, totaling approximately 82% of all water heaters found, for both Census-adjusted weighted and strata weighted. About 6% of the water heaters are electric, while fuel type is not known for 12%. Previous CLASS results from 2005 found a significantly lower percentage of water heaters were gas, at about 80%[32].

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[32] See Appendix G: Statistical Significance Testing for details on comparison of 2012 to 2005.

Figure 28: Distribution of Water Heater Fuel Type

Census-ajusted weights
n = 1,987

Strata weights
n = 1,987
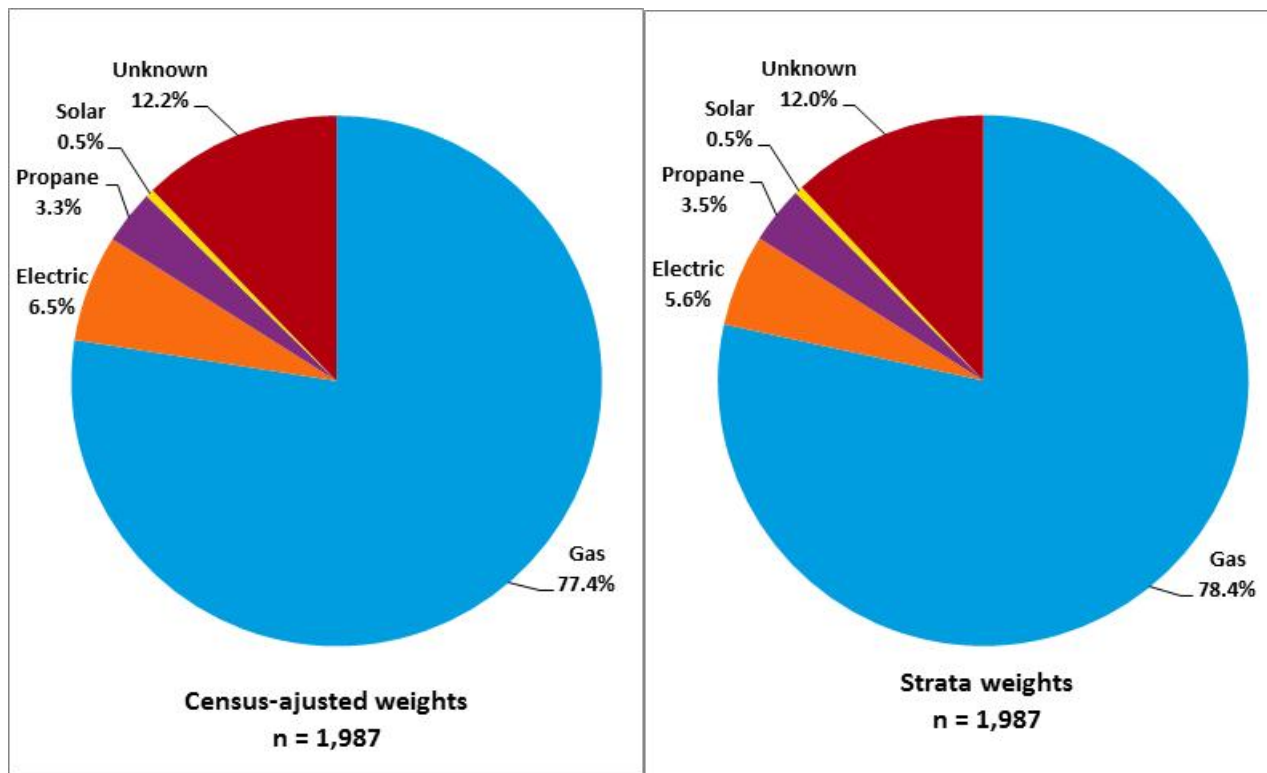
Size

Table 115 shows the average size of the water heaters, overall and for each of the fuel types, for Census-adjusted and strata weights. The average sizes of the units were obtained from two sources, the first being from the manufacturer if the model number matched a model in the efficiency databases, the second being from the site visit if the model was not matched. The surveyor attempted to obtain the capacity of the water heater from the nameplate information; if no nameplate capacity data were available, the surveyor made an estimate wherever possible. The average size of all types of water heaters was 42.9 gallons using Census-adjusted weights (43.5 gallons using strata weights). The 2005 study found the average size of all types of water heaters was significantly smaller at 42.5 gallons[33].

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[33] See Appendix G: Statistical Significance Testing for details on comparison of 2012 to 2005.

Table 115: Average Size of Water Heaters by Fuel Type

Fuel	Census-adjusted weights		Strata weights		Sample Size
	Average Size (Gallons)	Error Bound	Average Size (Gallons)	Error Bound	
All Types	42.9	0.6	43.5	0.4	1,526
Electric	41.2	2.7	42.9	2.9	119
Gas	42.8	0.5	43.3	0.4	1,318
Propane	44.6	3.3	44.2	2.4	74
Solar/Electric	85.3	23.2	78.7	17.7	10
Solar/Gas	63.2	0.0	65.7	0.0	4
Solar/Propane	50.0	0.0	50.0	0.0	1

Table 116 shows the percentage of water heaters in each size range within each fuel type. The sample sizes used to calculate the percentages in each fuel type are also presented in the table below. Notice that the distribution of water heater capacities differs slightly for electric and gas units. The largest proportion of gas units are in the 40 to 49 gallon range, whereas with the electric units there is a wide distribution of capacities from 30 to 59 gallons. However, the largest share of all the water heaters combined by fuel type is still in the size range from 40 to 49 gallons.

Table 116: Distribution of Water Heaters by Size Range within Fuel Type, using Strata Weights

Size (Gallons)	Strata weights - Fuel Type													
	Overall (n=1,526)		Electric (n=119)		Gas (n=1,318)		Propane (n=74)		Solar/Electric (n=10)		Solar/Gas (n=4)		Solar/Propane (n=1)	
	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB
Less Than 30	1.9%	0.7%	5.5%	4.1%	1.8%	0.8%	-	-	-	-	-	-	-	-
30 to 39	14.4%	1.9%	22.7%	8.4%	13.7%	2.0%	20.8%	9.1%	-	-	-	-	-	-
40 to 49	48.4%	2.5%	39.6%	8.6%	49.9%	2.7%	36.6%	10.7%	-	-	31.0%	42.3%	-	-
50 to 59	30.3%	2.1%	27.0%	7.1%	30.4%	2.2%	35.1%	11.5%	28.2%	24.9%	7.8%	12.4%	100.0%	0.0%
60 to 69	1.0%	0.5%	1.7%	1.8%	1.0%	0.5%	-	-	14.7%	22.3%	-	-	-	-
70 to 79	2.9%	0.6%	-	-	3.0%	0.7%	5.6%	4.0%	-	-	11.7%	18.1%	-	-
80 to 89	0.5%	0.3%	1.7%	1.6%	0.0%	0.1%	1.9%	3.1%	34.4%	27.3%	49.5%	57.9%	-	-
Greater Than 89	0.5%	0.3%	1.9%	3.1%	0.3%	0.2%	-	-	22.7%	24.1%	-	-	-	-

Table 117 shows the percentage of total water heaters by fuel type within the size ranges. These percentages were calculated as a proportion relative to the entire set of water heaters, regardless of type. This summary table better displays the actual percentage of the population of water heaters in each size range. The previous table shows that the 40 to 49 gallon size range accounts for 39.6% of all electric water heaters and Table 117 shows that the same size electric heaters constitute only 1.8% of the entire population. This emphasizes the market dominance of the 40-gallon gas fired water heater that accounts for 34.4% of all water heaters.

Table 117: Distribution of Water Heaters within Size Ranges and Fuel Types Among all Water Heaters, using Strata Weights

Size (Gallons)	Strata weights - Fuel Type (n=1,987)													
	Electric		Natural Gas		Propane		Solar/ Electric		Solar/Gas		Solar/ Propane		Unknown	
	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB
Instantaneous	0.2%	0.1%	4.4%	0.8%	0.1%	0.1%	-	-	-	-	-	-	-	-
1 to 29	0.2%	0.2%	1.1%	0.5%	-	-	-	-	-	-	-	-	-	-
30 to 39	1.0%	0.4%	8.9%	1.3%	0.6%	0.3%	-	-	-	-	-	-	-	-
40 to 49	1.8%	0.5%	32.4%	2.0%	1.1%	0.4%	-	-	0.1%	0.1%	-	-	-	-
50 to 59	1.2%	0.4%	19.7%	1.6%	1.0%	0.4%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	-	-
60 to 69	0.1%	0.1%	0.6%	0.3%	-	-	0.0%	0.1%	-	-	-	-	-	-
70 to 79	-	-	1.9%	0.4%	0.2%	0.1%	-	-	0.0%	0.0%	-	-	-	-
80 to 89	0.1%	0.1%	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%	0.1%	0.2%	-	-	-	-
90+	0.1%	0.1%	0.2%	0.1%	-	-	0.1%	0.1%	-	-	-	-	-	-
Unknown	0.8%	0.4%	9.1%	1.2%	0.5%	0.3%	0.0%	0.0%	-	-	-	-	12.0%	1.6%

Age

Table 118 shows the average age of water heaters by fuel type in each of the size ranges. The ages of the water heaters were obtained during the site visit only. No age information was available in the efficiency databases. The average age of all water heaters for which an age obtained is 8.0 years old, while the 2005 study found that the average age of all water heaters was significantly newer at 7.2 years old[34]. The ages of the electric and gas water heaters are both 8.2 years in the 2012 study.

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[34] See Appendix G: Statistical Significance Testing for details on comparison of 2012 to 2005.

Table 118: Average Age of Water Heaters by Fuel Type within Size Ranges, using Strata Weights

Size (Gallons)	All Types			Electric			Natural Gas			Propane			Solar/Electric			Solar/Gas			Solar/Propane		
	Avg Age	EB	Samp Size	Avg Age	EB	Samp Size	Avg Age	EB	Samp Size	Avg Age	EB	Samp Size	Avg Age	EB	Samp Size	Avg Age	EB	Samp Size	Avg Age	EB	Samp Size
All Sizes	8.0	0.3	1,585	8.2	1.0	116	8.2	0.3	1,376	7.3	0.8	80	7.0	2.0	9	7.9	0.0	3	5.0	0.0	1
Tankless	4.5	0.4	107	1.8	0.0	3	4.5	0.4	102	8.9	4.3	10	-	-	-	-	-	-	-	-	-
1 to 29	5.2	1.5	21	13.7	5.2	5	3.3	1.0	519	-	-	-	-	-	-	-	-	-	-	-	-
30 to 39	7.6	0.8	131	6.3	1.1	15	7.8	0.9	444	6.6	0.0	13	-	-	-	-	-	-	-	-	-
40 to 49	8.4	0.5	582	7.7	1.4	39	8.5	0.5	10	6.8	1.3	23	-	-	-	5.0	0.0	1	-	-	-
50 to 59	7.9	0.4	506	8.3	0.7	32	7.9	0.5	62	7.3	0.9	26	6.5	0.0	2	4.0	0.0	1	5.0	0.0	1
60 to 69	6.4	0.6	14	1.2	0.0	3	7.6	0.0	1	-	-	-	11.6	0.0	2	-	-	-	-	-	-
70 to 79	7.3	0.8	68	-	-	-	7.2	0.7	4	6.4	0.0	5	-	-	-	5.0	0.0	1	-	-	-
80 to 89	9.8	2.2	8	7.5	4.1	2	10.0	0.0	115	-	-	-	1.0	0.0	1	-	-	-	-	-	-
>89	7.2	0.0	5	-	-	-	7.2	0.0	102	-	-	-	8.1	4.6	4	-	-	-	-	-	-
Size Unknown	10.1	1.1	143	10.8	2.6	17	10.1	1.2	13	15.0	0.0	1	7.0	0.0	1	20.0	0.0	1	-	-	-

Table 119 shows the percentage of water heaters within each fuel type and size range that fall into each of the estimated manufacture date ranges. The first row of data, representing all water heaters, shows the largest percentage was manufactured between 2006 and 2012, totaling over 48% of all the units.

All size/fuel categories with a substantial sample show a similar distribution of age ranges. The largest percentage of water heaters is found in the most recent age range ending with a small percent in the 1979 and older category.

Table 119: Distribution of Water Heaters in Purchase Date Ranges by Fuel Type, using Strata Weights

Fuel Type	Size Range (Gallons)	Strata weights - Estimated Manufacture Date								
		1979 and Older	1980-1984	1985-1989	1990-1994	1995-1999	2000-2005	2006-2009	2010-2012	Sample Size
All Types	All Sizes	0.2%	0.7%	2.0%	5.4%	9.3%	33.7%	32.7%	16.0%	1,585
	Tankless	-	-	-	-	0.5%	19.2%	59.4%	21.0%	107
	1 to 29	-	3.8%	-	-	3.8%	8.9%	46.0%	37.5%	21
	30 to 39	-	0.5%	0.3%	6.6%	7.9%	36.9%	22.6%	25.1%	131
	40 to 49	0.1%	1.0%	2.9%	7.2%	9.9%	32.6%	30.2%	16.2%	582
	50 to 59	-	0.2%	2.1%	3.2%	9.3%	38.7%	36.0%	10.4%	506
	60 to 69	-	-	-	4.2%	17.2%	3.7%	51.1%	23.8%	14
	70 to 79	-	-	-	3.3%	6.2%	38.6%	37.2%	14.6%	68
	80 to 89	-	5.2%	-	-	23.1%	28.2%	43.5%	-	8
	>90	-	-	-	-	-	83.7%	-	16.3%	5
	Size Unknown	1.8%	0.8%	1.6%	8.0%	15.1%	34.7%	24.1%	13.9%	143
Electric	All Sizes	1.1%	1.2%	2.0%	1.9%	14.2%	31.6%	31.4%	16.5%	116
	Tankless	-	-	-	-	-	0.0%	26.7%	73.3%	3
	1 to 29	-	21.0%	-	-	21.0%	49.4%	-	8.6%	5
	30 to 39	-	-	-	-	7.4%	36.7%	32.0%	23.9%	15
	40 to 49	1.3%	-	0.9%	6.0%	16.1%	19.9%	38.5%	17.2%	39
	50 to 59	-	-	2.7%	-	19.7%	31.9%	44.4%	1.2%	32
	60 to 69	-	-	-	-	-	-	16.8%	83.2%	3
	70 to 79	-	-	-	-	-	-	-	-	0
	80 to 89	-	-	-	-	-	50.0%	50.0%	-	2
	>90	-	-	-	-	-	-	-	-	0
	Size Unknown	4.2%	-	6.5%	-	11.9%	51.1%	8.4%	17.9%	17
Natural Gas	All Sizes	0.1%	0.7%	1.9%	5.8%	9.1%	33.7%	32.9%	15.8%	1,376
	Tankless	-	-	-	-	0.5%	19.0%	60.5%	20.0%	102
	1 to 29	-	-	-	-	-	-	56.1%	43.9%	16

Fuel Type	Size Range (Gallons)	Strata weights - Estimated Manufacture Date								Sample Size
		1979 and Older	1980-1984	1985-1989	1990-1994	1995-1999	2000-2005	2006-2009	2010-2012	
	30 to 39	-	0.6%	0.4%	7.9%	8.7%	35.2%	21.1%	26.2%	103
	40 to 49	-	1.1%	2.8%	7.5%	9.8%	33.1%	30.3%	15.4%	519
	50 to 59	-	0.2%	2.2%	3.5%	8.8%	39.1%	35.0%	11.2%	444
	60 to 69	-	-	-	5.2%	21.1%	4.5%	60.2%	9.1%	10
	70 to 79	-	-	-	2.1%	6.7%	40.4%	35.1%	15.8%	62
	80 to 89	-	-	-	-	-	100.0%	-	-	1
	>90	-	-	-	-	-	77.1%	-	22.9%	4
	Size Unknown	1.7%	0.9%	1.2%	9.1%	14.6%	34.1%	25.7%	12.8%	115
Propane	All Sizes	-	-	2.9%	1.4%	8.3%	40.0%	27.5%	19.9%	80
	Tankless	-	-	-	-	-	62.3%	37.7%	-	2
	1 to 29	-	-	-	-	-	-	-	-	0
	30 to 39	-	-	-	-	-	58.5%	28.8%	12.7%	13
	40 to 49	-	-	9.3%	-	2.7%	38.3%	8.9%	40.8%	23
	50 to 59	-	-	-	2.1%	6.2%	43.3%	42.2%	6.3%	26
	60 to 69	-	-	-	-	-	-	-	-	0
	70 to 79	-	-	-	-	-	20.5%	79.5%	-	5
	80 to 89	-	-	-	-	100.0%	-	-	-	1
	>90	-	-	-	-	-	-	-	-	0
	Size Unknown	-	-	-	5.8%	28.8%	19.5%	22.2%	23.7%	10
Solar/ Electric	All Sizes	-	5.0%	-	-	11.2%	22.3%	44.0%	17.5%	9
	50 to 59	-	-	-	-	69.2%	-	30.8%	-	2
	60 to 69	-	-	-	-	-	-	-	100.0%	1
	80 to 89	-	12.2%	-	-	-	12.2%	75.6%	-	4
	>90	-	-	-	-	-	100.0%	-	-	1
	Size Unknown	-	-	-	-	-	-	100.0%	-	1
Solar/ Gas	All Sizes	-	-	-	23.2%	-	-	76.8%	-	3
	40 to 49	-	-	-	-	-	-	100.0%	-	1
	50 to 59	-	-	-	-	-	-	100.0%	-	1
	70 to 79	-	-	-	100.0%	-	-	-	-	1
	Size Unknown	-	-	-	-	-	-	-	-	0
Solar/ Propane	All Sizes	-	-	-	-	-	-	100.0%	-	1
	50 to 59	-	-	-	-	-	-	100.0%	-	1

Energy Factor

Energy factor for water heaters is a measure of efficiency expressed as the ratio defined below, where a higher energy factor equates to a more efficient water heater:

$$\frac{\textit{heater supplied energy content of the delivered hot water}}{\textit{energy consumed by the water heater}}$$

The average energy factor for the popular 40 gallon gas fired water heater is 0.58 using Census-adjusted weights, which is slightly lower than the average of 0.59 from the National Appliance Energy Conservation Act Standards (NAECA), implemented in 2004. Using strata weights, the average energy factor is 0.6, which is slightly above standard. The average energy factor for electric models of the two most popular sizes (40 and 50 gallon) is also above standard.

Table 120: Average Energy Factor for Water Heaters and Comparison to Standards

Size	Fuel Type	Census-adjusted weights		Strata weights	
		Energy Factor Standard	Average Energy Factor	Energy Factor Standard	Average Energy Factor
40 Gallons	Gas	0.59	0.58	0.59	0.6
40 Gallons	Propane	0.59	0.59	0.59	0.6
40 Gallons	Electric	0.92	0.89	0.92	0.91
50 Gallons	Electric	0.90	0.89	0.90	0.91

Table 121 shows the average energy factor by fuel type within each size range. The energy factor was obtained from the efficiency databases, thus only the models that matched were included in the following table. The average energy factor from matched gas units is 0.6 while the average energy factor for all electric units is 0.9.

Table 121: Average Energy Factor by Fuel Type in Size Ranges, using Strata Weights

Size (Gallons)	Strata weights - Fuel Type														
	Gas			Electric			Propane			Solar w/Electric			Solar w/Gas		
	Average Energy Factor	Error Bound	Sample Size	Average Energy Factor	Error Bound	Sample Size	Average Energy Factor	Error Bound	Sample Size	Average Energy Factor	Error Bound	Sample Size	Average Energy Factor	Error Bound	Sample Size
Overall	0.6	0.0	898	0.9	0.0	65	0.6	0.0	34	0.9	0.0	5.00	0.6	0.0	1
Tankless	0.8	0.0	32	-	-	-	0.8	0.0	2	-	-	-	-	-	-
1 to 29	0.6	-	-	0.9	0.0	1	-	-	-	-	-	-	-	-	-
30 to 39	0.6	0.0	88	0.9	0.0	11	0.6	0.0	6	-	-	-	-	-	-
40 to 49	0.6	0.0	398	0.9	0.0	19	0.6	0.0	9	-	-	-	0.6	0.0	1
50 to 59	0.6	0.0	333	0.9	0.0	28	0.6	0.0	17	0.9	0.0	2	-	-	-
60 to 69	0.6	0.0	7	0.9	0.0	2	-	-	-	1.0	0.0	1	-	-	-
70 to 79	0.5	0.0	25	-	-	-	-	-	-	-	-	-	-	-	-
80 to 89	-	-	-	0.7	0.0	3	-	-	-	-	-	-	-	-	-
90+	0.5	0.0	2	0.8	0.0	1	-	-	-	0.8	0.0	2	-	-	-
Size Unknown	0.9	0.0	1	-	-	-	-	-	-	-	-	-	-	-	-

Table 122 and Table 123 show the percentage of water heaters within each fuel type and size range that fall into each of the energy factor ranges. Energy factors of gas water heaters seems to be well distributed throughout the range from 0.48 to 0.64, while the majority of electric water heaters fall within the range from 0.92 to 0.96.

Table 122: Percentage of Water Heaters in Energy Factor Ranges by Size (Gallons) for Electric and Solar with Electric Fuel Types, using Strata Weights

Energy Factor		Strata weights											
		Electric								Solar w/Elec			
		All Sizes	1 to 29 gal	30 to 39 gal	40 to 49 gal	50 to 59 gal	60 to 69 gal	80 to 89 gal	90+ gal	All Sizes	50 to 59 gal	60 to 69 gal	90+ gal
<0.48	%	0.6%	-	-	-	-	-	20.9%	-	-	-	-	-
	Error Bound	1.1%	-	-	-	-	-	30.6%	-	-	-	-	-
.80-0.839	%	4.7%	-	-	-	-	-	79.1%	100.0%	41.7%	-	-	100.0%
	Error Bound	4.6%	-	-	-	-	-	42.2%	-	41.6%	-	-	-
0.84 to 0.879	%	0.3%	-	-	-	0.9%	-	-	-	-	-	-	-
	Error Bound	0.5%	-	-	-	1.5%	-	-	-	-	-	-	-
0.88 to 0.919	%	40.6%	100.0%	24.0%	28.2%	60.1%	100.0%	-	-	25.8%	100.0%	-	-
	Error Bound	11.8%	-	18.9%	17.5%	21.1%	-	-	-	27.6%	-	-	-
0.92 to 0.959	%	53.7%	-	76.0%	71.8%	39.0%	-	-	-	32.6%	-	100.0%	-
	Error Bound	12.7%	-	25.7%	20.4%	16.4%	-	-	-	44.0%	-	-	-
Sample Size		65	1	11	19	28	2	3	1	5	2	1	2

Table 123: Percentage of Water Heaters in Energy Factor Ranges by Size (Gallons) for Gas, Propane, and Solar with Gas Fuel Types, using Strata Weights

Energy Factor		Strata weights														
		Gas										Propane					Solar w/Gas
		All Sizes	Tankless	1 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	90+	Unknown	All Sizes	Tankless	30 to 39	40 to 49	50 to 59	40 to 49
0.48-0.519	%	1.5%	-	-	-	0.1%	-	-	73.5%	100.0%	-	-	-	-	-	-	-
	Error Bound	0.6%	-	-	-	0.2%	-	-	17.0%	-	-	-	-	-	-	-	-
0.52-0.559	%	9.0%	-	-	-	1.3%	24.3%	36.1%	23.3%	-	-	4.1%	-	-	8.4%	4.2%	-
	Error Bound	1.7%	-	-	-	1.1%	4.5%	39.4%	12.4%	-	-	4.8%	-	-	13.2%	6.8%	-
0.56-0.599	%	43.8%	4.0%	-	46.7%	58.0%	29.3%	63.9%	3.2%	-	-	56.1%	-	50.2%	45.3%	73.2%	-
	Error Bound	3.3%	6.5%	-	10.0%	4.8%	5.0%	31.5%	5.1%	-	-	17.3%	-	37.1%	27.4%	24.6%	-
0.60-0.639	%	42.3%	-	100.0%	53.3%	40.2%	46.1%	-	-	-	-	34.5%	-	49.8%	46.3%	22.6%	100.0%
	Error Bound	3.2%	-	-	9.6%	4.7%	5.4%	-	-	-	-	16.7%	-	36.6%	36.9%	18.0%	-
0.64-0.679	%	0.1%	-	-	-	-	0.4%	-	-	-	-	-	-	-	-	-	-
	Error Bound	0.2%	-	-	-	-	0.6%	-	-	-	-	-	-	-	-	-	-
.76-0.799	%	0.1%	1.5%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Error Bound	0.1%	2.5%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
.80-0.839	%	2.2%	62.3%	-	-	0.3%	-	-	-	-	-	5.3%	100.0%	-	-	-	-
	Error Bound	0.9%	16.2%	-	-	0.4%	-	-	-	-	-	6.3%	-	-	-	-	-
0.84-0.879	%	1.1%	32.2%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Error Bound	0.7%	17.7%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0.88-0.919	%	0.1%	-	-	-	-	-	-	-	-	100.0%	-	-	-	-	-	-
	Error Bound	0.2%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sample Size		898	32	12	88	398	333	7	25	2	1	34	2	6	9	17	1

Table 124 shows the percentage of all types of water heaters broken down by whether the tank was wrapped with insulation or unwrapped. The unknown category contains tanks that were observable. Of the 1,730 water heaters observed, about 85% of them were unwrapped.

Table 124: Percentage Of Water Heaters that were Wrapped and Unwrapped with Insulation in Conditioned or Unconditioned Space, within Size Ranges, using Strata Weights

Size Range (Gallons)	Strata weights								Sample Size
	Not Wrapped/ Conditioned		Not Wrapped/ Unconditioned		Wrapped/ Conditioned		Wrapped/ Unconditioned		
	%	EB	%	EB	%	EB	%	EB	
Overall	15.9%	1.8%	69.0%	2.1%	1.8%	0.6%	13.4%	1.5%	1,730
1 to 29	32.5%	17.3%	64.4%	19.3%	0.0%	0.0%	3.1%	5.1%	21
30 to 39	31.4%	6.8%	56.9%	6.9%	0.5%	0.9%	11.1%	4.6%	166
40 to 49	18.5%	2.9%	71.2%	3.2%	1.5%	0.9%	8.7%	2.0%	680
50 to 59	10.2%	2.5%	83.2%	3.1%	0.1%	0.2%	6.5%	2.0%	551
60 to 69	-	-	73.3%	22.7%	3.8%	6.1%	22.9%	17.1%	16
70 to 79	8.9%	5.9%	78.5%	8.9%	1.2%	1.9%	11.5%	6.2%	72
80 to 89	-	-	100.0%	0.0%	-	-	-	-	10
90+	-	-	100.0%	0.0%	-	-	-	-	10
Size Unknown	4.6%	2.8%	39.7%	6.8%	7.9%	3.4%	47.7%	6.3%	204

4.6 Clothes Washers

This section describes clothes washer data. The model numbers collected on the washers were linked with the CEC database in order to obtain the energy factor. There was no manufacture date data, thus all the age data presented in this section are customer reported dates from the on-site survey.

As Table 125 shows, approximately 80% of all homes have a clothes washing machine. Almost all of single-family detached homes in our sample were found to have a washer. The percentage of apartments with washers is significantly lower than that of single-family homes because it is common to have a central laundry facility in apartment complexes.

Table 125: Percentage of Homes with Clothes Washers by Type of Residence

Type of Residence	Census-adjusted weights		Strata weights		Sample Size
	Percentage	Error Bound	Percentage	Error Bound	
Overall	80.7%	1.6%	80.7%	1.6%	1,987
Single Family Detached	96.4%	1.1%	97.2%	0.8%	1,491
Apt 2-4 Units	49.0%	9.8%	52.3%	8.6%	96
Apt 5+ Units	34.2%	6.3%	31.2%	4.9%	251
Duplex (Single Story)	68.9%	12.8%	72.4%	12.1%	45
Mobile Home	84.5%	12.4%	86.6%	10.6%	34
Townhouse/Rowhouse (2-4 Unit Multi-Story)	95.1%	4.9%	96.2%	4.2%	70

Type

Table 126 shows the distribution of 1,748 clothes washers found on-site, presented by type of washer and type of residence. Approximately 30% of all washers found were horizontal axis washing machines; this is significantly up from 9% in the previous 2005 study[35]. The largest percentage of homes with horizontal axis washers occurred in single-family detached houses. Approximately 33% of all homes of that type with washers have horizontal axis washers. Approximately 90% of all mobile homes sampled had standard washing machines. More than 20% of all apartments with more than five units sampled had a stacked clothes washers.

Table 126: Distribution of Clothes Washers by Type of Washer and by Type of Residence, using Strata Weights

Type of Residence	Strata weights						Sample Size
	Horizontal Axis		Standard		Stacked		
	Percentage	Error Bound	Percentage	Error Bound	Percentage	Error Bound	
Overall	30.2%	2.0%	65.4%	2.2%	4.4%	1.0%	1,748
Single Family Detached	32.6%	2.2%	64.9%	2.4%	2.5%	0.9%	1,465
Apt 2-4 Units	12.3%	7.2%	83.0%	9.0%	4.7%	4.6%	57
Apt 5+ Units	26.2%	8.2%	52.5%	9.3%	21.3%	7.9%	94
Duplex (Single Story)	23.5%	13.7%	60.0%	15.8%	16.5%	10.7%	34
Mobile Home	9.3%	9.0%	90.7%	9.8%	-	-	31
Townhouse/Rowhouse (2-4 Unit Multi-Story)	28.3%	10.2%	66.7%	10.4%	4.9%	5.0%	67

[35] See Appendix G: Statistical Significance Testing for details on comparison of 2012 to 2005.

Age

The sample size of washers with ages was 1,646, with an average age of 7.1 years. Again, the age data reported is the number of years old the customer reported for the washing machine. The washing machine was excluded from this part of the analysis if the customer was not aware of the age of the machine. As shown in Table 127, the largest share of clothes washers was reported to have been manufactured since 2000. No clothes washers manufactured in 1979 or earlier were found in the surveyed homes.

Table 127: Distribution of Manufacture Date of Clothes Washers

Manufactured Date Range	Census-adjusted weights		Strata weights	
	Percentage (n=1,646)	Error Bound	Percentage (n=1,646)	Error Bound
2010 to 2012	18.5%	2.0%	19.4%	1.8%
2006 to 2009	36.0%	2.6%	36.4%	2.2%
2000 to 2005	32.8%	2.7%	31.2%	2.2%
1995 to 1999	7.1%	1.3%	7.4%	1.3%
1990 to 1994	2.5%	0.7%	2.9%	0.8%
1985 to 1989	2.9%	1.1%	2.5%	0.8%
1980 to 1984	0.2%	0.3%	0.3%	0.3%

Energy Factor

In 2004 federal standards switched from rating clothes washer efficiencies from Energy Factor (EF) units to Modified Energy Factor (MEF) units. The change was made due to differences in the amount of water extracted from the clothing between different models. The MEF accounts for these differences, which have an impact on the energy consumption of the clothes washer. MEF for clothes washers is defined in cubic feet per kWh per cycle. The current federal efficiency standards for standard top-loading clothes washers as well as front-loading clothes washers, effective in 2007, set a minimum MEF of 1.26. The minimum ENERGY STAR qualifying energy factor is 2.0 for all clothes washers.

Table 128 shows the average MEF, using Census-adjusted and strata weights, for the clothes washers sampled. The average energy factor of each of the types of clothes washers, based upon the sample of clothes washers that were successfully linked with the efficiency database, meets the 2007 minimum standard energy factor. Horizontal axis washers, which easily achieved ENERGY STAR qualifying levels on average, performed significantly better than standard or stacked units. This is consistent with findings from the previous 2005 CLASS study.

Table 128: Average Modified Energy Factor for Clothes Washers and Comparison to Standards

Type of Washer	2007 MEF Minimum Standard	Energy Star Qualifying MEF	Census-adjusted weights		Strata weights		Sample Size
			MEF	Error Bound	MEF	Error Bound	
Overall	1.3	2.0	1.8	0.06	1.8	0.04	563
Horizontal Axis	-	2.0	2.2	0.04	2.2	0.04	325
Stacked	-	2.0	1.6	0.1	1.6	0.2	17
Standard	1.3	2.0	1.56	0.04	1.5	0.04	221

Table 129 summarizes the modified energy factor distribution relative to efficiency standards. It shows that all of the horizontal axis washers far exceeded the minimum federal requirements, and most exceeded the ENERGY STAR minimum requirements. The table also shows that all of the standard washers far exceeded the minimum federal requirements, but only a small percentage exceeded the ENERGY STAR minimum requirements. Overall, more than half of all clothes washers sampled failed to meet ENERGY STAR minimum requirements.

Table 129: Distribution of Clothes Washers in Modified Energy Factor Ranges by Washer Type

Type of Washer	Census-adjusted Weights										Strata weights									
	<1.42 MEF	1.42-1.71 MEF	1.72-1.79 MEF	1.80-1.99 MEF	2.00-2.09 MEF	2.10-2.19 MEF	2.20-2.29 MEF	2.30-2.39 MEF	2.40-2.49 MEF	2.50+ MEF	<1.42 MEF	1.42-1.71 MEF	1.72-1.79 MEF	1.80-1.99 MEF	2.00-2.09 MEF	2.10-2.19 MEF	2.20-2.29 MEF	2.30-2.39 MEF	2.40-2.49 MEF	2.50+ MEF
Overall	37.7%	11.0%	2.6%	8.2%	8.9%	0.5%	9.1%	6.0%	9.2%	6.8%	32.4%	12.7%	3.1%	8.8%	10.7%	0.7%	9.2%	6.0%	9.8%	6.7%
Horizontal Axis	-	14.1%	2.4%	9.0%	16.0%	0.6%	14.3%	12.6%	18.7%	12.2%	-	14.9%	2.8%	9.1%	17.7%	0.7%	14.2%	11.5%	18.1%	11.1%
Stacked	62.5%	-	-	5.1%	8.5%	-	-	-	5.9%	18.1%	59.6%	-	-	7.2%	8.8%	-	-	-	5.9%	18.5%
Standard	73.0%	8.9%	3.0%	7.6%	1.8%	0.5%	4.7%	-	0.1%	0.4%	68.8%	11.2%	3.7%	8.6%	2.4%	0.7%	4.1%	-	0.2%	0.5%

4.7 Clothes Dryers

The following section describes the clothes dryers found during the on-site surveys. This section contains information on the percentage of homes with dryers, the breakdown of fuel types, and the age of the dryers obtained by the surveyors during the site visits.

Table 130 shows the breakdown of the percentage of homes with dryers by residence type. As shown, almost 80% of all sites that were visited have a dryer. The error bound and sample size of each type of residence is also displayed in the table. Not surprisingly, the percentage of sites with dryers in apartments is substantially lower than the percentages of single-family homes with dryers, due to the presence of common laundry facilities.

Table 130: Percentage of Homes with Dryers by Type of Residence

Type of Residence	Census-adjusted weights		Strata weights		Sample Size
	Percentage with Dryers	Error Bound	Percentage with Dryers	Error Bound	
Overall	77.0%	2.0%	79.0%	1.7%	1,987
Single Family Detached	94.4%	1.3%	95.8%	1.0%	1,491
Apt 2-4 Units	43.7%	9.9%	44.6%	8.3%	96
Apt 5+ Units	33.4%	6.2%	30.6%	4.9%	251
Duplex (Single Story)	67.3%	13.0%	71.5%	12.2%	45
Mobile Home	84.5%	12.4%	86.6%	10.6%	34
Townhouse/Rowhouse (2-4 Unit Multi-Story)	95.1%	4.9%	96.2%	4.2%	70

Figure 29 shows the breakdown of fuel types among all dryers found during the on-site visits. with strata and Census-adjusted weighting yielding identical results. The majority of homes used gas dryers, while approximately a third of homes used electric dryers. This is a corresponding significant increase of natural gas dryers and a decrease in electric dryers by 5% from the previous 2005 study[36].

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[36] See Appendix G: Statistical Significance Testing for comparison details.

Figure 29: Distribution of Clothes Dryers by Fuel Type
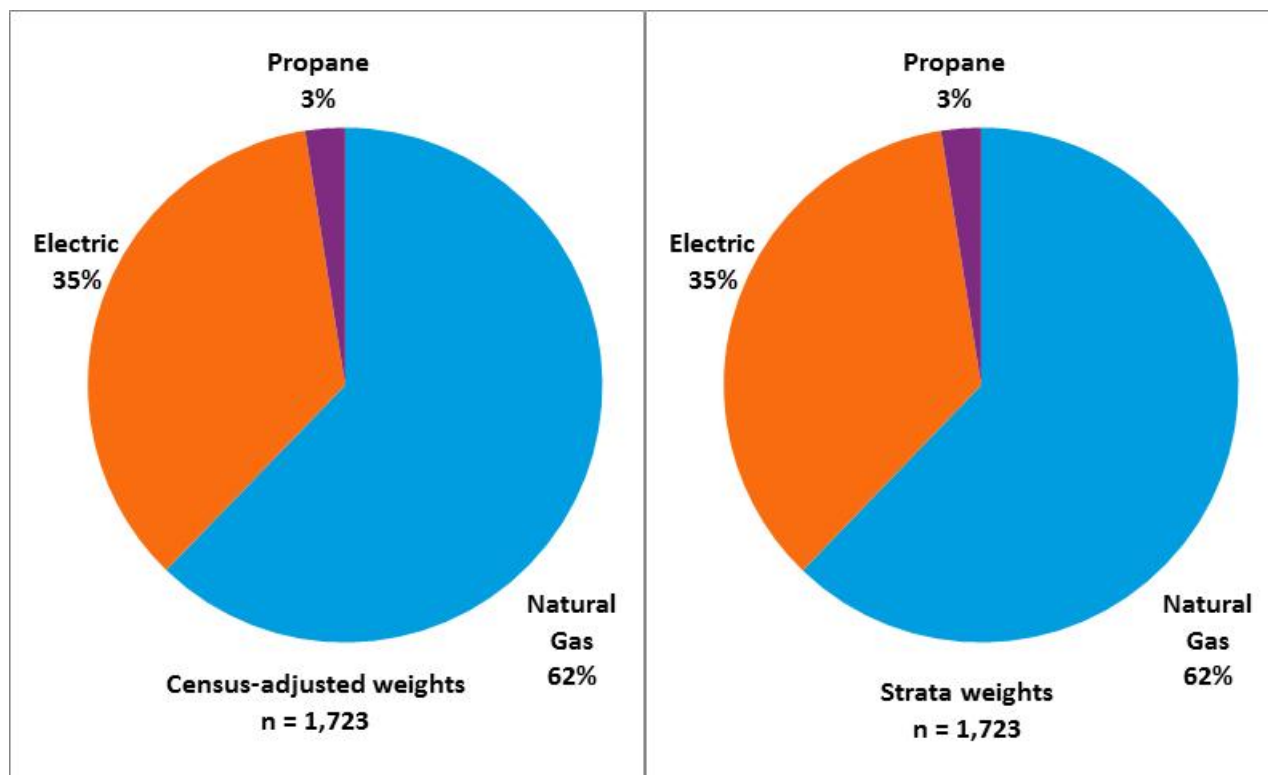
Age

The data of the age of the dryers were obtained from either the owner of the house or the surveyor estimation of age. A total of 141 dryers in the sample have an average estimated age of 6.9 years. Table 131 shows the distribution of the estimated manufacture date for the dryers, by Census-adjusted and strata weights. The largest percentages of dryers in the sample were manufactured between 2006 and 2009 and between 2000 and 2005. More than 90% of dryers sampled were manufactured since 2000. In the 2005 study, 68% of the dryers in the sample had been manufactured within the previous 10 years.

Table 131: Distribution of Estimated Manufacture Date of Dryers

Manufacture Date Range	Census-adjusted weights		Strata weights	
	Percentage (n=141)	Error Bound	Percentage (n=141)	Error Bound
2010 to 2012	11.4%	4.1%	16.0%	5.6%
2006 to 2009	37.0%	9.0%	37.8%	7.8%
2000 to 2005	39.3%	9.2%	37.6%	8.1%
1995 to 1999	5.0%	3.5%	4.6%	3.2%
1990 to 1994	7.2%	7.0%	3.8%	3.3%
1985 to 1989	-	-	-	-

Manufacture Date Range	Census-adjusted weights		Strata weights	
	Percentage (n=141)	Error Bound	Percentage (n=141)	Error Bound
1980 to 1984	-	-	-	-
1979 and older	0.2%	0.3%	0.3%	0.4%

4.8 Dishwashers

The following section summarizes the 1,428 dishwashers found during the site visits. The data were merged with CEC databases to obtain the energy factor for the model. This section contains information on the percentage of homes with dishwashers, the age of the dishwasher obtained by the surveyor during the site visit, and the energy factor from the CEC database.

Table 132 shows the percentage of homes with dishwashers by type of home. Approximately 71% of all homes have a dishwasher, using Census-adjusted weights (73.7% using strata weights), which is significantly higher than the 68% of homes sampled in the previous 2005 study[37]. The table shows that dishwashers are more concentrated in townhomes and single-family detached homes.

Table 132: Percentage of Homes with Dishwasher by Type of Residence

Type of Residence	Census-adjusted weights		Strata weights		Sample Size
	Percentage with Dishwashers	Error Bound	Percentage with Dishwashers	Error Bound	
Overall	71.0%	2.1%	73.7%	1.8%	1,987
Single Family Detached	74.0%	2.3%	79.1%	2.0%	1,491
Apt 2-4 Units	50.3%	10.3%	50.7%	8.7%	96
Apt 5+ Units	67.7%	6.2%	60.7%	5.3%	251
Duplex (Single Story)	68.2%	13.1%	72.6%	12.3%	45
Mobile Home	67.2%	16.6%	68.7%	14.8%	34
Townhouse/Rowhouse (2-4 Unit Multi-Story)	88.3%	7.3%	88.3%	6.9%	70

Age

As Table 133 shows, approximately a third of dishwashers were reported to have been manufactured between 2006 and 2009, and about 85% have been manufactured within the last 10 years. This is significantly up from 75% of dishwashers that were 10 years old or newer in the 2005 study. The

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[37] See Appendix G: Statistical Significance Testing for comparison details.

average age of dishwashers in the 1,428 sample is 7.6 years. No dishwashers manufactured in 1979 or earlier were found in the surveyed homes.

Table 133: Distribution of Manufacture Date of Dishwashers

Manufactured Date Range	Census-adjusted weights		Strata weights	
	Percentage (n=1,428)	Error Bound	Percentage (n=1,428)	Error Bound
2010 to 2012	17.1%	2.0%	18.9%	2.0%
2006 to 2009	37.2%	3.0%	35.4%	2.4%
2000 to 2005	29.9%	2.7%	30.0%	2.3%
1995 to 1999	7.2%	1.6%	6.9%	1.3%
1990 to 1994	4.8%	1.2%	4.6%	1.1%
1985 to 1989	3.8%	1.1%	4.0%	1.1%
1980 to 1984	0.0%	0.1%	0.1%	0.1%
1979 and older	-	-	-	-

Table 134 shows the distribution of Energy Factors (EF) found in the dishwashers sampled. No dishwashers with energy factors less than 0.275 were found. The majority of dishwashers fall within the range of 0.580 to 0.775 EF, comprising two-thirds of dishwashers. In the 2005 study, dishwashers with energy factors within this range comprised only 13% of the sample.

Table 134: Distribution of Dishwashers by Energy Factor

Energy Factor	Census-adjusted weights		Strata weights	
	Percentage (n=764)	Error Bound	Percentage (n=764)	Error Bound
0.275-0.459 EF	2.0%	1.3%	1.6%	0.9%
0.460-0.579 EF	29.6%	4.0%	27.9%	3.5%
0.580-0.775 EF	65.8%	3.7%	67.6%	3.3%
0.776+ EF	2.6%	1.3%	2.8%	1.2%

4.9 Ranges and Ovens

The following section describes the information on the fuel type of the ranges and ovens found at the sampled residences. This data was not collected during the previous 2005 study and thus cannot be compared here.

Range Fuel Type

Table 135 shows the breakdown of fuel types found in ranges in the sampled homes. Of the 1,987 total ranges sampled, over two-thirds of the ranges found used natural gas as fuel. Approximately a third of ranges were electric. A small percentage of ranges used propane fuel.

Table 135: Percentage of Fuel Types Used by Ranges

Percentage of Fuel Types	Census-adjusted weights		Strata weights	
	Percentage (n=1,987)	Error Bound	Percentage (n=1,987)	Error Bound
Natural Gas	66.9%	2.3%	68.1%	0.1%
Electric	29.5%	2.3%	28.2%	0.4%
Propane	3.7%	0.8%	3.8%	0.3%

Oven Fuel Type

As shown in Table 136, of the 1,987 total ovens sampled, over half used natural gas. Electric ovens made up approximately 40% of ovens sampled. Similar to ranges, a very small percentage of ovens used propane fuel.

Table 136: Percentage of Fuel Types Used by Ovens

Percentage of Fuel Types	Census-adjusted weights		Strata weights	
	Percentage (n=1,987)	Error Bound	Percentage (n=1,987)	Error Bound
Natural Gas	56.7%	2.5%	55.9%	0.2%
Electric	40.3%	2.3%	41.1%	0.3%
Propane	3.0%	0.8%	3.0%	0.2%

4.10 Televisions and Connected Devices

The following section shows the data for televisions and connected devices found at the surveyed households. In total, 98.8% of households had one or more televisions. These appliances were not surveyed in the previous 2005 CLASS report and thus are not compared here.

4.10.1   Televisions

Table 137 below summarizes the number of televisions found in the surveyed homes, by type of residence. Interestingly, most of the single family detached homes surveyed had more than one TV, compared to 16.6% of homes which only had one TV. On the contrary, 40.7% of homes surveyed in apartment buildings with 5+ units had only one television.

Table 137: Average Number of TVs by Type of Residence, using Census-adjusted Weights

Type of Residence	Census-adjusted weights																		
	Avg. Number of TVs		Do not have TV		One TV		2 TVs		3 TVs		4 TVs		5 TVs		6 TVs		7 TVs		8 or more TVs	
	#	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB
Overall	2.5	0.0	1.3%	0.6%	23.3%	2.3%	31.8%	2.4%	24.9%	2.1%	11.5%	1.4%	5.2%	0.8%	1.5%	0.5%	0.4%	0.2%	0.2%	0.2%
Single Family Detached	2.8	0.0	0.6%	0.3%	16.6%	2.3%	29.2%	2.7%	27.5%	2.7%	15.3%	1.9%	7.6%	1.2%	2.3%	0.7%	0.5%	0.3%	0.4%	0.4%
Apt 2-4 Units	2.0	0.1	1.5%	2.5%	26.1%	8.8%	49.7%	11.9%	15.4%	6.1%	5.3%	3.8%	1.5%	2.4%	-	-	0.5%	0.9%	-	-
Apt 5+ Units	1.8	0.1	3.7%	2.5%	40.7%	6.6%	31.7%	5.7%	20.7%	5.0%	3.2%	1.7%	-	-	-	-	-	-	-	-
Duplex (Single Story)	2.0	0.2	0.0%	0.0%	37.6%	14.5%	32.2%	13.4%	18.7%	8.6%	11.6%	9.8%	-	-	-	-	-	-	-	-
Mobile Home	1.9	0.2	0.0%	0.0%	42.0%	20.8%	34.5%	14.4%	16.4%	12.0%	5.8%	5.9%	1.4%	2.2%	-	-	-	-	-	-
Townhouse/ Rowhouse (2-4 Unit Multi-Story)	2.5	0.1	1.1%	1.8%	15.0%	10.7%	34.6%	9.3%	33.1%	11.0%	9.9%	5.5%	6.3%	5.3%	-	-	-	-	-	-

The distribution of the most-used televisions is shown below in Figure 30. The largest share of televisions were LCD televisions, at 47.8%. Cathode Ray Tube (CRT) televisions comprised 26.5% of televisions, followed by plasma (9.1%), LED (8.9%), and projection (6.7%).

Figure 30: Distribution of Type of Most-Used TV, using Census-adjusted Weights
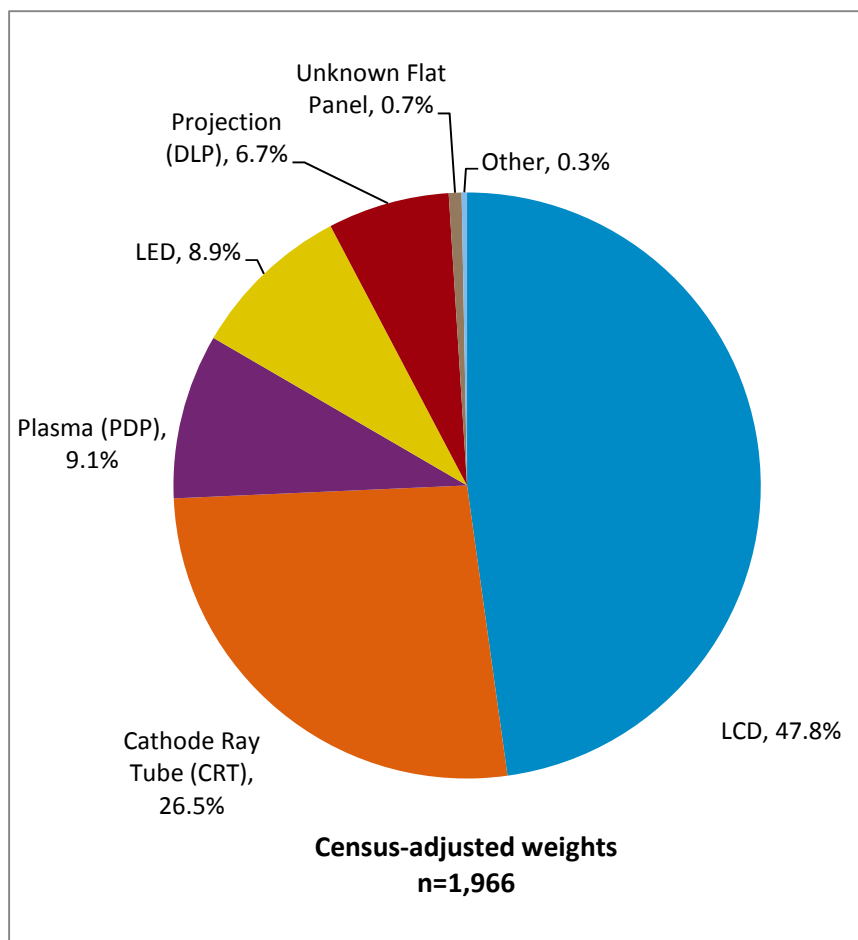
Table 138 shows the distribution of television sizes by type of the most-used television. Television size measures the diagonal of the television screen. LCD and LED TVs were found in the widest range of sizes. No plasma TVs smaller than 20 inches or larger than 66 inches in size were found.

Table 138: Distribution of Most-Used TVs in Size Ranges by Type of TV, using Census-adjusted Weights

| Size Range | Census-adjusted weights | | | | | | | | | | | | | | | |
| | All Types | | LCD | | Cathode Ray Tube (CRT) | | Plasma (PDP) | | LED | | Projection (DLP) | | Unknown Flat Panel | | Other | |
	%	Error Bound	%	Error Bound	%	Error Bound	%	Error Bound	%	Error Bound	%	Error Bound	%	Error Bound	%	Error Bound
Less than 20 in.	3.6%	0.9%	1.2%	0.7%	10.2%	2.8%	-	-	2.0%	3.3%	0.2%	0.4%	12.3%	19.0%	-	-
20-35 in.	39.1%	2.6%	36.2%	3.6%	73.9%	4.6%	3.5%	2.4%	15.1%	6.8%	1.3%	1.3%	46.6%	25.3%	48.8%	40.6%
36-40 in.	12.6%	1.6%	17.2%	2.7%	11.8%	3.2%	1.7%	1.1%	9.6%	4.5%	2.6%	3.1%	2.4%	3.9%	18.2%	27.1%
41-45 in.	13.7%	1.7%	18.4%	3.0%	0.1%	0.1%	36.4%	6.7%	9.2%	3.5%	10.0%	5.0%	14.6%	18.9%	-	-
46-50 in.	15.1%	1.7%	15.7%	2.4%	2.0%	1.5%	36.1%	7.2%	25.2%	7.3%	20.2%	7.8%	5.5%	6.3%	30.1%	41.4%
51-55 in.	9.1%	1.4%	8.4%	1.8%	0.3%	0.3%	9.8%	5.1%	31.1%	8.1%	19.6%	7.8%	10.1%	15.7%	-	-
56-60 in.	3.8%	0.9%	2.1%	1.1%	0.1%	0.2%	10.0%	4.0%	6.6%	2.9%	19.0%	7.8%	8.5%	9.9%	-	-
61-65 in.	2.2%	0.7%	0.3%	0.2%	1.6%	1.3%	2.5%	2.0%	0.5%	0.6%	21.1%	7.7%	-	-	2.9%	4.7%
66+ in.	0.7%	0.4%	0.5%	0.5%	-	-	-	-	0.8%	0.9%	6.1%	4.4%	-	-	-	-

The distribution of television manufacturer-reported ages is shown in Table 139 below. Not surprisingly, no LCD or plasma televisions were found manufactured prior to 1995, and no LED televisions were found that were manufactured prior to 2006. Approximately half of LCD (49.1%), plasma (50.4%), and unknown flat panel (49.0%) televisions were manufactured between 2006 and 2009. No televisions were found that were manufactured before 1980.

Table 139: Average Age and Percentage of TVs Manufacturer Reported Ages, using Census-adjusted Weights

Type of Most-Used TV	Census-adjusted weights									Sample Size
	Avg Mfg. Age	Ave Mfg. Age EB	1980-1984	1985-1989	1990-1994	1995-2000	2000-2005	2006-2009	2010-2012	
Overall	5.3	0.2	0.1%	0.5%	1.9%	5.0%	21.1%	36.6%	34.8%	1,884
LCD	3.1	0.1	-	-	-	0.1%	5.8%	49.1%	45.0%	954
Cathode Ray Tube (CRT)	11.0	0.5	0.6%	1.8%	7.8%	17.8%	57.1%	13.1%	1.8%	385
Plasma (PDP)	3.8	0.3	-	-	-	1.2%	10.6%	50.4%	37.8%	215
LED	1.7	0.1	-	-	-	-	-	17.7%	82.3%	175
Projection (DLP)	7.8	0.7	-	1.1%	-	8.6%	52.6%	33.1%	4.6%	134
Unknown Flat Panel	3.6	1.3	-	-	-	-	12.5%	49.0%	38.5%	15
Other	2.2	0.3	-	-	-	-	-	36.4%	63.6%	6

4.10.2   Boxes and Entertainment Devices

The homes were also surveyed for boxes and entertainment devices that were connected to the televisions. Table 140 shows the percentage of homes with the following types of peripherals, as well as the percentage of homes where the peripherals were connected to the most-used, or primary, television. The most common peripheral was the DVD player; 74.9% of homes had at least one TV with a DVD player, and it was connected to the most-used TV in 57.1% of homes.

Table 140: Percentage of Homes with Peripheral Connected and Connected to Most-Used TV, using Census-adjusted Weights

Type of Peripheral	Census-adjusted weights			
	% of Homes with at least one TV connected to this type of peripheral		% of Homes with Peripheral Connected to Most-Used TV	
	n= 1,959		n= 1,941	
	%	EB	%	EB
Amplifier	3.6%	0.9%	2.7%	0.8%
Blu-ray Player	20.9%	2.0%	15.9%	1.8%
Cable Multifunction DVR	3.6%	1.0%	2.3%	0.7%
Digital TV Converter	11.7%	2.0%	8.2%	1.6%
DVD Player	74.9%	2.5%	57.1%	2.6%
DVD VCR Combo	1.8%	0.6%	1.2%	0.5%
HD Cable	21.7%	2.4%	16.2%	1.8%
HD Cable Multifunction DVR	19.1%	2.3%	16.6%	1.9%
HD Satellite	16.7%	2.0%	14.2%	1.6%
HD Satellite Multifunction DVR	0.3%	0.3%	0.2%	0.1%
Internet Streaming	6.8%	1.3%	4.7%	1.0%
Media PC	1.2%	0.4%	0.9%	0.4%
Sound System	2.3%	0.8%	1.3%	0.6%
Stand-Alone DVR/TiVo	8.1%	1.4%	6.1%	1.1%
Standard Cable Box	20.8%	2.5%	13.0%	1.7%
Standard Satellite Box	8.8%	1.6%	5.5%	1.0%
Stereo Component	1.6%	0.8%	1.6%	0.8%
VCR	37.4%	2.5%	24.0%	2.1%
Video Game Console	38.2%	2.5%	24.8%	2.1%
None	16.5%	2.2%	2.5%	0.7%
Other	2.6%	1.0%	2.0%	0.7%

Table 141 shows the average number of television peripherals by type of residence. Detached single family homes had the highest average number of peripherals, at 4.7, and apartments in buildings with more than 5 units had on average 3.1 peripherals, the lowest.

Table 141: Average Number of TV Peripherals by Type of Residence, using Census-adjusted Weights

Type of Residence	Census-adjusted weights	
	Avg.	Error Bound
Overall	4.2	0.2
Single Family Detached	4.7	0.3
Apt 2-4 Units	3.3	0.6
Apt 5+ Units	3.1	0.3
Duplex (Single Story)	3.8	0.9
Mobile Home	3.2	0.8
Townhouse/Rowhouse (2-4 Unit Multi-Story)	4.4	0.8

4.11 Personal Computers and Peripherals

The following section presents the data on personal computers (PCs) and corresponding peripherals found during the on-site visits. Personal computers and their peripherals were also not surveyed in the previous 2005 CLASS report, and thus results are not compared here. For this report, we only examined the two most-used, or primary, PCs available in the home.

Most homes were found to have one or more PCs (87%), with 51% of homes having two or more PCs. Eighty-two percent of all homes have at least one computer connected to the internet. Table 142 below shows the breakdown of number of PCs by type of residence. Approximately 40% of single family homes had two PCs. Interestingly, no mobile homes were found to have more than three PCs.

Table 142: Average Number of PCs by Type of Residence, using Census-adjusted Weights

Type of Residence	Census-adjusted weights																		
	Avg. Number of PCs		Do not have PC		One PC		2 PCs		3 PCs		4 PCs		5 PCs		6 PCs		7 PCs		8 or more PCs	
	Avg.	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB
Overall	1.7	0.0	12.6%	1.9%	36.5%	2.5%	35.9%	2.3%	7.5%	1.1%	3.8%	0.9%	2.1%	0.6%	0.9%	0.4%	0.3%	0.2%	0.4%	0.2%
Single Family Detached	1.8	0.0	9.7%	2.0%	34.9%	2.9%	38.5%	2.7%	7.9%	1.4%	4.0%	0.9%	2.6%	0.8%	1.3%	0.7%	0.5%	0.2%	0.6%	0.3%
Apt 2-4 Units	1.4	0.2	30.6%	12.1%	28.0%	7.5%	26.0%	8.2%	4.7%	3.3%	10.2%	7.7%	0.5%	0.9%	-	-	-	-	-	-
Apt 5+ Units	1.5	0.1	13.9%	3.7%	42.3%	6.4%	33.4%	6.4%	6.9%	2.8%	1.5%	1.4%	1.5%	1.6%	0.5%	0.8%		-	-	-
Duplex (Single Story)	1.4	0.2	14.7%	10.5%	51.9%	14.8%	21.4%	9.3%	6.8%	8.7%	3.8%	4.5%	1.3%	2.1%	-	-	-	-	-	-
Mobile Home	1.3	0.1	27.2%	20.0%	23.1%	10.8%	44.9%	17.2%	4.9%	6.0%	-	-	-	-	-	-	-	-	-	-
Townhouse/ Rowhouse (2-4 Unit Multi-Story)	1.7	0.1	4.1%	4.1%	45.1%	12.2%	35.4%	9.9%	12.2%	7.7%	0.0%	0.0%	1.7%	2.8%	0.5%	0.7%	1.1%	1.7%	0.0%	0.0%

As shown in Figure 31, the overwhelming largest shares of most-used computers surveyed were either desktop computers or laptops. Other types of computers included netbooks, tablets, and computers with integrated monitors.

Figure 31: Distribution of the Type of Most Used PC, using Census-adjusted Weights

Census-adjusted weights
n = 1,815
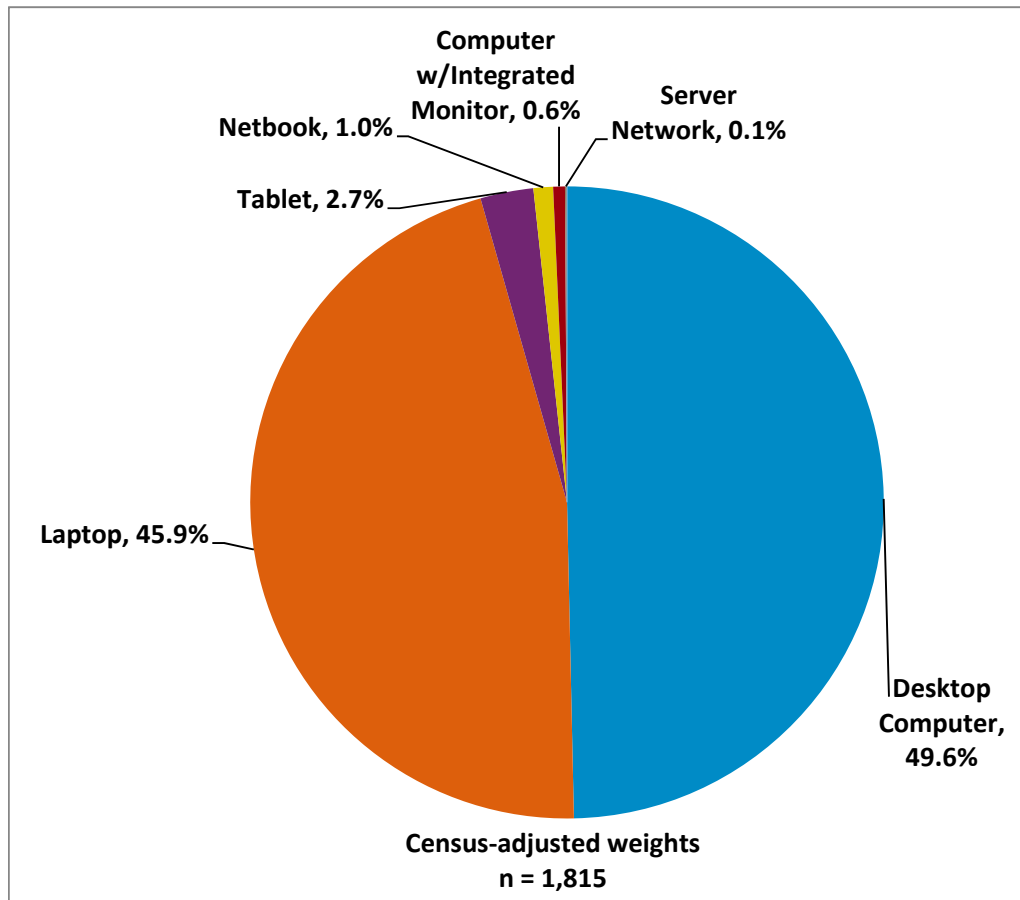
Table 143 shows the average age and manufacturer reported ages for most-used personal computers found in the surveyed homes. As expected, no personal computers were found that were manufactured prior to 1989.

Table 143: Average Age and Percentage of PCs Manufacturer Reported Ages, using Census-adjusted Weights

Type of Most-Used PC	Census-adjusted weights							Sample Size
	Avg Mfg. Age	Ave Mfg. Age EB	1990 to 1994	1995 to 1999	2000 to 2005	2006 to 2009	2010 to 2012	
Overall	3.7	0.1	0.001	0.01	0.1	0.5	0.4	1,771
Desktop Computer	4.4	0.2	0.002	0.02	0.2	0.5	0.3	936
Laptop	3.2	0.2	0.001	-	0.1	0.5	0.5	760
Netbook	2.1	0.3	-	-	-	0.3	0.7	19
Computer w/Integrated Monitor	2.2	0.5	-	-	-	0.4	0.7	13
Server Network	12.6	0.0	-	0.6	0.4	-	-	2
Tablet	1.1	0.2	-	-	-	0.02	1.0	40
Other	2.0	0.0	-	-	-	-	1.0	1

Table 144 below shows the distribution of homes with the following types of connected peripherals, as well as the percentage of homes with the following peripherals connected to the most-used PC. Over half (58.5%) of homes had a multi-function inkjet printer, although a smaller percentage (46.7%) had it connected to their most-used PC.

Table 144: Percentage of Homes with Peripheral Connected and Connected to Most-Used PC, using Census-adjusted Weights

Type of Peripheral	Census-adjusted weights			
	% of Homes with at least one PC connected to this type of peripheral (n= 1,811)		% of Homes with Peripheral Connected to Most-Used PC (n= 1,805)	
	%	EB	%	EB
Copier	1.0%	0.4%	0.7%	0.3%
External Hard Drive	4.8%	1.0%	3.9%	1.0%
Fax	1.7%	0.5%	1.5%	0.6%
Inkjet Printer	12.6%	1.5%	9.2%	1.4%
Laser Printer	6.0%	1.0%	4.5%	0.9%
Multi-Function Inkjet	58.5%	2.5%	46.7%	2.6%
Multi-Function Laser	3.0%	0.9%	2.6%	1.0%
Scanner	3.8%	0.9%	2.8%	0.9%
Speakers	28.8%	2.1%	21.9%	2.2%
Webcam	1.8%	0.6%	1.3%	0.7%
None	56.5%	2.7%	35.8%	2.6%
Other	1.8%	0.7%	1.5%	0.7%

Table 145 shows the average number of peripherals by type of residence. Single family detached homes and 2-4 unit multi-story townhouses/rowhouses had the most computer peripherals, at 1.9 on average.

Table 145: Average Number of PC Peripherals by Type of Residence, using Census-adjusted Weights

Type of Residence	Census-adjusted weights	
	Avg.	Error Bound
Overall	1.8	0.0
Single Family Detached	1.8	0.0
Apt 2-4 Units	1.4	0.1
Apt 5+ Units	1.7	0.1
Duplex (Single Story)	1.4	0.1
Mobile Home	1.4	0.1
Townhouse/Rowhouse (2-4 Unit Multi-Story)	1.9	0.1

4.12 Building Envelope

The following section describes the window and wall construction types at the residences. Information on the type of window frame and the number of panes in each window was recorded during the site visit. If the customer reported that there were multiple types of frames or panes in their home, the predominant window type was observed and recorded. Data was also collected on the type of wall construction.

4.12.1   Windows – Frame Type, Pane Type, Glazing

Figure 32 shows the breakdown of window frame types among all homes, for estimates derived through Census-adjusted weights and strata weights. The largest proportion of window frame types found in homes is metal, followed closely by vinyl and wood. When compared to the 2005 study, the

market share of vinyl window frames has significantly increased 25% from 20.3% in 2005 to 45.3% in 2012[38].

Figure 32: Percentage of Homes by Window Frame Type
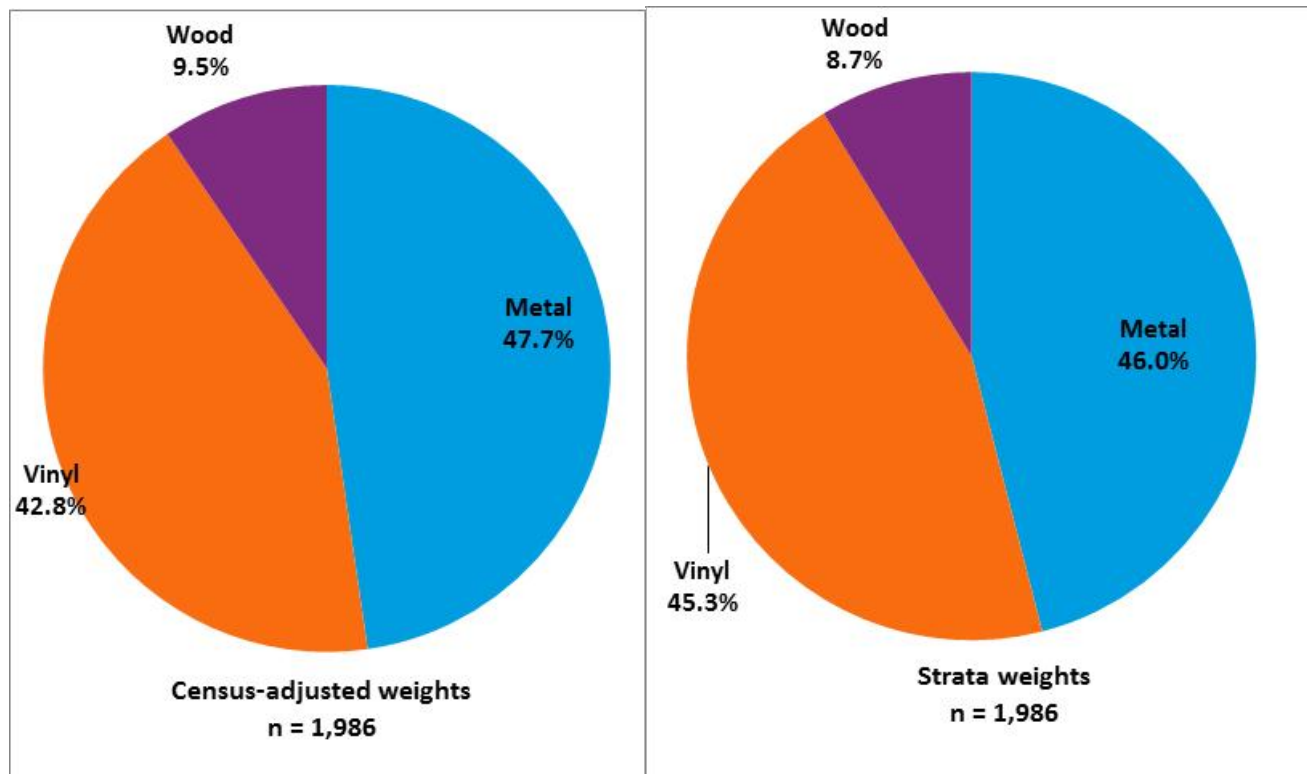
Window Frame Type

Table 146 shows the breakdown of homes by window frame type and type of panes by type of residence. About one-third of all homes have metal framed, single paned windows. Interestingly, 70.6% of mobile homes and about half of apartment buildings surveyed have metal framed, single paned windows. This may present an excellent opportunity for energy efficiency in the multifamily retrofit market.

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[38] See Appendix G: Statistical Significance Testing for comparison details.

Table 146: Percentage of Homes by Frame Type and Pane Type by Type of Residence, using Strata Weights

Type of Residence	Strata weights - Window and Pane Type																		Sample Size
	Metal Single		Metal Double		Metal Other		Wood Single		Wood Double		Wood Triple		Vinyl Single		Vinyl Double		Vinyl Triple		
	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	
Overall	30.7%	2.0%	15.2%	1.5%	0.1%	0.2%	6.9%	1.2%	1.7%	0.5%	0.1%	0.2%	0.6%	0.3%	44.5%	2.1%	0.2%	0.2%	1,986
Single Family Detached	20.7%	2.0%	15.0%	1.7%	0.1%	0.2%	6.6%	1.3%	2.4%	0.7%	0.2%	0.3%	0.5%	0.4%	54.2%	2.5%	0.1%	0.1%	1,490
Apt 2-4 Units	42.9%	8.7%	17.5%	6.9%	-	-	10.2%	5.9%	-	-	-	-	1.0%	1.1%	28.4%	8.3%	-	-	96
Apt 5+ Units	52.1%	5.5%	15.2%	4.1%	-	-	7.6%	3.2%	0.6%	1.1%	-	-	1.1%	1.0%	22.9%	4.8%	0.6%	1.0%	251
Duplex (Single Story)	37.9%	13.1%	9.8%	7.2%	-	-	15.2%	10.2%	-	-	-	-	-	-	37.1%	13.4%	-	-	45
Mobile Home	70.6%	14.7%	7.7%	8.9%	-	-	-	-	-	-	-	-	-	-	21.8%	12.5%	-	-	34
Townhouse/Rowhouse (2-4 Unit Multi-Story)	44.4%	10.6%	20.2%	9.3%	-	-	1.1%	1.9%	-	-	-	-	-	-	34.3%	10.3%	-	-	70

Table 147 shows the percentage of homes by frame and pane type by age of residence. Not surprisingly, a larger percentage of newer homes built have double paned windows than the older homes. For example, 85% of homes built between 2000 and 2012 have wood or vinyl double paned windows, while only 30% of homes built in the years 1980-1989 have the same type of windows.

Table 147: Percentage of Homes by Frame Type and Pane Type by Age of Residence, using Strata Weights

Age of Residence	Strata weights - Window and Pane Type																Sample Size
	Metal Single		Metal Double		Metal Other		Wood Single		Wood Double		Wood Triple		Vinyl Single		Vinyl Double		Vinyl Triple		
	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	
Overall	30.7%	0.3%	15.2%	1.5%	0.1%	0.2%	6.9%	1.2%	1.7%	0.5%	0.1%	0.2%	0.6%	0.3%	44.5%	2.1%	0.2%	0.2%	1,986
1969 or earlier	31.2%	3.3%	9.1%	2.0%	0.2%	0.4%	15.6%	2.6%	2.5%	1.0%	-	-	0.7%	0.6%	40.6%	3.3%	0.1%	0.2%	742
1970-1979	43.9%	5.2%	11.3%	3.1%	-	-	1.8%	1.0%	2.0%	1.6%	-	-	0.7%	0.6%	40.0%	4.9%	0.3%	0.3%	365
1980-1989	38.3%	5.3%	29.0%	5.1%	-	-	0.3%	0.3%	0.8%	0.7%	-	-	0.4%	0.4%	30.4%	4.8%	0.8%	1.2%	315
1990-1994	32.0%	10.6%	30.7%	8.0%	-	-	0.7%	0.8%	0.7%	1.1%	2.9%	4.7%	1.3%	2.2%	31.7%	8.8%	-	-	89
1995-1999	4.6%	4.0%	30.0%	8.8%	-	-	-	-	3.5%	3.0%	-	-	-	-	61.9%	8.9%	-	-	101
2000-2012	0.7%	1.1%	13.8%	4.4%	-	-	-	-	0.3%	0.4%	-	-	0.6%	1.0%	84.5%	4.1%	-	-	274
Unknown	52.4%	9.2%	15.7%	6.6%	-	-	2.5%	2.7%	-	-	-	-	-	-	29.4%	8.8%	-	-	100

Table 148 shows the percentage of homes by glazing characteristics and age of residence. Low-E glazing constitutes less than 10% of the overall window glazing. The residences built between 2000 and 2012 have the highest percentage of low-E glazing, 55.5%. This is probably due to new construction activity and window upgrade renovations.

Table 148: Percentage of Homes by Glazing Type and Age of Residence, using Strata Weights

| Age of Residence | Strata weights - Window Glazing Characteristics | | | | | | Sample Size |
| | Low E Glazing | | Clear Glazing | | Unknown Glazing | | |
	Percentage	Error Bound	Percentage	Error Bound	Percentage	Error Bound	
Overall	29.3%	1.9%	67.7%	2.0%	3.0%	0.8%	1987
1969 or earlier	26.5%	3.0%	70.8%	3.2%	2.7%	1.3%	742
1970-1979	30.2%	4.6%	68.3%	4.7%	1.5%	1.4%	365
1980-1989	22.5%	4.6%	76.8%	4.6%	0.7%	0.6%	315
1990-1994	22.5%	8.0%	74.6%	8.7%	2.9%	4.7%	89
1995-1999	35.5%	8.8%	58.5%	9.1%	6.1%	4.7%	101
2000-2012	55.5%	5.6%	37.0%	5.5%	7.5%	3.6%	275
Unknown	6.4%	4.4%	91.0%	5.3%	2.6%	3.2%	100

Wall Construction Type

Figure 33 shows the breakdown of all homes by wall construction type. The large majority of homes were constructed using 2X4 wood, totaling 87.6% of all homes. The second-most popular wall construction type was 2X6 wood.

Figure 33: Percentage of Homes by Wall Construction Type

Left pie chart:
- 2 x 4 Steel Framed 0.3%
- 2 x 6 Steel Framed 0.2%
- Manufactured Home 2.2%
- Not Observable 0.7%
- Masonry 1.2%
- 2 x 6 Wood 7.6%
- 2 x 4 Wood 87.8%
- Census-adjusted weights n = 1,987

Right pie chart:
- 2 x 4 Steel Framed 0.2%
- 2 x 6 Steel Framed 0.2%
- Manufactured Home 2.0%
- Not Observable 0.7%
- Masonry 1.1%
- 2 x 6 Wood 8.2%
- 2 x 4 Wood 87.6%
- Strata weights n = 1,987
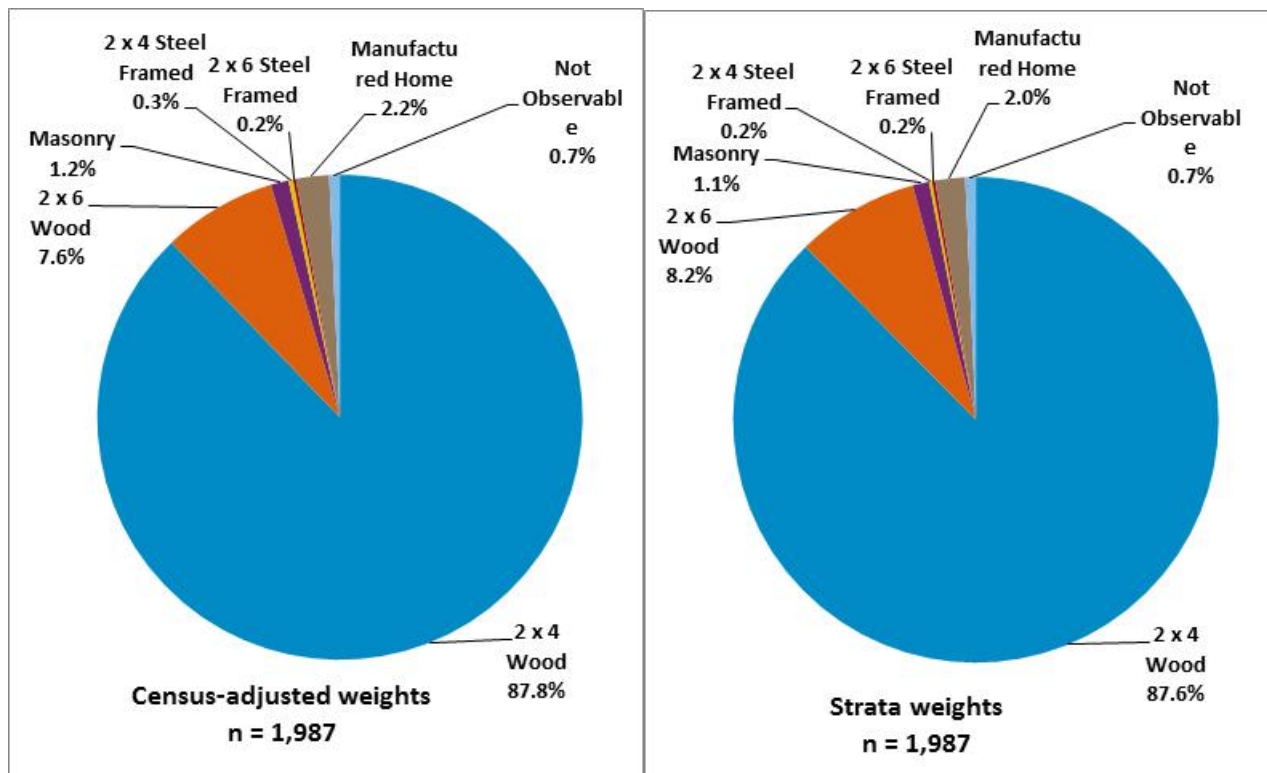
4.12.2   Insulation

The following section describes the insulation in walls, floors, and attics. This data was collected with some difficulty during the site visits. Difficulty arose when the attic was inaccessible due to the fact that it was located in another apartment unit, blocked by furniture, etc. When the attic was accessible and there was batt insulation, in some cases the R-Value was not observable, then the surveyor estimated the thickness of the insulation, which was then converted into R value.

Attic

The average R-Value among all homes with an estimated or verified R-Value for attic insulation is 20.2, significantly up from the 2005 report at 18.2[39]. Table 149 shows the average R-Value and the

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[39] See Appendix G: Statistical Significance Testing for comparison details.

percentage of homes with R-Values in ranges by age of residence. The largest percent of homes are in the range between R-19 to R-21.99, which is consistent with 2005 report results. No homes were found with insulation with an R-Value less than 11.

Table 149: Average R-Value and Percentage of Homes with Attic Insulation R-Value Ranges by Age of Residence, using Strata Weights

| Residence Age Range | Strata weights | | | | | | | | | | | |
| | Avg R-Value | EB | R-11 to R-18.99 | | R-19 to R-21.99 | | R-22 to R-29.99 | | R-30 to R-37.99 | | > R-37.99 | | Sample Size |
			%	EB	%	EB	%	EB	%	EB	%	EB	
Overall	20.8	0.4	27.8%	2.7%	27.8%	2.6%	23.3%	2.5%	16.3%	2.2%	4.8%	1.3%	1,037
1969 or earlier	18.4	0.7	41.3%	5.3%	27.7%	4.4%	20.7%	4.5%	7.2%	2.5%	3.1%	2.1%	325
1970-1979	18.7	0.8	38.1%	6.8%	31.3%	6.2%	18.0%	5.2%	11.1%	5.2%	1.5%	1.4%	190
1980-1989	20.7	0.8	22.7%	6.3%	37.4%	7.3%	23.2%	6.2%	13.4%	5.2%	3.3%	2.1%	173
1990-1994	24.4	1.2	7.1%	5.0%	28.7%	11.9%	29.1%	9.5%	28.1%	10.6%	7.1%	6.2%	63
1995-1999	24.0	1.1	9.1%	6.1%	24.7%	9.8%	31.5%	9.1%	30.8%	10.4%	3.9%	3.2%	78
2000-2012	26.5	0.8	5.8%	2.8%	14.4%	4.4%	30.3%	6.8%	36.1%	7.1%	13.4%	5.3%	174
Unknown	18.8	1.2	36.2%	0.0%	32.4%	0.0%	18.2%	0.0%	10.5%	0.0%	2.7%	0.0%	34

Walls

Table 150 shows the percentage of insulated walls in homes by wall construction type. Approximately 22% of homes surveyed have no exterior wall insulation is 21.8%, while the percentage of homes in which all the exterior walls are insulated totals over 50% of homes. It was not possible to observe the walls insulation in almost a quarter of homes surveyed.

Table 150: Percentage of Homes by Wall Construction Type by Percentage of Walls Insulated, using Strata Weights

| Construction Type | Strata weights - Percentage of Walls Insulated | | | | | | | | | | | | | | Sample Size |
| | 0% | | 1%-25% | | 26%-50% | | 51%-75% | | 75%-99% | | 100% | | Unknown | | |
	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	
All Types	21.8%	1.9%	1.4%	0.5%	2.2%	0.6%	0.6%	0.3%	0.1%	0.1%	50.4%	2.1%	23.5%	1.9%	1987
2 x 4 Wood	22.3%	2.0%	1.5%	0.6%	2.0%	0.7%	0.6%	0.3%	0.1%	0.1%	47.9%	2.2%	25.7%	2.1%	1723
2 x 6 Wood	5.5%	3.5%	1.5%	1.4%	2.2%	1.8%	-	-	-	-	87.2%	4.8%	3.6%	2.9%	182
Masonry	44.9%	19.7%	-	-	7.9%	12.5%	-	-	-	-	18.6%	14.9%	28.5%	17.4%	23
2 x 4 Steel Framed	-	-	-	-	-	-	-	-	-	-	100.0%	0.0%	-	-	3
2 x 6 Steel Framed	22.6%	32.7%	-	-	-	-	-	-	-	-	51.7%	41.8%	25.7%	36.5%	4
Manufactured Home	41.5%	14.9%	-	-	6.5%	7.6%	6.0%	9.6%	-	-	31.6%	12.4%	14.3%	10.1%	39
Not Observable	60.3%	27.4%	-	-	5.9%	9.4%	-	-	-	-	23.0%	17.7%	10.8%	12.4%	13

Table 151 shows the percentage of homes with any amount of wall insulation by type of residence, regardless of the R-value that was obtained during the site visit. Almost 70% of the homes have some type of wall insulation, using Census-adjusted weights (71.6% using strata weights). This is significantly up from the 2005 study, which found wall insulation in two-thirds of homes[40]. The townhouses and rowhouses surveyed had the highest rates of wall insulation; approximately 80% were found to have wall insulation, using both Census-adjusted and strata weights.

Table 151: Percentage Of Homes With Wall Insulation By Type Of Residence

Type of Residence	Census-adjusted weights		Strata weights		Sample Size
	Percentage of Homes	Error Bound	Percentage of Homes	Error Bound	
Overall	69.8%	2.5%	71.6%	2.1%	1,195
Single Family Detached	70.3%	2.7%	74.0%	2.3%	949
Apt 2-4 Units	72.9%	10.7%	71.6%	9.8%	48
Apt 5+ Units	69.7%	7.5%	63.7%	6.3%	117
Duplex (Single Story)	48.4%	14.2%	54.0%	15.2%	20
Mobile Home	60.8%	18.6%	61.2%	16.8%	18
Townhouse/Rowhouse (2-4 Unit Multi-Story)	79.5%	10.0%	80.1%	9.9%	43

4.13 Spa and Pool Equipment

The following section describes the pools and spas found at the residences. Information on the fuel type, pump horsepower and pump efficiency were recorded during the site visit. However, surveyors found this data very difficult to access and record given time limitations and access issues. Of course, the overall lack of data is compounded by a low overall saturation of homes with pools and spas. This report will focus on fuel type for both pools and spas, and pump horsepower for pools. Due to a small sample size and difficulty in matching with databases, the pump efficiency data is not presented in this report.

During the on-site visits for this study, 11.2% of homes were found to have spas; during the 2005 study, 6.0% of homes had spas. Figure 34 shows the percentage of fuel types used by spas found at surveyed residences, comparing the strata weighted and Census-adjusted weighted data. Electric and natural gas fuels made up the majority of spa fuel types, over 90% in total. For both Census-adjusted

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[40] See Appendix G: Statistical Significance Testing for comparison details.

weighted results and strata weighted results, electricity comprised just over one-half of spa fuel types, with natural gas at around 40%.

Figure 34: Percentage of Fuel Types Used by Spas
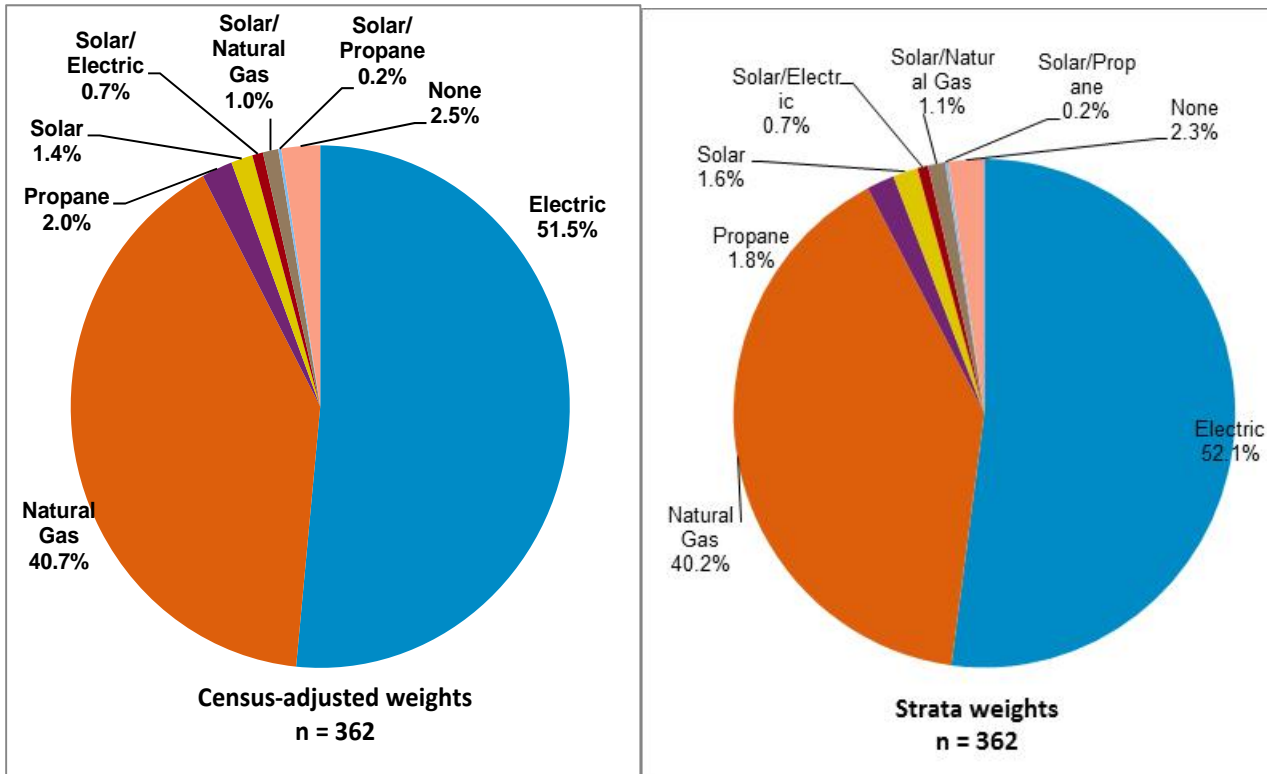
During the on-site visits for this study, 10.4 % of homes were found to have pools; during the 2005 study, 7.0% of homes had pools. Figure 35 shows the percentage of fuel types used by pools, for estimates based on Census-adjusted weights and strata weights. Approximately one-third of all homes that had a pool used natural gas fuel, while 15% of residences used solar fuel. Among Census-adjusted weighted results there were slightly more pools with no fuel, at 45.5% compared to 43.9% of pools when weighted by strata.

Figure 35: Percentage of Fuel Types Used by Pools
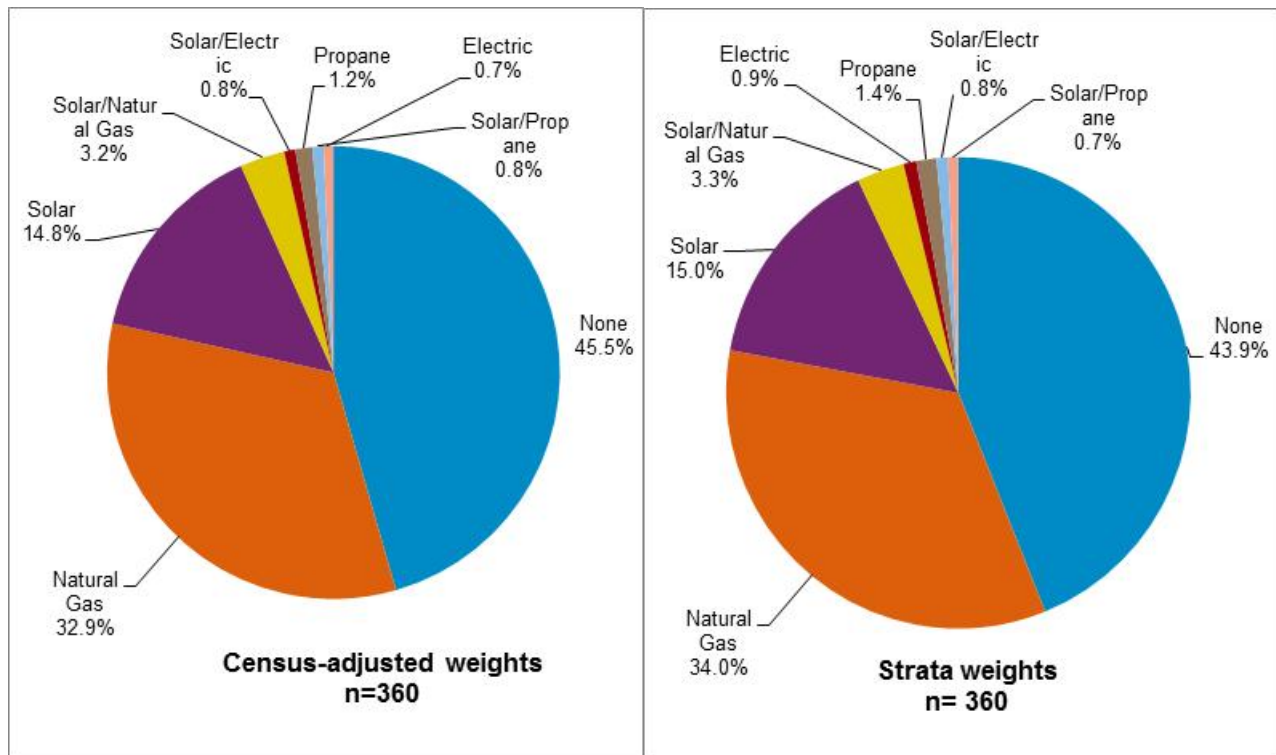
5 Database Development and Web-based Tool

5.1 Database Development

The data collected from the 1,987 on-site visits are contained in a SQL database and have been exported to a series of tables in Excel. The tables contain information collected on-site via the iPads and information from the database sources merged via model matching. All of the tables in the report were created from queries of the database via the webtool. The following sections outline the steps taken to prepare the data for delivery.

- Consolidation of Surveyor Information: Each field engineer recorded site data in an iPad. Data were transmitted securely each evening to a central database stored on a secure DNV GL server. The Field Task Manager performed QC of the data uploaded the previous evening.

- Merge of Weights: Once field data collection was completed, sample design case weights were merged with the site data. Each site in a specific stratum was assigned a case weight defined to be the number of sites that it represented. These weights were used to expand the sample to the population.

- Merging of Saturation and Efficiency Information: the field engineers were able to capture make and model, but not efficiency information. The model numbers for equipment were matched to information from various databases to obtain efficiency information. The matching was done by an automated process in SQL and then a QC process was performed. Manual matching was performed on equipment that was not matched through the automated process. Table 152 summarizes the results of the model matching in terms of proportions of model numbers found during field data collection and percentages of models that were successfully matched with efficiency databases. Table 153 and Table 154 present similar summaries of model matching processes performed in the 2005 and 2000 CLASS studies.

Table 152: 2012 Model Number Match Rates by Appliance

2012	Total Number in Database (A)	Model Numbers Found (B)	Model Numbers Matched (C)	% Model Numbers Matched (C/B)	% Model Numbers Not Found (1-(B/A))	% of Total Matched (C/A)
Primary Refrigerators	1986	1892	1626	86%	5%	82%
Secondary Refrigerators	777	625	470	75%	20%	60%
Cooling Overall	1433	1164	927	80%	19%	65%
Cooling Packaged A/C	165	92	63	68%	44%	38%
Cooling Packaged HP	9	2	1	50%	78%	11%
Cooling Split A/C	944	874	743	85%	7%	79%
Cooling Split HP	36	33	23	70%	8%	64%
Cooling Win/Wall A/C	176	97	87	90%	45%	49%
Cooling Win/Wall HP	4	2	1	50%	50%	25%
Cooling Portable/Stand-alone AC	46	42	9	21%	9%	20%
Clothes Dryer	1723	1277	416	33%	26%	24%
Heating	1953	1425	1068	75%	27%	55%
Primary Freezer	458	359	231	64%	22%	50%
Dishwasher	1590	1521	764	50%	4%	48%
Washing Machine - EN Factor	1745	1599	698	44%	8%	40%
Washing Machine - Mod EN Factor	1745	1599	563	35%	8%	32%
Water Heater	1918	1562	1003	64%	19%	52%

Table 153: 2005 Model Number Match Rates by Appliance

2005	Total Number in Database (A)	Model Numbers Found (B)	Model Numbers Matched (C)	% Model Numbers Matched (C/B)	% Model Numbers Not Found (1-(B/A))	% of Total Matched (C/A)
Primary Refrigerators	848	773	530	69%	9%	63%
Secondary Refrigerators	160	119	70	59%	26%	44%
Cooling Overall	490	266	167	63%	46%	34%
Cooling Packaged	99	47	34	72%	53%	34%
Cooling Split	230	188	118	63%	18%	51%
Cooling Win/Wall	65	15	6	40%	77%	9%
Clothes Dryer	680	644	21	3%	5%	3%
Heat Pump	27	13	10	77%	52%	37%
Heating	809	400	233	58%	51%	29%
Primary Freezer	164	109	51	47%	34%	31%
Dishwasher	583	559	148	26%	4%	25%
Washing Machine	696	602	106	18%	14%	15%
Water Heater	848	564	276	49%	33%	33%

Table 154: 2000 Model Number Match Rates by Appliance

2000	Total Number In Database (A)	Model Numbers Found (B)	Model Numbers Matched (C)	% Model Numbers Matched (C/B)	% Model Numbers Not Found (1-(B/A))	% of Total Matched (C/A)
Refrigerators	1444	1260	865	69%	13%	60%
Cooling Overall	733	460	300	65%	37%	41%
Cooling Evap	49	13	0	0%	73%	0%
Cooling Packaged	117	48	26	54%	59%	22%
Cooling Split Sys	400	328	268	82%	18%	67%
Cooling Win Wall	167	71	6	8%	57%	4%
Furnace	1275	791	339	43%	38%	27%
Heat Pumps	83	60	30	50%	28%	36%
Freezers	214	165	51	31%	23%	24%
Dishwashers	871	849	286	34%	3%	33%
Washing Machines	965	865	156	18%	10%	16%
Hot Water Heaters	1074	822	439	53%	23%	41%

- Creation of Efficiency Categories: Efficiency categories from the 2005 CLASS were adjusted for appliances as needed, depending on the distributions of the efficiencies. Size and age categories were also adjusted, to account for changes in size distributions for newer equipment.

- Creation of Analysis Queries: Analysis queries were developed in SQL to follow the queries used in the 2005 CLASS.

- Efficiency Weighting Adjustments for Unmatched Appliances:

5.2 Webtool Development

After the SQL database was developed, a webtool was constructed to facilitate queries of the 2012 CLASS data. Complete instructions on the webtool are contained in Appendix F: 2012 CLASS Website User Guide.

6 Appendix A: 2012 CLASS Lighting Results Using Strata Weights

Kitchen

Table 155 presents the percentage of homes with a given fixture type and lamp type in the kitchen along with the associated error bound. The most predominant fixture and lamp type combinations are ceiling mounted, recessed, and stove top fixtures. Ceiling-mounted fluorescent lights are the most common fixture. Recessed lighting fixtures have increased steadily since previous studies; the percentage of homes with recessed lighting has increased to 47% from 26% in 2005 and 9% in 2000.

Table 155: Percentage Of Homes With Fixture Type And Lamp Type In Kitchen, using Strata Weights

Fixture Type	Strata weights (n= 1,977)															
	Lamp Type															
	Overall		Incandescent		CFL		LED		Fluorescent		Halogen		HID		Socket Empty	
	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB
Overall	-	-	58.7%	2.7%	54.1%	2.7%	3.3%	1.0%	49.7%	2.3%	19.4%	2.1%	0.2%	0.2%	5.9%	1.1%
Ceiling-Mounted	57.0%	2.6%	13.7%	1.7%	21.7%	2.1%	0.2%	0.2%	30.1%	2.1%	1.1%	0.5%	-	-	2.7%	0.7%
Floor/Table Lamp	3.6%	0.9%	1.9%	0.6%	1.5%	0.6%	0.1%	0.1%	-	0.1%	0.2%	0.2%	-	-	0.1%	0.1%
Torchiere	0.4%	0.3%	-	-	0.1%	0.2%	-	-	0.1%	0.1%	0.2%	0.2%	-	-	-	-
Wall-Mounted	3.7%	0.9%	1.4%	0.5%	1.7%	0.7%	-	-	0.4%	0.2%	0.2%	0.2%	-	-	0.1%	0.2%
Recessed	47.1%	2.7%	21.9%	1.9%	20.6%	2.0%	1.8%	0.7%	7.4%	1.1%	7.0%	1.3%	-	-	0.7%	0.4%
Suspended	20.8%	1.9%	12.8%	1.5%	7.1%	1.1%	0.4%	0.3%	0.1%	0.1%	2.0%	0.6%	-	-	0.3%	0.2%
Ceiling Fan	14.4%	1.6%	8.7%	1.2%	6.1%	1.1%	0.2%	0.2%	0.2%	0.2%	0.2%	0.1%	-	-	1.1%	0.4%
Track Lighting	4.1%	1.0%	0.9%	0.4%	1.1%	0.6%	-	-	-	-	2.1%	0.7%	0.1%	0.1%	0.1%	0.1%
Desk Lamp	0.6%	0.5%	0.1%	0.1%	0.3%	0.2%	-	-	0.1%	0.1%	0.2%	0.4%	-	-	-	-
Under Counter	18.3%	1.8%	0.6%	0.3%	0.2%	0.2%	1.0%	0.5%	13.2%	1.6%	4.0%	0.9%	-	-	0.2%	0.1%
Stove Top	35.6%	2.1%	19.1%	1.7%	7.1%	1.2%	0.2%	0.2%	0.9%	0.4%	7.5%	1.1%	0.2%	0.1%	1.2%	0.5%
Other Hard-Wired	0.6%	0.4%	0.1%	0.2%	-	-	0.1%	0.1%	0.4%	0.3%	0.1%	0.1%	-	-	-	-
Other Plug-In	0.2%	0.2%	-	-	0.1%	0.1%	0.1%	0.1%	-	-	0.1%	0.1%	-	-	-	-

Bedrooms

Table 156, Table 157, Table 158, and Table 159 present the percentage of homes with a given fixture type and lamp type in the bedrooms, as well as the error bounds associated with these estimates. The most predominant fixture and lamp type combinations are floor/table lamps with incandescents and compact fluorescents, ceiling fans with incandescents, as well as ceiling mounted incandescents and compact fluorescents.

Table 156: Percentage of Homes with Fixture Type and Lamp Type in Bedroom 1, using Strata Weights

	Strata weights (n= 1,943)															
	Lamp Type															
	Overall		Incandescent		CFL		LED		Fluorescent		Halogen		HID		Socket Empty	
Fixture Type	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB
Overall	-	-	64.5%	2.7%	60.9%	2.6%	1.3%	0.5%	3.5%	0.8%	9.0%	1.4%	0.1%	0.1%	7.7%	1.2%
Ceiling-Mounted	25.6%	2.2%	12.0%	1.5%	12.5%	1.5%	0.2%	0.2%	1.2%	0.4%	0.5%	0.3%	-	-	2.2%	0.7%
Floor/Table Lamp	65.0%	2.7%	38.9%	2.5%	35.1%	2.5%	0.3%	0.2%	0.7%	0.3%	1.4%	0.5%	0.1%	0.1%	2.3%	0.6%
Torchiere	8.2%	1.3%	2.7%	0.8%	4.2%	0.9%	-	-	0.4%	0.3%	1.3%	0.5%	-	-	0.4%	0.3%
Wall-Mounted	7.0%	1.3%	3.2%	0.8%	3.1%	0.8%	0.2%	0.2%	0.3%	0.2%	0.7%	0.5%	-	-	0.4%	0.3%
Recessed	9.7%	1.3%	5.4%	0.9%	2.9%	0.8%	0.2%	0.1%	0.1%	0.1%	1.9%	0.6%	-	-	0.1%	0.1%
Suspended	3.5%	0.8%	2.0%	0.6%	1.4%	0.5%	0.1%	0.1%	0.0%	0.1%	-	-	-	-	0.2%	0.2%
Ceiling Fan	33.5%	2.0%	20.8%	1.7%	12.4%	1.4%	0.1%	0.1%	0.2%	0.2%	0.9%	0.4%	-	-	2.4%	0.6%
Track Lighting	1.2%	0.5%	0.5%	0.3%	0.3%	0.2%	0.0%	0.1%	-	-	0.5%	0.3%	-	-	-	-
Desk Lamp	7.1%	1.3%	2.0%	0.7%	2.7%	0.8%	0.3%	0.3%	0.5%	0.3%	2.2%	0.8%	-	-	-	-
Under Counter	0.6%	0.4%	0.2%	0.2%	-	-	0.1%	0.1%	0.1%	0.1%	0.2%	0.3%	-	-	-	-
Other Hard-Wired	0.3%	0.2%	0.2%	0.2%	0.0%	0.1%	-	-	-	-	-	-	0.0%	0.1%	-	-
Other Plug-In	0.2%	0.2%	0.1%	0.1%	0.1%	0.2%	-	-	-	-	-	-	-	-	-	-

Table 157: Percentage of Homes with Fixture Type and Lamp Type in Bedroom 2, using Strata Weights

Fixture Type	Strata weights (n= 1,719)													
	Lamp Type													
	Overall		Incandescent		CFL		LED		Fluorescent		Halogen		Socket Empty	
	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB
Overall	-	-	60.7%	2.6%	57.4%	2.5%	1.2%	0.4%	3.6%	0.7%	8.6%	1.2%	6.7%	0.9%
Ceiling-Mounted	26.8%	1.9%	12.1%	1.3%	13.2%	1.4%	0.3%	0.2%	1.5%	0.5%	0.6%	0.3%	1.6%	0.4%
Floor/Table Lamp	58.0%	2.6%	32.9%	2.2%	29.9%	2.0%	0.5%	0.3%	0.8%	0.4%	1.5%	0.4%	2.0%	0.6%
Torchiere	7.2%	1.0%	2.0%	0.6%	3.5%	0.7%	-	-	0.2%	0.1%	1.8%	0.5%	0.2%	0.2%
Wall-Mounted	7.2%	1.1%	3.7%	0.8%	3.0%	0.7%	-	-	0.3%	0.2%	0.7%	0.4%	0.2%	0.1%
Recessed	6.7%	0.9%	3.6%	0.7%	2.3%	0.5%	0.1%	0.1%	0.2%	0.1%	1.2%	0.4%	-	-
Suspended	3.3%	0.7%	2.0%	0.6%	1.1%	0.4%	-	-	-	-	0.1%	0.2%	0.2%	0.2%
Ceiling Fan	33.5%	1.9%	20.4%	1.5%	13.4%	1.3%	0.1%	0.1%	0.1%	0.1%	0.8%	0.3%	2.3%	0.5%
Track Lighting	1.9%	0.5%	0.7%	0.3%	0.5%	0.2%	-	-	-	-	1.0%	0.4%	0.1%	0.1%
Desk Lamp	6.0%	1.0%	2.0%	0.5%	2.2%	0.5%	0.2%	0.1%	0.3%	0.2%	1.6%	0.6%	0.1%	0.1%
Under Counter	0.8%	0.4%	0.2%	0.2%	0.1%	0.3%	-	-	0.4%	0.2%	0.1%	0.1%	-	-
Other Hard-Wired	0.3%	0.2%	0.1%	0.1%	-	-	-	-	0.2%	0.2%	-	-	-	-
Other Plug-In	0.3%	0.3%	0.1%	0.1%	0.2%	0.2%	-	-	-	-	-	-	-	-

Table 158: Percentage Of Homes With Fixture Type And Lamp Type In Bedroom 3, using Strata Weights

Fixture Type	Strata weights (n= 1,211_															
	Lamp Type															
	Overall		Incandescent		CFL		LED		Fluorescent		Halogen		Socket Empty		Other	
	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB
Overall	-	-	62.2%	2.2%	56.7%	2.1%	1.6%	0.4%	4.2%	0.7%	7.1%	0.8%	8.0%	0.8%	0.2%	0.1%
Ceiling-Mounted	25.4%	1.5%	11.4%	1.0%	12.2%	1.0%	0.2%	0.2%	1.8%	0.4%	0.6%	0.2%	2.2%	0.4%	-	-
Floor/Table Lamp	54.1%	2.1%	32.2%	1.6%	26.6%	1.5%	0.5%	0.2%	0.9%	0.4%	1.1%	0.3%	1.8%	0.4%	-	-
Torchiere	7.7%	0.8%	1.5%	0.3%	4.1%	0.6%	-	-	0.4%	0.2%	1.7%	0.4%	0.3%	0.1%	-	-
Wall-Mounted	6.1%	0.7%	3.3%	0.5%	2.4%	0.4%	-	-	0.2%	0.1%	0.2%	0.1%	0.4%	0.2%	0.1%	0.1%
Recessed	8.4%	0.9%	5.0%	0.6%	3.2%	0.5%	0.1%	0.1%	-	-	1.4%	0.4%	0.2%	0.1%	-	-
Suspended	3.0%	0.5%	2.3%	0.4%	0.8%	0.3%	-	-	-	-	-	-	-	-	-	-
Ceiling Fan	39.1%	1.7%	23.7%	1.3%	15.3%	1.1%	0.4%	0.2%	0.1%	0.1%	0.9%	0.2%	3.4%	0.5%	-	-
Track Lighting	1.4%	0.3%	0.5%	0.2%	0.4%	0.2%	-	-	-	-	0.6%	0.2%	-	-	-	-
Desk Lamp	5.6%	0.8%	1.2%	0.3%	3.0%	0.6%	0.4%	0.2%	0.6%	0.3%	1.4%	0.4%	-	-	-	-
Under Counter	0.7%	0.2%	0.4%	0.2%	-	-	-	-	0.1%	0.1%	0.3%	0.1%	-	-	-	-
Stove Top	0.1%	0.0%	0.1%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-
Other Plug-In	0.8%	0.3%	0.3%	0.1%	0.1%	0.0%	-	-	0.2%	0.2%	0.1%	-	0.2%	0.2%	-	-

Table 159: Percentage Of Homes With Fixture Type And Lamp Type In Bedroom 4, using Strata Weights

Fixture Type	Strata weights (n= 471)															
	Lamp Type															
	Overall		Incandescent		CFL		LED		Fluorescent		Halogen		HID		Socket Empty	
	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB
Overall	-	-	60.3%	1.4%	57.6%	1.3%	0.9%	0.1%	2.8%	0.3%	4.0%	0.3%	0.3%	0.1%	7.1%	0.4%
Ceiling-Mounted	24.3%	0.8%	11.4%	0.5%	12.5%	0.6%	-	-	1.1%	0.2%	0.1%	-	-	-	1.4%	0.2%
Floor/Table Lamp	50.8%	1.3%	25.9%	1.0%	26.9%	0.9%	0.3%	0.1%	1.1%	0.2%	2.0%	0.2%	0.3%	0.1%	1.4%	0.2%
Torchiere	5.9%	0.4%	2.5%	0.3%	2.7%	0.2%	-	-	0.5%	0.2%	0.3%	0.1%	-	-	0.4%	0.1%
Wall-Mounted	7.2%	0.4%	5.0%	0.3%	2.0%	0.2%	-	-	0.1%	0.0%	0.1%	0.0%	-	-	0.6%	0.2%
Recessed	10.6%	0.5%	7.3%	0.4%	3.4%	0.3%	0.1%	0.0%	-	-	0.5%	0.1%	-	-	0.1%	0.0%
Suspended	3.2%	0.3%	2.4%	0.2%	0.8%	0.1%	-	-	-	-	-	-	-	-	0.2%	0.1%
Ceiling Fan	38.6%	1.0%	21.9%	0.7%	17.2%	0.6%	0.3%	0.1%	-	-	0.6%	0.1%	-	-	3.1%	0.3%
Track Lighting	1.1%	0.2%	0.4%	0.1%	0.3%	0.1%	-	-	-	-	0.4%	0.1%	-	-	-	-
Desk Lamp	5.5%	0.4%	2.6%	0.3%	2.4%	0.3%	0.2%	0.1%	-	-	0.3%	0.1%	-	-	-	-
Under Counter	0.4%	0.1%	0.3%	0.1%	-	-	-	-	-	-	0.2%	0.0%	-	-	-	-
Other Plug-In	1.3%	0.2%	0.8%	0.1%	0.3%	0.1%	-	-	-	-	-	-	-	-	0.5%	0.1%

Living Room

Table 160 shows the breakdown of fixture and lamp types found in living rooms surveyed, along with the error bounds associated with these estimates. The most commonly found fixture and lamp type combinations are floor/table lamps with incandescent and compact fluorescent lamps. Incandescent bulbs and compact fluorescents are almost equally prevalent, at 70% and 66%, respectively.

Table 160: Percentage of Homes with Fixture Type and Lamp Type in Living Room, using Strata Weights

	Strata weights (n= 1909)																
	Lamp Type																
	Overall		Incandescent		CFL		LED		Fluorescent		Halogen		HID		Socket Empty		Other	
Fixture Type	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB
Overall	-	-	69.8%	3.1%	66.3%	2.9%	2.5%	0.7%	5.8%	1.0%	17.3%	1.9%	0.2%	0.2%	8.3%	1.2%	0.1%	0.1%
Ceiling-Mounted	14.7%	1.7%	5.9%	1.0%	6.8%	1.2%	0.1%	0.1%	1.7%	0.5%	0.7%	0.3%	-	-	1.3%	0.5%	-	-
Floor/Table Lamp	75.0%	3.0%	46.2%	2.9%	46.9%	2.8%	1.0%	0.5%	1.1%	0.4%	2.9%	0.8%	-	-	3.3%	0.7%	-	-
Torchiere	19.4%	1.9%	6.6%	1.1%	8.9%	1.4%	0.2%	0.1%	0.4%	0.3%	5.2%	0.9%	-	-	0.7%	0.4%	-	-
Wall-Mounted	9.5%	1.3%	5.7%	1.0%	2.5%	0.7%	0.2%	0.2%	0.8%	0.4%	1.0%	0.4%	-	-	0.2%	0.2%	-	-
Recessed	22.8%	2.3%	14.0%	1.7%	6.7%	1.3%	0.4%	0.3%	0.5%	0.2%	5.2%	1.2%	-	-	0.4%	0.3%	-	-
Suspended	13.0%	1.6%	9.7%	1.3%	3.9%	0.9%	0.0%	0.1%	0.1%	0.1%	0.4%	0.3%	-	-	0.6%	0.3%	-	-
Ceiling Fan	27.9%	2.0%	17.7%	1.6%	10.1%	1.4%	0.1%	0.1%	0.2%	0.2%	0.9%	0.4%	-	-	2.3%	0.6%	0.1%	0.1%
Track Lighting	5.0%	1.0%	1.7%	0.5%	0.6%	0.4%	0.1%	0.1%	-	-	3.0%	0.7%	-	-	0.2%	0.2%	-	-
Desk Lamp	5.9%	1.2%	2.5%	0.7%	1.9%	0.7%	0.4%	0.4%	0.5%	0.3%	1.4%	0.5%	-	-	-	-	-	-
Under Counter	2.7%	0.7%	1.4%	0.6%	-	-	0.1%	0.2%	0.5%	0.3%	0.7%	0.3%	0.1%	0.2%	-	-	-	-
Stove Top	0.1%	0.1%	0.1%	0.1%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Hard-Wired	0.3%	0.3%	0.2%	0.2%	-	-	-	-	0.1%	0.2%	-	-	-	-	-	-	-	-
Other Plug-In	0.7%	0.4%	0.3%	0.3%	0.2%	0.2%	-	-	0.2%	0.2%	-	-	-	-	-	-	-	-

Bathrooms

Table 161, Table 162, Table 163, and Table 164 show the breakdown of lamps and fixtures in bathrooms. The most predominate fixture was wall-mounted, with approximately three-quarters of homes surveyed found to have them. The next most prevalent types were ceiling mounted and recessed fixture types. Incandescent and compact fluorescent lights were the most prevalent lamp types found. No HID lamps were found in any bathrooms surveyed.

Table 161: Percentage Of Homes With Fixture Type And Lamp Type In Bathroom 1, using Strata Weights

Fixture Type	Strata weights (n= 1,981)													
	Lamp Type													
	Overall		Incandescent		CFL		LED		Fluorescent		Halogen		Socket Empty	
	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB
Overall	-	-	62.2%	2.5%	50.4%	2.5%	0.9%	0.4%	13.7%	1.5%	6.0%	1.0%	6.6%	1.1%
Ceiling-Mounted	39.5%	2.2%	15.4%	1.6%	16.9%	1.7%	-	-	8.2%	1.2%	0.6%	0.3%	1.2%	0.5%
Floor/Table Lamp	1.2%	0.5%	0.7%	0.4%	0.4%	0.3%	-	-	-	-	0.1%	0.1%	0.1%	0.2%
Torchiere	0.1%	0.2%	0.1%	0.2%	-	-	-	-	-	-	-	-	-	-
Wall-Mounted	78.5%	2.0%	45.9%	2.3%	32.2%	2.2%	0.5%	0.3%	2.8%	0.8%	2.3%	0.6%	5.2%	1.0%
Recessed	25.1%	2.1%	14.0%	1.6%	8.2%	1.2%	0.4%	0.2%	2.7%	0.7%	3.1%	0.7%	0.3%	0.3%
Suspended	2.8%	0.7%	1.8%	0.5%	1.1%	0.4%	-	-	0.1%	0.2%	-	-	-	-
Ceiling Fan	0.6%	0.3%	0.3%	0.2%	0.3%	0.2%	-	-	0.1%	0.1%	-	-	-	-
Track Lighting	0.7%	0.3%	0.3%	0.2%	0.1%	0.1%	-	-	-	-	0.3%	0.2%	-	-
Desk Lamp	0.2%	0.2%	0.2%	0.2%	-	-	-	-	-	-	-	0.1%	-	-
Under Counter	0.1%	0.1%	-	-	-	-	-	-	0.1%	0.1%	-	-	-	-

Table 162: Percentage of Homes with Fixture Type and Lamp Type in Bathroom 2, using Strata Weights

Fixture Type	Strata weights (n= 1,535)															
	Lamp Type															
	Overall		Incandescent		CFL		LED		Fluorescent		Halogen		Socket Empty		Other	
	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB
Overall	-	-	65.6%	2.4%	46.7%	2.2%	1.0%	0.3%	14.0%	1.2%	6.9%	0.9%	7.4%	0.9%	0.1%	0.1%
Ceiling-Mounted	37.8%	1.9%	14.2%	1.3%	16.6%	1.3%	0.2%	0.2%	8.8%	0.9%	0.6%	0.2%	1.0%	0.3%	0.1%	0.1%
Floor/Table Lamp	1.2%	0.4%	0.6%	0.3%	0.7%	0.3%	-	-	-	-	-	-	-	-	-	-
Torchiere	0.1%	0.1%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wall-Mounted	77.7%	2.3%	48.9%	2.0%	27.5%	1.7%	0.3%	0.2%	2.2%	0.5%	2.7%	0.5%	6.2%	0.9%	-	-
Recessed	29.0%	1.9%	14.4%	1.3%	11.8%	1.2%	0.4%	0.2%	3.2%	0.6%	3.2%	0.6%	0.2%	0.1%	-	-
Suspended	2.9%	0.6%	2.1%	0.5%	0.8%	0.3%	-	-	-	-	0.2%	0.1%	-	-	-	-
Ceiling Fan	0.9%	0.3%	0.4%	0.2%	0.3%	0.1%	-	-	0.1%	0.1%	-	-	0.2%	0.2%	-	-
Track Lighting	0.5%	0.2%	0.2%	0.1%	0.1%	0.1%	-	-	-	-	0.3%	0.1%	-	-	-	-
Desk Lamp	0.3%	0.2%	-	-	-	-	-	-	-	-	0.3%	0.2%	-	-	-	-
Under Counter	0.1%	0.1%	-	-	-	-	-	-	-	-	0.1%	0.1%	-	-	-	-
Other Hard-Wired	0.1%	0.1%	-	-	0.1%	0.1%	-	-	-	-	-	-	-	-	-	-

Table 163: Percentage of Homes with Fixture Type and Lamp Type in Bathroom 3, using Strata Weights

Fixture Type	Strata weights (n= 686)															
	Lamp Type															
	Overall		Incandescent		CFL		LED		Fluorescent		Halogen		Socket Empty		Other	
	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB
Overall	-	-	68.5%	1.8%	46.5%	1.5%	1.6%	0.2%	15.9%	0.8%	7.4%	0.6%	7.1%	0.5%	0.1%	0.0%
Ceiling-Mounted	39.4%	1.3%	14.3%	0.8%	17.5%	0.9%	-	-	9.1%	0.6%	1.0%	0.2%	1.4%	0.2%	-	-
Floor/Table Lamp	0.7%	0.2%	0.4%	0.1%	0.4%	0.1%	-	-	-	-	-	-	-	-	-	-
Torchiere	0.3%	0.1%	0.1%	-	0.2%	0.1%	-	-	-	-	-	-	-	-	-	-
Wall-Mounted	74.8%	1.7%	50.2%	1.4%	23.2%	1.0%	1.0%	0.2%	1.7%	0.3%	3.2%	0.3%	4.9%	0.4%	0.1%	0.0%
Recessed	37.7%	1.4%	21.1%	0.9%	14.8%	0.8%	0.6%	0.1%	4.9%	0.5%	3.4%	0.4%	0.6%	0.2%	-	-
Suspended	2.4%	0.3%	1.9%	0.3%	0.4%	0.1%	-	-	-	-	0.1%	-	-	-	-	-
Ceiling Fan	0.6%	0.1%	0.2%	0.1%	0.2%	0.1%	-	-	0.3%	0.1%	-	-	0.2%	0.1%	-	-
Track Lighting	0.7%	0.1%	-	-	-	-	-	-	-	-	0.7%	0.1%	-	-	-	-
Under Counter	0.1%	-	-	-	-	-	-	-	0.1%	-	0.1%	0.0%	-	-	-	-

Table 164: Percentage of Homes with Fixture Type and Lamp Type in Bathroom 4, using Strata Weights

Fixture Type	Strata weights (n= 147)															
	Lamp Type															
	Overall		Incandescent		CFL		LED		Fluorescent		Halogen		HID		Socket Empty	
	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB
Overall	-	-	65.0%	0.6%	60.7%	0.7%	1.0%	0.1%	11.0%	0.2%	14.6%	0.3%	0.3%	-	2.8%	0.1%
Ceiling-Mounted	38.9%	0.5%	10.2%	0.2%	22.6%	0.4%	-	-	6.1%	0.2%	1.6%	0.1%	0.3%	-	1.0%	0.1%
Floor/Table Lamp	0.3%	-	0.3%	-	-	-	-	-	-	-	-	-	-	-	-	-
Wall-Mounted	66.9%	0.6%	41.9%	0.5%	24.2%	0.4%	0.5%	-	0.9%	-	3.7%	0.1%	-	-	1.9%	0.1%
Recessed	45.4%	0.6%	19.1%	0.3%	28.2%	0.4%	0.5%	-	3.5%	0.1%	9.7%	0.3%	-	-	-	-
Suspended	1.7%	0.1%	0.6%	-	-	-	-	-	-	-	1.1%	0.1%	-	-	-	-
Ceiling Fan	0.3%	-	0.3%	-	-	-	-	-	-	-	-	-	-	-	-	-
Track Lighting	0.6%	-	0.6%	-	-	-	-	-	-	-	-	-	-	-	-	-
Desk Lamp	0.6%	-	-	-	-	-	-	-	0.6%	-	-	-	-	-	-	-

Hallway

Table 165 presents the percentage of homes with a given fixture type and lamp type in hallways and the error bounds associated with these estimates. The most commonly found fixture and lamp type combinations are ceiling mounted incandescent and compact fluorescent lamps, as well as recessed fixtures with compact fluorescents.

Table 165: Percentage of Homes with Fixture Type and Lamp Type in Hallway, using Strata Weights

Fixture Type	Strata weights (n= 1810)													
	Lamp Type													
	Overall		Incandescent		CFL		LED		Fluorescent		Halogen		Socket Empty	
	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB
Overall	-	-	67.8%	2.8%	51.2%	2.7%	1.9%	0.6%	4.5%	0.9%	7.1%	1.2%	5.3%	1.0%
Ceiling-Mounted	63.5%	2.7%	36.5%	2.4%	29.6%	2.2%	0.2%	0.2%	3.6%	0.8%	0.9%	0.4%	3.1%	0.8%
Floor/Table Lamp	6.4%	1.1%	4.2%	0.9%	2.4%	0.7%	0.2%	0.2%	-	-	0.1%	0.1%	0.1%	0.1%
Torchiere	0.5%	0.3%	0.3%	0.2%	0.1%	0.2%	-	-	-	-	0.1%	0.1%	-	-
Wall-Mounted	20.7%	1.9%	11.4%	1.4%	8.9%	1.2%	0.1%	0.1%	0.1%	0.1%	1.1%	0.4%	0.8%	0.4%
Recessed	38.1%	2.7%	24.7%	2.2%	16.2%	1.8%	1.2%	0.5%	0.3%	0.2%	4.2%	0.9%	0.8%	0.4%
Suspended	19.4%	1.7%	16.0%	1.5%	4.0%	0.8%	0.3%	0.2%	-	-	0.3%	0.2%	0.7%	0.3%
Ceiling Fan	1.9%	0.6%	1.3%	0.5%	0.5%	0.3%	-	-	-	-	0.1%	0.1%	0.2%	0.2%
Track Lighting	2.0%	0.6%	0.4%	0.2%	0.1%	0.1%	-	-	-	-	1.5%	0.5%	-	-
Desk Lamp	0.4%	0.2%	0.1%	0.1%	0.1%	0.1%	-	-	-	-	0.1%	0.1%	-	-
Under Counter	0.8%	0.3%	0.2%	0.2%	-	-	0.1%	0.1%	0.4%	0.2%	0.1%	0.1%	0.8%	0.3%
Stove Top	0.1%	0.2%	0.1%	0.1%	-	-	-	-	-	-	0.1%	0.1%	0.1%	0.2%
Other Hard-Wired	0.3%	0.2%	0.2%	0.1%	-	-	-	-	0.1%	0.1%	0.1%	0.1%	0.3%	0.2%
Other Plug-In	0.1%	0.1%	-	-	-	-	-	-	-	-	-	-	0.1%	0.1%

Dining Room

Table 166 shows the breakdown of lamps and fixtures in the dining room of surveyed homes as well as the error bounds associated with these estimates. Suspended fixtures with incandescent bulbs and ceiling fans with incandescent and compact fluorescent lamps were the most common fixture types. The percent of compact fluorescents in dining rooms has increased fourfold since the last study, from 8% to 33%.

Table 166: Percentage of Homes with Fixture Type and Lamp Type in Dining Room, using Strata Weights

Fixture Type	Strata weights (n= 1288)															
	Lamp Type															
	Overall		Incandescent		CFL		LED		Fluorescent		Halogen		HID		Socket Empty	
	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB
Overall	-	-	74.2%	2.3%	32.8%	1.8%	0.9%	0.3%	2.3%	0.5%	8.7%	1.0%	0.1%	0.1%	5.9%	0.8%
Ceiling-Mounted	13.0%	1.2%	6.3%	0.8%	5.7%	0.8%	-	-	0.9%	0.3%	0.3%	0.1%	-	-	0.6%	0.3%
Floor/Table Lamp	15.6%	1.4%	9.5%	1.0%	6.8%	0.9%	0.1%	0.1%	0.3%	0.1%	0.1%	0.1%	-	-	0.4%	0.2%
Torchiere	3.0%	0.6%	0.7%	0.3%	1.3%	0.4%	-	-	-	-	1.2%	0.4%	-	-	0.2%	0.1%
Wall-Mounted	3.2%	0.5%	2.4%	0.5%	0.5%	0.2%	-	-	0.1%	0.0%	0.1%	0.1%	-	-	0.1%	0.1%
Recessed	13.3%	1.1%	7.9%	0.8%	2.8%	0.5%	0.2%	0.1%	0.3%	0.2%	3.2%	0.6%	-	-	0.1%	0.1%
Suspended	56.4%	2.1%	47.1%	1.9%	9.1%	1.0%	0.5%	0.2%	0.1%	0.1%	1.4%	0.4%	0.1%	0.1%	2.2%	0.5%
Ceiling Fan	24.8%	1.6%	14.5%	1.2%	10.3%	1.0%	0.2%	0.1%	0.2%	0.2%	0.9%	0.3%	-	-	2.1%	0.4%
Track Lighting	2.3%	0.5%	0.4%	0.2%	0.4%	0.2%	-	-	-	-	1.6%	0.4%	-	-	-	-
Desk Lamp	0.7%	0.2%	0.4%	0.1%	0.3%	0.1%	-	-	-	-	-	-	-	-	-	-
Under Counter	2.3%	0.5%	1.3%	0.4%	-	-	-	-	0.4%	0.2%	0.6%	0.2%	-	-	-	-
Stove Top	0.2%	0.2%	0.2%	0.2%	-	-	-	-	-	-	-	-	-	-	0.1%	0.0%
Other Plug-In	0.2%	0.1%	-	-	-	-	-	-	0.1%	0.1%	0.1%	0.1%	-	-	-	-

Home Office

Table 167 shows the breakdown of lamps and fixture types in home offices. Approximately half of homes were found to have floor/table lamps in the home office. Of these, incandescent and compact fluorescent lamps were most commonly used. Ceiling-mounted, ceiling fans and desk lamps were also each found in approximately a quarter of homes surveyed.

Table 167: Percentage of Homes with Fixture Type and Lamp Type in Home Office, using Strata Weights

Fixture Type	Strata weights (n= 834)															
	Lamp Type															
	Overall		Incandescent		CFL		LED		Fluorescent		Halogen		HID		Socket Empty	
	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB
Overall	-	-	64.2%	2.2%	51.5%	2.0%	2.5%	0.4%	10.6%	0.8%	21.2%	1.2%	0.2%	0.1%	5.4%	0.6%
Ceiling-Mounted	24.9%	1.3%	10.6%	0.9%	9.8%	0.8%	0.1%	0.1%	3.9%	0.5%	1.1%	0.3%	-	-	1.3%	0.3%
Floor/Table Lamp	50.9%	2.0%	29.9%	1.5%	24.2%	1.4%	0.6%	0.2%	2.0%	0.3%	3.4%	0.5%	0.2%	0.1%	1.2%	0.3%
Torchiere	8.7%	0.8%	3.5%	0.5%	1.9%	0.3%	0.2%	0.1%	0.3%	0.2%	2.9%	0.4%	-	-	0.3%	0.2%
Wall-Mounted	6.6%	0.7%	3.7%	0.5%	2.4%	0.4%	-	-	0.6%	0.2%	0.4%	0.2%	-	-	0.2%	0.1%
Recessed	15.0%	0.9%	8.1%	0.6%	4.5%	0.5%	0.7%	0.2%	0.4%	0.1%	2.8%	0.4%	-	-	-	-
Suspended	6.1%	0.7%	3.5%	0.5%	2.0%	0.4%	0.1%	0.0%	0.2%	0.1%	0.6%	0.2%	-	-	0.2%	0.1%
Ceiling Fan	28.9%	1.4%	17.5%	1.0%	11.8%	0.9%	0.5%	0.2%	0.4%	0.1%	0.4%	0.1%	-	-	1.8%	0.3%
Track Lighting	5.4%	0.7%	2.3%	0.4%	1.4%	0.3%	0.1%	-	-	-	2.9%	0.4%	-	-	0.3%	0.1%
Desk Lamp	23.2%	1.3%	7.5%	0.7%	8.0%	0.7%	0.6%	0.2%	2.1%	0.4%	8.3%	0.8%	-	-	0.1%	0.1%
Under Counter	2.3%	0.4%	-	-	-	-	0.2%	0.1%	1.5%	0.3%	0.6%	0.2%	-	-	-	-
Other Hard-Wired	0.3%	0.2%	-	-	-	-	-	-	0.3%	0.2%	-	-	-	-	-	-

Laundry Room

Table 168 shows the breakdown of fixture and lamp types in laundry rooms. Ceiling-mounted fixtures with incandescent, compact fluorescent and fluorescent lamps were most commonly found in the homes surveyed.

Table 168: Percentage of Homes with Fixture Type and Lamp Type in Laundry Room, using Strata Weights

Fixture Type	Strata weights (n= 1040													
	Lamp Type													
	Overall		Incandescent		CFL		LED		Fluorescent		Halogen		Socket Empty	
	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB
Overall	-	-	44.2%	1.7%	35.9%	1.6%	0.5%	0.2%	23.2%	1.2%	3.0%	0.5%	1.4%	0.3%
Ceiling-Mounted	74.0%	1.9%	29.4%	1.4%	26.0%	1.4%	-	-	19.7%	1.1%	0.3%	0.1%	1.1%	0.3%
Floor/Table Lamp	1.0%	0.3%	0.7%	0.3%	0.4%	0.1%	0.1%	0.1%	-	-	-	-	-	-
Torchiere	0.3%	0.2%	0.3%	0.2%	-	-	-	-	-	-	-	-	-	-
Wall-Mounted	9.5%	1.0%	4.4%	0.7%	3.0%	0.5%	0.1%	0.1%	1.8%	0.4%	0.6%	0.3%	0.1%	0.1%
Recessed	17.4%	1.1%	9.5%	0.8%	6.0%	0.6%	0.4%	0.1%	0.8%	0.2%	1.2%	0.3%	-	-
Suspended	2.1%	0.4%	0.9%	0.3%	0.8%	0.3%	-	-	0.3%	0.2%	0.1%	0.1%	-	-
Ceiling Fan	1.3%	0.3%	0.8%	0.2%	0.5%	0.2%	-	-	-	-	-	-	0.1%	0.1%
Track Lighting	0.7%	0.2%	0.3%	0.2%	0.2%	0.1%	-	-	-	-	0.2%	0.1%	-	-
Desk Lamp	0.3%	0.1%	0.1%	0.0%	-	-	-	-	-	-	0.3%	0.1%	-	-
Under Counter	1.2%	0.2%	-	-	-	-	-	-	1.0%	0.2%	0.2%	0.1%	-	-
Other Plug-In	0.4%	0.2%	0.1%	-	-	-	-	-	0.1%	0.1%	0.2%	0.1%	-	-

Closets

Table 169 shows the breakdown of fixtures and lamps in the closets of surveyed homes. Eighty percent of homes had ceiling-mounted fixtures in their closets, primarily with incandescent lamps and compact fluorescent lamps.

Table 169: Percentage of Homes with Fixture Type and Lamp Type in Closets, using Strata Weights

Fixture Type	Strata weights (n= 1033)													
	Lamp Type													
	Overall		Incandescent		CFL		LED		Fluorescent		Halogen		Socket Empty	
	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB
Overall	-	-	64.7%	2.3%	39.2%	1.9%	0.6%	0.3%	12.8%	1.1%	2.9%	0.4%	3.2%	0.5%
Ceiling-Mounted	80.0%	2.5%	49.5%	2.1%	29.8%	1.6%	0.4%	0.3%	10.0%	1.0%	0.6%	0.2%	2.5%	0.5%
Floor/Table Lamp	3.2%	0.7%	1.7%	0.5%	1.2%	0.4%	-	-	0.1%	0.0%	-	-	0.5%	0.2%
Torchiere	0.1%	0.0%	0.1%	0.0%	-	-	-	-	-	-	-	-	-	-
Wall-Mounted	20.6%	1.5%	11.2%	1.1%	7.0%	0.8%	0.1%	0.1%	4.0%	0.6%	0.2%	0.1%	0.2%	0.1%
Recessed	12.8%	1.0%	8.6%	0.8%	4.1%	0.6%	0.2%	0.1%	-	-	1.4%	0.3%	-	-
Suspended	0.8%	0.2%	0.6%	0.2%	0.2%	0.1%	-	-	-	-	-	-	-	-
Ceiling Fan	0.4%	0.1%	0.2%	0.1%	0.2%	0.1%	-	-	-	-	-	-	-	-
Track Lighting	1.3%	0.3%	0.5%	0.2%	0.3%	0.2%	-	-	-	-	0.6%	0.2%	-	-
Desk Lamp	0.1%	0.1%	0.1%	0.1%	0.1%	-	-	-	-	-	-	-	-	-
Under Counter	0.3%	0.2%	-	-	-	-	-	-	0.2%	0.1%	0.1%	0.1%	-	-
Other Hard-Wired	0.1%	0.0%	0.1%	0.0%	-	-	-	-	-	-	-	-	-	-
Other Plug-In	0.2%	0.2%	0.2%	0.2%	-	-	-	-	-	-	-	-	-	-

Garage

Table 170 shows the breakdown of fixtures and lamps in the garages in surveyed homes. Approximately three-quarters of homes were found to have ceiling-mounted fixtures in their garages; over 50% of homes had ceiling-mounted fluorescent lamps. Other prominent fixtures included wall-mounted fixtures with incandescents and compact fluorescent lights. Only 14% of garages surveyed had garage door lights.

Table 170: Percentage of Homes with Fixture Type and Lamp Type in Garage, using Strata Weights

Fixture Type	Strata weights (n= 1324)															
	Lamp Type															
	Overall		Incandescent		CFL		LED		Fluorescent		Halogen		HID		Socket Empty	
	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB
Overall	-	-	37.6%	1.9%	33.8%	1.8%	0.2%	0.1%	66.0%	2.4%	3.2%	0.6%	0.2%	0.2%	5.0%	0.7%
Ceiling-Mounted	75.1%	2.5%	16.3%	1.3%	17.0%	1.3%	-	-	51.0%	2.2%	0.7%	0.3%	-	-	2.4%	0.5%
Floor/Table Lamp	2.5%	0.5%	0.7%	0.2%	1.3%	0.4%	0.1%	0.1%	0.4%	0.2%	0.2%	0.1%	-	-	-	-
Torchiere	0.7%	0.3%	0.2%	0.2%	0.2%	0.1%	-	-	-	-	0.2%	0.2%	-	-	-	-
Wall-Mounted	27.8%	1.7%	11.7%	1.1%	13.0%	1.2%	-	-	3.1%	0.6%	0.9%	0.3%	0.2%	0.2%	1.3%	0.4%
Recessed	1.8%	0.5%	1.0%	0.4%	0.3%	0.1%	-	-	0.3%	0.2%	0.2%	0.2%	-	-	0.2%	0.1%
Suspended	15.5%	1.4%	1.0%	0.4%	0.8%	0.3%	-	-	14.4%	1.3%	-	-	-	-	0.5%	0.2%
Ceiling Fan	1.5%	0.4%	0.6%	0.2%	0.9%	0.3%	-	-	-	-	-	-	-	-	0.4%	0.2%
Track Lighting	0.9%	0.4%	0.6%	0.3%	0.4%	0.2%	-	-	-	-	0.2%	0.1%	-	-	0.2%	0.1%
Desk Lamp	1.8%	0.5%	1.0%	0.3%	0.7%	0.3%	-	-	0.4%	0.2%	0.2%	0.2%	-	-	-	-
Garage Door	14.0%	1.1%	10.8%	1.0%	3.3%	0.6%	0.1%	0.0%	-	-	-	-	-	-	0.4%	0.2%
Under Counter	1.3%	0.4%	0.1%	0.1%	-	-	-	-	0.9%	0.3%	0.3%	0.2%	-	-	-	-
Stove Top	0.1%	0.1%	-	-	-	-	-	-	0.1%	0.1%	-	-	-	-	-	-
Other Hard-Wired	0.2%	0.1%	0.2%	0.1%	-	-	-	-	-	-	-	-	-	-	-	-
Other Plug-In	2.1%	0.5%	0.8%	0.3%	0.7%	0.3%	-	-	0.5%	0.3%	0.3%	0.2%	-	-	-	-

Other Room Types

Table 171 shows the breakdown of fixture and lamp types in "other" rooms. Other rooms include non-typical room types such as weight rooms, libraries, attics, basements and dens. Prevalent fixture types include ceiling-mounted incandescent and compact fluorescent lamps, as well as wall-mounted and recessed fixtures.

Table 171: Percentage of Homes with Fixture Type and Lamp Type in Other Room Type, using Strata Weights

Fixture Type	Strata weights (n= 304)													
	Lamp Type													
	Overall		Incandescent		CFL		LED		Fluorescent		Halogen		Socket Empty	
	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB
Overall	-	-	62.6%	1.4%	44.5%	1.2%	1.4%	0.2%	21.0%	0.8%	13.0%	0.6%	6.6%	0.4%
Ceiling-Mounted	53.9%	1.4%	22.1%	0.8%	22.5%	0.9%	-	-	16.5%	0.7%	2.7%	0.3%	1.6%	0.2%
Floor/Table Lamp	24.0%	0.9%	13.7%	0.6%	11.8%	0.5%	0.3%	0.0%	0.8%	0.1%	1.3%	0.1%	2.7%	0.3%
Torchiere	3.8%	0.3%	1.4%	0.2%	0.6%	0.1%	0.2%	0.0%	0.2%	-	1.4%	0.1%	-	-
Wall-Mounted	22.7%	0.7%	15.1%	0.6%	6.7%	0.4%	-	-	0.8%	0.1%	1.0%	0.1%	1.4%	0.2%
Recessed	21.8%	0.7%	12.6%	0.5%	4.3%	0.3%	0.4%	0.1%	1.0%	0.1%	5.8%	0.4%	0.8%	0.2%
Suspended	9.2%	0.4%	6.2%	0.4%	2.6%	0.2%	-	-	0.7%	0.1%	0.1%	-	-	-
Ceiling Fan	13.8%	0.5%	8.1%	0.4%	4.7%	0.3%	-	-	0.8%	0.1%	0.2%	-	0.1%	0.0%
Track Lighting	6.2%	0.4%	2.2%	0.2%	0.6%	0.1%	0.2%	0.1%	-	-	3.9%	0.3%	-	-
Desk Lamp	4.7%	0.5%	1.9%	0.2%	2.7%	0.3%	0.3%	0.1%	1.6%	0.2%	0.4%	0.1%	-	-
Under Counter	0.9%	0.1%	-	-	-	-	-	-	0.9%	0.1%	-	-	-	-
Other Plug-In	2.0%	0.3%	1.7%	0.3%	-	-	-	-	0.2%	0.0%	0.2%	0.0%	-	-

Exteriors

Table 172 shows the breakdown of fixture and lamp types found on the exterior entries of homes surveyed. Unsurprisingly, wall-mounted fixtures were overwhelmingly the most common fixture type found on exterior entries. The most common lamp types were incandescents and compact fluorescent lamps.

Table 172: Percentage of Homes with Fixture Type and Lamp Type in Exterior - Entry, using Strata Weights

Fixture Type	Strata weights (n= 1237)															
	Lamp Type															
	Overall		Incandescent		CFL		LED		Fluorescent		Halogen		HID		Socket Empty	
	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB	% of Homes	EB
Overall	-	-	50.9%	2.2%	54.6%	2.2%	1.3%	0.3%	0.9%	0.3%	9.2%	1.0%	0.5%	0.2%	2.9%	0.5%
Ceiling-Mounted	12.7%	1.2%	6.0%	0.8%	6.1%	0.9%	-	-	0.3%	0.1%	0.4%	0.2%	0.1%	0.1%	0.2%	0.1%
Floor/Table Lamp	0.5%	0.2%	0.1%	0.1%	0.4%	0.2%	-	-	-	-	-	-	-	-	-	-
Torchiere	0.2%	0.2%	-	-	0.2%	0.2%	-	-	-	-	-	-	-	-	-	-
Wall-Mounted	84.3%	2.5%	42.7%	2.0%	44.0%	2.1%	1.0%	0.3%	0.5%	0.3%	7.1%	0.9%	0.4%	0.2%	2.6%	0.5%
Recessed	8.9%	0.9%	3.2%	0.6%	4.8%	0.7%	0.1%	0.1%	-	-	1.1%	0.3%	-	-	-	-
Suspended	3.0%	0.6%	2.1%	0.5%	0.9%	0.3%	-	-	-	-	-	-	-	-	-	-
Ceiling Fan	0.1%	0.1%	0.1%	0.1%	-	-	-	-	-	-	-	-	-	-	-	-
Other Hard-Wired	2.4%	0.5%	1.3%	0.3%	0.5%	0.2%	0.2%	0.1%	-	-	0.7%	0.3%	-	-	0.1%	0.1%

7 Appendix B: Customer Contact Materials

B.1 CLASS Recruiting Script

Hello, my name is <INTERVIEWER>. I'm calling from DNV KEMA, an energy consulting firm. We are conducting research on behalf of the California Public Utility Commission (C.P.U.C.) Is this the < participant's name > residence? The CPUC has hired us to conduct a study of energy efficient appliances and lighting in California homes. This study is purely research toward helping the CPUC and the electric utilities better understand the way energy is being used in California. This research is funded by the ratepayers of the State of California and at no time will anyone attempt to sell you anything. We are offering an incentive of
$100 as a thank you for allowing us to do this research. The information we gather will only be used anonymously and in aggregate.

If an answering machine picks up leave the following message):

Hello I am trying to reach<Customer Name>. This is<INTERVIEWER> from DNV KEMA, an energy consulting firm hired by the California Public Utility Commission to survey the types of appliances and lighting that are being used in California homes. We are hoping to schedule a time for our field surveyor to visit your home. There are no sales involved, but a ONE hundred dollar Visa gift card will be provided to surveyed homes. There a limited number of surveys being conducted in your area on a first- come, first-served basis. Please call 1.800.576.6392 as soon as possible, if you would like to be considered for a survey. Thank you. Once again, the number is 1.800.576.6392.

The field auditors we send out will do an inventory of the types of HVAC, appliances, televisions, computer monitors and lighting in your home as well as certain building characteristics such as insulation. A typical home will take 2 hours to conduct the research. After the visit you will receive a Visa gift card for $100 as a thank you.

Are you interested in participating in our study? Great!

I have your address as < listed address>. Is this correct?   *If not correct they cannot participate*. Terminate call.

(If necessary)

The State of California has specific laws that protect the privacy and confidentiality of individuals and businesses that choose to participate in this research. As such, all information collected during the course of this study will be subject to these laws and will be held in the strictest confidence. All information related to this project, whether provided by utilities or collected directly from participants will not be released to anyone in a form that could allow the identification of any business, individual or facility.

(We have a validation letter from the CPUC contact we can email or send them)

IF they ask:

Yes, we will need to briefly access the attic and crawl space. (not a deal breaker if they do not have attic access) Thank you agreeing to participate in our study!
I just have a few questions to ask you.

If they agree to site visit:

Is there anything we should know about finding your home? _____

Which of the following types of housing units would you say best describes your home? Is it a…
1. Single-family detached **house**
2. Single-family attached **house** (townhouse, row house, excluding duplex)
3. Duplex
4. Building with 2-4 living units,
5. Building with 5 or more living units
6. Mobile home or house trailer
77. Other (describe)

How many bathrooms do you have in your home? How many half bathrooms do you have in your home? A full bathroom is one that has a sink with running water, and a toilet, and either a bathtub or shower. A half bathroom has a sink and either a toilet or a bathtub or a shower?
_____NUMBER FULL BATHROOMS
_____NUMBER HALF BATHROOMS
88. Refused
99. Don't know

How many bedrooms do you have in your home (If a one-room efficiency, or studio apartment, bedrooms=0)
_____NUMBER of Bedrooms
88. Refused
99. Don't know

Is this the best phone to reach you at? _____

[Schedule date & time of site visit.]

If something comes up and you need to reschedule please give me a call at 1.800.576.6392. The auditor who will be coming out is <Field Tech Name>. She/He will be there on <day, date & time>. His/her cell phone is___.

Thanks again and have a great day.

RETURN CALLS or POSTCARD CALLS

If someone calls and wants to participate - Check their bucket to see if that bucket has someone scheduled – if no, then schedule them or transfer them to the designated scheduler. **If the bucket has a scheduled site it is important that we use these words**:
"I'm sorry we do not have a field auditor in your area right now. If we are coming back to your area is it okay if we give you a call back? Thank you." (We want to keep our options open in case of site cancellations or if we are unable to meet our target for other buckets.)
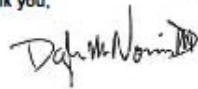
B.2 Postcard

Dear California Residential Energy Customer,

The California Public Utilities Commission (CPUC) has hired DNV KEMA Energy and Sustainability Inc., an independent program evaluator, to collect information on building characteristics and in-home usage of appliances and lighting technologies in California homes. The information gathered will be used to identify opportunities for increased energy efficiency and assist in planning California's future energy needs.

Your household has been selected at random to be invited to participate in the study. In the near future we may be calling to schedule an appointment for a field engineer to visit your home to inventory the appliances in your home. The typical visit should take 1.5 to 2 hours. There are no sales involved but a $100 Visa gift card will be provided to surveyed homes. There are a limited number of surveys being conducted in your area on a first come, first served basis. You can find additional information about CPUC studies and a list of firms who are assisting them at http://cpuc.ca.gov/eevalidation. If you would like to participate in the study or would like to be removed from the list of eligible participants please call us at our toll free number 1.800.576.6392.

Thank you,

Doug Norris
DNV KEMA, Inc.
155 Grand Avenue Suite 500
Oakland CA 94612
1.800.576.6392
Doug.Norris@dnvkema.com

KEMA

DNV KEMA, Inc.
155 Grand Avenue Suite 500
Oakland CA 94612

«Missing merge field»
«Missing merge field»
«Missing merge field»

B.3 Letter

STATE OF CALIFORNIA   Edmund G. Brown Jr., Governor

PUBLIC UTILITIES COMMISSION
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3298

April 27, 2012

Dear Residential Survey Participant:

The California Public Utilities Commission (CPUC) is currently employing independent program evaluators for statewide residential telephone and on-site surveys. These surveys will collect information on building characteristics and in-house usage of residential appliances and lighting technologies. Customer participation will help both the electric utilities and the CPUC better understand the way energy is used in residences across California, helping them plan for future energy needs and energy efficiency programs. These surveys are undertaken in coordination with California's investor-owned utilities: PG&E, SCE, and SDG&E.

The CPUC's Energy Division requests your cooperation for these data gathering efforts. The CPUC has retained DNV KEMA Energy and Sustainability, Inc as the primary contractor for this work. This letter serves to authenticate their request for information. You can find additional information about CPUC studies and a list of firms who are assisting them at http://cpuc.ca.gov/eevalidation.

Thank you for agreeing to participate in the research effort by providing useful information about the residential lighting and appliance sectors. For agreeing to participate, we would like to thank you by providing you with a **$100.00 VISA® gift card** at the time of the site visit..

By agreeing to participate, you would be allowing our verification contractor, DNV KEMA Energy and Sustainability, Inc., to send field engineers to your home, at your convenience, to verify the appliances and lighting technologies in your home. The field engineers may require access to your attic, garage, utility closet, backyard, or rooftop, depending on location of the HVAC system and other equipment components. Their total time on site will vary, however we estimate **the typical inspection and verification will take about 1.5 hours to 2 hours to complete**. We recognize that your agreement to participate in this study may present an inconvenience to you. Please know that your participation is very important to ensure that the study findings are reliable. **Doug Norris, the Recruitment Coordinator at DNV KEMA, is available at 1.800.576.6392 to answer any questions about scheduling.**

Please do not hesitate to contact me at the phone number or email address shown below if you have further questions regarding the evaluation process.

Sincerely,

Dina Mackin
Contract Manager – Energy Division
California Public Utilities Commission
415-703-2125
Dina.mackin@cpuc.ca.gov

B.4 On-Site Materials – Surveyor Badge

Energy Surveyor

Auditor Name Here

KEMA

DNV

The individual pictured on the reverse is under contract to the California Public Utilities Commission to verify impacts achieved by energy efficiency programs in California.

This visit supports energy efficiency programs conducted by PG&E, SCE, SCG and SDG&E on behalf of the California Public Utilities Commission (CPUC).

IF FOUND, PLEASE RETURN TO:

DMV KEMA Energy & Sustainability
155 Grand Ave, Suite 500
Oakland, CA 94612
1 (510) 891-0446

B.5 Letter – Spanish Translation

PUBLIC UTILITIES COMMISSION
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3298

April 27, 2012

Sr./Sra. Participante de la Encuesta Residencial,

La Comisión de Servicios Publicos de California (CPUC) está en este momento empleando evaluadores independientes para unas encuestas … Estas encuestas collectarán información sobre las características del edificio además de/y también el uso de energía de los aparatos y las luces de la casa. Su participación ayudará a sus servicios locales y el CPUC entender mejor la manera en que la energía está usada en las residencias por todo California, ayudandoles planificar para las necessidades del futuro y programmas sobre la eficiencia de la energía … Para cumplir estas encuestas estamos trabajando junto con los servicios privados: PG&E, SCE and SDG&E.

La División de Energía del CPUC pide su cooperacción con estas encuestas. El CPUC ha contratado DNV KEMA Energía y Sostenibilidad, Inc. como el asesor principal para este trabajo. Esta carta sirve para autenticar su solicitud/pedido de información. Puede encontrar información adicional acerca de CPUC estudios y una lista de las empresas que están ayudando a ellos en: http://cpuc.ca.gov/eevalidation.

Gracias por participar en el estudio, dandonos información útil sobre los sectores de las luces y los aparatos de la casa. Como una forma de dar gracias por su participación, le regalaremos una tarjeta de regalo de VISA® con un valor de $100 al tiempo de la visita.

Si usted decidiera participar, permitirá nuestro asesor de verificación, DNV KEMA Energía y Sostenibilidad, Inc., mandar sus ingenieros a su casa, cuando le convenga a usted, para evaluar a las luces y los aparatos de su casa. Es possible que los ingenieros vayan a requerir acceso a su ático, garaje, patio, o techo, dependiendo en donde queda el sistema aire acondicionado y tal. El tiempo que occupan los ingenieros depende en varias cosas, pero la casa típica tarda mas o menos 1.5 a 2 horas para cumplir. Reconocemos que su participación en esta encuesta puede incomodorle. Queremos que usted sepa que su participación es muy importante para asegurar que los resultados sean correctos. Doug Norris, el Coordinator de Contratacción, puede resolver cualquier pregunta que tenga/tiene sobre la planificacción. Su numero de telefono es 1.800.576.6392.

Por favor no dude en contactarme al numero telefono o la dirección de email abajo si usted tiene otras preguntas sobre el processo de evaluación.

Sinceramente/Attentamente,

Dina Mackin
Contract Manager – Energy Division
California Public Utilities Commission
415-703-2125
Dina.mackin@cpuc.ca.gov

B.6 Incentive Signature Form

CPUC California Lighting and Appliance Saturation Study Incentive Verification

My signature below indicates I received a $100 VISA gift card as an incentive gift for my participation in the CPUC California Lighting and Appliance Saturation Study. I understand that this gift card should be considered the same as cash and that neither KEMA nor the CPUC are responsible for lost or stolen cards.

Mi firma abajo indica que recibí una tarjeta de regalo de $100 VISA como un regalo de incentivo para mi participación en la iluminación de California CPUC y estudio de saturación del aparato. Entiendo que este regalo debe ser considerado igual a dinero en efectivo y que KEMA ni la CPUC son responsables de tarjetas perdidas o robadas.

Printed Name:_____

Signature:_____   Date:_____

Gift Card #:_____

Energy Surveyor Name:_____

SITE ID:_____

8 Appendix C: Digital Data Collection Procedure Guide

C.1 Field Reference Guide

Electric Utility Meter #
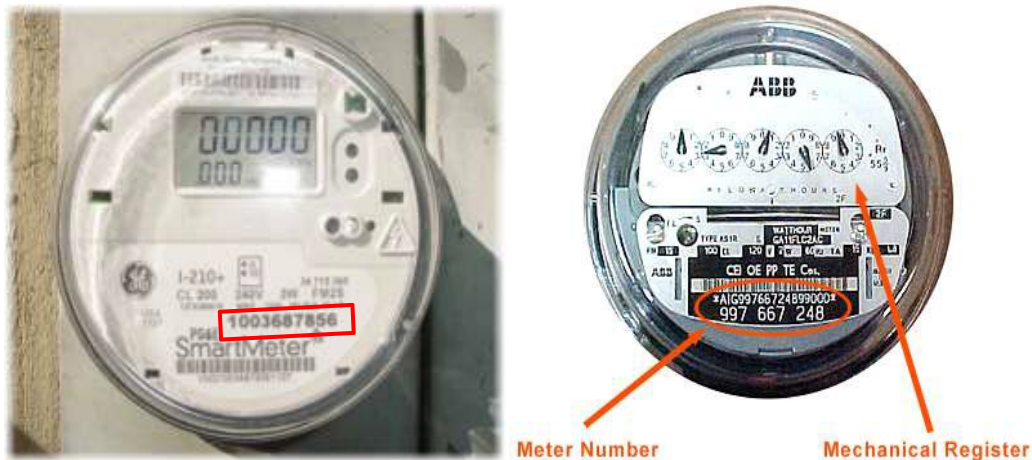
Gas Utility Meter #

HVAC – Thermostat

Digital Non-Programmable Thermostat
program for 2 days, 5 days or 7 days.

Digital Programmable Thermostat – Find out if it can

Hybrid Mechanical

HVAC – System Type

Split Forced Air Furnace – The furnace and AC are located in two separate places but share the ducting in the house. Could be found in a closet, garage or attic.

Nameplate (Serial # is usually listed by the Model #). Check for Constant or Variable speed fan.

Evaporator Coil (Split Systems w/AC)
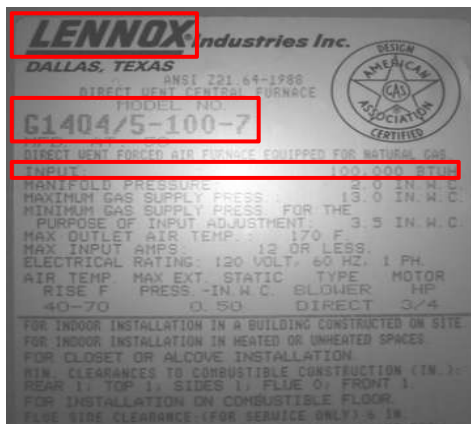
TXV Installed? This can only be confirmed by looking at the name plate and looking for "TXV."

AC NAMEPLATE
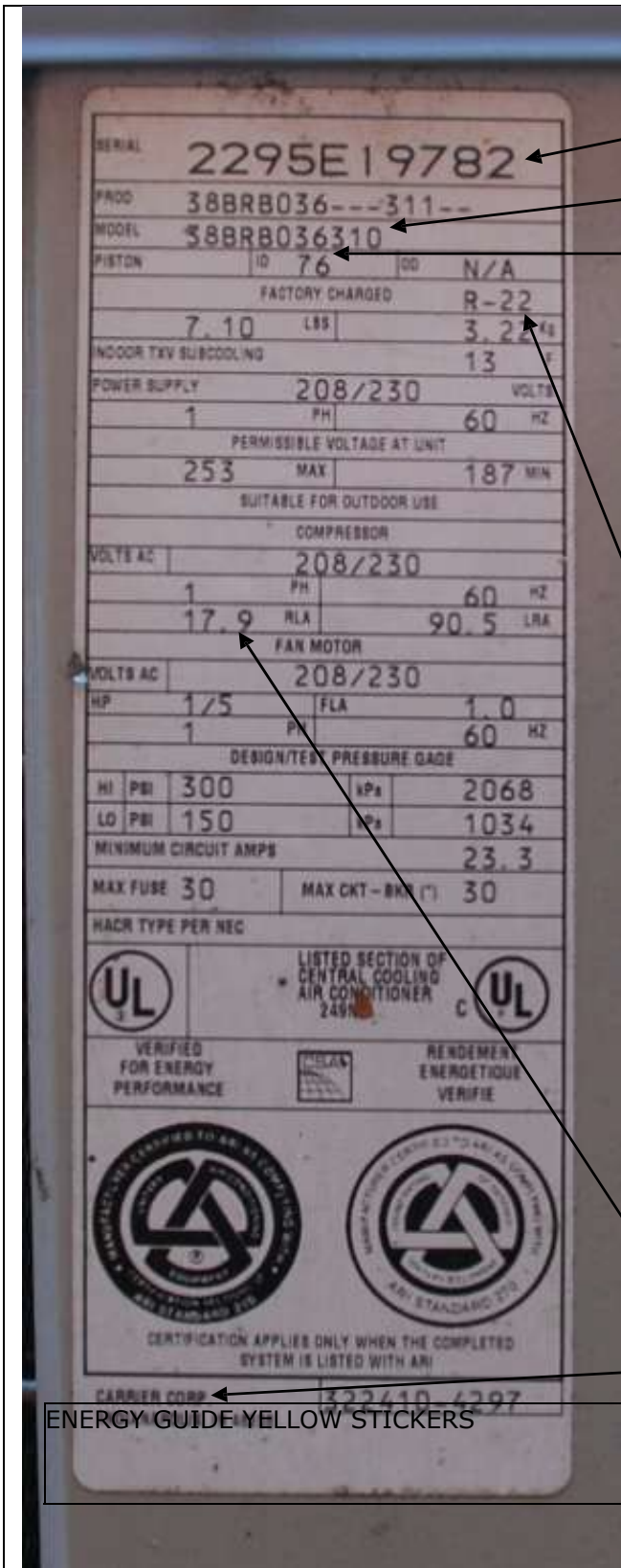
| SERIAL NUMBER |
| MODEL NUMBER |
| |
| TON RATING IN kBtu |

Over 90% of package and split-system air conditioning units list the kBtu capacity somewhere in the model number. 12 kBtu is equal to one ton of cooling. The rule of thumb is to look for a multiple of 6 somewhere in the model number and then divide that by 12 to get the tonnage. Split- system units can be found as small as 1.5 tons and generally aren't larger than 5 tons. Package units can range anywhere from 1.5 tons to 25 tons.

REFRIGERANT TYPE
Generally split and package system AC units will use either R-22 or R-410a type refrigerant. R-22 is currently being phased out and it would be highly unlikely to find a new, high-efficiency (15 SEER or higher) AC with R22 refrigerant

EFFICIENCY
Efficiency is generally not found on an AC nameplate. There are certain clues to look for that will tell you whether or not it is a high-efficiency unit but for verification purposes, the only way to verify the efficiency would be to read the rating given by an Energy Guide sticker.

ELECTRIC INPUT
Usually in Amps but sometimes listed in kW.

MANUFACTURER
In this case, it's found at the bottom of the nameplate. Often it's found at the top or there is a separate placard on the unit with the Manufacturer on it.

ENERGY GUIDE YELLOW STICKERS

Source: http://www.energyvanguard.com   Source: http://www.faryal.net
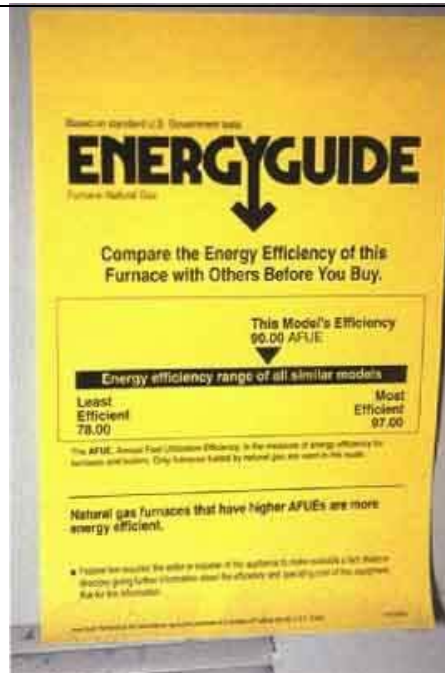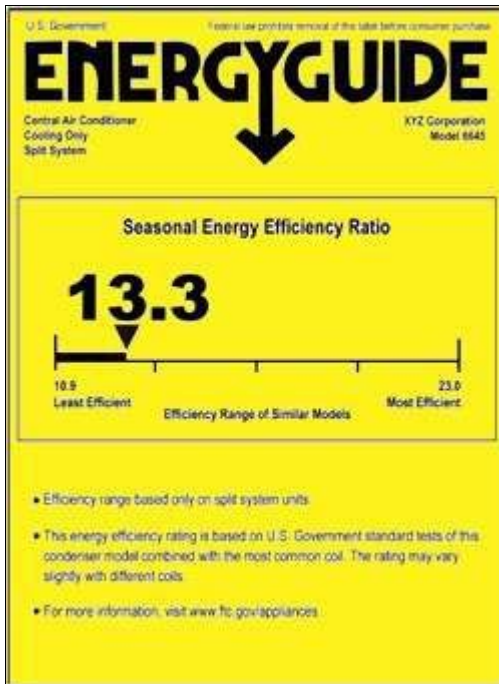
This is generally a reliable way to verify the efficiency rating of an appliance
- Often this is the only way to determine what the rated efficiency is without looking up the model number on a manufacturer's website

Packaged System (Furnace/AC) – cooling and heating equipment in one package.

Hydronic (Radiant) system – A boiler heats water and a pump provides the hot water to baseboards or coils underneath the slab.
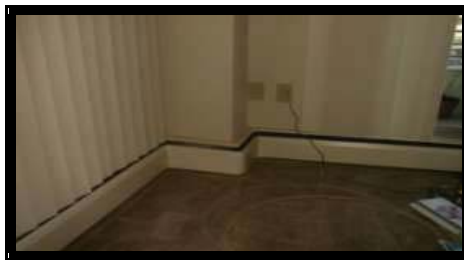
Split Heat pump w/ electronic supplement

Split Heat pump w/o electronic supplement

Packaged Heat Pump

Gravity Furnace – Can be short or tall. Heat is diffuse from this unit only and not into other rooms .
Name Plate – usually on the bottom

Ceiling Cable – electric resistance cables that run through the ceiling. Not very common in California and customer will know that they are there.

Electric Baseboards – run along the base of the wall and can be under windows and along interior walls. Range in lengths from 2 ft to approximately 10 ft. – 250 W/LF (LF = linear foot). One thermostat per baseboard and typically at least one baseboard per room.
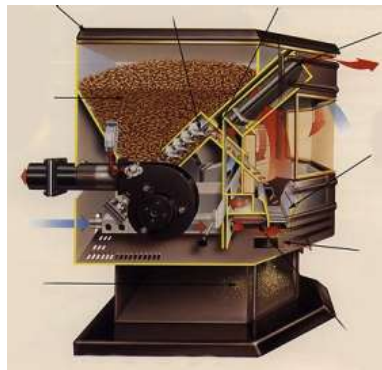
Fireplace Heat Exchanger – designed to keep more of the warm air in the room by using a fan to supply the fuel rather than the air in the room.

Fresh Air Ventilation

APPLIANCES

Domestic Hot Water (DHW) – Gas Storage   Domestic Hot Water (DHW) – Electric Storage

NAMEPLATE, Record:

Manufacturer Model Number

MFG Date/Customer reported Age Capacity (Gallons)

Input kBtuh (gas) Input kW (electric)

Tank and Pipe Insulation   Recirculation Control (Timer/Temperature)
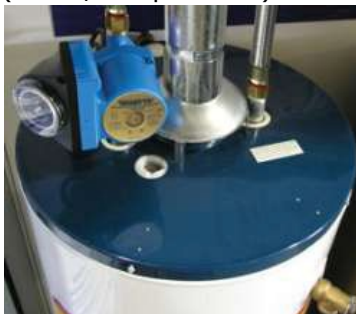
Instantaneous (Tankless) Water Heater

Gas (look for gas line)   **Electric**

Heat Pump Water Heater - Heat pump water heaters use electricity to move heat from the air to the tank instead of generating heat directly. Residential heat pump water heaters use the same technology as your refrigerator, but it operates in a reverse order. The inside of the tank captures heat instead of rejecting it.

Solar Hot Water (Gas/Electric/Propane Storage tank)
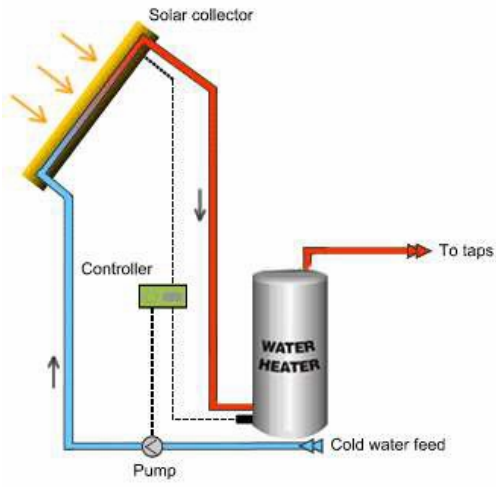
Solar ONLY

Common Boiler

Hydronic-DHW & HVAC

REFRIGERATOR

Single Door   Built-in

Nameplate – could be on the side of the fridge.

DISHWASHER – nameplate usually found
on the side of the door.

CLOTHES WASHER and DRYER – nameplate is usually accessible by opening the door.

BUILDING SHELL

Batt

Blow-in Loose – looks like wool

<mark>Adiabatic</mark>: Any ceiling or wall area that borders another conditioned space.

For example, the ceiling of a first floor apartment in a 3 story apartment building would not have attic or ceiling insulation. The ceiling of the 1st floor apartment does not border a conditioned space and therefore would be considered adiabatic.

TV

LCD – Back-lit with CCFLs (fluorescent lighting) (usually These will be the most common.

LED – same as LCD but back-lit with LEDs slimmer). They use less electricity than LCDs.

PDP - Plasma

CRT (Cathode Ray Tube) – These are the traditional TV sets that are NOT flat and usually have some adds depth.

DLP (projection) – typically used for Home Theater applications. There is a rear projection unit which some significant depth to the unit.

High Definition (HDTV) – this is a **feature** that is sometimes included in many LCD, LED, PDP (plasma) and DLP (projection) type TVs. HD feature is only available in a 16:9 aspect ratio also known as "widescreen" however   not all widescreen TVs are HDTV. The example below shows an HDTV that is also an **ENERGY STAR** rated model.

There may be a sticker on the TV that indicates this or you will have to check the nameplate for this information.

Television nameplate

Measuring the screen size – This can be measured by the diagonal distance of the actual **screen**. Please be cautious to not include distance from one diagonal end to the other which may include a bit of the frame.
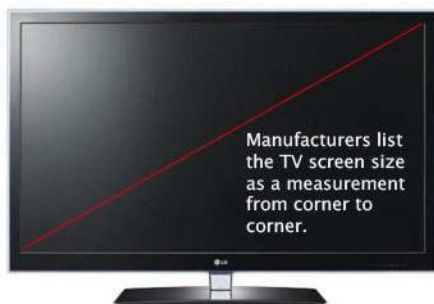
Different connected devices to the TV:

VGC – video game console such as Sony Playstation, Xbox, Nintendo Wii, etc.

DVD and Blu-Ray Players - Look for these logos on the disc players to be certain of what kind of player they are. You may also see variations of these such as HD DVD or Blu-Ray 3D.

Digital TV Converter (DTVC) – This device is used in conjunction with an antenna to receive digital signals for devices that do not have cable or satellite TV subscriptions. The device is usually less than half the size of a VCR or DVD player.

HD Satellite – Dish network or Directv are the the most common satellite providers. If a satellite receiver has an High Definition (HD) feature, there will usually be a label on it that says HD or HDTV.

DVR/Tivo (Digital Video Recorder) – This stand alone device offers the capability of recording live television and replaying it later. Note: some cable or satellite receivers now have this feature built-in, which eliminates the need of having an extra box. See the example under "HD Satellite" for this feature.

Cable Multifunction DVR (MF)

HD Cable Multifunction DVR (HDMF)
Media PC (PC)
Various TV Features

- 3D
- Lighting
- ABC (Auto Brightness Control)
- WiFi / Ethernet
- HDMI
- Component/optical audio
- USB
- 720p HD
- 1080i HD
- 1080p HD

Computer w/ Integrated Monitor – While the iMac is the most common type of this computer, there are PC version out there as well that have the CPU build into the monitor.

Server network

LCD - the most common type of flat screen monitor for computers

CRT – the old version of computer monitor (slightly curved glass)   Flat Panel CRT

Dual-view CRTs

Power Supply

Surge Protector aka "power strip"   Surge Protector (UPB)

Smart Power Shut-Off strip – these power strips use a main or "control" load to trigger the shut down of other associated plug loads. For instance, a TV can be plugged into the "control" and other associated devices (VCR,DVD or Satellite receiver) can be plugged in to the rest of the sockets. Once the TV is turned off, all power going to the other devices is automatically cut-off, thus reducing the phantom power.

Cable Router/Modem – This device connects to the wall through a round coaxial cable **and then to**

DSL Modem – this devices connects to a phone jack and then to a wired/wireless router

Cable Modem and Router with Wireless

Dial up – utilizes a connection from the phone jack on the wall directly to the modem built into a computer. This is the slowest way to connect to the internet.

External Hard drive – used for extra storage.

Inkjet Printer   **Laser Printer** – Will usually indicate that it is Laser on the printer.

Multi-function Device – these devices usually have the following capabilities: print, fax, copy and scan. Their printers can be laser or inkjet based.

C.2 Digital Data Collection Procedure Guide

This document is designed to serve as a step-by-step on-site procedure guide for the California Lighting and Appliance Saturation Study to accompany the digital site form on the Apple iPad. A digital version of the procedure guide was stored on each iPad used for the study. Additionally, this procedure guide was accompanied by a categorized equipment guide that included pictures and descriptions of the equipment and lighting choices inventoried during this study.

"Form" page [not included with on-site data]

The majority of the data fields on this page should be pre-populated from the scheduling/tracking information. After arriving on-site and greeting the homeowner go through the contents of this page and confirm the following with the homeowner:

- Customer name
- Site address (street, city, zip code)
- Customer telephone numbers

If the customer reports any information different from the pre-populated information, update the fields to represent the customer reported data.

Record:

- Any updates observed on-site regarding the address of the residence
- Any updates observed on-site regarding the phone number
- Any other scheduling notes

Hit "Go" to move from Home page to CLASS page
To return to Home page, hit "CLASS" from the CLASS page

"CLASS" page [in Main Table]

- **SiteID**   Site Identification
- **C_BathNum** Number of baths- customer reported during recruiting call
- **C_BedNum** Number of bedrooms- customer reported during recruiting call
- **C_BldType** Building Type- customer reported during recruiting call
- **Strata**   CLASS Strata
- **CZ_Group** T24 Climate Zone Group
- **CARE_FERA**CARE_FERA status
- **Strat_wt**   Case weight based on stratification

This page is designed to address all the homeowner input questions. It covers questions from other pages within the form that require answers provided by the homeowner.

Demographics questions included the following:

- **[DEM_11]** How many square feet of living space are there in your residence, including bathrooms, foyers and hallways? (Exclude garages, basements and unheated porches.)
    - o Open text entry field
        - If answer is an estimate, mark the "estimate" box
- Don't Know

- **[DEM_12 / Type of Residence]** Which of the following types of housing units would you say best describes your home? Is it a…
    - o Single-family detached house
    - o Single-family attached house (townhouse, row house, usually 2-4 units with multiple stories per unit, excluding duplex)
    - o Duplex (2 unit single story structure)
    - o Building with 2-4 living units,
    - o Building with 5 or more living units
    - o Mobile home or house trailer
    - o **[DEM_12_OTHER]** Other (Description required)

- **[DEM_13]** Number of stories above-grade
    - o Drop down choices: 1, 1.5, 2, 2.5, 3
    - o Open text entry field

- **[DEM_14]** Who is your Electric Utility Provider?
    - o PG&E
    - o SCE
    - o SDG&E
    - o Other (Description required)

- **[DEM_15]** Who is your Gas Utility Provider?
    - o PG&E
    - o SDG&E
    - o SoCalGas
    - o Other (Description required)

- **[DEM_1 / Rent or Own]** Do you or members of your household own this home or do you rent?
    - o   Own/Buying
    - o   Rent / Lease
    - o   Occupied without payment of rent
    - o   **[DEM_1_OTHER]** Other (Description required)

- **[DEM_2 / Home Age Range]** About when was this building first built?
    - o   Before the 1970s
    - o   1970s
    - o   1980s
    - o   1990-1994
    - o   1995-1999
    - o   2000s
    - o   Refused
    - o   Don't know

- **[DEM_3 / Total People in Home]** Including yourself, how many people currently live in your home year-round?
    - o   Drop down choices 0, 1, 2, 3, 4, 5, 6, 7, 8, and >8
    - o   Don't know
    - o   Refused

"Customer Survey" portal:

Hit the "Enter Customer Survey" button to reach the following CLASS items-At this point the Field Surveyor will present the site contact with the tablet device and explain how to go through the "Customer Survey" portion by tapping the appropriate answer choices for each question and how to hit complete upon finishing the "Customer Survey". The Field Surveyor will also explain that once they complete the "Customer Survey" portion, those pages will become permanently hidden to the field surveyor. If the interviewee is unable or uncomfortable using the tablet device the Field Surveyor will conduct the "Customer Survey" and complete the response choices provided by the interviewee.

- **[DEM_4]** Which of the following best describes your age? (Radio Button choice entry format with only one allowable option)
    - Less than 18 years old,
    - 18 to 24,
    - 25 to 34,
    - 35 to 44,
    - 45 to 54,
    - 55 to 64, or
    - 65 or older?
    - Refused
    - Don't know

- Including yourself, how many of the people currently living in your home year-round are in the following age groups? [TOTAL SHOULD EQUAL NUMBER OF YEAR-ROUND RESIDENTS ENTERED ABOVE]
    - o **[DEM_5A]** Less than 18 years old
        - o [Drop Down choices 0, 1, 2, 3, 4, 5, 6, 7, 8, >8, Don't Know, Refused, Other (Description Required)]
    - o **[DEM_5B]** 18 to 24
        - o [Drop Down choices 0, 1, 2, 3, 4, 5, 6, 7, 8, >8, Don't Know, Refused, Other (Description Required)]
    - o **[DEM_5C]** 25 to 34
        - o [Drop Down choices 0, 1, 2, 3, 4, 5, 6, 7, 8, >8, Don't Know, Refused, Other (Description Required)]
    - o **[DEM_5D]** 35 to 44
        - o [Drop Down choices 0, 1, 2, 3, 4, 5, 6, 7, 8, >8, Don't Know, Refused, Other (Description Required)]
    - o **[DEM_5E]** 45 to 54
        - o [Drop Down choices 0, 1, 2, 3, 4, 5, 6, 7, 8, >8, Don't Know, Refused, Other (Description Required)]
    - o **[DEM_5F]** 55 to 64
        - o [Drop Down choices 0, 1, 2, 3, 4, 5, 6, 7, 8, >8, Don't Know, Refused, Other (Description Required)]
    - o **[DEM_5G]** 65 or older
        - o [Drop Down choices 0, 1, 2, 3, 4, 5, 6, 7, 8, >8, Don't Know, Refused, Other (Description Required)]

- **[DEM_6]** What is the highest level of education you have completed? (Radio Button choice entry format with only one allowable option)
    - o No schooling
    - o Less than high school
    - o Some high school
    - o High school graduate or equivalent (e.g., GED)
    - o Trade or technical school
    - o Some college
    - o College degree
    - o Some graduate school
    - o Graduate degree/Professional degree
    - o Post Graduate
    - o Refused
    - o Don't know

- **[DEM_7 / Income]** What was your annual household income from all sources in 2011, before taxes? (Radio Button choice entry format with only one allowable option)
    - o Less than $20,000 per year
    - o 20 to less than $30,000
    - o 30 to less than $40,000
    - o 40 to less than $50,000
    - o 50 to less than $60,000
    - o 60 to less than $75,000
    - o 75 to less than $100,000
    - o 100 to less than $150,000
    - o 150 to less than $200,000
    - o $200,000 or more
    - o Refused
    - o Don't know

[DEM_8] Are you Spanish/Hispanic/Latino? (Radio Button choice entry format with only one allowable option)
- o Yes
- o No
- o Refused
- o Don't know

How would you describe your race? (Radio Button choice entry format with no limit number of selections)

- o **[DEM_9A]** White
- o **[DEM_9B]** Black or African-American
- o **[DEM_9C]** American Indian or Alaska Native
- o **[DEM_9D]** Asian Indian
- o **[DEM_9E]** Chinese
- o **[DEM_9F]** Japanese
- o **[DEM_9G]** Korean
- o **[DEM_9H]** Vietnamese
- o **[DEM_9I]** Filipino
- o **[DEM_9J]** Native Hawaiian
- o **[DEM_9K]** Guamanian or Chamorro
- o **[DEM_9L]** Samoan
- o **[DEM_9M]** Other Asian
- o **[DEM_9N]** Other Pacific Islander
- o **[DEM_9O]** Hispanic or Latino
- o **[DEM_9_P / DEM_9_OTHER]** Other (describe)
- o **[DEM_9_REF]** Refused
- o **[DEM_9_DK]** Don't Know

[DEM_10 / Primary Language] What is the primary language spoken in your home? (Radio Button choice entry format with only one allowable option)

- o English
- o Spanish
- o Mandarin
- o Cantonese
- o Tagalog
- o Korean
- o Vietnamese
- o Russian
- o Japanese
- o **[DEM_10_OTHER]** Other (Description Required)
- o Refused
- o Don't know

At this point there is the option to hit the "complete" button. If this is done a window will pop-up saying: "Thank You! Hit "Cancel" if you want to change any answers." If Interviewee hit's "OK" the customer survey will close and become inaccessible until the site data is uploaded to the Master Database on the DNV GL Network which Field Surveyors do not have access to. If the interviewee hits "cancel" the window will close and they can continue editing their answer choices for the customer survey.

"CLASS" page continued...

[DW_YN] Do you have a dishwasher?
- o Yes
- o No

[CW_YN] Do you have a clothes washer?
- o Yes
- o No

[CD_YN] Do you have a clothes dryer?
- o Yes
- o No

[SPA_3] Do you have a pool?
- o No
- o Yes
  - o **[SPA_4]** How is the Pool Heated?
    - ▪ Natural Gas
    - ▪ Electric
    - ▪ Propane
    - ▪ Solar
    - ▪ Solar/Electric
    - ▪ Solar/Natural Gas
    - ▪ Solar/Propane
    - ▪ None

  - o **[SPA_5]** How old is the pool pump?
    - ▪ Drop down choices for ages 1-24, $\geq$25
    - ▪ Don't know

[SPA_1] Do you have a spa?

- o   No
- o   Yes

  - • **[SPA_2]** How is the spa heated?
    - • Natural Gas
    - • Electric
    - • Propane
    - • Solar
    - • Solar/Electric
    - • Solar/Natural Gas
    - • Solar/Propane
    - • None

[REF_COUNT] How many refrigerators do you have?

- o   Drop down choices numbers 1-5
- o   Open text entry field

[FR_COUNT] How many freezers do you have?

- o   Drop down choices numbers 1-5
- o   Open text entry field

[TV_COUNT] How many tvs do you have?

- o   Drop down choices numbers 1-5
- o   Open text entry field

[COMP_COUNT] How many computers do you have?

- o   Drop down choices numbers 1-5
- o   Open text entry field

[LT_STORAGE_YN] Do you have any light bulbs in storage?

- o   Yes
- o   No

"HVAC/DHW" page

Identify with homeowner:
- The primary heating system used in the home
- Any other heating systems used in the home

After determining the primary heating system
- Ask the site contact for permission to inspect the different heating systems
  - **[HS_8]** In the case of multiple systems ask the homeowner to estimate what percentage of the total household heating is provided by each system.
    - If they truly do not know probe with frequency-of-use questions and then estimate the percentages based on their responses.
    - Take into account the Btu output for the different units when making estimates.

Once the primary system has been determined:
- **[TSTAT / Type of Thermostat]** Locate the thermostat used to control the primary system and indicate the thermostat type from the drop-down list of choices- Note the thermostat type is only identified for the primary heating and cooling (when applicable) system type.
  - Digital-unknown
  - Digital-non programmable
  - Digital- 2 day
  - Digital- 5 day
  - Digital- 7day
  - Hybrid
  - Mechanical
  - **[TSTAT_OTHER]** Other

- **[HS_1 / Heating System Type]** Indicate the primary system type from the drop-down choices
  - Split Forced Air Furnace
  - Package Furnace/AC
  - Wall Furnace
  - Hydronic System
  - Split Heat pump w/ electronic supplement
  - Split Heat pump w/o electronic supplement
  - Package Heat Pump
  - Electronic Resistance Wall Unit
  - Gravity Furnace
  - Ceiling Cable
  - Electric Baseboards
  - Pellet Stove

- o Fireplace
- o Electric Space Heater
- o Forced Air Furnace (No AC)
- o Common Building System: (description text field)
- o Wood Stove
- o **[HS_1_OTHER]** Other: (description text field)

- For any of the above types:
- **[HS_2 / Heating System Fuel Type]** Indicate fuel type:
  - o Natural Gas
  - o Electric
  - o Propane
  - o Solar
  - o Wood
  - o **[HS_2_OTHER]** Other: (description required)

- **[HS_7]** Indicate unit location:
  - o Garage
  - o Attic
  - o Basement
  - o Conditioned Space o   Mechanical Closet o   Roof
  - o Crawlspace
  - o **[HS_7_OTHER]** Other: (description required)

- **[HS_9]** Indicate if there is a fresh air ventilation feature associated with the primary heating system
  - o Yes
  - o No
  - o Don't Know
  - o Not Applicable

- **[HS_10 / Manufacturer]** Heating System Manufacturer
    - o (Text field for Manufacturer)
    - o DK
    - o NA

- **[HS_11 / Model Number]** Heating System Model Number
    - o (Text field for Model Number)
    - o DK
    - o NA

- **[HS_12]** Look for a manufacture date on the heating system nameplate and note the date on the digital site form or indicate "DK" if a manufacture date is not included (sometimes the first two or four digits of a serial number will indicate the manufacturer date. Use such a number if the perceived condition of the unit matches the vintage indicated by the serial number digits.)
    - o **[HS_MONTH]** Manufacturer Month
        - (1,2,3,…12)
        - DK
    - o **[HS_YEAR]** Manufacturer Year
        - (four digit numerical entry greater than 1900 required)
        - DK
        - NA

- **[HS_13]** Supply Fan Control Type:
    - o   Constant speed
    - o   Variable speed
    - o   No Fan

- **[HS_14]** If the unit's fuel source is gas or propane enter the rated input in kBtu/Hr (this question will not appear if the unit's fuel source is electric, wood, solar or other).
    - o   (Numeric value restricted field)
    - o   DK
    - o   NA

- **[HS_15]** If the unit's fuel source is gas or propane enter the rated output in kBtu/Hr (this question will not appear if the unit's fuel source is electric, wood, solar or other).
  - o (Numeric value restricted field)
  - o DK
  - o NA

- **[HS_16]** If the unit's fuel source is electric enter the max load amperage or kW rating
  - o (Numeric value restricted field)
  - o DK
  - o NA

- **[HS_23]** If the unit's fuel source is wood, solar, or other describe the Input quantity of the fuel source as reported by the equipment or the site contact
  - o (open text field)
  - o DK
  - o NA

- **[HS_18]** Examine the heating unit's nameplate and/or an Energy Guide Sticker for an efficiency rating and indicate the value listed below
  - o (Numeric value restricted field)
  - o DK
  - o NA

- **[HS_19]** For all entered efficiency values enter the efficiency rating type of the value (for DK, or NA answers to the efficiency question this question will default to DK)
  - o AFUE
  - o HSPF
  - o DK
  - o Other (description required)

- **[HS_AC]** Inspect the heating unit for the presence of an Evaporator Coil (generally only found on unit's with an air handler)
  - o Yes
  - o No
  - o Not Applicable

- **[HS_20]** For all Evaporator Coils found enter the Manufacturer listed on the coil's nameplate
    - o   (open text field)
    - o   DK
    - o   NA

- **[HS_21]** For all Evaporator Coils found enter the Model Number listed on the coil's nameplate
    - o   (open text field)
    - o   DK
    - o   NA

- **[HS_22]** For all Evaporator Coils found inspect the nameplate for any indication of a Thermal Expansion Valve (TXV Installed)
    - o   Yes
    - o   No
    - o   DK
    - o   NA

- **[HS_2]** For Fireplace heating system types answer the following questions
    - o   Determine the primary fuel type
        - ▪   Natural Gas
        - ▪   Propane
        - ▪   Electric
        - ▪   Wood
        - ▪   Other (description required)

    - o   **[HS_3]** Ask the site contact to indicate the frequency the system is used
        - ▪ Daily
        - ▪ 3-5 days/week
        - ▪ 1-2 days/week
        - ▪ <1 day/week

    - o   **[HS_4]** Heat exchanger present (usually found above the fireplace and includes an air register or vent of some type)
        - ▪ Yes
        - ▪ No
        - ▪ Not Applicable

- o **[HS_5]** Record the model number and a picture of the model number if a heat exchanger is present
    - (Text field for Model Number)
    - DK
    - NA

- o **[HS_6]** Indicate what floor the fireplace is located on
    - 1st Floor
    - 2nd Floor
    - 3rd Floor

- o Take a picture of the Heating Unit's nameplate (if the nameplate is not accessible take a picture of the unit)
    - If the heating system or thermostat does not fall under any of the provided category types record a detailed description of the unit and take a picture of the unit showing it in its surroundings.

Cooling System

- **[CS_1 / Cooling System Type]** Locate and examine the AC unit to determine the type of system
    - o Split System AC
    - o Package System AC
    - o Split System Heat Pump
    - o Package System Heat Pump
    - o Window/Wall AC
    - o Window Wall Heat Pump
    - o Portable/Stand Alone AC
    - o Common Building System:
    - o Evaporative Cooler (Swamp Cooler)
    - o [CS_1_OTHER] Other:

- **[CS_2]** Ask site contact the frequency of use during the cooling season:
    - o Daily
    - o 3-5 days/week
    - o 1-2 days/week
    - o <1 day/week

- **[CS_3]** Percent of house served
    - o (Open Text field)
    - o 0%
    - o 25%
    - o 50%
    - o 75%
    - o 100%
    - o Don't Know

- **[CS_4 / Manufacturer]** Enter the AC Unit's Manufacturer
    - o (open text field)
    - o DK
    - o NA

- **[CS_5 / Model Number]** Enter the AC Unit's Model Number
    - o (open text field)
    - o DK
    - o NA

- **[CS_6]** Look for a manufacture date on the AC system nameplate and note the date on the digital site form or indicate "DK" if a manufacture date is not included (sometimes the first two or four digits of a serial number will indicate the manufacturer date. Use such a number if the perceived condition of the unit matches the vintage indicated by the serial number digits.)
    - o **[CS_MONTH]** Manufacturer Month
        - (1,2,3,…12)
        - ▪ DK

    - o **[CS_YEAR]** Manufacturer Year
        - ▪ (four digit numerical entry greater than 1900 required)
        - ▪ DK
        - ▪ NA

- **[CS_7]** Look at the AC unit's model number and condenser the cooling capacity (within the model number a number divisible by 6 or 12, the quotient of which is the cooling capacity in half tons or tons respectively
    - o (open text field)
    - o .5
    - o 1
    - o 1.5
    - o 2
    - o 2.5
    - o 3
    - o 3.5
    - o 4
    - o 4.5
    - o 5
    - o DK
    - o NA

- **[CS_8]** Examine the AC unit's nameplate and/or an Energy Guide Sticker for an efficiency rating and indicate the value listed
    - o (open text field)
    - o DK
    - o NA

- **[CS_9]** For all entered efficiency values enter the efficiency rating type of the value (for DK, or NA answers to the Efficiency question this question will default to DK)
    - o SEER
    - o EER
    - o HSPF
    - o NA
    - o **[CS_9_OTHER]** Other (describe)

- **[CS_10]** Enter the refrigerant type listed on the AC units nameplate
    - o R22
    - o R410a
    - o R134a
    - o Water
    - o **[CS_10_OTHER]** Other (description required)

Take a photo of the AC unit's nameplate (take a picture of the unit if the nameplate is not present)

If the AC unit does not fall under any of the provided category types record a detailed description of the unit and take a picture of the unit showing it in its surroundings

Domestic Hot Water

Locate the water heater

- **[DHW_1]** Determine the type of water heater from the drop down list
    - o Gas Storage
    - o Propane Storage
    - o Electric Storage
    - o Gas Instantaneous
    - o Elec. Instantaneous
    - o Heat pump
    - o Solar w/Gas Storage
    - o Solar w/Elec Storage
    - o Solar w/Propane Storage
    - o Solar only
    - o Common Boiler
    - o Combined Hydronic DHW & HVAC
    - o Common Building:
    - o **[DHW_1_OTHER]** Other:

- **[DHW_2]** Customer-reported Age
    - o (open text field)
    - o Don't Know
    - o NA

Locate the nameplate on the exterior of the water heater to establish information about the specific model unit. Record:

- **[DHW_3 / Manufacturer]** Manufacturer
    - o (open text field)
    - o DK
    - o NA

- **[DHW_4 / Model Number]** Model number
    - o (open text field)
    - o DK
    - o NA

- **[DHW_6]** Look for a manufacture date on the Water Heater's nameplate and note the date on the digital site form or indicate "DK" if a manufacture date is not included (sometimes the first two or four digits of a serial number will indicate the manufacturer date. Use such a number if the perceived condition of the unit matches the vintage indicated by the serial number digits.)

- **[DHW_MONTH]** Manufacturer Month
    - o (1,2,3,…12)
    - o DK

- **[DHW_YEAR]** Manufacturer Year
    - o (four digit numerical entry greater than 1900 required)
    - o DK
    - o NA

- **[DHW_7]** For all gas and propane water heaters indicate the kBtu input value
    - o (open text field)
    - o DK
    - o NA (this will be the default answer for all electric units)

- **[DHW_8]** For all electric water heaters indicate the kW input value
    - o (open text field)
    - o DK
    - o NA (this will be the default answer for all gas and propane units)

- **[DHW_14]** For all non-instantaneous units enter the rated tank size (in gallons)
    - o (open text field)
    - o Don't Know
    - o NA (this will be the default entry for all instantaneous units)

Examine the exterior of the water heater unit and its connections for external insulation and auxiliary systems.

- **[DHW_11 / Tank Wrap]** If the unit type is "Storage" check for and record the presence of an external insulation jacket around the storage tank and the physical location of the system
    - o   Yes, conditioned space
    - o   Yes, unconditioned space
    - o   No, conditioned space
    - o   No, unconditioned space

- **[DHW_10]** If the unit type is "Storage" inspect the unit nameplate for an indication of the internal "R-value" of the unit and record the finding
    - o   (open text field)
    - o   Don't Know
    - o   NA

- **[DHW_12]** For all water heating units look for the presence of hot water pipe insulation. Determine and record the presence of insulated piping (R-4 or better) on the first four feet of piping coming off the unit (if less than 4' of piping is exposed and all exposed hot water piping is insulated indicate this as a "Yes"
    - o   Yes, conditioned space
    - o   Yes, unconditioned space
    - o   No, conditioned space
    - o   No, unconditioned space

- **[DHW_13]** Record the presence of a hot water recirculation system as well as the recirculation pump control type
    - o   None
    - o   Continuous
    - o   Temperature
    - o   Timer
    - o   Timer/Temperature
    - o   **[DHW_13_OTHER]** Other (description required)

Photograph the nameplate
- If the water heating unit does not fall under any of the provided category types record a detailed description of the unit and take a picture of the unit showing it in its surroundings

"Appliances" page

Dishwasher

- **[DW_YN]** While still in the kitchen, locate the dishwasher if one is present. The nameplate is usually located on the inside of the door or on the interior wall of the dishwasher near the door opening. Record:

    - **[DW_4]** Customer-reported Age
      - o   (open text field)
      - o   Don't Know
      - o   NA

    - **[DW_1]** Manufacturer
      - o   (open text field)
      - o   Don't Know
      - o   NA

    - **[DW_2]** Product Line
      - o   (open text field)
      - o   Don't Know
      - o   NA

    - **[DW_3]** Model number
      - o   (open text field)
      - o   Don't Know
      - o   NA

    - **[DW_5]** Manufacture date (if present on nameplate or obvious within serial number)
      - o   **[DW_MONTH]** Month
        - (1, 2, 3, . . . 12)
        - DK

      - o   **[DW_YEAR]** Year
        - (four digit numerical entry greater than 1900 required)
        - DK
        - NA

- **[DW_6]** Presence of an ENERGY STAR label
  - o   Yes
  - o   No
  - o   Not Applicable

- **[DW_7]** Nameplate amps
  - o   (open text field)
  - o   DK

Clothes Washer and Dryer
- **[CW_YN]** Locate the clothing washer and dryer if present in the home. For the washer record:
  - **[CW_1]** Type of unit
    - o   Top loading
    - o   Front loading
    - o   [CW_1_OTHER] Other (description required)

  - **[CW_5]** Customer-reported Age
    - o   (open text field)
    - o   Don't Know
    - o   NA

  - **[CW_2 / Manufacturer]** Manufacturer
    - o   (open text field)
    - o   Don't Know
    - o   NA

  - **[CW_3]** Product Line
    - o   (open text field)
    - o   Don't Know
    - o   NA

  - **[CW_4 / Model Number]** Model number
    - o   (open text field)
    - o   Don't Know
    - o   NA

- **[CW_6]** Manufacture date (if present on nameplate or obvious within serial number)
  - o **[CW_MONTH]** Month
  - o (1, 2, 3, . . . 12)
  - o DK

  - o **[CW_YEAR]** Year
  - o (four digit numerical entry greater than 1900 required)
  - o DK
  - o NA

- **[CW_7]** Presence of an ENERGY STAR label
  - o Yes
  - o No
  - o Not Applicable

- **[CW_8]** Nameplate amps
  - o (open text field)
  - o DK
  - o NA

- Stacked Unit?
  - ▪ Function to indicate stacked unit and copies washer entries to dryer leaving Dryer fuel and Dryer ENERGY STAR question to be answered by Surveyor. (Not stored as a variable.)

- **[CD_YN]** If a clothes dryer is present record:
  - **[CD_5]** Customer-reported Age
    - o (open text field)
    - o Don't Know
    - o NA

  - **[CD_2]** Manufacturer
    - o (open text field)
    - o Don't Know
    - o NA

- **[CD_3]** Product Line
  - o (open text field)
  - o Don't Know
  - o NA

- **[CD_1]** Fuel type
  - o Natural Gas
  - o Electric
  - o Propane

- **[CD_4]** Model number
  - o (open text field)
  - o Don't Know
  - o NA

- **[CD_6]** Manufacture date (if present on nameplate or obvious within serial number)
  - ▪ **[CD_MONTH]** Month
    - ▪ (1, 2, 3, . . . 12)
      - • DK

  - ▪ **[CD_YEAR]** Year
    - • (four digit numerical entry greater than 1900 required)
    - • DK
    - • NA

- **[CD_7]** Presence of an ENERGY STAR label
  - ▪ Yes
  - ▪ No
  - ▪ Not Applicable

Range/Oven
- **[RO_1 / Range Fuel Type]** Record range fuel:
  - o Electric
  - o Gas
  - o Propane

- **[RO_2 / Oven Fuel Type]** Record oven fuel:
    - o Electric
    - o Gas
    - o Propane

"Ref/Freezer" page

- Locate the refrigerators and freezers in the home.
- Some homes may have more than one refrigerator or freezer so ask the homeowner if there are auxiliary units outside of the kitchen area.
- o **[RF_1]** Indicate the location of the refrigerator or freezer:
    - o Conditioned Space
    - o Garage/Unconditioned Space

- **[RF_2 / Refrigerator Type]** Indicate the type of refrigerator unit you are inventorying:
    - o Standard Top Freezer
    - o Side-by-Side
    - o Single Door
    - o Bottom Freezer
    - o Compact
    - o Built-in
    - o Refrigerator Only
    - o **[RF_2_OTHER]** Other (description required)

Using the nameplate information found inside of the conditioned compartment, record the following:
- o **[RF_7]** Usage type
    - o Primary-always
    - o Secondary-always
    - o Secondary-25%
    - o Secondary-50%
    - o Secondary-75%
    - o Secondary-0%
    - ▪ **[RF_7_OTHER]** Other (description required)

- o **[RF_5]** Customer Reported Age
  - (1, 2, 3, 4, … 24, $\geq$25)
    - o Don't Know

- o **[RF_3 / Manufacturer]** Manufacturer
  - o (open text field)
  - o Don't Know
  - o NA

- o **[RF_4 / Model Number]** Model number
  - o (open text field)
  - o Don't Know
  - o NA

- o **[RF_6 / Manufacture Date]** Manufacture date (if present on nameplate or obvious within serial number)
  - ▪ **[RF_MONTH]** Month
    - • (1, 2, 3, . . . 12)
    - • DK
  - ▪ **[RF_YEAR]** Year
    - • (four digit numerical entry greater than 1900 required)
    - • DK
    - • NA

Freezer
- • **[RF_8]** Size (Cubic feet)
  - o Very small (<13 cu ft)
  - o Small (13-16 cu ft)
  - o Medium (17-20 cu ft)
  - o Large (21-23 cu ft)
  - o Extra Large (>23 cu ft)

- o **[RF_9]** Type of defrost
  - o Frost free
  - o Partial frost free
  - o Manual

- o **[RF_10]** ENERGY STAR label present
    - o Yes
    - o No
    - o Don't Know

- o **[RF_11]** Any options present:
    - o None
    - o Icemaker
    - o Water Service
    - o Water & Ice in-door
    - **[RF_11_OTHER]** Other describe

- o **[RF_12]** Nameplate amps
    - o (open text field)
    - o DK
    - o NA

- For each freezer unit, indicate:
    - o **[FR_1]** Location
        - Conditioned space
        - Garage/Unconditioned space

    - o **[FR_2]** Type
        - Upright
        - Chest
        - **[FR_2_OTHER]** Other (description required)

    - o **[FR_5]** Customer Reported Age
        - (1, 2, 3, 4, … 24, $\geq$25)
        - Don't Know

    - o **[FR_3]** Manufacturer
        - (open text field)
        - Don't Know
        - NA

- o **[FR_4]** Model number
  - (open text field)
  - Don't Know
  - NA

- o **[FR_6]** Manufacture date (if present on nameplate or obvious within serial number)
  - **[FR_MONTH]** Month
    - (1, 2, 3, . . . 12)
    - DK

  - **[FR_YEAR]** Year
    - (four digit numerical entry greater than 1900 required)
    - DK
    - NA

- o **[FR_7]** Size (Cubic feet)
  - Small (<13 cu ft)
  - Medium (13-16 cu ft)
  - Large (>16 cu ft)

- o **[FR_8]** Type of defrost
  - Manual
  - Frost free

- o **[FR_9]** ENERGY STAR label present
  - Yes
  - No
  - Don't Know

- o **[FR_10]** Nameplate amps
  - (open text field)
  - DK
  - NA

"Manual J" page

- **[MJ_1]** Observe and indicate the exterior wall framing type of the home.
  - o 2 x 4 Wood
  - o 2 x 6 Wood
  - o Masonry
  - o 2 x 4 Steel Framed
  - o 2 x 6 Steel Framed
  - o Manufactured Home
  - o Don't Know
  - o **[MJ_1_OT]** Other (description required)

- **[MJ_2]** Indicate the percentage of exterior walls that are insulated (this will usually be 0% or 100%, in some instances a home will have had an addition and the newly added exterior walls will be insulated while the remaining exterior walls are not)
  - o (open field limited to numeric values)
  - o Drop Down choices (0%, 25%, 50%, 75%, 100%)
  - o Don't Know
  - o **[MJ_2_OT]** Other

- **[MJ_3]** Indicate the insulation R-value
  If the home is older than 1978, ask the homeowner if they are aware of insulation in the exterior walls. If they don't know, take the plate cover off of an AC outlet located on an exterior wall of the home. Using a wooden skewer try to probe the wall cavity for signs of insulation. If no signs are observed and the home was built before 1978 indicate no insulation. If the home was built between 1978 and 2004 and the exterior wall framing type is 2x4 wood framed, indicate R-11 insulation. If the exterior wall framing type is 2x6, indicate R-19. If the home was built after 2005 and is a 2x4 wood framed home, indicate R-13. If any other framing type is present in the home, indicate what you know about the exterior wall insulation in the notes portion of this page.
  - o R-0/None
  - o <R-11
  - o R-11
  - o R-13
  - o R-14
  - o R-15
  - o R-19
  - o DK
  - o **[MJ_3_OTHER]** Other (description required)

- **[MJ_3A]** Indicate how the insulation R-value was identified
    - o Vintage and frame type default
    - o Homeowner input
    - o Physical Inspection
    - o Not Applicable
    - o **[MJ_3A_OTHER]** Other (description required)

Access the attic if one is present.
- o Take a photograph of the attic insulation and attempt to show the insulation thickness with a ruler or tape measure

- o **[MJ_4]** Record the type of insulation in the attic. If more than one type of insulation is present inventory the primary insulation type.
    - Batt
    - Blown-in Loose
    - Combination Batt/Loose
    - NA Conditioned Space Above
    - DK
    - **[MJ_4_OTHER]** Other

- o **[MJ_5]** If Blown-in/loose insulation, indicate the type (if other this will default to N/A):
    - Loose Fiberglass
    - Cellulose
    - Rock-wool
    - Vermiculite
    - Don't Know
    - N/A
    - **[MJ_5_OTHER]** Other (description required)

- o **[MJ_6]** Record the inches of insulation in the attic.
    - (open text field)
    - Don't Know
    - N/A
    - **[MJ_6_OT]** Other

Walk around the perimeter of the home and observe the window types. For the predominant window type, indicate:

o   **[MJ_8]** Frame type
- Metal
- Wood
- Vinyl
- Don't Know
- N/A
- **[MJ_8_OTHER]** Other (description required)

o   **[MJ_9]** Number of panes
- Single
- Double
- Triple
- Don't Know
- N/A
- **[MJ_9_OTHER]** Other (description required)

o   **[MJ_10]** Presence of low-emissivity coating:
- Yes
- No
- Don't Know
- **[MJ_10_OT]** Other

o   **[MJ_11]** Presence of storm windows
- Yes
- No
- Don't Know
- **[MJ_11_OT]** Other

o   **[MJ_12]** Window area
- Very small < 5% of Homes
- Typical (covers 90% of all single family homes)
- Very Large > 95% of Homes
- Don't Know
- **[MJ_12_OTHER]** Other (description required)

- o **[MJ_13]** Overall Window Shading
  - Some (less than 20% of windows have significant shading)
  - Average (20-80% of windows have significant shading)
  - Most (80+% of windows have significant shading)
  - DK
  - **[MJ_13_OTHER]** Other

- o **[MJ_14]** Foundation Type
  - Basement (unconditioned)
  - Basement (conditioned)
  - Crawlspace
  - Slab
  - N/A (Over other conditioned space)
  - DK
  - **[MJ_14_OTHER]** Other (description required)

- o **[MJ_15]** Foundation Insulation
  - None
  - Perimeter
  - Under Floor
  - Partial
  - Perimeter and Under Floor
    - Under Slab
    - Don't Know
    - N/A

  - o **[MJ_16]** % of Ducts in Unconditioned Attic
    - (open field limited to numeric values)
    - Drop Down choices (0%, 25%, 50%, 75%, 100%)
    - Don't Know

  - o **[MJ_17]** % of Ducts in Unconditioned Basement or Crawlspace
    - (open field limited to numeric values)
    - Drop Down choices (0%, 25%, 50%, 75%, 100%)
    - Don't Know

- o **[MJ_18]** Duct Insulation
  - None
  - R-1
  - R-2
  - R-4.2
  - R-6
  - R-8
  - >R-8
  - Don't Know
  - N/A

- o **[MJ_19]** Duct Inspection
  - Conditioned Space
  - Tight
  - Average
  - Leaky
  - Very Leaky
  - Don't Know
  - N/A

Take photos of the front of the residence

"TV" page

For each television present in the home, record:
- **[TV_1]** Room location
  - o Master Bedroom
  - o Bedroom
  - o Office
  - o Living Room
  - o Kitchen
  - o Dining Room
  - o Garage
  - o Hall/ Entrance o Bath- room o Laundry Room o   Basement
  - o Closet
  - o Exterior
  - o **[TV_1_OTHER]** Other

- **[TV_2]** Product type (refer to the equipment guide for guidance)
    - LCD
    - CRT (Cathode Ray Tube)
    - PDP (Plasma)
    - LED
    - DLP (Projection)
    - Unknown Flat Panel
    - **[TV_2_OTHER]** Other
    - Don't know

- **[TV_3]** High Definition?
    - Yes
    - No

- **[TV_4]** Manufacturer
    - Record Manufacturer
    - DK
    - NA

- **[TV_5]** Model number
    - Record Model Number
    - DK
    - NA

  - **[TV_5_MODEL_NAME]** Model Name?

  - **[TV_6]** Nameplate amps o
    - Record Amps
    - DK
    - NA

  - **[TV_7]** TV connected to a plug strip?
    - Yes
    - No

- **[TV_8]** Details on external power supply
  - On/Off Power Chord
  - Surge Protector
  - Surge Protector/UPB
  - Smart Power Shut-off Strip
  - Wall Outlet
  - Other

- **[TV_9]** Presence of an ENERGY STAR label
  - Yes
  - No
  - DK

- **[TV_10]** Diagonal screen size
  - <20"
  - 20"-35"
  - 36"-40"
  - 41"-45"
  - 46"-50"
  - 51"-55"
  - 56"-60"
  - 61"-65"
  - >66"

  - **[TV_11]** Aspect ratio
    - standard
    - widescreen
    - **[TV_11_OTHER]** other

- Additional features present
  - o **[TV_13_NONE]** None
  - o **[TV_13A]** 3D
  - o **[TV_13B]** Backlit LED Lighting
  - o **[TV_13C]** Smart TV
  - o **[TV_13D]** ABC (Auto Brightness Control)
  - o **[TV_13E]** WiFi/Ethernet
  - o **[TV_13F]** HDMI
  - o **[TV_13G]** Component/optical audio
  - o **[TV_13H]** USB
  - o **[TV_13I]** 720p HD
  - o **[TV_13J]** 1080i HD
  - o **[TV_13K]** 1080p HD
  - o **[TV_13_OTHER]** Other specify

- Types of connected devices
  - o **[TV_12_NONE]** None
  - o **[TV_12A]** VGC   Video Game Console
  - o **[TV_12B]** VCR   Video Cassette Recorder
  - o **[TV_12C]** DVD   DVD Player
  - o **[TV_12D]** BR   Blu-ray Player
  - o **[TV_12E]** HDS   HD Satellite
  - o **[TV_12F]** HDC   HD Cable
  - o **[TV_12G]** DTVC Digital TV Converter
  - o **[TV_12H]** DVR   DVR/Tivo (Stand alone)
  - o **[TV_12I]** MF   Cable Multifunction DVR
  - o **[TV_12J]** HDMF HD Cable Multifunction DVR
  - o **[TV_12K]** PC   Media PC
  - o **[TV_12L]** Internet Streaming
  - o **[TV_12M]** Other
  - o **[TV_12N]** SSAT Standard Satellite Box
  - o **[TV_12O]** SCBL Standard Cable Box
  - o **[TV_12_OTHER]** Other specify

Once this information has been documented about each TV in the home, ask the homeowner or site contact the following questions about each TV and document your answer:

- **[TV_14]** How old is the TV?
  - o Enter Age
  - o DK
  - o NA

- **[TV_15]** How many hours a week is the TV on?
  - o Enter Hours
  - o DK
  - o NA

- **[TV_16]** Did this TV replace an older TV?
  - o **[TV_17]** If so, what happened to the older TV?
    - ▪ Moved to another room
    - ▪ Given Away
    - ▪ Throw away/ Recycled
    - ▪ Stored/Not in use
    - ▪ **[TV_17_OTHER]** Other (explain)

- **[TV_18]** Where the TV was purchased?
  - o Retail Store
  - o Online
  - o **[TV_18_OTHER]** Other (explain)
  - o DK

- **[TV_18_STORES]** If purchased at retail store or online, enter store or website [open text]

- **[TV_19]** What the primary influence of the purchase decision was?
  - o Price
  - o Connectivity (HDMI, optical audio, WiFi, etc)
  - o Picture Quality
  - o Size
  - o Don't Know
  - o **[TV_19_OTHER]** Other (explain)

- **[TV_20]** Define the primary use of the TV?
  - Cable/Satellite/ DVR viewing
  - Internet/Digital Media (eg Netflix, PC media, etc)
  - Gaming
  - **[TV_20_OTHER]** Other (explain)

"Computer" page

- Ask the homeowner how many computers are in the home.
  - **[COMP_COUNT]** Record Quantity

- If more than two computers are present, ask the homeowner to specify the two most-used computers in the home.
  - For the two most-used computers present in the home observe the following:
    - **[COM_1]** Room location (for Laptops record current location of the laptop)
      - Master Bedroom
      - Bedroom
      - Office
      - Living Room
      - Kitchen
      - Dining Room
      - Garage
      - Hall/ Entrance
      - Bathroom
      - Laundry Room
      - Basement
      - Closet
      - **[COM_1_OTHER]** Other

- **[COM_2]** Product type (refer to the equipment guide for guidance)
  - Desktop Computer
  - Laptop/Notebook
  - Netbook
  - Computer w/Integrated Monitor (All-in-one)
  - Server Network
  - Tablet
  - **[COM_2_OTHER]** Other

- **[COM_3]** Manufacturer
  - Record Manufacturer
  - DK
  - NA

- **[COM_4]** Primary Monitor type(s)
  - Laptop/Integrated
  - Single LCD
  - Single CRT
  - Flat Panel CRT
  - Dual LCD
  - Dual CRT
  - Single Integrated LED
  - Single Integrated CRT
  - **[COM_4_OTHER]** Other

- **[COM_5]** Diagonal screen size of primary monitor
  - <11"
  - 11"-13.9"
  - 14"-15.9"
  - 16"-17.9"
  - 18"-19.9"
  - 20"-21"
  - >21"

- **[COM_6A]** Secondary Monitor type(s)
  - Laptop/Integrated
  - Single LCD
  - Single CRT
  - Flat Panel CRT
  - Dual LCD
  - Dual CRT
  - Single Integrated LED
  - Single Integrated CRT
  - **[COM_6A_OTHER]** Other

- **[COM_6]** Diagonal screen size of secondary monitor
  - <11"
  - 11"-13.9"
  - 14"-15.9"
  - 16"-17.9"
  - 18"-19.9"
  - 20"-21"
  - >21"

- **[COM_7]** Power supply type
  - On/Off Power Cord
  - Surge Protector
  - Surge Protector/UPB
  - Smart Power shut-off strip
  - Wall Outlet
  - **[COM_7_OTHER]** Other

- **[COM_8]** Presence of an ENERGY STAR label
  - Yes
  - No
  - Don't Know
  - **[COM_8_OTHER]** Other

- **[COM_9]** Router or Modem type
  - None
  - Cable, Ethernet Connect
  - Cable Wireless
  - DSL, Ethernet Connect
  - DSL, Wireless
  - Dial-up
  - **[COM_9_OTHER]** Other

- Devices connected to the computer with external power supplies
  - **[COM_10A]** Speakers
  - **[COM_10B]** External Hard Drive
  - **[COM_10C]** Inkjet Printer
  - **[COM_10D]** Laser Printer
  - **[COM_10E]** Copier
  - **[COM_10F]** Fax
  - **[COM_10G]** Scanner
  - **[COM_10I]** Multi-function Device Inkjet
  - **[COM_10J]** Multi-function Device Laser
  - **[COM_10H]** Webcam
  - **[COM_10K / COM_10_OTHER]** Other
  - **[COM_10_NONE]** None

- Devices connected to the computer without external power supplies
  - **[COM_11A]** Speakers
  - **[COM_11B]** External Hard Drive
  - **[COM_11C]** Scanner
  - **[COM_11D]** Webcam
  - **[COM_11E / COM_11_OTHER]** Other
  - **[COM_11_NONE]** None

Once this information has been documented about the computer, ask the homeowner or site contact the following questions and document your answer:
- **[COM_12]** How old is the computer?
  - Drop down with 1-24, >25, and open entry

- o **[COM_13]** On average how many hours is the computer on each day?
  - Drop down with 1-24 options and open entry

- o **[COM_14]** Did this computer replace another computer?
  - **[COM_15]** If so, what happened to the other computer?
    - Moved to another room
    - Given Away
    - Throw away/ Recycled
    - Storage/Not in use
    - **[COM_15_OTHER]** Other (explain)

  - **[COM_16]** Where was the computer purchased?
    - Retail Store
    - Online
    - **[COM_16_OTHER]**Other (explain)
    - DK/Gift

    - **[COM_16_Stores]** If purchased at a retail store or online, enter store or website [open text]

- **[COM_17]** What is the computer's primary use?
  - Browsing Internet
  - Home Office
  - Gaming
  - Email/Social Networking
  - All of the above
  - **[COM_17_OTHER]** Other

"Lighting" page

- Take a whole-house inventory of study participant's homes, recording information about every lamp installed inside and outside of each home.
- Count the fixture groups in a clock-wise direction from the entrance where you first walk into the room. Overhead lights will be counted by the location of their switch.
- For each lamp installed, record the following characteristics:
  - **[SPACE_NUMBER]** Location in home by room type
    - Kitchen
    - Kitchen w. eat
    - Living Room
    - Dining Room
    - Bedroom
    - Bathroom
    - Hall/Entry
    - Office
    - Basement
    - Laundry/Utility Rm
    - Garage
    - Closet
    - Outside
    - Porch/Patio
    - Outdoor Entry
    - Other

  - **[LT_1]** Control type
    - 01 - Switch (on/off)
    - 02 - Dimmer
    - 03 - 3 Way
    - 04 - Lit Switch
    - 05 - Motion Sensor
    - 06 - Photocell
    - 07 - Timer
    - 08 - Home Automation
    - 09 - Multi-switch
    - **[LT_1_OT]** Other (Describe)

- o **[LT_3]** Number of Fixtures
    - Record Number

- o **[LT_4]** Fixture type
    - 01 -Ceiling Fix
    - 02 -Floor/Table Lamp
    - 03 -Touchier
    - 04 -Wall Mounted
    - 05 - Recessed
    - 06 -Suspended
    - 07 -Ceiling Fan
    - 08 -Track Lighting
    - 09 -Desk Lamp
    - 10 -Garage Door
    - 11 -Under Counter
    - 12 -Stove Top
    - Other Hardwired
    - Other Plug-in
    - **[LT_4_OT]** Other specify

- o Secondary Control type (if any)
    - **[LT_2_S]** 01 - Switch (on/off)
    - **[LT_2_D]** 02 - Dimmer
    - **[LT_2_3]** 03 - 3 Way
    - **[LT_2_L]** 04 - Lit Switch
    - **[LT_2_M]** 05 - Motion Sensor
    - **[LT_2_P]** 06 - Photocell
    - **[LT_2_T]** 07 - Timer
    - **[LT_2_H]** 08 - Home Automation
    - 09 - Multi-switch
    - **[LT_2_O / LT_2_OT]** Other (Describe)

- o **[LT_8]** Number of Lamps per Fixture
    - Record Number

- o **[LT_5]** Lamp type
  - 01 - Incandescent
  - 02 - CFL
  - 03 - Fluorescent
  - 04 - Halogen
  - 05 - LED
  - 06 - HID
  - 07 - Socket Empty
  - **[LT_5_OT]** Other (Describe)

- o **[LT_6]** Lamp shape
  - 01 - A-Type (Regular Inc.)
  - 02 - Spiral
  - 03 - Globe
  - 04 - Reflector/Flood
  - 05 - U-Bend
  - 06 - Decorative
  - 07 – Circ-line
  - 08 - Bullet or Post
  - 09 - Linear tube/Tubular
  - 10 - MR-16 pin Based Halogen
  - 11 - "G" Type, bi-pin Halogen
  - 12 - Low Voltage
  - 13 - Socket Empty
  - **[LT_6_OT]** Other (Describe)

- o **[LT_9]** Lamp Wattage
  - Record wattage number (for 3-way lamps record the middle wattage in the lamp wattage field)
    - **[LT_9A / LT_9B/ LT_9C]** Record 3-way lamp's low wattage and high wattage ratings

- o **[LT_7]** Base type
  - 01 - Standard Medium Screw-base
  - 02 - Small Screw-base
  - 03 - Pin Based
  - 04 - Socket Empty
  - **[LT_7_OT]** Other (Describe)

- o **[LT_BURNOUT_COUNT]** Number of Burnt Out Lamps
  - Record Number

- **[Space_Number = -1 for Lighting_IDs that are in Storage]** Record for all light bulbs in storage:
  - o **[LT_5]** Lamp type
    - 01 - Incandescent
    - 02 - CFL
    - 03 - Fluorescent
    - 04 - Halogen
    - 05 - LED
    - 06 - HID
    - 07 - Socket Empty
    - **[LT_5_OT]** Other (Describe)

  - o **[LT_6]** Lamp shape
    - 01 - A-Type (Regular Inc.)
    - 02 - Spiral
    - 03 - Globe
    - 04 - Reflector/Flood
    - 05 - U-Bend
    - 06 - Decorative
    - 07 - Circuline
    - 08 - Bullet or Post
    - 09 - Linear tube/Tubular
    - 10 - MR-16 pin Based Halogen
    - 11 - "G" Type, bi-pin Halogen
    - 12 - Low Voltage
    - 13 - Socket Empty
    - **[LT_6_OT]** Other (Describe)

- o **[LT_9]** Lamp Wattage
  - ▪ Record wattage number (for 3-way lamps record the middle wattage in the lamp wattage field)
    - **[LT_9A / LT_9B/ LT_9C]** Record 3-way lamp's low wattage and high wattage ratings

- o **[LT_7]** Base type
  - ▪ 01 - Standard Medium Screw-base
  - ▪ 02 - Small Screw-base
  - ▪ 03 - Pin Based
  - ▪ 04 - Socket Empty
  - ▪ **[LT_7_OT]** Other (Describe)

9 Appendix D: Development of Census-adjusted Weights

The process of estimating the population totals and deriving the weight adjustments is discussed in the six step procedure presented below.

1. Step One: Obtain Census Estimates by Ownership and Residence Type by Census Tract

   For each Census tract in California, estimates of the total number of housing units by home ownership and residence type were taken from the 2008-2012 American Community Survey (ACS) five year, pooled data file.[41]

2. Step Two: Obtain Estimates of the Residential Housing Unit Population by Census Tract and Zip Code

   The proportion of residential addresses in each Census Tract that belong to each zip code in California was taken from a data file obtained from the U.S. Department of Housing and Urban Development.[42] They created this file using data from the U.S. Postal Service.

   These proportions were used to adjust the ACS estimates derived in the first step so that ultimately, estimates by zip code of the total number of housing units by home ownership and residency type could be obtained. Zip code level estimates were needed because zip code, and not Census tract, was available for every residence on the CLASS sample frame.

3. Step Three: Zip-Code Level Estimates Were Adjusted for Master-Metered Customers Using 2009 RASS Estimates

   The CLASS survey target population only included individually metered electric customers and since master-metered customers are more likely to be associated with some certain residency type and home ownership groups (e.g. renters, residents of mobile homes) the zip code-level, total population estimates from the second step were adjusted using information from the 2009 California Residential Appliance Saturation Study (RASS) by electric utility region. The 2009 RASS data provided estimates of the fraction of customers that were individually metered.[43]

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[41] These estimates are readily available from the U.S. Census website using their American FactFinder tool located at: http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t.

[42] Available from: http://www.huduser.org/portal/datasets/usps_crosswalk.html

[43] The 2009 RASS Final Report and webtool are available at: http://websafe.kemainc.com/RASS2009/Default.aspx

4. Step Four: Derived Probability of each Residence Belonging to Home Ownership Category and Residency Type Category

The zip code by home ownership and zip code by residency type estimates obtained from the file from the second step, as well as the individually metered results from the third step were used to derive a probability that each residency on the CLASS sample frame belonged to a particular home ownership and residency type category. This was done by merging the individually metered fractions from the third step with the totals from the second step and deriving the probabilities of being in each home ownership and residency type group.

5. Step Five: Created Population Estimates

At the fifth step in this process, estimates of the total number of housing units on the CLASS sample frame by the various variables used in the weighting process were derived. For many of these variables, such as electric utility region and climate zone group (stratification variables), this process followed directly by simply adding up the total number of residences in each category on the sample frame. To derive estimates by home ownership and residency types, the probability that each household belonged to a group (from the fourth step) was summed across all residences on the sample frame.

6. Step Six: Derived the Final Census-adjusted Sample Weight

The final step in this process was to create the nonresponse-adjusted weight for each of the 1,987 households participating in the CLASS study. For each household, the final Census-adjusted sample weight was computed as the product of two factors:

    a. The inverse of the probability of selecting the household from the original sample frame.

    b. A calibration adjustment that was created so that the weighted distribution of the households over several variables of interest would match the frame distribution. This calibration adjustment accounts for survey nonrespondents as well as differences between the sample distribution and frame distribution that can be attributed to sample selection error.

The first component of the weight was taken directly from the sample selection process. The second component, the calibration adjustment, was created after data collection was complete. The average calibration adjustment was 0.96 (absolute value). The calibration adjustment was created for each household using a model-based, calibration technique for deriving the

adjustments [see for example, Folsom and Singh (2000)][44]. This method has numerous advantages over other ways of deriving a weight adjustment, such as the Weighting Class approach that involves applying a simple ratio adjustment within groups (called weighting classes). These advantages include:

- More variables can be used in the adjustment process than what can be used with the standard weighting class ratio adjustment. The use of a greater number of variables can reduce the non-response and coverage bias associated with the final estimates.

- Since adjustments are created using a modeling approach, one can test for and include the statistically significant predictors for each adjustment.

- Unlike the weighting class approach, continuous variables can be used in the adjustment process.

- There is no need to include higher order interactions of variables in the adjustment which would be needed with a standard weighting class ratio adjustment. Using just lower order interactions of variables helps minimize the effects of unequal weighting, which in turn maximizes precision of the final estimate by keeping sampling errors as low as possible.

- With the model-based approach there is no need to collapse weighting class cells. To overcome the problem of cells not having enough households the corresponding interaction term in the adjustment is simply excluded.

In this study, a calibration adjustment was created for each household using the following variables in the weight adjustment model:

Main Effects:
- Electric Utility Region (IOU)

- Climate Zone Group

- Indicator of Whether the Residence Participated in the CARE /FERA Low-Income Rate Program

- Categorized Average Daily kWh

- Home Ownership

- Residency Type

Two-Way Interactions:

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[44] Folsom, R.E. and Singh A.C. (2000) "The generalized exponential model for sampling weight calibration for extreme values, nonresponse, and post-stratification." *Proceeding of the* 2000 *American Statistical Association, Survey Research Methods Section*, pp.598-603.

- IOU by Climate Zone Group

- IOU by CARE/FERA Indicator

- IOU by Daily kWh

- IOU by Home Ownership

- IOU by Residency Type [*]

- Climate Zone Group by Home Ownership [*]

- CARE/FERA Indicator by Home Ownership

- Daily kWh by Home Ownership

- Climate Zone Group by Residency Type [*]

- CARE/FERA Indicator by Residency Type [*]

- Daily kWh by Residency Type [*]

<u>Four-Way Interactions:</u>

- IOU, Climate Zone Group, CARE/FERA Indicator and Daily kWh

A few of the two-way interaction terms had to be collapsed in the weighting calibration process because the respondent sample size was simply too small. When terms had to be collapsed, the newly weighted sample totals will not equal the original frame totals but the sum will generally be close.

Table 173 summarizes the population totals and weighted CLASS respondent sample totals across each of the above main effect and interaction terms. Except for those terms flagged with a [*], the weighted sample totals equal the population totals exactly, as desired.

Table 173 Summary of Population and Weighted Sample by Terms Used in the Weight Adjustment Calibration Process

Group	Population	Percent	Sample	Percent	Sum of New Weights	Percent	Difference Between Weight Sum and Population
Average							
Total	9,986,616	100.0	1,987	100.0	9,986,616	100.0	0
Electric IOU							
PG&E	4,500,685	45.1	797	40.1	4,500,685	45.1	0
SCE	4,261,537	42.7	793	39.9	4,261,537	42.7	0
SDG&E	1,224,394	12.3	397	20.0	1,224,394	12.3	0
Climate Zone Group							
Desert	129,934	1.3	36	1.8	129,934	1.3	0
Inland	5,479,995	54.9	1,150	57.9	5,479,995	54.9	0
Mild	4,376,687	43.8	801	40.3	4,376,687	43.8	0
CARE FERA Status							
Yes	3,195,274	32.0	589	29.6	3,195,274	32.0	0
No	6,791,342	68.0	1,398	70.4	6,791,342	68.0	0
Average Daily kWh							
<= 15 kWh	4,203,277	42.1	501	25.2	4,203,277	42.1	0
15-30 kWh	3,971,145	39.8	818	41.2	3,971,145	39.8	0
> 30 kWh	1,812,194	18.1	668	33.6	1,812,194	18.1	0
Home Ownership							
Own	5,844,057	58.5	1,486	74.8	5,844,057	58.5	0
Rent	4,142,559	41.5	501	25.2	4,142,559	41.5	0
Residence Type							
Single Family	6,234,771	62.4	1,491	75.0	6,234,771	62.4	0
Townhouse	719,196	7.2	115	5.8	719,196	7.2	0
Apartment, 2-4 Units	832,879	8.3	96	4.8	832,879	8.3	0
Apartment, 5+ Units	1,989,590	19.9	251	12.6	1,989,590	19.9	0
Mobile Home	210,181	2.1	34	1.7	210,181	2.1	0

Group	Population	Percent	Sample	Percent	Sum of New Weights	Percent	Difference Between Weight Sum and Population
Electric IOU by Climate Zone Group							
PG&E, Inland	1,884,896	18.9	397	20.0	1,884,896	18.9	0
PG&E, Mild	2,615,789	26.2	400	20.1	2,615,789	26.2	0
SCE, Desert	129,934	1.3	36	1.8	129,934	1.3	0
SCE, Inland	3,226,760	32.3	612	30.8	3,226,760	32.3	0
SCE, Mild	904,843	9.1	145	7.3	904,843	9.1	0
SDG&E, Inland	368,339	3.7	141	7.1	368,339	3.7	0
SDG&E, Mild	856,055	8.6	256	12.9	856,055	8.6	0
Electric IOU by CARE FERA Status							
PG&E, Yes	1,381,547	13.8	252	12.7	1,381,547	13.8	0
PG&E, No	3,119,138	31.2	545	27.4	3,119,138	31.2	0
SCE, Yes	1,495,332	15.0	251	12.6	1,495,332	15.0	0
SCE, No	2,766,205	27.7	542	27.3	2,766,205	27.7	0
SDG&E, Yes	318,395	3.2	86	4.3	318,395	3.2	0
SDG&E, No	905,999	9.1	311	15.7	905,999	9.1	0
Electric IOU by Average Daily kWh							
PG&E, <= 15 kWh	1,849,580	18.5	191	9.6	1,849,580	18.5	0
PG&E, 15-30 kWh	1,775,055	17.8	309	15.6	1,775,055	17.8	0
PG&E, > 30 kWh	876,050	8.8	297	14.9	876,050	8.8	0
SCE, <= 15 kWh	1,757,179	17.6	195	9.8	1,757,179	17.6	0
SCE, 15-30 kWh	1,746,830	17.5	332	16.7	1,746,830	17.5	0
SCE, > 30 kWh	757,528	7.6	266	13.4	757,528	7.6	0
SDG&E, <= 15 kWh	596,518	6.0	115	5.8	596,518	6.0	0
SDG&E, 15-30 kWh	449,260	4.5	177	8.9	449,260	4.5	0
SDG&E, > 30 kWh	178,616	1.8	105	5.3	178,616	1.8	0
Electric IOU by Home Ownership							
PG&E, Own	2,631,714	26.4	584	29.4	2,631,714	26.4	0

Group	Population	Percent	Sample	Percent	Sum of New Weights	Percent	Difference Between Weight Sum and Population
PG&E, Rent	1,868,971	18.7	213	10.7	1,868,971	18.7	0
SCE, Own	2,532,614	25.4	596	30.0	2,532,614	25.4	0
SCE, Rent	1,728,923	17.3	197	9.9	1,728,923	17.3	0
SDG&E, Own	679,728	6.8	306	15.4	679,728	6.8	0
SDG&E, Rent	544,666	5.5	91	4.6	544,666	5.5	0
Electric IOU by Residence Type[*]							
PG&E, Single Family	2,878,589	28.8	623	31.4	2,871,080	28.7	-7,509
PG&E, Townhouse	286,520	2.9	44	2.2	286,520	2.9	0
PG&E, Apartment, 2-4 Units	421,588	4.2	36	1.8	421,588	4.2	0
PG&E, Apartment, 5+ Units	812,356	8.1	80	4.0	812,356	8.1	0
PG&E, Mobile Home	101,632	1.0	14	0.7	109,141	1.1	7,509
SCE, Single Family	2,693,368	27.0	589	29.6	2,693,368	27.0	0
SCE, Townhouse	320,929	3.2	42	2.1	320,929	3.2	0
SCE, Apartment, 2-4 Units	316,267	3.2	45	2.3	316,267	3.2	0
SCE, Apartment, 5+ Units	829,933	8.3	97	4.9	829,933	8.3	0
SCE, Mobile Home	101,039	1.0	20	1.0	101,039	1.0	0
SDG&E, Single Family	662,814	6.6	279	14.0	670,323	6.7	7,509
SDG&E, Townhouse	111,747	1.1	29	1.5	111,747	1.1	0
SDG&E, Apartment, 2-4 Units	95,023	1.0	15	0.8	95,023	1.0	0
SDG&E, Apartment, 5+ Units	347,301	3.5	74	3.7	347,301	3.5	0
SDG&E, Mobile Home	7,509	0.1	0	0.0	0	0.0	-7,509
Climate Zone Group by Home Ownership [*]							
Desert, Own	84,923	0.9	31	1.6	101,116	1.0	16,193
Desert, Rent	45,011	0.5	5	0.3	28,818	0.3	-16,193
Inland, Own	3,371,477	33.8	875	44.0	3,371,477	33.8	0
Inland, Rent	2,108,518	21.1	275	13.8	2,108,518	21.1	0
Mild, Own	2,387,657	23.9	580	29.2	2,371,464	23.7	-16,193

Group	Population	Percent	Sample	Percent	Sum of New Weights	Percent	Difference Between Weight Sum and Population
Mild, Rent	1,989,030	19.9	221	11.1	2,005,223	20.1	16,193
CARE FERA Status by Home Ownership							
Yes, Own	1,768,922	17.7	343	17.3	1,768,922	17.7	0
Yes, Rent	1,426,352	14.3	246	12.4	1,426,352	14.3	0
No, Own	4,075,135	40.8	1,143	57.5	4,075,135	40.8	0
No, Rent	2,716,207	27.2	255	12.8	2,716,207	27.2	0
Average Daily kWh by Home Ownership							
<= 15 kWh, Own	2,281,222	22.8	289	14.5	2,281,222	22.8	0
<= 15 kWh, Rent	1,922,055	19.2	212	10.7	1,922,055	19.2	0
15-30 kWh, Own	2,403,827	24.1	655	33.0	2,403,827	24.1	0
15-30 kWh, Rent	1,567,318	15.7	163	8.2	1,567,318	15.7	0
> 30 kWh, Own	1,159,008	11.6	542	27.3	1,159,008	11.6	0
> 30 kWh, Rent	653,186	6.5	126	6.3	653,186	6.5	0
Climate Zone Group by Residence Type [*]							
Desert, Single Family	67,946	0.7	24	1.2	62,250	0.6	-5,696
Desert, Townhouse	25,297	0.3	0	0.0	0	0.0	-25,297
Desert, Apartment, 2-4 Units	11,142	0.1	5	0.3	44,950	0.5	33,808
Desert, Apartment, 5+ Units	17,722	0.2	2	0.1	6,369	0.1	-11,353
Desert, Mobile Home	7,827	0.1	5	0.3	16,365	0.2	8,538
Inland, Single Family	3,786,346	37.9	928	46.7	3,789,836	37.9	3,490
Inland, Townhouse	315,664	3.2	46	2.3	315,664	3.2	0
Inland, Apartment, 2-4 Units	375,240	3.8	47	2.4	375,240	3.8	0
Inland, Apartment, 5+ Units	871,014	8.7	107	5.4	871,014	8.7	0
Inland, Mobile Home	131,731	1.3	22	1.1	128,241	1.3	-3,490
Mild, Single Family	2,380,479	23.8	539	27.1	2,382,685	23.9	2,207
Mild, Townhouse	378,235	3.8	69	3.5	403,532	4.0	25,297
Mild, Apartment, 2-4 Units	446,497	4.5	44	2.2	412,689	4.1	-33,808

Group	Population	Percent	Sample	Percent	Sum of New Weights	Percent	Difference Between Weight Sum and Population
Mild, Apartment, 5+ Units	1,100,854	11.0	142	7.1	1,112,207	11.1	11,353
Mild, Mobile Home	70,623	0.7	7	0.4	65,574	0.7	-5,048
CARE FERA Status by Residence Type[*]							
Yes, Single Family	2,016,677	20.2	400	20.1	1,994,774	20.0	-21,903
Yes, Townhouse	204,446	2.0	31	1.6	204,446	2.0	0
Yes, Apartment, 2-4 Units	280,428	2.8	43	2.2	280,428	2.8	0
Yes, Apartment, 5+ Units	613,627	6.1	98	4.9	613,627	6.1	0
Yes, Mobile Home	80,096	0.8	17	0.9	101,999	1.0	21,903
No, Single Family	4,218,094	42.2	1,091	54.9	4,239,997	42.5	21,903
No, Townhouse	514,750	5.2	84	4.2	514,750	5.2	0
No, Apartment, 2-4 Units	552,451	5.5	53	2.7	552,451	5.5	0
No, Apartment, 5+ Units	1,375,962	13.8	153	7.7	1,375,962	13.8	0
No, Mobile Home	130,085	1.3	17	0.9	108,182	1.1	-21,903
Average Daily kWh by Residence Type[*]							
<= 15 kWh, Single Family	2,401,046	24.0	228	11.5	2,369,881	23.7	-31,165
<= 15 kWh, Townhouse	324,238	3.2	51	2.6	324,238	3.2	0
<= 15 kWh, Apartment, 2-4 Units	404,586	4.1	55	2.8	404,586	4.1	0
<= 15 kWh, Apartment, 5+ Units	996,234	10.0	158	8.0	996,234	10.0	0
<= 15 kWh, Mobile Home	77,172	0.8	9	0.5	108,337	1.1	31,165
15-30 kWh, Single Family	2,578,072	25.8	649	32.7	2,582,418	25.9	4,346
15-30 kWh, Townhouse	280,439	2.8	50	2.5	280,439	2.8	0
15-30 kWh, Apartment, 2-4 Units	304,531	3.0	33	1.7	304,531	3.0	0
15-30 kWh, Apartment, 5+ Units	721,015	7.2	69	3.5	721,015	7.2	0
15-30 kWh, Mobile Home	87,088	0.9	17	0.9	82,742	0.8	-4,346
> 30 kWh, Single Family	1,255,653	12.6	614	30.9	1,282,472	12.8	26,819
> 30 kWh, Townhouse	114,519	1.1	14	0.7	114,519	1.1	0
> 30 kWh, Apartment, 2-4 Units	123,762	1.2	8	0.4	123,762	1.2	0

Group	Population	Percent	Sample	Percent	Sum of New Weights	Percent	Difference Between Weight Sum and Population
> 30 kWh, Apartment, 5+ Units	272,340	2.7	24	1.2	272,340	2.7	0
> 30 kWh, Mobile Home	45,920	0.5	8	0.4	19,101	0.2	-26,819
Electric IOU, Climate Zone Group, CARE FERA Status and Average Daily kWh							
PG&E, Inland, Yes, <= 15 kWh	196,368	2.0	30	1.5	196,368	2.0	0
PG&E, Inland, Yes, 15-30 kWh	315,453	3.2	49	2.5	315,453	3.2	0
PG&E, Inland, Yes, > 30 kWh	200,503	2.0	69	3.5	200,503	2.0	0
PG&E, Inland, No, <= 15 kWh	310,276	3.1	44	2.2	310,276	3.1	0
PG&E, Inland, No, 15-30 kWh	519,618	5.2	90	4.5	519,618	5.2	0
PG&E, Inland, No, > 30 kWh	342,678	3.4	115	5.8	342,678	3.4	0
PG&E, Mild, Yes, <= 15 kWh	362,153	3.6	29	1.5	362,153	3.6	0
PG&E, Mild, Yes, 15-30 kWh	223,817	2.2	40	2.0	223,817	2.2	0
PG&E, Mild, Yes, > 30 kWh	83,253	0.8	35	1.8	83,253	0.8	0
PG&E, Mild, No, <= 15 kWh	980,783	9.8	88	4.4	980,783	9.8	0
PG&E, Mild, No, 15-30 kWh	716,167	7.2	130	6.5	716,167	7.2	0
PG&E, Mild, No, > 30 kWh	249,616	2.5	78	3.9	249,616	2.5	0
SCE, Desert, Yes, <= 15 kWh	6,970	0.1	2	0.1	6,970	0.1	0
SCE, Desert, Yes, 15-30 kWh	15,870	0.2	2	0.1	15,870	0.2	0
SCE, Desert, Yes, > 30 kWh	15,179	0.2	6	0.3	15,179	0.2	0
SCE, Desert, No, <= 15 kWh	28,024	0.3	4	0.2	28,024	0.3	0
SCE, Desert, No, 15-30 kWh	28,107	0.3	5	0.3	28,107	0.3	0
SCE, Desert, No, > 30 kWh	35,784	0.4	17	0.9	35,784	0.4	0
SCE, Inland, Yes, <= 15 kWh	564,321	5.7	59	3.0	564,321	5.7	0
SCE, Inland, Yes, 15-30 kWh	512,354	5.1	99	5.0	512,354	5.1	0
SCE, Inland, Yes, > 30 kWh	184,058	1.8	56	2.8	184,058	1.8	0
SCE, Inland, No, <= 15 kWh	684,069	6.8	80	4.0	684,069	6.8	0
SCE, Inland, No, 15-30 kWh	870,098	8.7	167	8.4	870,098	8.7	0
SCE, Inland, No, > 30 kWh	411,860	4.1	151	7.6	411,860	4.1	0

Group	Population	Percent	Sample	Percent	Sum of New Weights	Percent	Difference Between Weight Sum and Population
SCE, Mild, Yes, <= 15 kWh	118,116	1.2	12	0.6	118,116	1.2	0
SCE, Mild, Yes, 15-30 kWh	61,740	0.6	10	0.5	61,740	0.6	0
SCE, Mild, Yes, > 30 kWh	16,724	0.2	5	0.3	16,724	0.2	0
SCE, Mild, No, <= 15 kWh	355,679	3.6	38	1.9	355,679	3.6	0
SCE, Mild, No, 15-30 kWh	258,661	2.6	49	2.5	258,661	2.6	0
SCE, Mild, No, > 30 kWh	93,923	0.9	31	1.6	93,923	0.9	0
SDG&E, Inland, Yes, <= 15 kWh	45,364	0.5	10	0.5	45,364	0.5	0
SDG&E, Inland, Yes, 15-30 kWh	36,418	0.4	12	0.6	36,418	0.4	0
SDG&E, Inland, Yes, > 30 kWh	15,839	0.2	9	0.5	15,839	0.2	0
SDG&E, Inland, No, <= 15 kWh	92,776	0.9	13	0.7	92,776	0.9	0
SDG&E, Inland, No, 15-30 kWh	115,527	1.2	48	2.4	115,527	1.2	0
SDG&E, Inland, No, > 30 kWh	62,415	0.6	49	2.5	62,415	0.6	0
SDG&E, Mild, Yes, <= 15 kWh	138,137	1.4	25	1.3	138,137	1.4	0
SDG&E, Mild, Yes, 15-30 kWh	65,965	0.7	25	1.3	65,965	0.7	0
SDG&E, Mild, Yes, > 30 kWh	16,672	0.2	5	0.3	16,672	0.2	0
SDG&E, Mild, No, <= 15 kWh	320,241	3.2	67	3.4	320,241	3.2	0
SDG&E, Mild, No, 15-30 kWh	231,350	2.3	92	4.6	231,350	2.3	0
SDG&E, Mild, No, > 30 kWh	83,690	0.8	42	2.1	83,690	0.8	0

10 Appendix E: 2012 CLASS Appliance Results Using Census-adjusted Weights

10.1 Refrigerators and Freezers

10.1.1 Primary Refrigerators

Table 174: Percentage of Homes with Second or Third Refrigerator by Type of Residence using Census-adjusted Weights

Type of Residence	Census-adjusted weights								Sample Size
	Secondary Refrigerator				Third Refrigerator				
	Full or Very Small		Full Only		Full or Very Small		Full Only		
	%	Error Bound	%	Error Bound	%	Error Bound	%	Error Bound	
Overall	7.6%	1.2%	15.1%	1.4%	2.6%	0.5%	0.9%	0.4%	1,987
Single Family Detached	9.2%	1.4%	21.5%	2.1%	3.9%	0.8%	1.5%	0.6%	1,491
Apt 2-4 Units	4.2%	3.5%	5.6%	4.0%	-	-	-	-	96
Apt 5+ Units	3.6%	2.4%	0.7%	0.7%	0.6%	0.6%	-	-	251
Duplex (Single Story)	1.6%	2.6%	12.9%	9.3%	-	-	-	-	45
Mobile Home	21.9%	18.1%	7.6%	6.1%	-	-	-	-	34
Townhouse/Rowhouse (2-4 Unit Multi-Story)	7.0%	4.9%	12.7%	6.2%	2.1%	3.4%	-	-	70

Table 175: Distribution of Primary Refrigerators within Estimated Size Ranges within Type using Census-adjusted Weights

Refrigerator Type		Census-adjusted weights				
		Size Range (cu. ft.)				
		1 to 10	11 to 14	15 to 18	19 to 22	23+
All Types (n=835)	%	0.5%	6.9%	29.3%	28.2%	35.1%
	EB	0.3%	1.5%	2.9%	2.3%	2.2%
Top Freezer (n=548)	%	0.7%	14.0%	57.2%	26.1%	1.9%
	EB	0.6%	3.0%	4.5%	3.5%	1.0%
Top Freezer Water & Ice in-door (n=18)	%	15.5%	-	7.2%	26.9%	51.4%
	EB	14.0%	-	8.2%	21.4%	1.0%
Side-by-Side (n=58)	%	-	-	3.8%	65.7%	30.5%
	EB	-	-	4.9%	13.9%	10.1%
Side-by-Side Water & Ice in-door (n=703)	%	-	-	-	19.4%	80.6%
	EB	-	-	-	3.4%	3.2%
Single Door (n=3)	%	-	-	48.9%	-	51.1%
	EB	-	-	44.1%	-	58.8%
Single Door Water & Ice in-door (n=3)	%	-	-	-	-	100.0%
	EB	-	-	-	-	0.0%
Bottom Freezer (n=166)	%	0.6%	0.6%	8.2%	61.0%	30.2%
	EB	0.9%	0.0%	3.8%	7.8%	8.0%
Bottom Freezer Water & Ice in-door (n=100)	%	-	-	-	26.3%	73.7%
	EB	-	-	-	9.8%	9.7%
Built-in (n=16)	%	-	-	4.3%	78.1%	17.6%
	EB	-	-	7.0%	25.5%	12.5%
Built-in Water & Ice in-door (n=7)	%	-	-	-	21.3%	78.7%
	EB	-	-	-	22.0%	29.7%
Refrigerator Only (n=4)	%	-	-	87.5%	12.5%	-
	EB	-	-	31.5%	19.2%	-

Table 176: Average Age and Distribution of Manufacturer Reported Ages within Size Ranges of Primary Refrigerators using Census-adjusted Weights

Ref Type	Size Range (cu. ft.)	Avg Mfg. Age	EB	1985-1989	1990-1994	1995-1999	2000-2005	2006-2009	2010-2012	Sample Size
						Census-adjusted Weights - Manufactured Date Ranges				
All Types	Overall	8.5	0.4	1.5%	5.9%	12.1%	38.8%	29.6%	12.1%	930
	1 to 10	6.4	0.0	-	-	-	67.3%	32.7%	-	2
	11 to 14	8.1	1.9	7.9%	7.9%	-	26.4%	47.5%	10.3%	33
	15 to 18	8.0	0.7	0.8%	4.8%	11.4%	39.4%	30.7%	12.8%	176
	19 to 22	8.6	0.7	1.5%	5.2%	14.7%	38.3%	25.5%	14.8%	225
	23+	7.8	0.5	1.6%	4.3%	8.7%	39.2%	33.5%	12.6%	371
	Unknown	10.7	0.8	-	11.8%	20.8%	42.0%	19.4%	6.0%	123
Top Freezer	Overall	8.5	0.6	1.7%	6.1%	12.8%	36.3%	31.2%	11.9%	369
	1 to 10	6.4	0.0	-	-	-	67.3%	32.7%	-	2
	11 to 14	8.1	1.9	7.9%	7.9%	-	26.4%	47.5%	10.3%	33
	15 to 18	8.0	0.7	0.8%	4.9%	11.5%	39.6%	30.8%	12.4%	169
	19 to 22	8.6	1.0	1.8%	5.6%	14.4%	33.8%	28.6%	15.8%	112
	23+	4.0	0.0	-	-	-	-	100.0%	-	1
	Unknown	10.5	1.1	0.0%	10.4%	24.6%	35.9%	24.8%	4.3%	52
Top Freezer Water & Ice in-door	Overall	8.7	0.6	-	14.3%	-	67.8%	-	17.8%	9
	15 to 18	4.3	0.0	-	-	-	41.7%	-	58.3%	2
	19 to 22	7.0	0.0	-	-	-	100.0%	-	-	1
	23+	10.3	0.0	-	23.2%	-	60.9%	-	15.9%	6
Side-by-Side	Overall	12.6	1.0	2.5%	23.2%	8.0%	53.3%	6.7%	6.2%	25
	15 to 18	2.0	0.0	-	-	-	-	-	100.0%	1
	19 to 22	13.1	0.6	3.9%	18.9%	9.9%	62.4%	4.9%	-	12
	23+	15.5	0.0	-	57.3%	8.6%	26.7%	7.4%	-	8
	Unknown	10.5	0.0	-	-	-	79.4%	20.6%	-	4
Side-by-Side Water & Ice in-door	Overall	8.6	0.5	1.3%	5.3%	11.9%	43.5%	27.8%	10.2%	451
	19 to 22	8.8	0.9	0.7%	3.1%	16.8%	46.9%	21.3%	11.1%	78
	23+	8.0	0.6	1.7%	3.6%	9.5%	41.9%	32.6%	10.7%	318
	Unknown	11.2	0.9	0.0%	17.1%	16.9%	46.8%	12.4%	6.9%	55
Single Door	Overall	6.0	0.0	-	-	-	-	100.0%	-	1
	15 to 18	6.0	0.0	-	-	-	-	100.0%	-	1
Single Door Water & Ice in-door	Overall	23.0	0.0	-	-	100.0%	-	-	-	1
	23+	23.0	0.0	-	-	100.0%	-	-	-	1
Bottom Freezer	Overall	6.5	0.8	-	-	14.1%	26.7%	40.3%	19.0%	27
	15 to 18	11.0	0.0	-	-	-	100.0%	-	-	1
	19 to 22	6.3	0.6	-	-	19.7%	20.0%	48.5%	11.8%	12

| Census-adjusted Weights - Manufactured Date Ranges | | | | | | | | | | | |
Ref Type	Size Range (cu. ft.)	Avg Mfg. Age	EB	1985-1989	1990-1994	1995-1999	2000-2005	2006-2009	2010-2012	Sample Size
Bottom Freezer Water & Ice in-door	23+	3.1	0.0	-	-	-	4.3%	60.4%	35.2%	11
	Unknown	11.9	0.0	-	-	31.5%	61.1%	-	7.4%	3
	Overall	2.9	0.3	-	-	-	8.9%	38.8%	52.3%	36
	19 to 22	5.0	0.4	-	-	-	-	100.0%	-	7
	23+	11.0	0.4	-	-	31.5%	68.5%	-	-	22
	Unknown	12.0	0.1	-	-	-	100.0%	-	-	7
Built-in	Overall	10.6	0.0	-	-	6.0%	77.3%	16.7%	-	5
	19 to 22	5.0	0.0	-	-	-	-	100.0%	-	1
	23+	11.0	0.0	-	-	31.5%	68.5%	-	-	2
	Unknown	12.0	0.0	-	-	-	100.0%	-	-	2
Built-in Water & Ice in-door	Overall	6.7	0.8	-	-	-	76.6%	23.4%	-	3
	19 to 22	5.0	0.0	-	-	-	-	100.0%	-	1
	23+	7.2	0.0	-	-	-	100.0%	-	-	2
Refrigerator Only	Overall	8.8	0.0	-	-	39.9%	-	60.1%	-	3
	15 to 18	7.6	0.0	-	-	25.7%	-	74.3%	-	2
	19 to 22	14.0	0.0	-	-	100.0%	-	-	-	1

Table 177: Average Age and Distribution of Manufacturer Reported Ages and On-site Estimated Ages within Size Ranges of Primary Refrigerators using Census-Adjusted Weights

Ref Type	Size Range (cu. ft.)	Average Est Age	EB	1985-1989	1990-1994	1995-1999	2000-2005	2006-2009	2010-2012	Sample Size
					Census-adjusted weights					
				Manufacture Date and Estimated Manufacture Date Ranges						
All Types	Overall	8.2	0.3	2.7%	5.4%	10.9%	34.1%	33.1%	13.9%	1,902
	1 to 10	6.7	0.0	-	-	23.3%	27.0%	24.4%	25.3%	8
	11 to 14	9.7	1.6	9.1%	6.1%	10.3%	30.9%	37.3%	6.2%	52
	15 to 18	7.8	0.6	1.3%	5.1%	9.4%	37.4%	31.2%	15.5%	292
	19 to 22	8.4	0.5	2.1%	5.7%	12.2%	35.5%	30.0%	14.5%	452
	23+	6.9	0.4	1.0%	3.3%	7.1%	33.1%	39.2%	16.4%	760
	Unknown	10.4	1.0	6.3%	8.6%	17.4%	30.7%	28.7%	8.4%	338
Top Freezer	Overall	8.89	0.6	3.9%	6.0%	13.4%	34.1%	29.9%	12.7%	615
	1 to 10	5.9	0.0	-	-	17.4%	31.4%	15.3%	36.0%	4
	11 to 14	9.7	1.6	9.1%	6.1%	10.3%	30.9%	37.3%	6.2%	52
	15 to 18	7.9	0.6	1.4%	5.3%	9.7%	37.1%	31.3%	15.1%	268
	19 to 22	9.2	0.9	3.0%	6.8%	15.3%	36.4%	25.6%	12.9%	163
	23+	11.1	2.7	-	7.7%	49.5%	20.3%	7.3%	15.1%	17
	Unknown	10.5	1.9	8.9%	6.5%	18.7%	26.7%	30.4%	8.8%	111
Top Freezer Water & Ice in-door	Overall	10.07	1.7	3.2%	12.6%	13.0%	45.7%	15.9%	9.6%	19
	1 to 10	11.0	0.0	-	-	54.6%	24.6%	20.7%	-	3
	15 to 18	4.3	0.0	-	-	-	41.7%	-	58.3%	2
	19 to 22	7.4	3.6	-	-	18.0%	48.0%	34.0%	-	4
	23+	12.7	2.9	7.7%	30.5%	-	49.0%	-	12.8%	8
	Unknown	9.3	0.0	-	-	-	60.9%	39.1%	-	2
Side-by-Side	Overall	10.28	1.2	5.9%	13.0%	5.7%	41.7%	25.9%	7.7%	80
	15 to 18	2.2	0.0	-	-	-	-	24.3%	75.7%	2
	19 to 22	11.5	1.2	10.7%	10.7%	8.6%	48.3%	18.3%	3.4%	30
	23+	9.3	0.7	-	19.4%	4.2%	26.2%	42.3%	7.9%	26
	Unknown	9.8	1.0	2.7%	13.1%	2.2%	47.5%	26.1%	8.4%	22
Side-by-Side Water & Ice in-door	Overall	8.13	0.4	0.9%	5.2%	10.6%	39.2%	34.5%	9.6%	832
	19 to 22	8.8	0.7	0.5%	3.6%	14.0%	49.9%	22.7%	9.3%	125
	23+	7.3	0.4	1.1%	3.1%	7.2%	37.8%	39.7%	11.0%	568
	Unknown	10.9	0.9	0.6%	15.1%	20.7%	34.3%	24.8%	4.4%	139
Single Door	Overall	15.22	0.0	50.8%	-	-	12.4%	28.4%	8.4%	6
	15 to 18	3.2	0.0	0.0%	-	-	-	29.0%	71.0%	2
	23+	8.0	0.0	0.0%	-	-	100.0%	-	-	1
	Unknown	18.3	0.0	67.0%	-	-	-	33.0%	-	3

Ref Type	Size Range (cu. ft.)	Census-adjusted weights								
		Manufacture Date and Estimated Manufacture Date Ranges								
		Average Est Age	EB	1985-1989	1990-1994	1995-1999	2000-2005	2006-2009	2010-2012	Sample Size
Single Door Water & Ice in-door	Overall	10.48	0.0	35.8%	-	-	-	48.5%	15.8%	3
	23+	10.5	0.0	35.8%	-	-	-	48.5%	15.8%	3
Bottom Freezer	Overall	5.95	0.7	-	3.3%	5.3%	25.4%	43.5%	22.6%	177
	1 to 10	3.0	0.0	-	-	-	-	100.0%	-	1
	15 to 18	6.0	1.2	-	-	-	62.5%	19.9%	17.6%	14
	19 to 22	6.3	1.0	-	6.1%	7.1%	17.5%	48.4%	20.9%	95
	23+	4.5	0.4	-	-	-	26.0%	45.1%	28.9%	49
	Unknown	7.6	0.9	-	-	12.0%	36.3%	31.0%	20.7%	18
Bottom Freezer Water & Ice in-door	Overall	2.77	0.3	-	-	-	4.8%	43.8%	51.4%	114
	19 to 22	2.9	0.5	-	-	-	3.1%	46.1%	50.8%	22
	23+	2.7	0.4	-	-	-	3.7%	44.6%	51.6%	78
	Unknown	3.1	0.1	-	-	-	18.0%	30.3%	51.7%	14
Compact	Overall	25	0.0	100.0%	-	-	-	-	-	1
	Unknown	25.0	0.0	100.0%	-	-	-	-	-	1
Built-in	Overall	9.15	1.2	4.3%	-	11.4%	54.3%	26.0%	4.1%	32
	15 to 18	2.0	0.0	-	-	-	-	-	100.0%	1
	19 to 22	5.9	0.5	-	-	-	53.1%	41.7%	5.2%	10
	23+	8.3	1.3	-	-	11.4%	77.2%	11.4%	-	5
	Unknown	12.1	1.5	8.4%	-	20.4%	53.6%	17.6%	-	16
Built-in Water & Ice in-door	Overall	7.3	1.2	-	-	13.2%	36.8%	46.0%	4.0%	18
	19 to 22	6.6	0.0	-	-	-	53.1%	46.9%	-	2
	23+	8.3	0.0	-	-	14.4%	68.4%	-	17.3%	5
	Unknown	7.1	0.3	-	-	14.0%	24.9%	61.1%	-	11
Refrigerator Only	Overall	7.02	0.0	-	-	23.4%	-	76.6%	-	5
	15 to 18	6.2	0.0	-	-	15.6%	-	84.4%	-	3
	19 to 22	14.0	0.0	-	-	100.0%	-	-	-	1
	Unknown	6.0	0.0	-	-	-	-	100.0%	-	1

Table 178: Distribution of Nameplate UEC Ranges within Size Ranges and Type of Primary Refrigerators using Census-adjusted Weights

Census-adjusted Weights												
Unit Energy Consumption Ranges (kWh/Year)												
Ref Type	Size Range (cu. ft.)	Less than 350	350 to 549.9	550 to 749.9	750 to 949.9	950 to 1149.9	1150 to 1349.9	1350 to 1549.9	1550 to 1749.9	1750 to 1949.9	1950 to 2150	More than 2150
All Types	Overall	0.70%	44.9%	40.3%	8.6%	3.6%	1.1%	0.5%	0.2%	-	0.1%	44.9%
	1 to 10	22.0%	78.0%	-	-	-	-	-	-	-	-	78.0%
	11 to 14	-	68.0%	29.9%	2.1%	-	-	-	-	-	-	68.0%
	15 to 18	2.1%	70.6%	19.2%	6.9%	1.2%	-	-	-	-	-	70.6%
	19 to 22	-	48.5%	32.4%	12.0%	4.6%	1.6%	0.6%	0.2%	0.1%	-	48.5%
	23+	-	15.5%	67.0%	8.6%	5.6%	1.9%	0.9%	0.2%	-	0.2%	15.5%
Top Freezer	Overall	0.9%	66.3%	22.3%	8.2%	1.8%	0.3%	0.2%	-	-	-	66.3%
	1 to 10	-%	100.0%	-	-	-	-	-	-	-	-	100.0%
	11 to 14	-	68.0%	29.9%	2.1%	-	-	-	-	-	-	68.0%
	15 to 18	1.6%	70.6%	19.3%	7.2%	1.2%	-	-	-	-	-	70.6%
	19 to 22	-	60.2%	23.2%	11.7%	4.0%	0.3%	0.6%	-	-	-	60.2%
	23+	-	3.4%	51.1%	33.7%	-	11.8%	-	-	-	-	3.4%
Top Freezer Water & Ice in-door	Overall	15.7%	23.2%	21.4%	22.0%	-	8.7%	-	-	-	8.9%	23.2%
	1 to 10	100.0%	-	-	-	-	-	-	-	-	-	-
	15 to 18	-	100.0%	-	-	-	-	-	-	-	-	100.0%
	19 to 22	-	60.7%	18.1%	21.2%	-	-	-	-	-	-	60.7%
	23+	-	-	32.7%	32.3%	-	17.3%	-	-	-	-	17.6%
Side-by-Side	Overall	2.6%	15.9%	41.0%	21.6%	4.0%	11.2%	-	2.6%	1.0%	-	-
	15 to 18	75.1%	24.9%	-	-	-	-	-	-	-	-	-
	19 to 22	-	18.7%	39.6%	18.2%	6.0%	12.0%	-	3.9%	1.6%	-	-
	23+	-	8.8%	49.0%	31.5%	0.0%	10.7%	-	-	-	-	-
Side-by-Side Water & Ice in-door	Overall	-	7.0%	72.8%	10.5%	6.8%	1.8%	0.9%	0.3%	-	-	-
	19 to 22	-	13.2%	59.8%	19.3%	4.5%	3.1%	-	-	-	-	-
	23+	-	5.4%	76.0%	8.3%	7.3%	1.5%	1.1%	0.3%	-	-	-
Single Door	Overall	33.1%	14.0%	52.8%	-	-	-	-	-	-	-	-

Census-adjusted Weights											
Unit Energy Consumption Ranges (kWh/Year)											
Ref Type	**Size Range (cu. ft.)**	**Less than 350**	**350 to 549.9**	**550 to 749.9**	**750 to 949.9**	**950 to 1149.9**	**1150 to 1349.9**	**1350 to 1549.9**	**1550 to 1749.9**	**1750 to 1949.9**	**1950 to 2150**	**More than 2150**
	15 to 18	70.3%	29.7%	-	-	-	-	-	-	-	-	-
	23+	-	-	100.0%	-	-	-	-	-	-	-	-
Single Door Water & Ice in-door	Overall	-	-	60.7%	-	-	-	39.3%	-	-	-	-
	23+	-	-	60.7%	-	-	-	39.3%	-	-	-	-
Bottom Freezer	Overall	-	77.5%	14.0%	3.2%	4.4%	-	1.0%	-	-	-	-
	1 to 10	-	100.0%	-	-	-	-	-	-	-	-	-
	15 to 18	-	76.4%	23.6%	-	-	-	-	-	-	-	-
	19 to 22	-	69.2%	16.9%	5.2%	7.1%	-	1.7%	-	-	-	-
	23+	-	94.6%	5.4%	-	-	-	-	-	-	-	-
Bottom Freezer Water & Ice in-door	Overall	-	50.2%	49.8%	-	-	-	-	-	-	-	-
	19 to 22	-	66.9%	33.1%	-	-	-	-	-	-	-	-
	23+	-	44.3%	55.7%	-	-	-	-	-	-	-	-
Built-in	Overall	4.1%	24.2%	69.2%	2.5%	-	-	-	-	-	-	-
	15 to 18	100.0%	-	-	-	-	-	-	-	-	-	-
	19 to 22	-	31.2%	68.3%	-	-	-	-	-	-	-	-
	23+	-	-	86.5%	13.5%	-	-	-	-	-	-	-
Built-in Water & Ice in-door	Overall	-	-	65.5%	20.1%	-	-	13.5%	-	-	-	-
	19 to 22	-	-	100.0%	-	-	-	-	-	-	-	-
	23+	-	-	56.5%	26.5%	-	-	17.0%	-	-	-	-
Refrigerator Only	Overall	32.3%	67.7%	-	-	-	-	-	-	-	-	-
	15 to 18	37.9%	62.1%	-	-	-	-	-	-	-	-	-
	19 to 22	-	100.0%	-	-	-	-	-	-	-	-	-

10.1.2　Secondary Refrigerators

Table 179: Distribution of Estimated Size Ranges within Type of Secondary Refrigerators using Census-adjusted Weights

Refrigerator Type		Census-adjusted weights				
		Size Range (cu. ft.)				
		1 to 10	11 to 14	15 to 18	19 to 22	23+
All Types (n=469)	%	20.8%	7.6%	30.2%	22.2%	19.2%
	Error Bound	4.3%	2.5%	22.2%	3.6%	4.0%
Top Freezer (n=249)	%	2.2%	13.1%	54.2%	27.3%	3.1%
	Error Bound	1.6%	4.5%	6.9%	5.4%	1.6%
Top Freezer Water & Ice in-door (n=6)	%	-	-	-	82.2%	17.8%
	Error Bound	-	-	-	17.8%	26.6%
Side-by-Side (n=9)	%	-	-	-	89.4%	20.1%
	Error Bound	-	-	-	20.1%	11.7%
Side-by-Side Water & Ice in-door (n=85)	%	-	-	-	13.6%	86.4%
	Error Bound	-	-	-	6.2%	8.5%
Single Door (n=23)	%	97.5%	-	2.5%	-	-
	Error Bound	6.5%	-	4.1%	-	-
Bottom Freezer (n=27)	%	-	2.4%	15.4%	72.7%	9.5%
	Error Bound	-	3.8%	13.6%	17.6%	8.9%
Bottom Freezer Water & Ice in-door (n=4)	%	-	-	-	-	100.0%
	Error Bound	-	-	-	-	0.0%
Compact (n=60)	%	99.3%	0.7%	-	-	-
	Error Bound	2.5%	1.2%	-	-	-
Built-in (n=2)	%	100.0%	-	-	-	-
	Error Bound	0.0%	-	-	-	-
Refrigerator Only (n=4)	%	59.5%	40.5%	-	-	-
	Error Bound	56.1%	37.8%	-	-	-

Table 180: Average Age and Distribution of Manufacturer Reported Ages within Size Ranges of Secondary Refrigerators using Census-adjusted Weights

Ref Type	Size Range (cu. ft.)	Avg Mfg. Age	EB	Census-adjusted weights							
				Manufactured Date Ranges							
				1980-1984	1985-1989	1990-1994	1995-1999	2000-2005	2006-2009	2010-2012	Sample Size
All Types	Overall	10.1	0.8	0.4%	3.0%	10.7%	21.6%	29.3%	22.6%	12.4%	270
	1 to 10	13.4	0.2	8.9%	10.3%	3.8%	30.4%	10.7%	36.0%	-	-
	11 to 14	7.1	1.5	-	3.4%	7.7%	5.6%	26.8%	35.0%	21.5%	-
	15 to 18	9.6	0.9	-	2.2%	10.7%	17.5%	34.3%	24.9%	10.4%	-
	19 to 22	11.2	1.1	-	2.7%	13.9%	31.3%	23.2%	18.8%	10.1%	-
	23+	12.2	1.8	-	4.8%	14.0%	22.2%	44.0%	11.8%	3.3%	-
	Unknown	8.0	1.3	-	0.5%	6.8%	22.6%	18.8%	24.2%	27.1%	-
Top Freezer	Overall	9.6	0.9	-	3.1%	10.1%	19.2%	30.7%	23.1%	13.8%	167
	1 to 10	8.4	0.0	-	-	-	-	100.0%	-	-	3
	11 to 14	7.2	1.6	-	3.6%	8.3%	6.1%	28.8%	30.0%	23.2%	23
	15 to 18	9.7	0.9	-	2.2%	10.7%	17.7%	34.6%	25.2%	9.7%	72
	19 to 22	9.9	1.0	-	1.5%	10.0%	25.6%	29.3%	20.8%	12.8%	40
	23+	24.5	0.0	-	100.0%	-	-	-	-	-	2
	Unknown	10.0	1.4	-	0.9%	11.1%	29.2%	21.0%	16.3%	21.5%	27
Top Freezer Water & Ice in-door	Overall	16.7	0.0	-	17.2%	24.0%	33.0%	25.9%	-	-	6
	1 to 10	11.6	1.2	-	-	-	62.0%	26.0%	12.0%	-	4
	19 to 22	17.8	0.0	-	-	42.1%	57.9%	-	-	-	4
	23+	23.0	0.0	-	100.0%	-	-	-	-	-	1
	Unknown	10.0	0.0	-	-	-	-	100.0%	-	-	1
Side-by-Side	Overall	12.1	1.6	-	1.5%	14.1%	31.8%	40.4%	9.4%	2.8%	58
	19 to 22	11.7	0.0	-	-	-	80.7%	-	19.3%	-	2
	23+	13.0	0.0	-	-	-	100.0%	-	-	-	1
	Unknown	11.0	0.0	-	-	-	-	100.0%	-	-	1
Side-by-Side Water & Ice in-door	Overall	9.5	0.5	-	-	-	41.5%	-	51.1%	7.5%	7
	19 to 22	15.7	1.7	-	11.4%	11.1%	64.5%	13.0%	-	-	8
	23+	12.0	1.7	-	-	16.0%	24.9%	50.3%	5.1%	3.8%	42
	Unknown	8.8	0.5	-	-	6.1%	37.9%	11.3%	44.7%	-	8
Single Door	Overall	9.0	6.5	-	-	29.2%	-	-	46.9%	23.9%	8
	1 to 10	11.1	0.4	-	-	-	55.3%	-	44.7%	-	4
	15 to 18	2.0	0.0	-	-	-	-	-	-	100.0%	1
	Unknown	6.0	0.0	-	-	-	-	-	100.0%	-	2
Bottom Freezer	Overall	6.0	0.0	-	-	-	-	-	100.0%	-	2
	11 to 14	3.0	0.0	-	-	-	-	-	100.0%	-	1
	19 to 22	12.7	2.0	-	-	47.4%	-	-	42.5%	10.1%	5

Ref Type	Size Range (cu. ft.)	Avg Mfg. Age	EB	Census-adjusted weights							
				Manufactured Date Ranges							
				1980-1984	1985-1989	1990-1994	1995-1999	2000-2005	2006-2009	2010-2012	Sample Size
Bottom Freezer Water & Ice in-door	Unknown	3.1	0.0	-	-	-	-	-	42.8%	57.2%	2
	Overall	8.2	2.6	8.5%	9.8%	3.6%	3.4%	10.0%	19.9%	44.7%	15
	23+	6.0	0.0	-	-	-	-	-	100.0%	-	2
Compact	Overall	7.0	0.0	-	-	-	-	100.0%	-	-	1
	1 to 10	18.7	0.1	25.8%	29.9%	11.1%	-	-	33.2%	-	6
	Unknown	3.0	2.3	-	-	-	5.1%	15.0%	13.3%	66.6%	9
Built-in	Overall	7.0	0.0	-	-	-	-	100.0%	-	-	1
	1 to 10	7.0	0.0	-	-	-	-	100.0%	-	-	1
Refrigerator Only	Overall	6.0	0.0	-	-	-	-	-	100.0%	-	2
	11 to 14	6.0	0.0	-	-	-	-	-	100.0%	-	2

Table 181: Average Age and Distribution of Manufacturer Reported Ages and On-site Estimated Ages within Size Ranges of Secondary Refrigerators using Census-adjusted Weights

Ref Type	Size Range (cu. ft.)	Avg Mfg. Age	Ave Mfg. Age EB	1980-1984	1985-1989	1990-1994	1995-1999	2000-2005	2006-2009	2010-2012	Sample Size
				Census-adjusted weights							
All Types	Overall	9.4	1.4	0.4%	3.0%	10.7%	21.6%	29.3%	22.6%	12.4%	270
	1 to 10	8.2	1.4	8.9%	10.3%	3.8%	30.4%	10.7%	36.0%	-	80
	11 to 14	7.9	1.5	-	3.4%	7.7%	5.6%	26.8%	35.0%	21.5%	34
	15 to 18	9.8	0.9	-	2.2%	10.7%	17.5%	34.3%	24.9%	10.4%	120
	19 to 22	10.9	0.9	-	2.7%	13.9%	31.3%	23.2%	18.8%	10.1%	107
	23+	11.4	1.2	-	4.8%	14.0%	22.2%	44.0%	11.8%	3.3%	91
	Unknown	8.7	1.0	-	0.5%	6.8%	22.6%	18.8%	24.2%	27.1%	285
Top Freezer	Overall	9.8	0.7	-	5.2%	8.7%	15.9%	34.6%	23.3%	12.3%	305
	1 to 10	3.6	0.0	-	-	-	-	21.1%	26.9%	52.0%	7
	11 to 14	8.1	1.7	-	3.0%	11.3%	11.1%	28.0%	25.9%	20.6%	30
	15 to 18	9.8	0.9	-	4.5%	8.6%	16.9%	32.4%	30.2%	7.5%	114
	19 to 22	10.3	1.0	-	2.7%	11.4%	20.6%	37.6%	16.8%	10.9%	67
	23+	14.8	1.8	-	23.7%	-	30.1%	39.9%	6.3%	-	13
	Unknown	10.1	1.4	-	7.8%	7.2%	12.2%	38.6%	17.9%	16.2%	74
Top Freezer Water & Ice in-door	Overall	12.5	1.0	-	7.6%	10.6%	14.6%	67.2%	-	-	8
	19 to 22	15.6	3.5	-	-	30.3%	41.6%	28.1%	-	-	5
	23+	23.0	0.0	-	100.0%	-	-	-	-	-	1
	Unknown	9.2	0.0	-	-	-	-	100.0%	-	-	2
Side-by-Side	Overall	17.3	2.2	-	24.2%	24.2%	31.9%	15.9%	3.8%	-	12
	19 to 22	16.0	3.6	-	-	43.2%	50.0%	-	6.8%	-	6
	23+	12.5	0.0	-	-	-	47.6%	52.4%	-	-	2
	Unknown	20.4	0.0	-	67.4%	-	-	32.6%	-	-	4
Side-by-Side	Overall	12.0	1.2	-	3.4%	14.3%	29.1%	37.3%	11.1%	4.8%	108

Ref Type	Size Range (cu. ft.)	Avg Mfg. Age	Ave Mfg. Age EB	Census-adjusted weights							Sample Size
				1980-1984	1985-1989	1990-1994	1995-1999	2000-2005	2006-2009	2010-2012	
Water & Ice in-door	19 to 22	15.1	1.4	-	14.9%	8.8%	51.1%	20.2%	4.9%	-	13
	23+	11.3	1.3	-	-	13.5%	25.1%	46.4%	8.1%	6.9%	68
	Unknown	13.1	0.9	-	9.3%	19.4%	32.2%	15.1%	24.0%	-	27
Single Door	Overall	8.7	1.6	-	7.2%	8.4%	9.9%	16.2%	42.3%	16.0%	53
	1 to 10	7.9	0.9	-	-	-	20.2%	22.5%	54.9%	2.4%	17
	15 to 18	2.0	0.0	-	-	-	-	-	-	100.0%	1
	Unknown	9.3	1.9	-	11.5%	13.4%	4.2%	13.0%	36.0%	22.0%	35
Bottom Freezer	Overall	12.5	5.9	-	25.9%	10.8%	1.6%	21.9%	26.5%	13.3%	31
	11 to 14	3.0	0.0	-	-	-	-	-	100.0%	-	1
	15 to 18	10.4	0.0	-	-	12.8%	-	72.8%	14.5%	-	5
	19 to 22	8.5	0.6	-	-	20.6%	3.5%	14.3%	41.2%	20.4%	16
	23+	14.0	0.0	-	36.6%	-	-	42.6%	20.8%	-	3
	Unknown	18.7	0.0	-	67.2%	-	-	12.8%	8.5%	11.4%	6
Bottom Freezer Water & Ice in-door	Overall	5.7	1.4	-	-	-	-	11.0%	69.4%	19.6%	5
	23+	5.1	0.0	-	-	-	-	-	78.0%	22.0%	4
	Unknown	10.0	0.0	-	-	-	-	100.0%	-	-	1
Compact	Overall	6.8	1.1	0.7%	4.9%	4.9%	3.6%	22.0%	29.8%	34.2%	161
	1 to 10	8.7	0.7	2.1%	4.8%	10.3%	4.1%	20.6%	38.6%	19.5%	52
	11 to 14	5.0	0.0	-	-	-	-	-	100.0%	-	1
	Unknown	5.9	0.9	-	4.9%	2.2%	3.3%	22.8%	24.9%	41.9%	108
Built-in	Overall	8.0	0.0	-	-	-	14.3%	44.6%	4.9%	36.2%	6
	1 to 10	6.1	0.0	-	-	-	-	52.9%	47.1%	-	2
	Unknown	8.2	0.0	-	-	-	16.0%	43.6%	-	40.4%	4
Built-in Water & Ice in-door	Overall	14.0	0.0	-	-	-	100.0%	-	-	-	1
	Unknown	14.0	0.0	-	-	-	100.0%	-	-	-	1

Ref Type	Census-adjusted weights										
	Size Range (cu. ft.)	Avg Mfg. Age	Ave Mfg. Age EB	1980-1984	1985-1989	1990-1994	1995-1999	2000-2005	2006-2009	2010-2012	Sample Size
Refrigerator Only	9.5	6.6	1.2	-	-	-	3.8%	49.8%	32.2%	14.2%	27
	1 to 10	8.9	0.0	-	-	-	-	100.0%	-	-	2
	11 to 14	6.0	0.0	-	-	-	-	-	100.0%	-	2
	Unknown	6.4	1.4	-	-	-	4.3%	48.4%	31.0%	16.3%	23

Table 182 Distribution of Nameplate UEC Ranges within Size Ranges and Type of Secondary Refrigerators using Census-adjusted Weights

Ref Type	Size Range (cu. ft.)	Average UEC	EB	Census-adjusted weights — Unit Energy Consumption Ranges (kWh/Year)						
				<350	350 to 549.9	550 to 749.9	750 to 949.9	950 to 1149.9	1150 to 1349.9	1350 to 1549.9
All Types	Overall	579.3	22.54	19.0%	37.1%	24.0%	10.6%	4.9%	4.0%	0.5%
	1 to 10	331.1	5.03	83.6%	15.8%	0.6%	-	-	-	-
	11 to 14	501.8	29.70	-	78.7%	13.2%	6.9%	1.1%	-	-
	15 to 18	594.5	35.06	4.3%	54.1%	23.4%	9.2%	5.9%	3.0%	-
	19 to 22	647.0	31.81	-	41.5%	28.9%	23.1%	2.4%	3.7%	0.4%
	23+	784.2	61.61	-	11.6%	49.4%	12.1%	13.0%	11.8%	2.2%
	Unknown	275.0	0.00	100.0%	-	-	-	-	-	-
Top Freezer	Overall	584.2	27.91	4.6%	53.8%	22.6%	12.7%	4.0%	2.2%	-
	1 to 10	334.5	0.00	83.2%	16.8%	-	-	-	-	-
	11 to 14	503.9	31.25	-	78.5%	12.8%	7.4%	1.2%	-	-
	15 to 18	588.8	36.25	4.5%	54.3%	23.9%	9.5%	6.1%	1.8%	-
	19 to 22	600.3	26.08	-	49.7%	26.9%	22.2%	1.1%	-	-
	23+	913.2	57.62	-	8.0%	26.7%	20.5%	8.3%	36.5%	-
Top Freezer Water & Ice in-door	Overall	873.5	120.10	-	-	28.2%	47.1%	-	24.7%	-
	19 to 22	730.6	128.40	-	-	37.4%	62.6%	-	-	-
	23+	1310.0	0.00	-	-	-	-	-	100.0%	-
Side-by-Side	Overall	979.9	270.50	-	5.9%	28.2%	16.1%	-	38.4%	11.3%
	19 to 22	1003.3	308.78	-	6.7%	24.8%	12.3%	-	43.4%	12.8%
	23+	799.4	0.00	-	-	54.2%	45.8%	-	-	-
Side-by-Side Water & Ice in-door	Overall	801.4	58.94	-	3.8%	52.9%	18.3%	13.2%	9.5%	2.3%
	19 to 22	859.9	88.20	-	-	31.3%	57.0%	-	11.7%	-
	23+	792.3	66.62	-	4.4%	56.2%	12.3%	15.2%	9.2%	2.7%
Single Door	Overall	331.9	12.28	87.4%	12.6%	-	-	-	-	-
	1 to 10	327.4	10.24	91.1%	8.9%	-	-	-	-	-
	15 to 18	438.0	0.00	-	100.0%	-	-	-	-	-
Bottom Freezer	Overall	635.5	49.73	-	53.4%	27.1%	-	7.2%	12.3%	-
	11 to 14	443.1	0.00	-	100.0%	-	-	-	-	-
	15 to 18	875.5	0.00	-	35.1%	11.8%	-	-	53.2%	-
	19 to 22	611.9	66.46	-	48.8%	35.0%	-	9.9%	6.2%	-
	23+	506.4	0.00	-	100.0%	-	-	-	-	-
Bottom Freezer Water & Ice in-door	Overall	517.0	0.00	-	76.5%	23.5%	-	-	-	-
	23+	517.0	0.00	-	76.5%	23.5%	-	-	-	-

Ref Type	Size Range (cu. ft.)	Average UEC	EB	Census-adjusted weights						
				Unit Energy Consumption Ranges (kWh/Year)						
				<350	350 to 549.9	550 to 749.9	750 to 949.9	950 to 1149.9	1150 to 1349.9	1350 to 1549.9
Compact	Overall	333.1	6.39	80.2%	18.2%	1.6%	-	-	-	-
	1 to 10	332.0	5.54	80.5%	18.6%	1.0%	-	-	-	-
	11 to 14	601.0	0.00	-	-	100.0%	-	-	-	-
	Unknown	275.0	0.00	100.0%	-	-	-	-	-	-
Built-in	Overall	337.1	0.00	52.0%	48.0%	-	-	-	-	-
	1 to 10	337.1	0.00	52.0%	48.0%	-	-	-	-	-
Refrigerator Only	Overall	378.0	0.0	58.6%	41.4%	-	-	-	-	-
	1 to 10	332.4	0.0	100.0%	-	-	-	-	-	-
	11 to 14	442.7	0.0	-	100.0%	-	-	-	-	-

10.1.3　Freezers

Table 183: Distribution of Size of Primary Freezers by Type using Census-adjusted Weights

Size Range (cu. ft.)	Census-adjusted weights					
	All Stand Alone Freezers (n=231)		Chest (n=78)		Upright (n=153)	
	%	Error Bound	%	Error Bound	%	Error Bound
1.00-10.00	39.0%	8.3%	90.1%	8.3%	5.5%	3.5%
11.00-14.00	23.2%	5.4%	3.1%	2.2%	36.4%	8.1%
15.00-18.00	14.3%	4.5%	0.5%	0.9%	23.3%	7.0%
19.00-22.00	23.5%	5.9%	6.3%	5.6%	34.7%	8.5%

Table 184: Distribution of Nameplate Annual Energy Consumption (AEC) of Primary Freezers by Type using Census-adjusted Weights

Annual Usage Range (kWh/year)	Census-adjusted weights					
	Chest and Upright (n=231)		Chest (n=78)		Upright (n=153)	
	Percentage	Error Bound	Percentage	Error Bound	Percentage	Error Bound
Less than 225 AEC	2.2%	2.3%	6.6%	6.8%	-	-
225-424.99 AEC	33.3%	7.3%	86.0%	9.3%	6.9%	4.6%
425-624.99 AEC	25.6%	5.5%	2.7%	3.3%	37.0%	7.4%
0625-824.99 AEC	25.7%	7.0%	1.6%	2.6%	37.7%	9.6%
825-1024.99 AEC	6.0%	5.7%	1.7%	2.8%	8.1%	8.4%
1025-1224.99 AEC	5.1%	3.0%	-	-	7.7%	4.4%
1225+ AEC	2.2%	2.9%	1.4%	2.2%	2.6%	4.2%

Table 185: Distribution of Manufacture Date of Primary Freezers by Type using Census-adjusted Weights

Estimated and Manufacturer Reported Age Bins	Census-adjusted weights					
	Chest and Upright (n=437)		Chest (n=257)		Upright (n=180)	
	%	Error Bound	%	Error Bound	%	Error Bound
2010 to 2012	18.9%	4.8%	29.0%	8.7%	10.4%	4.5%
2006 to 2009	19.0%	3.8%	20.7%	6.3%	17.7%	4.5%
2000 to 2005	31.5%	4.5%	22.0%	6.0%	39.4%	6.4%
1995 to 1999	11.1%	3.4%	11.8%	5.8%	10.5%	3.9%
1990 to 1994	9.2%	2.5%	6.2%	3.2%	11.8%	3.6%
1985 to 1989	9.6%	2.9%	9.3%	5.0%	9.9%	3.4%
1980 to 1984	0.2%	0.3%	-	-	0.3%	0.6%
1979 and older	0.4%	0.7%	1.0%	1.6%	-	-

10.2 Heating Equipment

Table 186: Distribution of Heating Systems by Fuel Type within Type of Heating System using Census-adjusted Weights

| | System Type | Census-adjusted weights | | | | | | | | | | Sample Size |
| | | Gas | | Electricity | | Propane | | Wood | | Other | | |
		%	EB	%	EB	%	EB	%	EB	%	EB	
	All Types	81.7%	1.9%	13.1%	1.8%	3.8%	0.8%	1.2%	0.5%	0.1%	0.2%	1949
Central	All Central	89.6%	1.7%	6.1%	1.4%	4.3%	0.9%	-	-	-	-	1578
	Split Forced Air Furnace	92.3%	1.9%	3.4%	1.3%	4.3%	1.2%	-	-	-	-	1011
	Package Furnace/AC	86.4%	5.9%	6.4%	5.0%	7.2%	3.6%	-	-	-	-	165
	Hydronic System	78.9%	17.5%	9.5%	10.8%	11.6%	10.5%	-	-	-	-	25
	Split Heat pump w/ electronic supplement	-	-	100.0%	0.0%	-	-	-	-	-	-	14
	Split Heat pump w/o electronic supplement	-	-	100.0%	0.0%	-	-	-	-	-	-	21
	Package Heat Pump	-	-	100.0%	0.0%	-	-	-	-	-	-	10
	Forced Air furnace (No AC)	96.0%	2.4%	0.9%	0.8%	3.0%	1.7%	0.0%	0.0%	0.1%	0.2%	323
	Common Building	87.5%	19.9%	12.5%	19.2%	-	-	-	-	-	-	9
Space	All Space	61.2%	5.2%	31.6%	4.7%	2.5%	1.5%	4.4%	1.8%	0.4%	0.6%	371
	Wall Furnace	93.0%	3.8%	4.3%	2.5%	2.6%	2.3%	-	-	0.1%	0.2%	175
	Electronic Resistance Wall Unit	-	-	100.0%	0.0%	-	-	-	-	-	-	16
	Gravity Furnace	96.4%	5.8%	1.3%	2.1%	2.3%	3.8%	-	-	-	-	42
	Ceiling Cable	-	-	100.0%	0.0%	-	-	-	-	-	-	22
	Electronic Baseboards	-	-	100.0%	0.0%	-	-	-	-	-	-	19
	Pellet Stove	-	-	11.2%	17.4%	-	-	88.8%	49.0%	-	-	2
	Fireplace	53.7%	33.3%	12.9%	19.8%	2.5%	3.1%	30.8%	15.6%	-	-	18
	Electric Space Heater	-	-	100.0%	0.0%	-	-	-	-	-	-	52
	Wood Stove	8.2%	9.3%	-	-	22.0%	22.8%	69.8%	18.6%	-	-	21
	Window Wall Heat Pump	-	-	100.0%	0.0%	-	-	-	-	-	-	3

| System Type | Census-adjusted weights | | | | | | | | | | Sample Size |
| | Gas | | Electricity | | Propane | | Wood | | Other | | |
	%	EB	%	EB	%	EB	%	EB	%	EB	
All Types	81.7%	1.9%	13.1%	1.8%	3.8%	0.8%	1.2%	0.5%	0.1%	0.2%	1949
Other	-	-	-	-	-	-	-	-	100.0%	0.0%	1

Table 187: Average Estimated Age and Distribution of Heating Systems across Age Ranges within Type using Census-adjusted Weights

System Type		Avg Mfg Age	Avg Mfg. Age EB	1979 and Older		1980-1984		1985-1989		1990-1994		1995-1999		2000-2005		2006-2009		2010-2012		Sample Size
				%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	
All Types		15.5	1.0	9.2%	2.9%	4.1%	1.7%	17.9%	4.2%	9.0%	2.6%	6.6%	1.9%	30.1%	4.8%	16.8%	3.5%	6.3%	2.1%	506
Central	All Central	16.1	1.1	9.8%	3.1%	4.3%	1.8%	19.1%	4.5%	8.9%	2.7%	7.1%	2.0%	29.6%	4.8%	15.9%	3.3%	5.3%	1.9%	480
	Split Forced Air Furnace	14.5	1.2	6.4%	3.4%	4.5%	2.1%	15.9%	4.9%	10.7%	3.7%	6.2%	2.3%	33.2%	5.4%	17.3%	4.2%	5.9%	2.6%	319
	Package Furnace/AC	13.4	2.8	4.8%	7.7%	-	-	8.1%	8.9%	20.6%	18.2%	16.9%	10.3%	23.1%	12.8%	14.8%	11.7%	11.6%	12.0%	33
	Hydronic System	5.0	0.0	-	-	-	-	-	-	-	-	-	-	100.0%	0.0%	-	-	-	-	1
	Split Heat pump w/ electronic supplement	2.4	2.5	-	-	-	-	-	-	-	-	12.6%	19.4%	-	-	-	-	87.4%	44.3%	3
	Split Heat pump w/o electronic supplement	9.9	0.0	-	-	-	-	-	-	-	-	-	-	80.9%	58.1%	-	-	19.1%	28.2%	2
	Package Heat Pump	25.6	0.0	-	-	-	-	100.0%	0.0%	-	-	-	-	-	-	-	-	-	-	2
	Forced Air furnace (No AC)	19.3	2.0	17.1%	6.8%	4.8%	4.0%	25.5%	9.8%	4.2%	3.6%	7.0%	4.0%	25.6%	10.3%	13.0%	6.0%	2.7%	2.6%	120
Space	All Space	9.6	1.6	3.1%	3.7%	2.2%	3.5%	5.7%	6.6%	9.7%	9.7%	1.3%	2.1%	35.5%	22.1%	26.3%	18.6%	16.3%	12.1%	26
	Wall Furnace	11.4	3.7	-	-	-	-	18.7%	22.7%	20.5%	30.0%	-	-	14.4%	22.0%	46.4%	39.8%	-	-	6
	Gravity Furnace	11.0	1.4	-	-	-	-	4.3%	7.0%	10.4%	16.2%	-	-	81.0%	42.0%	4.3%	7.0%	-	-	5

System Type	Avg Mfg Age	Avg Mfg. Age EB	1979 and Older		1980-1984		1985-1989		1990-1994		1995-1999		2000-2005		2006-2009		2010-2012		Sample Size
			%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	
Ceiling Cable	9.8	0.0	24.0%	34.4%	-	-	-	-	-	-	-	-	-	-	-	-	76.0%	61.2%	2
Electronic Baseboards	7.8	0.0	4.9%	7.9%	-	-	-	-	-	-	-	-	48.6%	57.3%	42.0%	52.6%	4.5%	7.3%	4
Pellet Stove	15.0	0.0	-	-	-	-	-	-	-	-	100.0%	0.0%	-	-	-	-	-	-	1
Fireplace	7.0	0.0	-	-	-	-	-	-	-	-	100.0%	0.0%	-	-	-	-	-	-	1
Electric Space Heater	2.5	0.0	-	-	-	-	-	-	-	-	-	-	-	-	32.9%	44.3%	67.1%	34.0%	5
Wood Stove	22.8	0.0	-	-	47.6%	56.7%	-	-	52.4%	59.5%	-	-	-	-	-	-	-	-	2

Census-adjusted weights - Manufactured Date and Estimated Manufactured Date Ranges

Table 188: Distribution of AFUE Ranges within Heating System Type using Census-adjusted Weights

			Census-adjusted weights						
	AFUE Range		**Less than 66**	**66 - 71.99**	**72 - 77.99**	**78 - 84.99**	**85 - 89.99**	**90 - 96.99**	**97 +**
Central	All Central (n=976)	%	0.0%	3.0%	7.3%	81.8%	-	7.3%	0.5%
		EB	1.7%	45.9%	40.6%	11.6%	-	0.2%	0.0%
	Split Forced Air Furnace (n=664)	%	-	1.4%	5.5%	84.8%	-	8.0%	0.3%
		EB	-	1.1%	1.7%	3.2%	-	1.9%	0.5%
	Package Furnace/AC (n=71)	%	-	2.2%	5.2%	92.5%	-	-	-
		EB	-	3.6%	4.8%	7.3%	-	-	-
	Hydronic System (n=5)	%	-	-	-	66.5%	-	34.5%	-
		EB	-	-	-	32.4%	-	44.9%	-
	Forced Air furnace (No AC) (n=236)	%	-	6.2%	11.4%	73.6%	-	7.7%	1.1%
		EB	-	4.2%	5.5%	6.2%	-	2.9%	1.4%
Space	All Space (n=91)	%	1.7%	45.9%	40.6%	11.6%	-	0.2%	-
		EB	2.0%	9.5%	10.9%	6.8%	-	0.3%	-
	Wall Furnace (n=71)	%	1.4%	41.7%	41.5%	15.2%	-	0.2%	-
		EB	2.3%	10.2%	12.2%	8.8%	-	0.3%	-
	Gravity Furnace (n=18)	%	-	62.1%	37.9%	-	-	-	-
		EB	-	21.5%	25.1%	-	-	-	-
	Fireplace (n=1)	%	100.0%	-	-	-	-	-	-
		EB	0.0%	-	-	-	-	-	-
	Wood Stove (n=1)	%	-	-	100.0%	-	-	-	-
		EB	-	-	0.0%	-	-	-	-

10.3 Cooling Equipment

Table 189: Distribution of Cooling System Manufacture Date Ranges within Types using Census-adjusted Weights

Age Range	Census-adjusted weights																	
	Central										Space							
	All Types (n=380)		Split System A/C (n=325)		Package System A/C (n=33)		Split System Heat Pump (n=14)		Package System Heat Pump (n=2)		Evaporative Cooler (n=6)		All Types (n=24)		Window/Wall AC (n=3)		Portable/Stand Alone AC (n=6)	
	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB
1979 and Older	1.9%	1.3%	1.7%	1.3%	4.8%	7.7%	-	-	-	-	-	-	-	-	-	-	-	-
1980-1984	4.2%	2.2%	4.6%	2.5%	-	-	11.5%	13.2%	-	-	-	-	5.8%	9.3%	7.7%	12.1%	-	-
1985-1989	16.3%	4.5%	16.7%	5.0%	8.1%	8.6%	13.5%	15.6%	100.0%	0	-	-	5.2%	8.4%	6.8%	10.9%	-	-
1990-1994	20.1%	5.1%	21.3%	5.6%	18.1%	18.1%	9.7%	15.1%	-	-	-	-	-	-	-	-	-	-
1995-1999	19.2%	6.2%	20.6%	7.1%	17.0%	10.3%	3.9%	6.3%	-	-	-	-	8.2%	8.6%	10.7%	11.2%	-	-
2000-2005	20.5%	3.8%	20.0%	4.2%	25.6%	13.1%	27.6%	26.4%	-	-	20.5%	21.4%	36.8%	18.6%	38.9%	21.7%	30.0%	35.1%
2006-2009	12.3%	3.8%	11.6%	4.0%	14.8%	11.7%	-	-	-	-	55.3%	44.5%	35.6%	23.2%	27.7%	22.4%	61.0%	54.9%
2010-2012	5.4%	2.1%	3.6%	1.8%	11.6%	12.0%	33.8%	23.6%	-	-	24.2%	25.8%	8.3%	10.1%	8.1%	12.8%	9.0%	10.3%

Table 190: Distribution of Cooling System Size Ranges within Type using Census-adjusted Weights

Ton Range	Census-adjusted weights																			
	Central Type												Space Type							
	All Central HP and A/C Types (n=1010)		Split System A/C (n=876)		Package System A/C (n=347)		Package System Heat Pump (n=8)		Common Building (n=14)		Split System HP (n=6)		All Space Types (n=153)		Window/Wall AC (n=30)		Window/Wall Heat Pump (n=30)		Portable/Stand Alone AC (n=30)	
	%	EB	%	EB	%	EB			%	EB	%	EB	%	EB	%	EB	%	EB	%	EB
0.1-0.99	0.1%	0.1%	0.1%	0.1%	-	-	-	-	-	-	-	-	62.2%	8.0%	62.6%	9.0%	-	-	63.7%	18.0%
1.0-1.49	1.3%	1.0%	1.0%	0.8%	-	-	-	-	100.0%	0.0%	-	-	31.2%	8.2%	29.6%	9.2%	100.0%	0.0%	34.0%	18.3%
1.5-1.99	8.4%	3.2%	8.2%	3.5%	4.2%	6.0%	73.8%	62.2%	-	-	16.9%	13.7%	3.1%	2.0%	3.8%	2.5%	-	-	-	-
2.0-2.49	9.0%	2.4%	7.4%	1.9%	19.7%	14.2%	-	-	-	-	17.2%	16.2%	1.0%	1.3%	1.2%	1.6%	-	-	-	-
2.5-2.99	16.3%	2.7%	17.0%	3.0%	13.2%	7.6%	-	-	-	-	13.4%	10.8%	1.5%	2.3%	1.8%	2.9%	-	-	0.7%	1.1%
3.0-3.49	19.7%	2.5%	20.2%	2.7%	18.0%	7.0%	-	-	-	-	18.1%	12.3%	0.3%	0.5%	-	-	-	-	1.7%	2.7%
3.5-3.99	14.2%	2.1%	13.2%	2.2%	21.4%	7.9%	9.1%	14.3%	-	-	18.9%	10.7%	0.5%	0.8%	0.6%	1.0%	-	-	-	-
4.0-4.49	13.6%	2.3%	13.5%	2.5%	16.8%	6.9%	17.1%	25.6%	-	-	5.6%	7.0%	-	-	-	-	-	-	-	-
4.5-5.00	15.8%	2.0%	17.6%	2.3%	6.4%	3.5%	-	-	-	-	8.3%	11.0%	0.2%	0.4%	0.3%	0.5%	-	-	-	-
>5.01	1.7%	1.0%	1.9%	1.2%	0.4%	0.6%	-	-	-	-	1.5%	2.5%	-	-	-	-	-	-	-	-

Table 191: Distribution of Manufacture Date Ranges for Central Cooling Systems within Capacity Ranges and Types using Census-adjusted Weights

System Type	Ton Range	1979 and Older		1980-1984		1985-1989		1990-1994		1995-1999		2000-2005		2006-2009		2010-2012		Sample Size
		%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	
All Types	All Ranges	1.9%	1.3%	4.2%	2.2%	16.3%	4.5%	20.1%	5.1%	19.2%	6.2%	20.5%	3.8%	12.3%	3.8%	5.4%	2.1%	380
	1.0 to 1.49	-	-	-	-	39.1%	50.2%	60.9%	44.3%	-	-	-	-	-	-	-	-	3
	1.5 to 1.99	-	-	-	-	29.1%	21.9%	11.1%	12.2%	36.5%	43.8%	17.3%	14.0%	3.9%	6.3%	2.1%	3.4%	18
	2.0 to 2.49	9.4%	10.6%	13.8%	12.4%	18.8%	12.8%	16.6%	14.2%	12.7%	11.4%	11.9%	9.9%	7.3%	8.2%	9.5%	12.2%	27
	2.5 to 2.99	0.9%	1.2%	9.7%	8.2%	12.2%	8.5%	41.4%	18.5%	19.8%	10.7%	10.2%	5.8%	3.3%	5.4%	2.4%	3.0%	60
	3.0 to 3.49	5.4%	5.5%	1.2%	1.9%	8.0%	6.8%	13.9%	8.3%	30.1%	11.9%	25.6%	11.6%	10.9%	8.7%	5.0%	3.8%	67
	3.5 to 3.99	-	-	7.4%	7.7%	17.8%	13.5%	12.8%	7.0%	12.1%	6.0%	35.0%	10.6%	13.2%	9.2%	1.6%	2.6%	65
	4.0 to 4.49	-	-	1.2%	2.0%	12.1%	9.7%	7.8%	10.0%	26.0%	12.9%	18.1%	11.0%	20.6%	11.9%	14.2%	11.2%	47
	4.5 to 5.00	-	-	-	-	16.2%	10.0%	26.7%	11.1%	12.2%	6.8%	31.0%	12.4%	10.2%	6.5%	3.6%	3.0%	69
	>5.00	-	-	-	-	-	-	-	-	6.8%	10.9%	14.9%	16.0%	73.4%	42.3%	4.9%	7.9%	9
	Unknown	-	-	-	-	30.7%	25.1%	15.3%	23.2%	-	-	9.9%	8.2%	27.7%	21.9%	16.4%	15.7%	15
Split System AC	All Ranges	1.70%	1.3%	4.60%	2.5%	16.70%	5.0%	21.30%	5.6%	20.60%	7.1%	20.00%	4.2%	11.60%	4.0%	3.60%	1.8%	325
	1.0 to 1.49	-	-	-	-	39.1%	50.2%	60.9%	44.3%	-	-	-	-	-	-	-	-	3
	1.5 to 1.99	-	-	-	-	28.2%	22.8%	11.6%	12.7%	38.1%	45.2%	18.0%	14.6%	4.1%	6.5%	-	-	16
	2.0 to 2.49	12.4%	13.7%	18.1%	15.9%	23.9%	16.3%	9.2%	12.2%	16.6%	14.5%	7.7%	8.7%	9.6%	10.6%	2.6%	4.2%	21
	2.5 to 2.99	1.0%	1.2%	10.4%	8.8%	12.4%	9.0%	44.3%	19.3%	19.9%	11.3%	8.5%	5.7%	3.5%	5.7%	-	-	54
	3.0 to 3.49	3.1%	3.9%	1.3%	2.1%	8.9%	7.5%	14.7%	9.1%	30.5%	12.8%	25.6%	12.5%	12.2%	9.6%	3.8%	3.6%	59
	3.5 to 3.99	-	-	6.8%	9.3%	16.4%	15.9%	16.3%	8.8%	10.8%	6.4%	36.3%	12.2%	11.4%	10.0%	2.0%	3.3%	52
	4.0 to 4.49	-	-	1.4%	2.3%	13.9%	11.1%	9.1%	11.5%	24.4%	13.7%	13.2%	7.2%	22.3%	13.4%	15.7%	12.8%	41
	4.5 to 5.00	-	-	-	-	16.9%	10.3%	27.7%	11.5%	12.7%	7.1%	31.2%	12.8%	9.7%	6.6%	1.8%	2.0%	65
	>5.00	-	-	-	-	-	-	-	-	6.8%	10.9%	14.9%	16.0%	73.4%	42.3%	4.9%	7.9%	9
	Unknown	-	-	-	-	51.1%	58.8%	-	-	-	-	12.2%	13.3%	4.9%	7.8%	31.8%	43.2%	5
Package System AC	All Ranges	4.80%	7.7%	-	-	8.10%	8.6%	18.10%	18.1%	17.00%	10.3%	25.60%	13.1%	14.80%	11.7%	11.60%	12.0%	33
	2.0 to 2.49	-	-	-	-	3.8%	6.1%	42.0%	52.6%	-	-	8.4%	13.2%	-	-	45.8%	55.5%	4
	2.5 to 2.99	-	-	-	-	-	-	-	-	30.2%	41.5%	54.1%	42.9%	-	-	15.7%	23.8%	4
	3.0 to 3.49	30.2%	41.5%	-	-	-	-	8.0%	12.6%	31.8%	33.8%	30.0%	29.2%	-	-	-	-	6

System Type	Ton Range	Census-adjusted weights															Sample Size
		Age Range															
		1979 and Older		1980-1984		1985-1989		1990-1994		1995-1999		2000-2005		2006-2009		2010-2012		
		%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	
	3.5 to 3.99	-	-	-	-	29.2%	29.4%	-	-	17.1%	18.2%	28.6%	23.0%	25.1%	27.0%	-	-	9
	4.0 to 4.49	-	-	-	-	-	-	-	-	39.3%	39.3%	50.3%	58.3%	10.4%	16.3%	-	-	4
	4.5 to 5.00	-	-	-	-	-	-	-	-	-	-	23.8%	34.2%	23.8%	34.2%	52.4%	42.2%	4
	Unknown	-	-	-	-	-	-	63.8%	63.2%	-	-	-	-	36.2%	47.5%	-	-	2
Split System HP	All Ranges	-	-	11.50%	13.2%	13.50%	15.6%	9.70%	15.1%	3.90%	6.3%	27.60%	26.4%	-	-	33.80%	23.6%	14
	1.5 to 1.99	-	-	-	-	51.1%	58.8%	-	-	-	-	-	-	-	-	48.9%	57.5%	2
	2.0 to 2.49	-	-	-	-	-	-	37.0%	48.3%	-	-	63.0%	63.0%	-	-	-	-	2
	2.5 to 2.99	-	-	-	-	25.5%	36.2%	-	-	-	-	-	-	-	-	74.5%	61.9%	2
	3.0 to 3.49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0%	0.0%	2
	3.5 to 3.99	-	-	47.1%	41.9%	-	-	-	-	16.0%	24.1%	36.9%	48.2%	-	-	-	-	4
	4.0 to 4.49	-	-	-	-	-	-	-	-	-	-	50.0%	58.2%	-	-	50.0%	58.2%	2
Package System HP	Unknown	-	-	-	-	100.0%	0.0%	-	-	-	-	-	-	-	-	-	-	2
Evap Cooler	Unknown	-	-	-	-	-	-	-	-	-	-	20.5%	21.4%	55.3%	44.5%	24.2%	25.8%	6

Table 192: Distribution of Manufacture Date Ranges for Space Cooling Systems within Capacity Ranges and Types using Census-adjusted Weights

System Type	Cooling Tons	Census-adjusted weights													Sample Size
		Age Range													
		1980-1984		1985-1989		1990-1994		1995-1999		2000-2005		2006-2009		2010-2012		
		%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	
All Types	All Ranges	5.8%	9.3%	5.2%	8.4%	-	-	8.2%	8.6%	36.8%	18.6%	35.6%	23.2%	8.3%	10.1%	24
	0.1 to 0.99	13.2%	20.2%	11.8%	18.2%	-	-	7.6%	9.3%	8.7%	13.7%	41.7%	34.2%	17.0%	21.5%	11
	1.0 to 1.49	-	-	-	-	-	-	-	-	64.5%	33.0%	35.5%	46.9%	-	-	5
	2.0 to 2.49	-	-	-	-	-	-	80.7%	58.3%	-	-	19.3%	28.5%	-	-	2
	2.5 to 2.99	-	-	-	-	-	-	-	-	-	-	-	-	100.0%	0.0%	1
	3.0 to 3.49	-	-	-	-	-	-	-	-	-	-	100.0%	0.0%	-	-	1
	3.5 to 3.99	-	-	-	-	-	-	-	-	100.0%	0.0%	-	-	-	-	1
	4.5 to 5	-	-	-	-	-	-	-	-	-	-	100.0%	0.0%	-	-	1
	Unknown	-	-	-	-	-	-	-	-	100.0%	0.0%	-	-	-	-	2
Window/ Wall Air Conditioner	All Ranges	7.7%	12.1%	6.8%	10.9%	-	-	10.7%	11.2%	38.9%	21.7%	27.7%	22.4%	8.1%	12.8%	18
	1.0 to 1.49	13.6%	20.8%	12.2%	18.7%	-	-	7.9%	9.6%	9.0%	14.1%	43.0%	34.8%	14.4%	22.0%	10
	1.5 to 1.99	-	-	-	-	-	-	-	-	100.0%	0.0%	-	-	-	-	4
	2.0 to 2.49	-	-	-	-	-	-	80.7%	58.3%	-	-	19.3%	28.5%	-	-	2
	3.5 to 3.99	-	-	-	-	-	-	-	-	100.0%	0.0%	-	-	-	-	1
	4.5 to 5	-	-	-	-	-	-	-	-	-	-	100.0%	0.0%	-	-	1
Portable/ Stand	All Ranges	-	-	-	-	-	-	-	-	30.0%	35.1%	61.0%	54.9%	9.0%	10.3%	6
	0.1 to	-	-	-	-	-	-	-	-	-	-	-	-	100.0%	0.0%	1

System Type	Cooling Tons	Census-adjusted weights													Sample Size
		Age Range													
		1980-1984		1985-1989		1990-1994		1995-1999		2000-2005		2006-2009		2010-2012		
		%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	
Alone Air Conditioner	0.00															
	1.0 to 1.49	-	-	-	-	-	-	-	-	-	-	100.0%	0.0%	-	-	1
	2.5 to 2.99	-	-	-	-	-	-	-	-	-	-	-	-	100.0%	0.0%	1
	3.0 to 3.49	-	-	-	-	-	-	-	-	-	-	100.0%	0.0%	-	-	1
	Unknown	-	-	-	-	-	-	-	-	100.0%	0.0%	-	-	-	-	2

Table 193: Distribution of Cooling Systems by SEER/EER Ranges within Cooling System Type using Census-adjusted Weights

Efficiency Range	Census-adjusted weights																	
	Central										Space							
	All Types (n=765)		Split System A/C (n=689)		Package System A/C (n=55)		Split System Heat Pump (n=20)		Package System Heat Pump (n=1)		All Types (n=148)		Window/Wall AC (n=135)		Window/Wall HP (n=1)		Portable/Stand Alone AC (n=12)	
	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB
Less than 10 SEER	12.1%	2.8%	13.1%	3.1%	3.7%	4.4%	9.0%	10.1%	-	-	-	-	-	-	-	-	-	-
10-11.99 SEER	43.8%	4.3%	43.2%	4.4%	49.8%	17.7%	43.2%	22.3%	-	-	-	-	-	-	-	-	-	-
12-12.99 SEER	11.9%	2.2%	11.2%	2.3%	20.9%	8.4%	1.2%	2.0%	100.0%	0.0%	-	-	-	-	-	-	-	-
13-13.99 SEER	24.8%	3.3%	25.8%	3.6%	17.2%	8.2%	18.6%	15.0%	-	-	-	-	-	-	-	-	-	-
14-15.99 SEER	6.4%	1.7%	5.8%	1.6%	8.4%	7.8%	22.2%	18.4%	-	-	-	-	-	-	-	-	-	-
16 or Higher SEER	0.9%	0.6%	0.9%	0.6%	-	-	5.7%	7.5%	-	-	-	-	-	-	-	-	-	-
06-08.99 EER	-	-	-	-	-	-	-	-	-	-	3.9%	3.3%	1.3%	1.6%	-	-	36.9%	34.2%
09-10.99 EER		-	-	-	-	-	-	-	-	-	95.3%	4.6%	98.4%	2.9%	100.0%	0.0%	55.4%	35.0%
11-11.99 EER		-	-	-	-	-	-	-	-	-	0.8%	1.0%	0.3%	0.5%	-	-	7.7%	12.1%

10.4 Water Heaters

Table 194: Distribution of Water Heaters by Size Range within Fuel Type using Census-adjusted Weights

Size (Gallons)	Census-adjusted weights - Fuel Type													
	Overall (n=1526)		Electric (n=119)		Gas (n=1318)		Propane (n=74)		Solar/Electric (n=10)		Solar/Gas (n=4)		Solar/Propane (n=1)	
	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB
Less Than 30	2.2%	0.9%	4.6%	3.7%	2.1%	1.0%	-	-	-	-	-	-	-	-
30 to 39	16.9%	2.5%	30.4%	11.9%	15.7%	2.6%	21.4%	9.5%	-	-	-	-	-	-
40 to 49	49.8%	3.0%	40.7%	10.5%	51.4%	3.2%	38.7%	12.2%	-	-	37.9%	49.1%	-	-
50 to 59	26.4%	2.1%	20.2%	6.1%	26.8%	2.3%	29.6%	10.6%	25.0%	22.8%	7.5%	11.9%	100.0%	0.0%
60 to 69	1.0%	0.5%	1.2%	1.2%	0.9%	0.6%	-	-	12.0%	18.5%	-	-	-	-
70 to 79	2.6%	0.7%	-	-	2.6%	0.7%	8.6%	7.8%	-	-	6.5%	10.3%	-	-
80 to 89	0.4%	0.3%	1.3%	1.2%	0.0%	0.1%	1.7%	2.8%	26.9%	23.1%	48.1%	57.0%	-	-
Greater Than 89	0.7%	0.5%	1.5%	2.5%	0.5%	0.5%	-	-	36.0%	40.0%	-	-	-	-

Table 195: Distribution of Water Heaters within Size Ranges and Fuel Types Among all Water Heaters using Census-adjusted Weights

Size (Gallons)	Census-adjusted weights - Fuel Type (n=848)													
	Electric		Natural Gas		Propane		Solar/ Electric		Solar/Gas		Solar/ Propane		Unknown	
	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB
Instantaneous	0.2%	0.2%	3.8%	0.8%	0.1%	0.1%	-	-	-	-	-	-	-	-
1 to 29	0.3%	0.2%	1.3%	0.6%	-	-	-	-	-	-	-	-	-	-
30 to 39	1.6%	0.8%	10.0%	1.7%	0.6%	0.3%	-	-	-	-	-	-	-	-
40 to 49	2.2%	0.7%	32.8%	2.4%	1.1%	0.4%	-	-	0.1%	0.2%	-	-	-	-
50 to 59	1.1%	0.4%	17.1%	1.5%	0.8%	0.4%	0.1%	0.1%	-	-	-	-	-	-
60 to 69	0.1%	0.1%	0.6%	0.4%	-	-	0.0%	0.1%	-	-	-	-	-	-
70 to 79	-	-	1.7%	0.4%	0.2%	0.2%	-	-	-	-	-	-	-	-
80 to 89	0.1%	0.1%	-	-	0.0%	0.1%	0.1%	0.1%	0.1%	0.2%	-	-	-	-
90+	0.1%	0.1%	0.3%	0.3%	-	-	0.1%	0.1%	-	-	-	-	-	-
Unknown	0.9%	0.5%	9.7%	1.5%	0.5%	0.2%	-	-	-	-	-	-	12.2%	0.0%

Table 196: Average Age of Water Heaters by Fuel Type within Size Ranges using Census-adjusted Weights

Size (Gallons)	Census-adjusted weights - Fuel Type																				
	All Types			Electric			Natural Gas			Propane			Solar/Electric			Solar/Gas			Solar/Propane		
	Avg Age	EB	Samp Size	Avg Age	EB	Samp Size	Avg Age	EB	Samp Size	Avg Age	EB	Samp Size	Avg Age	EB	Samp Size	Avg Age	EB	Samp Size	Avg Age	EB	Samp Size
All Sizes	8.0	0.3	1585	8.0	1.0	116	8.0	0.3	1376	7.5	0.9	80	7.3	1.3	9	6.2	0.0	3	5.0	0.0	1
Tankless	4.6	0.4	107	2.3	0.0	3	4.7	0.4	102	8.7	4.2	10	-	-	-	-	-	-	-	-	-
1 to 29	5.4	1.4	21	14.4	5.6	5	3.7	1.3	519	-	-	-	-	-	-	-	-	-	-	-	-
30 to 39	7.6	0.9	131	6.1	0.5	15	7.9	1.1	444	6.4	0.1	13	-	-	-	-	-	-	-	-	-
40 to 49	8.4	0.6	582	8.0	1.6	39	8.4	0.6	10	7.7	1.5	23	-	-	-	5.0	0.0	1	-	-	-
50 to 59	7.8	0.5	506	8.5	0.7	32	7.8	0.5	62	7.2	0.8	26	7.0	0.0	2	4.0	0.0	1	5.0	0.0	1
60 to 69	6.8	0.5	14	1.6	0.0	3	7.7	0.0	1	-	-	-	12.9	0.0	2	-	-	-	-	-	-
70 to 79	6.9	0.7	68	-	-	-	6.8	0.7	4	6.2	0.0	5	-	-	-	5.0	0.0	1	-	-	-
80 to 89	9.8	1.8	8	7.5	4.1	2	10.0	0.0	115	-	-	-	1.0	0.0	1	-	-	-	-	-	-
>89	7.7	0.0	5	-	-	-	8.2	0.0	102	-	-	-	7.6	4.0	4	-	-	-	-	-	
Size Unknown	10.1	1.2	143	9.3	3.4	17	10.3	1.3	13	15.0	0.0	1	7.0	0.0	1	20.0	0.0	1	-	-	-

Table 197: Distribution of Water Heaters in Purchase Date Ranges by Fuel Type using Census-adjusted Weights

Fuel Type	Size Range (Gallons)	Census-adjusted weights								
		Estimated Manufacture Date								
		1979 and Older	1980-1984	1985-1989	1990-1994	1995-1999	2000-2005	2006-2009	2010-2012	Sample Size
All Types	All Sizes	0.2%	0.7%	1.9%	5.9%	9.1%	33.2%	33.2%	15.9%	1,585
	Tankless	-	-	-	-	0.6%	22.2%	56.8%	20.4%	107
	1 to 29	-	3.4%	-	-	4.9%	6.7%	52.8%	32.1%	21
	30 to 39	-	0.5%	0.3%	6.8%	8.8%	34.8%	24.7%	24.0%	131
	40 to 49	0.1%	1.0%	2.8%	8.3%	8.5%	32.1%	31.0%	16.3%	582
	50 to 59	-	0.2%	1.9%	3.2%	9.4%	37.9%	37.1%	10.3%	506
	60 to 69	-	-	-	3.9%	20.0%	4.2%	52.3%	19.6%	14
	70 to 79	-	-	-	2.7%	5.8%	33.1%	44.8%	13.6%	68
	80 to 89	-	4.2%	-	-	26.4%	27.2%	42.2%	-	8
	>90	-	-	-	-	-	92.4%	-	7.6%	5
	Size Unknown	1.8%	0.6%	1.9%	6.9%	15.8%	36.8%	23.7%	12.5%	143
Electric	All Sizes	0.8%	1.1%	1.6%	3.1%	14.0%	28.8%	35.7%	14.8%	116
	Tankless	-	-	-	-	-	0.0%	44.6%	55.4%	3
	1 to 29	-	21.6%	-	-	31.1%	42.2%	-	5.0%	5
	30 to 39	-	-	-	-	5.2%	34.6%	45.3%	14.9%	15
	40 to 49	1.2%	-	1.1%	9.0%	17.2%	14.1%	44.1%	13.4%	39
	50 to 59	-	-	2.7%	-	21.5%	31.5%	43.4%	0.9%	32
	60 to 69	-	-	-	-	-	-	27.1%	72.9%	3
	70 to 79									0
	80 to 89	-	-	-	-	-	50.0%	50.0%	-	2
	>90									0
	Size Unknown	2.7%	-	4.8%	-	9.3%	50.4%	6.3%	26.5%	17
Natural Gas	All Sizes	0.2%	0.7%	1.8%	6.3%	8.8%	33.4%	33.1%	15.8%	1,376
	Tankless	-	-	-	-	0.7%	22.0%	57.6%	19.7%	102
	1 to 29	-	-	-	-	-	-	62.8%	37.2%	16
	30 to 39	-	0.6%	0.3%	8.3%	10.0%	33.7%	21.2%	25.9%	103
	40 to 49	-	1.1%	2.5%	8.6%	8.2%	33.2%	30.6%	15.8%	519
	50 to 59	-	0.2%	2.0%	3.4%	8.8%	38.3%	36.3%	11.1%	444
	60 to 69	-	-	-	4.5%	23.6%	4.9%	58.4%	8.4%	10
	70 to 79	-	-	-	1.9%	6.3%	34.8%	42.3%	14.7%	62
	80 to 89	-	-	-	-	-	100.0%	-	-	1

Fuel Type	Size Range (Gallons)	Census-adjusted weights								
		Estimated Manufacture Date								
		1979 and Older	1980-1984	1985-1989	1990-1994	1995-1999	2000-2005	2006-2009	2010-2012	Sample Size
	>90	-	-	-	-	-	88.1%	-	11.9%	4
	Size Unknown	1.8%	0.7%	1.7%	7.8%	15.8%	36.4%	25.6%	10.2%	115
Propane	All Sizes	-	-	5.0%	1.4%	7.3%	36.0%	29.9%	20.4%	80
	Tankless	-	-	-	-	-	74.1%	25.9%	-	2
	1 to 29	-	-	-	-	-	-	-	-	0
	30 to 39	-	-	-	-	-	51.0%	33.8%	15.2%	13
	40 to 49	-	-	14.8%	-	2.0%	32.2%	13.5%	37.5%	23
	50 to 59	-	-	-	3.1%	4.9%	41.4%	44.4%	6.2%	26
	60 to 69	-	-	-	-	-	-	-	-	0
	70 to 79	-	-	-	-	-	14.1%	85.9%	-	5
	80 to 89	-	-	-	-	100.0%	-	-	-	1
	>90	-	-	-	-	-	-	-	-	0
	Size Unknown	-	-	-	4.7%	29.8%	16.7%	23.7%	25.1%	10
Solar/Electric	All Sizes	-	3.3%	-	-	13.8%	36.9%	32.5%	13.5%	9
	50 to 59	-	-	-	-	80.9%	-	19.1%	-	2
	60 to 69	-	-	-	-	-	-	-	100.0%	1
	80 to 89	-	10.7%	-	-	-	10.7%	78.6%	-	4
	>90	-	-	-	-	-	100.0%	-	-	1
	Size Unknown	-	-	-	-	-	-	100.0%	-	1
Solar/Gas	All Sizes	-	-	-	12.5%	-	-	87.5%	-	3
	40 to 49	-	-	-	-	-	-	100.0%	-	1
	50 to 59	-	-	-	-	-	-	100.0%	-	1
	70 to 79	-	-	-	100.0%	-	-	-	-	1
	Size Unknown	-	-	-	-	-	-	-	-	0
Solar/ Propane	All Sizes	-	-	-	-	-	-	100.0%	-	1
	50 to 59	-	-	-	-	-	-	100.0%	-	1

Table 198: Average Energy Factor by Fuel Type in Size Ranges using Census-adjusted Weights

| Size (Gallons) | Census-adjusted weights - Fuel Type | | | | | | | | | | | | | | |
| | Gas | | | Electric | | | Propane | | | Solar w/Electric | | | Solar w/Gas | | |
	Average Energy Factor	Error Bound	Sample Size	Average Energy Factor	Error Bound	Sample Size	Average Energy Factor	Error Bound	Sample Size	Average Energy Factor	Error Bound	Sample Size	Average Energy Factor	Error Bound	Sample Size
Overall	0.6	0.0	898	0.9	0.0	65	0.6	0.0	34	0.9	0.0	5	0.6	0.0	1
Tankless	0.8	0.0	32	-	-	-	0.8	0.0	2	-	-	-	-	-	-
1 to 29	0.6	-	-	0.9	0.0	1	-	-	-	-	-	-	-	-	-
30 to 39	0.6	0.0	88	0.9	0.0	11	0.6	0.0	6	-	-	-	-	-	-
40 to 49	0.6	0.0	398	0.9	0.0	19	0.6	0.0	9	-	-	-	0.6	0.0	1
50 to 59	0.6	0.0	333	0.9	0.0	28	0.6	0.0	17	0.9	0.0	2	-	-	-
60 to 69	0.6	0.0	7	0.9	0.0	2	-	-	-	1.0	0.0	1	-	-	-
70 to 79	0.5	0.0	25	-	-	-	-	-	-	-	-	-	-	-	-
80 to 89	-	-	-	0.7	0.0	3	-	-	-	-	-	-	-	-	-
90+	0.5	0.0	2	0.8	0.0	1	-	-	-	0.8	0.0	2	-	-	-
Size Unknown	0.9	0.0	1	-	-	-	-	-	-	-	-	-	-	-	-

Table 199: Percentage of Water Heaters in Energy Factor Ranges by Size (Gallons) for Electric and Solar with Electric Fuel Types using Census-adjusted Weights

Energy Factor	Census-adjusted weights											
	Electric								Solar w/Elec			
	All Sizes	1 to 29 gal	30 to 39 gal	40 to 49 gal	50 to 59 gal	60 to 69 gal	80 to 89 gal	90+ gal	All Sizes	50 to 59 gal	60 to 69 gal	90+ gal
<0.48	0.7%	-	-	-	-	-	28.1%	-	-	-	-	-
EB	1.1%	-	-	-	-	-	39.2%	-	-	-	-	-
.80-0.839	3.7%	-	-	-	-	-	71.9%	100.0%	62.1%	-	-	100.0%
EB	3.8%	-	-	-	-	-	44.4%	-	56.6%	-	-	-
0.84 to 0.879	0.3%	-	-	-	0.9%	-	-	-	-	-	-	-
EB	0.6%	-	-	-	1.5%	-	-	-	-	-	-	-
0.88 to 0.919	42.0%	100.0%	34.9%	31.1%	56.1%	100.0%	-	-	15.1%	100.0%	-	-
EB	14.0%	-	30.0%	19.9%	23.9%	-	-	-	17.3%	-	-	-
0.92 to 0.959	53.3%	-	65.1%	68.9%	42.7%	-	-	-	22.8%	-	100.0%	-
EB	13.0%	-	26.0%	20.3%	18.1%	-	-	-	33.0%	-	-	-
Sample Size	65	1	11	19	28	2	3	1	5	2	1	2

Table 200: Percentage of Water Heaters in Energy Factor Ranges by Size (Gallons) for Gas, Propane, and Solar with Gas Fuel Types using Census-adjusted Weights

Energy Factor	Census-adjusted weights															
	Gas										Propane					Solar w/Gas
	All Sizes	Tankless	1 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	90+	Unknown	All Sizes	Tankless	30 to 39	40 to 49	50 to 59	40 to 49
0.48-0.519	1.3%	-	-	-	0.2%	-	-	58.7%	100.0%	-	-	-	-	-	-	-
EB	0.6%	-	-	-	0.3%	-	-	17.3%	-	-	-	-	-	-	-	-
0.52-0.559	8.4%	-	-	-	1.2%	24.1%	38.5%	38.8%	-	-	2.9%	-	-	7.7%	2.8%	-
EB	1.7%	-	-	-	1.0%	4.9%	43.5%	23.9%	-	-	3.5%	-	-	12.1%	4.6%	-
0.56-0.599	44.1%	3.5%	-	46.5%	57.7%	29.5%	61.5%	2.5%	-	-	54.6%	-	43.0%	49.2%	75.7%	-
EB	3.8%	5.6%	-	10.8%	5.5%	5.5%	33.3%	4.1%	-	-	17.8%	-	33.1%	28.4%	25.9%	-
0.60-0.639	42.9%	-	100.0%	53.5%	40.6%	46.2%	-	-	-	-	36.8%	-	57.0%	43.2%	21.5%	100.0%
EB	3.3%	-	-	10.4%	5.4%	5.8%	-	-	-	-	18.1%	-	37.8%	34.3%	18.2%	-
0.64-0.679	0.0%	-	-	-	-	0.2%	-	-	-	-	-	-	-	-	-	-
EB	0.1%	-	-	-	-	0.3%	-	-	-	-	-	-	-	-	-	-
.76-0.799	0.1%	2.1%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EB	0.1%	3.4%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
.80-0.839	2.0%	63.2%	-	-	0.3%	-	-	-	-	-	5.7%	100.0%	-	-	-	-
EB	0.8%	16.2%	-	-	0.3%	-	-	-	-	-	7.3%	-	-	-	-	-
0.84-0.879	0.9%	31.3%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EB	0.7%	18.0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0.88-0.919	0.1%	-	-	-	-	-	-	-	-	100.0%	-	-	-	-	-	-
EB	0.2%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sample Size	898	32	12	88	398	333	7	25	2	1	34	2	6	9	17	1

Table 201: Percentage Of Water Heaters that were Wrapped and Unwrapped with Insulation in Conditioned or Unconditioned Space, within Size Ranges using Census-adjusted Weights

| Size Range (Gallons) | Census-adjusted weights | | | | | | | | Sample Size |
| | Not Wrapped/ Conditioned | | Not Wrapped/ Unconditioned | | Wrapped/ Conditioned | | Wrapped/ Unconditioned | | |
	%	EB	%	EB	%	EB	%	EB	
Overall	16.6%	2.1%	68.5%	2.5%	1.6%	0.6%	13.2%	1.8%	1,730
1 to 29	33.5%	19.0%	64.4%	21.4%	-	-	2.1%	3.5%	21
30 to 39	33.5%	7.9%	56.1%	7.8%	0.4%	0.6%	10.1%	4.5%	166
40 to 49	18.5%	3.3%	71.2%	3.8%	1.1%	0.7%	9.2%	2.5%	680
50 to 59	10.5%	2.8%	83.4%	3.5%	0.1%	0.1%	6.0%	2.0%	551
60 to 69	-	-	73.9%	24.7%	3.6%	5.7%	22.5%	17.2%	16
70 to 79	6.6%	4.4%	82.5%	10.0%	0.9%	1.5%	10.1%	5.5%	72
80 to 89	-	-	100.0%	0.0%	-	-	-	-	10
90+	-	-	100.0%	0.0%	-	-	-	-	10
Size Unknown	4.3%	2.9%	43.4%	8.3%	7.6%	3.6%	44.7%	6.8%	204

10.5 Clothes Washers

Table 202: Distribution of Clothes Washers by Type of Washer and by Type of Residence using Census-adjusted Weights

| Type of Residence | Census-adjusted weights | | | | | | Sample Size |
| | Horizontal Axis | | Standard | | Stacked | | |
	Percentage	Error Bound	Percentage	Error Bound	Percentage	Error Bound	
Overall	30.2%	2.0%	65.4%	2.2%	4.4%	1.0%	1,748
Single Family Detached	29.6%	2.3%	67.6%	2.8%	2.8%	1.1%	1,465
Apt 2-4 Units	14.7%	8.3%	81.3%	11.4%	4.0%	3.9%	57
Apt 5+ Units	21.3%	7.8%	59.0%	11.6%	19.7%	9.2%	94
Duplex (Single Story)	18.3%	12.4%	63.0%	16.5%	18.7%	12.3%	34
Mobile Home	8.2%	8.7%	91.8%	10.3%	-	-	31
Townhouse/Rowhouse (2-4 Unit Multi-Story)	28.7%	11.7%	66.4%	10.5%	4.9%	4.7%	67

10.6 Building Envelope

Table 203: Percentage of Homes by Frame Type and Panes Type by Type of Residence using Census-adjusted Weights

Type of Residence	Census-adjusted weights - Window and Pane Type																	Sample Size
	Metal Single		Metal Double		Metal Other		Wood Single		Wood Double		Wood Triple		Vinyl Single		Vinyl Double		Vinyl Triple		
	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	
Overall	32.8%	2.4%	14.8%	1.8%	0.1%	0.2%	7.8%	1.4%	1.5%	0.6%	0.1%	0.2%	0.9%	0.6%	41.8%	2.3%	0.2%	0.2%	1,986
Single Family Detached	22.7%	2.6%	15.1%	2.0%	0.2%	0.4%	7.8%	1.7%	2.4%	0.9%	0.2%	0.3%	0.8%	0.7%	50.8%	2.7%	0.1%	0.1%	1,490
Apt 2-4 Units	41.5%	10.9%	19.2%	9.5%	-	-	11.5%	6.4%	-	-	-	-	1.6%	1.9%	26.2%	8.5%	-	-	96
Apt 5+ Units	53.3%	5.9%	13.2%	4.3%	-	-	6.2%	2.7%	0.3%	0.5%	-	-	1.4%	1.7%	25.2%	6.3%	0.5%	0.8%	251
Duplex (Single Story)	37.2%	13.3%	7.0%	5.0%	-	-	21.8%	13.7%	-	-	-	-	-	-	34.0%	12.9%	-	-	45
Mobile Home	72.0%	16.5%	9.6%	11.7%	-	-	-	-	-	-	-	-	-	-	18.4%	11.1%	-	-	34
Townhouse/Row house (2-4 Unit Multi-Story)	46.5%	12.0%	17.8%	8.4%	-	-	1.3%	2.0%	-	-	-	-	-	-	34.5%	10.2%	-	-	70

Table 204: Percentage of Homes by Frame Type and Panes Type by Age of Residence using Census-adjusted Weights

Age of Residence	Census-adjusted weights																		Sample Size
	Window and Pane Type																		
	Metal Single		Metal Double		Metal Other		Wood Single		Wood Double		Wood Triple		Vinyl Single		Vinyl Double		Vinyl Triple		
	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	
Overall	32.8%	0.6%	14.8%	1.8%	0.1%	0.2%	7.8%	1.4%	1.5%	0.6%	0.1%	0.2%	0.9%	0.6%	41.8%	2.3%	0.2%	0.2%	1,986
1969 or earlier	32.1%	3.7%	9.0%	2.2%	0.3%	0.5%	17.3%	3.1%	2.1%	0.8%	-	-	1.1%	1.0%	38.1%	3.6%	0.1%	0.1%	742
1970-1979	46.2%	6.0%	10.8%	3.8%	-	-	1.8%	1.3%	2.5%	2.5%	-	-	0.9%	0.9%	37.6%	5.3%	0.2%	0.2%	365
1980-1989	41.2%	6.5%	28.6%	5.8%	-	-	0.3%	0.3%	0.7%	0.7%	-	-	0.4%	0.6%	28.1%	4.7%	0.7%	1.1%	315
1990-1994	35.1%	12.3%	28.3%	8.5%	-	-	0.7%	0.9%	0.4%	0.7%	3.1%	5.0%	0.5%	0.9%	31.8%	10.5%	-	-	89
1995-1999	6.2%	5.7%	31.8%	10.4%	-	-	-	-	2.9%	2.6%	-	-	-	-	59.1%	9.5%	-	-	101
2000-2012	0.8%	1.1%	13.5%	5.3%	-	-	-	-	0.3%	0.3%	-	-	1.6%	2.7%	83.8%	5.2%	-	-	274
Unknown	54.7%	11.6%	18.1%	9.7%	-	-	3.2%	3.7%	-	-	-	-	-	-	24.1%	7.9%	-	-	100

Table 205: Percentage of Homes by Glazing Type and Age of Residence using Census-adjusted Weights

| Age of Residence | Census-adjusted weights - Window Glazing Characteristics | | | | | | Sample Size |
| | Low E Glazing | | Clear Glazing | | Unknown Glazing | | |
	Percentage	Error Bound	Percentage	Error Bound	Percentage	Error Bound	
Overall	27.3%	2.1%	69.7%	2.3%	3.0%	1.0%	1987
1969 or earlier	24.5%	3.1%	72.7%	3.5%	2.8%	1.5%	742
1970-1979	28.6%	5.4%	69.3%	5.2%	2.2%	2.5%	365
1980-1989	20.0%	4.7%	79.2%	5.1%	0.8%	0.7%	315
1990-1994	23.9%	10.6%	73.0%	9.7%	3.1%	5.0%	89
1995-1999	33.7%	8.9%	59.7%	10.3%	6.6%	5.5%	101
2000-2012	55.1%	7.2%	37.7%	6.9%	7.2%	3.9%	275
Unknown	5.1%	3.5%	93.4%	5.7%	1.6%	2.0%	100

Table 206: Average R-Value and Percentage of Homes with Attic Insulation R-Value Ranges by Age of Residence using Census-adjusted Weights

| Residence Age Range | Census-adjusted weights | | | | | | | | | | | | Sample Size |
| | Avg R-Value | EB | R-11 to R-18.99 | | R-19 to R-21.99 | | R-22 to R-29.99 | | R-30 to R-37.99 | | > R-37.99 | | |
			%	EB	%	EB	%	EB	%	EB	%	EB	
Overall	20.8	0.5	28.3%	3.2%	28.1%	3.0%	22.6%	2.9%	15.9%	2.6%	5.1%	1.9%	1,037
1969 or earlier	18.5	0.7	40.7%	5.8%	27.9%	5.1%	21.2%	5.3%	6.8%	2.6%	3.4%	2.4%	325
1970-1979	18.8	1.0	38.6%	7.7%	31.4%	6.7%	15.0%	4.5%	13.3%	7.1%	1.7%	1.9%	190
1980-1989	20.5	0.9	23.9%	8.8%	36.8%	8.4%	23.4%	7.4%	12.8%	5.4%	3.1%	2.0%	173
1990-1994	24.1	1.4	6.2%	4.4%	34.1%	16.7%	26.5%	9.4%	26.4%	10.8%	6.8%	6.0%	63
1995-1999	23.7	1.1	8.7%	6.0%	26.1%	11.7%	33.4%	10.2%	28.6%	10.4%	3.1%	2.7%	78
2000-2012	27.0	1.1	4.8%	2.4%	13.6%	4.6%	30.2%	8.4%	34.3%	7.4%	17.0%	9.9%	174
Unknown	20.0	1.1	32.3%	17.1%	29.1%	17.9%	17.0%	12.1%	20.1%	26.2%	1.4%	1.7%	34

Table 207: Percentage of Homes by Wall Construction Type by Percentage of Walls Insulated using Census-adjusted Weights

Construction Type	Census-adjusted weights - Percentage of Walls Insulated														Sample Size
	0%		1%-25%		26%-50%		51%-75%		75%-99%		100%		Unknown		
	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	%	EB	
All Types	22.8%	2.2%	1.2%	0.5%	2.2%	0.7%	0.7%	0.4%	0.1%	0.1%	48.8%	2.4%	24.3%	2.3%	1987
2 x 4 Wood	23.3%	2.3%	1.3%	0.5%	2.0%	0.7%	0.5%	0.3%	0.1%	0.1%	46.4%	2.5%	26.4%	2.5%	1723
2 x 6 Wood	6.2%	4.9%	1.2%	1.2%	2.6%	2.3%	-	-	-	-	85.5%	6.2%	4.5%	4.3%	182
Masonry	48.6%	26.8%	-	-	6.9%	11.0%	-	-	-	-	20.2%	18.3%	24.2%	18.9%	23
2 x 4 Steel Framed	-	-	-	-	-	-	-	-	-	-	100.0%	0.0%	-	-	3
2 x 6 Steel Framed	25.1%	35.8%	-	-	-	-	-	-	-	-	63.3%	52.8%	11.6%	17.9%	4
Manufactured Home	39.8%	17.0%	-	-	6.3%	7.1%	8.9%	14.0%	-	-	29.7%	12.2%	15.2%	11.7%	39
Not Observable	54.8%	30.1%	-	-	4.9%	7.9%	-	-	-	-	29.6%	24.4%	10.6%	12.7%	13

11 Appendix F: 2012 CLASS Website User Guide

The California Lighting and Appliance Saturation Study (CLASS) webtool serves as powerful resource for users to create reports through a vast number of combinations.

11.1 Background of California Lighting and Appliance Saturation Study

The webtool provides public access to query the data from the 2012 California Residential Lighting and Appliance Efficiency Saturation Study. DNV GL (formerly DNV KEMA) conducted the study on behalf of the four investor owned utilities, including San Diego Gas and Electric, Southern California Gas Company, Southern California Edison and Pacific Gas and Electric. The California Public Utilities Commission managed the study.

The 2012 California Lighting and Appliance Efficiency Saturation Study (CLASS) is a follow-on study to the 2005 CLASS study and the 2000 Statewide Lighting and Appliance Efficiency Saturation Study[45]. Each of these studies were paid for by Public Purpose funds for the purpose of understanding current levels of equipment and lighting saturation and efficiencies in the existing residential sector, as well as future energy savings potential and past accomplishments. The results of the 2012 CLASS are useful to both the Energy Division's (ED) evaluation of residential programs and to the portfolio planning of Investor Owned Utility (IOU) programs that require accurate baseline information.

In addition to updating the information developed from the 2005 and 2000 CLASS studies, the 2012 CLASS expands the body of knowledge acquired through the Energy Commission's 2009 Residential Appliance Saturation Study (RASS)[46], a survey collecting self-reported information from residents, with sample sizes an order of magnitude larger than the CLASS.

The four primary objectives of this study were:

Objective 1: Complete 2000 on-site surveys of single-family, multi-family and mobile home residences in the service territories of the Investor Owned Utilities.

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[45] The 2000 and 2005 CLASS Reports and data queries are available here: http://calresest.kemainc.com/

[46] The RASS reports and access to query the data are available here: http://websafe.kemainc.com/RASS2009/Default.aspx

Objective 2: Develop a database of residential building characteristics, lighting and appliance saturations and efficiencies, expanded to represent the population of residential individually-metered population.

Objective 3: Develop a web-based tool to provide utility staff and other parties the ability to conduct "what-if" scenario analyses on the data collected.

Objective 4: Conduct trend and comparison analyses of saturations and efficiencies between the 2012 CLASS data to compare results from the previous CLASS studies.

Key outputs of the study include:

- Distribution of building characteristics such as square footage, room types and window types
- Distribution of type, efficiency, size and age of equipment such as ACs, refrigerators and furnaces
- Distribution of installed watts for lighting by room type and fixture type
- Distribution of household demographic characteristics such as number and ages of occupants

11.2 Access to the Webtool

11.2.1   Location

The CLASS Webtool can be accessed through the following web link:
https://websafe.kemainc.com/projects62/Default.aspx?tabid=190

11.2.2   Registration

The webtool is only accessible to registered users. The home page (linked above) includes a link in the top right corner to initiate the registration process. At the registration page, the user will be asked to create a username and password. By default, all usernames will have "cwt" at the end. For example, if a user chose "Joe" as their username, the text "cwt" would automatically be added to create "Joecwt" to identify the user in the database as associated with the CLASS webtool. The user will also be able to find out instantly if the username they chose is available for registration.

The password has to be at least 7 characters long and the registration page will also indicate the strength of the password. In the example in Figure 36 below, the password is rated as *Good*. All of the fields shown below are required including email address, which will only be used for authenticating the registration process and resetting the password at the user request.

Click on the "Click Here to Register" link at the bottom of the Registration window to activate the Registration process. An Authorization Email will be sent to the email address provided. Users must click on the Authorization link provided in the email that will open the webtool and authorizes the user.

The final step is to click on the Home page to refresh the menu. Once these steps are completed, the user can proceed to use the webtool.

Figure 36: Registration

11.2.3   Login to Access Webtool

Only registered users can access the webtool by clicking the **Login** link on the top right hand corner of the main home page.

Figure 37: Login Link
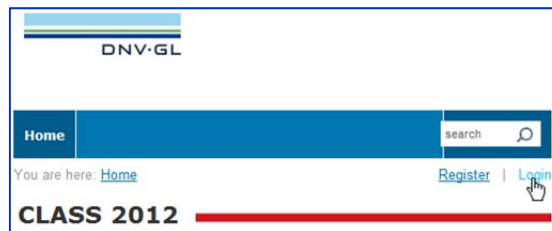
A pop-up window prompts the user to log in.

Figure 38 User Login Popup Window
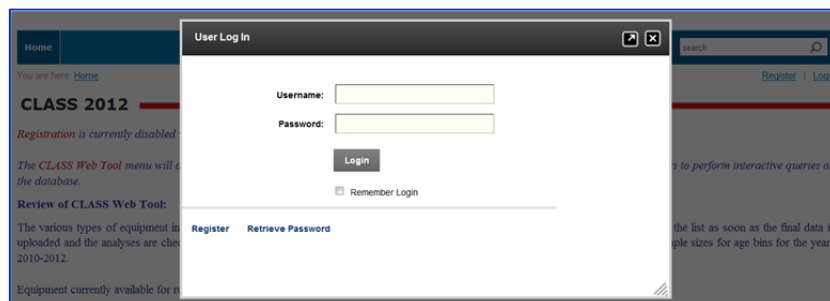
11.2.4   Access to Design Data Queries

Once the user is logged in, a link to the **CLASS Web Tool** appears on the home page menu along with inks to the **Contact** and **FAQ** pages.

Figure 39: CLASS Web Tool Access

11.3 How to Query the CLASS Data

11.3.1   Required Filters

The required filters set the basis for all queries.

Figure 40: Select Required Filters Area

11.3.1.1   View – Appliance or Lighting

The webtool is designed to produce reports for appliances and lighting individually where one of the two categories has to be selected for a given query.

Figure 41: Select View Area

Once the appropriate view is chosen a **Category** can be selected.

11.3.1.2 Category

The webtool allows for queries across 24 different appliance categories ranging from *Cooling* to *Water Heating*. Some appliance types have a separate category for efficiency-level information.

On the other hand, the lighting view allows queries to be made by two categories: *General* or *Rooms*. Room-specific information can be obtained through the *Rooms* category.

Figure 42: Category Selection Area, Appliance vs. Lighting
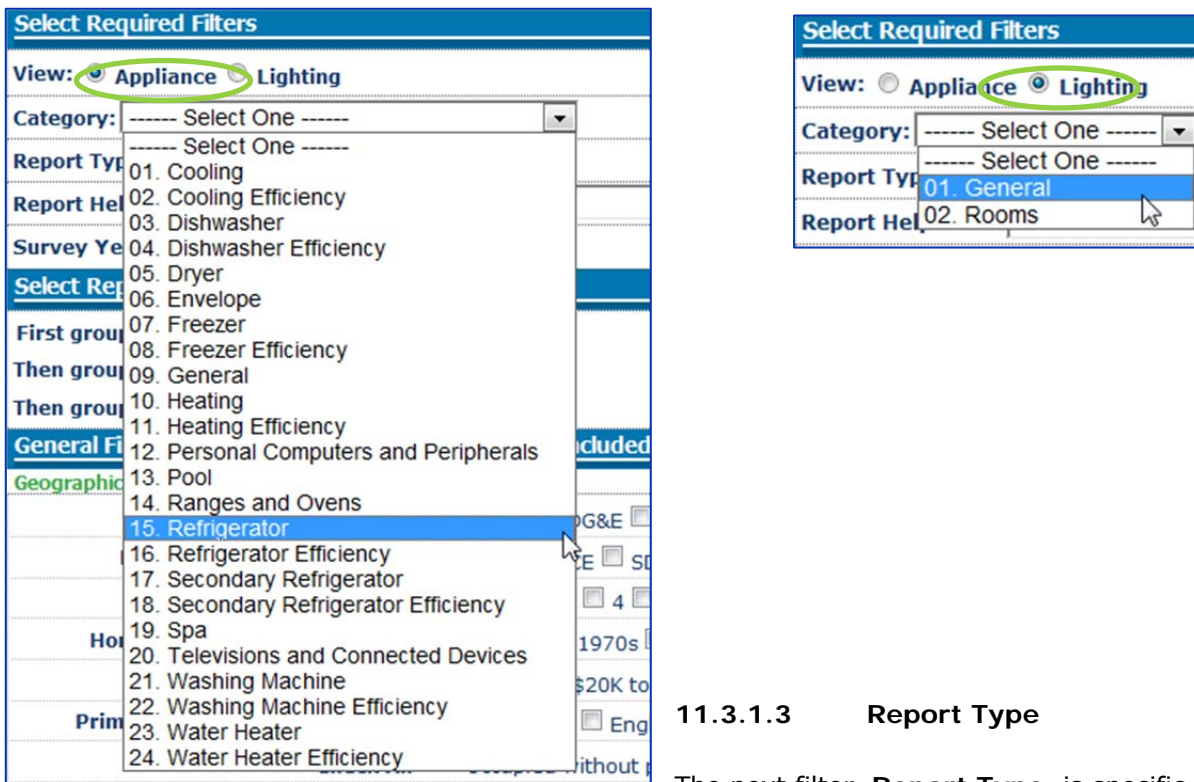
11.3.1.3 Report Type

The next filter, **Report Type**, is specific to a selected **Category**. For instance, the available drop-down selections are different between *Refrigerator* and *Heating* as shown in Figure 43.

Figure 43: Report Type Options based on Categories, Refrigerator vs. Heating
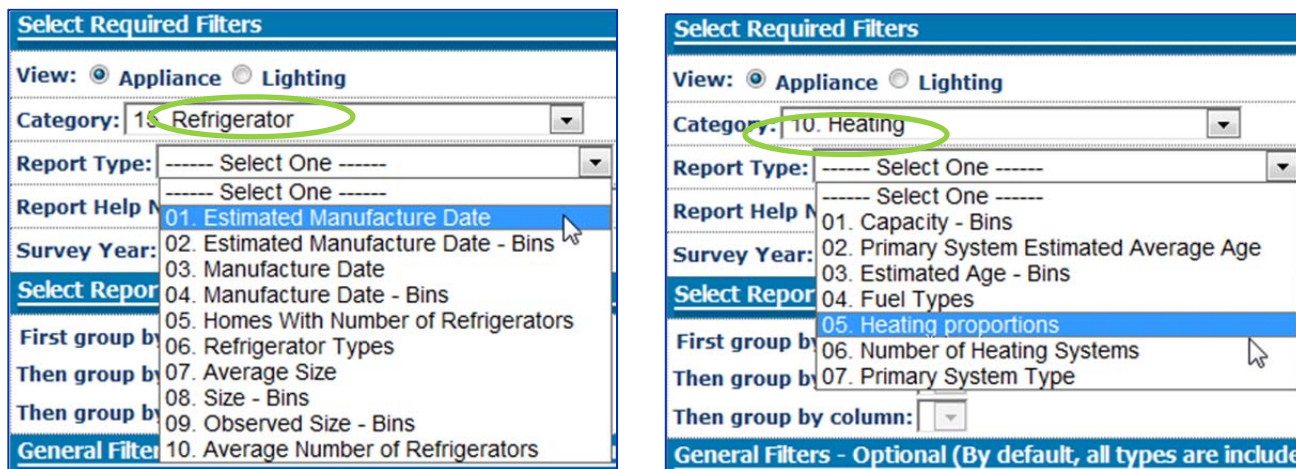
11.3.1.4   Report Help Note

Report Help Note provides a description of a query based on a selected **Category** and **Report Type**. Additionally, double-clicking the display field will expand the viewing area.

11.3.1.5   Survey Year

The default survey year is set to 2012 for all reports in the webtool. Future development may allow users to choose data from other CLASS studies.

11.3.1.6   Weighting Scheme

The sample was expanded in the database to represent the electric population of the participating utilities. Two weighting schemes are available:

- **Census-adjusted weights**: Developed to reduce potential bias of sample to better align with Census information. Computed by adjusting the strata weights on dimensions of home ownership and type of residence. Results are suitable for characterizing the current general state of building characteristics, appliance stock and installed lighting.

- **Strata weights**: Computed based on the four sample design stratification variables – Electric utility, climate zone group, low-income rate program (CARE/FERA) participation and average daily energy consumption. Results are suitable for comparison with previous CLASS studies, but may be biased towards higher proportions of single-family homes and owned homes.

11.3.2   Hide/Unhide Pivot columns limit the number of columns visible

The **Hide/Unhide Pivot Columns** section only appears once a **Report Type** is selected. The options available under this field will differ depending on the **Report Type**. The default action by the webtool is to select all of the available options, however, when available, the user has the ability to select

individual columns to display the data based on their preference. This option **only changes the number of columns displayed**, **but does not re-calculate results**.

In the example shown below (Figure 44), under the *Refrigerator* category various volumes of Size *Bins* are shown ranging from *01-10* to *23+ cubic feet.*

Figure 44: Hide/Unhide Pivot Columns

11.3.3   Report Summary Criteria – Summarize by Grouping Data

Once the required filters are selected along with optional specifications of pivot columns, the user has the ability to choose various categories by which to display the data. A user can select a variety of categories available under the **Appliance** and **Lighting** view which are specific to the **Category** and **Report Type** selected. An example of the drop down menu in the *Refrigerator* **Category** under the **Appliance** view is shown below.

Figure 45: Report Summary Criteria Options, Refrigerator (Appliance)

Once a category is selected for the first group, it will no longer be available in the second or third grouping options. For instance, if *Climate Zone* is selected as the first group by column, it will not appear in the menu of drop down choices for the second or third group by columns.

Changing the order of the group by columns will change the appearance of the results. The first group by column will be displayed in the left-most column of the results, with the second and third group by columns appearing to the right of the first.

11.3.4 Report Specific Filters Restrict the Data Processed

Note: The filters provided in this section are optional and by default, all types are included.

However, there are many options available should a user like to limit the overall results by a specific filter within a **Category** and **Report Type** (i.e. *Refrigerator* by *Size-Bins*). For instance, if a user only wanted to view the results by refrigerators that have top freezers they could select "01 – Standard Top Freezer" under *Refrigerator Type* as shown in Figure 46 below.

Report Specific Filters are displayed according to the **Category** and **Report Type** selected in the required filters selection area. In the example shown below, *Refrigerator* (**Category**) and *Size – Bins* (**Report Type**) were selected in an earlier step, and the options shown under the **Report Specific Filters** are *Estimated Refrigerator Age* and *Refrigerator Type*.

Figure 46: Report Specific Filters, Refrigerator and Size-Bins

If the **Report Type** is changed to another category, the display options under this section may differ. In the example shown below, *Refrigerator* (**Category**) and *Manufacture Date* (**Report Type**) were selected, and the options shown under the **Report Specific Filters** are *Refrigerator Type*, *Size of Refrigerator* and *Size of Refrigerator – Observed.*

Figure 47: Report Specific Filters, Refrigerator and Manufacture Date

11.3.5 General Filters - Restrict the Data Processed

General Filters allow the user to be even more specific with the types of results that are included or excluded in a given query. There are 11 categories spanning across geography as well as household and building characteristics (Figure 48) that can be filtered. Similar to **Report Specific Filters**, **General Filters** are also optional and by default include all types.

Figure 48: General Filters

As an example, all of the results could be limited by *Home Age Range* and *Total Adults in Home* as shown in Figure 49. In this case, all results will be grouped by homes that were built in the *1970s* and have a total of *2* adults as those are the only variables checked.

Figure 49: General Filters, Home Age Range and Total Adults in Home

11.3.6   Other Options

Figure 50: Other Options

11.3.6.1 Reset

After the **General Filters** section view, users have an option to reset all of the selections they may have previously made by clicking **Reset**. This option, which can be used anytime, unchecks boxes and clears selections by refreshing the page.

11.3.6.2 Submit

Once a given query has been finalized with the appropriate categorical selections and filters, the final step is to click **Submit** which populates the specified results.

11.3.6.3 Show output for

The webtool is capable of generating three types of tables, which can be found in the **Other Options** section. Table types include (Figure 51):

- **Results** – displays the percentages according to a given query.

- **Sample Sizes** – displays the actual number of sample points used to populate a given query.

- **Error Bounds** – displays the error bounds related to the **Results** table.

For **Appliances**, the default is to have all three generated at once. Some **Lighting** queries require extensive data processing that can lead to the query timing out, so the default for **Lighting** is to generate the Results and then the user must select Sample Size or Error Bound as next steps. If the **Results** remain selected, they will remain viewable while the **Sample Sizes** are computed. This is also true for the **Error Bound** processing.

Figure 51: Output Options

11.4 Display of Results

Once a desired table is populated, the user has the ability to perform the following actions within all three table options: **Hide Data**, **Download as CSV** and **Download as Excel**.

11.4.1   Hide Data

By clicking the **Hide Data** link, a given table can be taken out of display as shown in Figure 52 below. Conversely, clicking the **Show Data** link brings a table back into view.

Figure 52: Hide Data, Tutorial
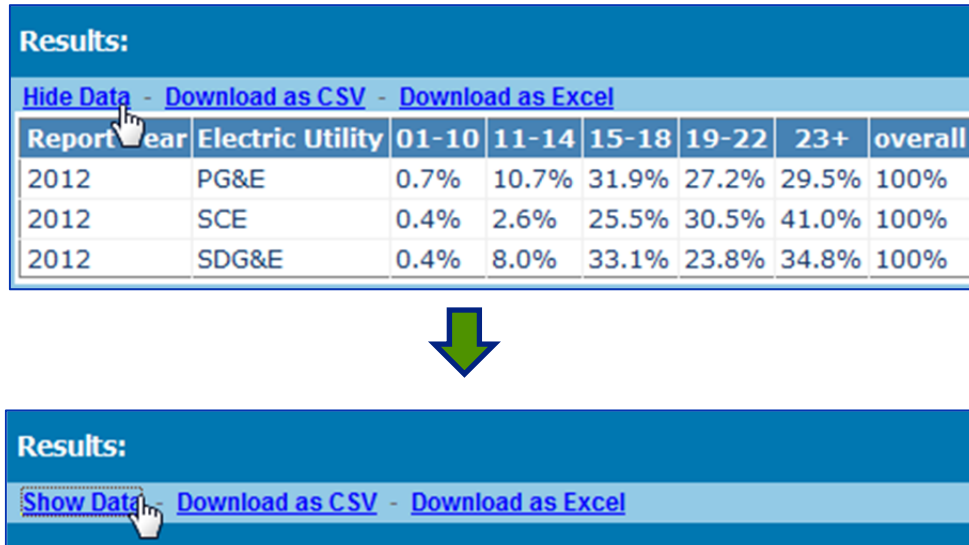
11.4.2   Copy and Paste Results into File

Once the results of a given query are populated, the user can chose to highlight all of the sections and paste into a document. Table formatting can be maintained or removed if pasted into Microsoft Excel.

11.4.3   Download as CSV

Any table within the **Results**, **Sample Sizes** or **Error Bounds** view can be exported as **CSV** by clicking the **Download as CSV** link. A popup window appears when the link is clicked and prompts the user to **Open** the file or **Save** it to their local computer (Figure 53). **Note:** each table has to be downloaded separately.

Figure 53: Download as CSV
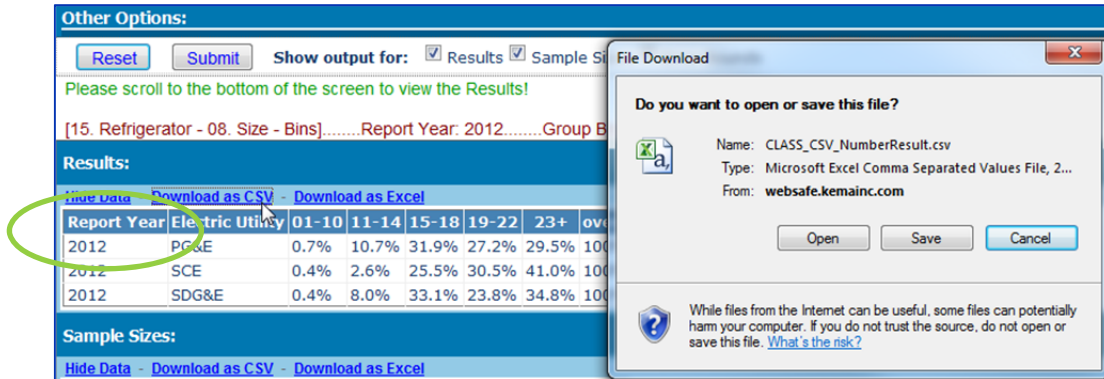
11.4.4   Download as Excel

Similarly to the **Download as CSV** example, a user can also download the results of their query as an MS Excel file (.xls). The .xls will maintain the formatting of the webtool. **Note:** each table has to be downloaded separately.

Figure 54: Download as Excel
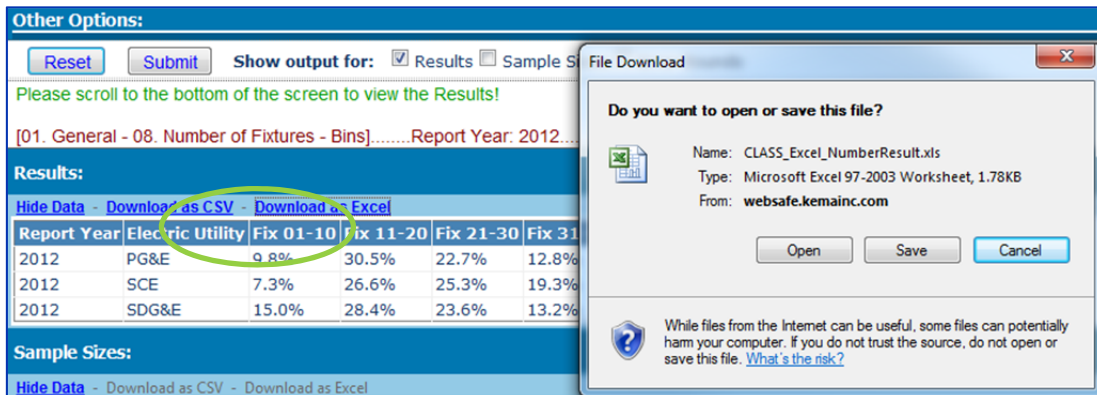
11.5 User Notes

Report Capability: The original scope of work provided budget for the development of the 2012 CLASS webtool with all of the capabilities of the 2005 webtool and a few enhancements. Key additional features include allowing the user to perform a "Group by" analysis and enabling filters to restrict the data processed for the query. Queries for specific fixtures such as "Homes with …." types were included as they were available in the 2005 webtool and the fixture types were recognized as types for which lighting technologies were under development.

Lighting Reports with Room Type: The numbers in the labels for bathrooms and bedrooms indicate the nth room that was observed in a home. The rooms were visited in the order they were accessible to the field surveyor.

Use of Room Type to Filter Data Processed: Selecting specific room types for a query in the Report Specific Filters area without using "Room" in the Report Summary Criteria will calculate results by combining the rooms selected for homes with one or more of the type of rooms. For example, if Bathroom -1 and Bathroom-2 are selected in the Report Specific Filter, without selecting to group by Room in the Report Summary Criteria, the result will include all homes that have only a Bathroom-1 (and no additional bathrooms) plus all homes that have both a Bathroom-1 and Bathroom-2.

11.6 Queries Used to Create Tables and Figures in 2012 CLASS Final Report

Table 208 presents the webtool queries performed to develop tables in the 2012 CLASS Final Report. The user will need to select the appropriate weights to use.

Table 208: Webtool Queries Used to Develop Tables in 2012 CLASS Final Report

Table in Report	Query Parameters for 2012 CLASS Webtool
Table 1: Equipment Model Numbers Obtained On-site and Rate of Model Matching	Not generated from webtool
Table 2: Type of Residence 2000-2012	Not generated from webtool
Table 3: Home Ownership 2000-2012	Not generated from webtool
Table 4: Year of Home Construction 2000-2012	Not generated from webtool
Table 5: Total Heated Floorspace 2000-2012	Not generated from webtool
Table 6: Average Number of Fixtures by Type of Residence 2005-2012, using Strata Weights	[01. General - 02. Average Number of Fixtures by Type - Total]........Report Year: 2012........Group By: None........Filters: ('Bathroom - 1','Bathroom - 2','Bathroom - 3','Bathroom - 4','Bathroom - 5','Bedroom - 1','Bedroom - 2','Bedroom - 3','Bedroom - 4','Bedroom - 5','Closet','Dining Room','Exterior - Entry','Garage','Hallway','Kitchen','Laundry/Utility Room','Living Room','Office','Other') [01. General - 02. Average Number of Fixtures by Type - Total]........Report Year: 2012........Group By: [Type of Residence]........Filters: ('Bathroom - 1','Bathroom - 2','Bathroom - 3','Bathroom - 4','Bathroom - 5','Bedroom - 1','Bedroom - 2','Bedroom - 3','Bedroom - 4','Bedroom - 5','Closet','Dining Room','Exterior - Entry','Garage','Hallway','Kitchen','Laundry/Utility Room','Living Room','Office','Other')
Table 7: Average Number of Lamps by Type of Residence 2005-2012, using Strata Weights	[01. General - 05. Average Number of Lamps by Type - Total]........Report Year: 2012........Group By: None........Filters: ('Bathroom - 1','Bathroom - 2','Bathroom - 3','Bathroom - 4','Bathroom - 5','Bedroom - 1','Bedroom - 2','Bedroom - 3','Bedroom - 4','Bedroom - 5','Closet','Dining Room','Exterior - Entry','Garage','Hallway','Kitchen','Laundry/Utility Room','Living Room','Office','Other') [01. General - 05. Average Number of Lamps by Type - Total]........Report Year: 2012........Group By: [Type of Residence]........Filters: ('Bathroom - 1','Bathroom - 2','Bathroom - 3','Bathroom - 4','Bathroom - 5','Bedroom - 1','Bedroom - 2','Bedroom - 3','Bedroom - 4','Bedroom - 5','Closet','Dining Room','Exterior - Entry','Garage','Hallway','Kitchen','Laundry/Utility Room','Living Room','Office','Other')
Table 8: Percentages of Homes with Lamp Types	[01. General - 16. Percent of Homes with Generic Lamp Types]........Report Year: 2012........Group By: None........Filters: ('Bathroom - 1','Bathroom - 2','Bathroom - 3','Bathroom - 4','Bathroom - 5','Bedroom - 1','Bedroom - 2','Bedroom - 3','Bedroom - 4','Bedroom - 5','Closet','Dining Room','Exterior - Entry','Garage','Hallway','Kitchen','Laundry/Utility Room','Living Room','Office','Other') [02. Rooms - 07. Percent of Homes with Generic Lamp Types]........Report Year: 2012........Group By: None........Filters: ('Bathroom - 1','Bathroom - 2','Bathroom - 3','Bathroom - 4','Bathroom - 5','Bedroom - 1','Bedroom - 2','Bedroom - 3','Bedroom - 4','Bedroom - 5','Closet','Dining Room','Exterior - Entry','Garage','Hallway','Kitchen','Laundry/Utility Room','Living Room','Office','Other')

Table in Report	Query Parameters for 2012 CLASS Webtool
Table 9. Table 9: Percent of Homes with CFL or LED Present by Room Types	• [02. Rooms - 07. Percent of Homes with Generic Lamp Types]........Report Year: 2012........Group By: [Room]........Filters: None
Table 10: Percentage of Sockets by Lamp Types	• [01. General - 19. Percent of Lamps by Type]........Report Year: 2012........Group By: None........Filters: ('Bathroom - 1','Bathroom - 2','Bathroom - 3','Bathroom - 4','Bathroom - 5','Bedroom - 1','Bedroom - 2','Bedroom - 3','Bedroom - 4','Bedroom - 5','Closet','Dining Room','Exterior - Entry','Garage','Hallway','Kitchen','Laundry/Utility Room','Living Room','Office','Other')
Table 11: Sample Frame with Strata and Target	Not generated from webtool
Table 12: Final Sample Sizes and Stratum Weights	Not generated from webtool
Table 13: Number of Sites Completed in IOU Electric Service	Not generated from webtool
Table 14: Recruiting Disposition by Service Territory	Not generated from webtool
Table 15: Building Characteristics Gathered during On-site Visits	Not generated from webtool
Table 16: Comparison of Type of Residence	• [09. General - 01. Demographic proportions]........Report Year: 2012........Group By: [Type of Residence]........Filters: None]
Table 17: Comparison of Home Ownership	• [09. General - 01. Demographic proportions]........Report Year: 2012........Group By: [Rent or Own]........Filters: None]
Table 18: Comparison of Number of Occupants	• [09. General - 01. Demographic proportions]........Report Year: 2012........Group By: [Total People in Home]........Filters: None]
Table 19: Comparison of Household Income	• [09. General - 01. Demographic proportions]........Report Year: 2012........Group By: [Income]........Filters: None]
Table 20: Percentage of Homes by Type of Residence and Story Number	Not generated from webtool
Table 21: Percentage of Homes by Type of Residence and Story Number	Not generated from webtool
Table 22: Percentage of Homes by Number of Occupants	• [09. General - 01. Demographic proportions]........Report Year: 2012........Group By: [Total People in Home]........Filters: None]
Table 23: Percentage of Homes by Number of Adults	• [09. General - 01. Demographic proportions]........Report Year: 2012........Group By: [Total Adults in Home]........Filters: None]
Table 24: Percentage of Homes by Primary	• [09. General - 01. Demographic proportions]........Report Year: 2012........Group By: [Primary

Table in Report	Query Parameters for 2012 CLASS Webtool
Language	Language].......Filters: None]
Table 25: Percentage of Homes by Total Household Income	• [09. General - 01. Demographic proportions]........Report Year: 2012........Group By: [Income]........Filters: None]
Table 26: Percentage of Homes by Year of Home Construction	• [09. General - 01. Demographic proportions]........Report Year: 2012........Group By: [Home Age Range]........Filters: None]
Table 27: Percentage of Homes by Total Heated Floorspace	• [09. General - 01. Demographic proportions]........Report Year: 2012........Group By: [Total Heated Floorspace]........Filters: None]
Table 28: Percentage of Homes by Occupancy Type	• [09. General - 01. Demographic proportions]........Report Year: 2012........Group By: [Rent or Own]........Filters: None]
Table 29: Comparison of Sample by Climate Zones for 2012 CLASS and 2005 CLASS	Not generated from webtool
Table 30: Completed Sites by Rate Class for 2012 CLASS	Not generated from webtool
Table 31: Completed Sites by Rate Class for 2005 CLASS	Not generated from webtool
Table 32: Average Number of Fixtures and Lamps by Type of Residence	• [01. General - 02. Average Number of Fixtures by Type - Total]........Report Year: 2012........Group By: None........Filters: None • [01. General - 02. Average Number of Fixtures by Type - Total]........Report Year: 2012........Group By: [Type of Residence]........Filters: None • [01. General - 05. Average Number of Lamps by Type - Total]........Report Year: 2012........Group By: None........Filters: None • [01. General - 05. Average Number of Lamps by Type - Total]........Report Year: 2012........Group By: [Type of Residence]........Filters: None
Table 33: Average Number of Fixtures by Fixture Type	• [01. General - 02. Average Number of Fixtures by Type - Total]........Report Year: 2012........Group By: None........Filters: None • [01. General - 01. Average Number of Fixtures by Type]........Report Year: 2012........Group By: None........Filters: None
Table 34: Percentage of Homes with Fixture Types	• [01. General - 15. Percent of Homes with Fixture Types]........Report Year: 2012........Group By: None........Filters: None
Table 35: Distribution of Number of Fixtures per Home	• [01. General - 08. Number of Fixtures - Bins]........Report Year: 2012........Group By: None........Filters: None
Table 36: Distribution of Number of Fixtures per Home by Residence Type	• [01. General - 08. Number of Fixtures - Bins]........Report Year: 2012........Group By: None........Filters: None • [01. General - 08. Number of Fixtures - Bins]........Report Year: 2012........Group By: [Type of

Table in Report	Query Parameters for 2012 CLASS Webtool
	Residence]........Filters: None
Table 37: Percent of Fixtures Containing Compact Fluorescent Lamps	• [01. General - 13. Percent of Fixtures with CFL - Total]........Report Year: 2012........Group By: None........Filters: None • [01. General - 12. Percent of Fixtures with CFL]........Report Year: 2012........Group By: None........Filters: None
Table 38: Percent of Homes with CFL by Room	• [02. Rooms - 07. Percent of Homes with Generic Lamp Types].......Report Year: 2012........Group By: [Room]........Filters: None
Table 39: Percent of Homes with LED by Room	• [02. Rooms - 07. Percent of Homes with Generic Lamp Types].......Report Year: 2012........Group By: [Room]........Filters: None
Table 40: Percent of Homes with LED by Type of Residence	• [02. Rooms - 07. Percent of Homes with Generic Lamp Types].......Report Year: 2012........Group By: [Type of Residence]........Filters: None
Table 41: Average Number of Lamps per Fixture	• [01. General - 03. Average Number of Lamps by Fixture Type]........Report Year: 2012........Group By: None........Filters: None
Table 42: Average Number of Lamps by General Lamp Type	• [01. General - 05. Average Number of Lamps by Type - Total]........Report Year: 2012........Group By: None........Filters: None • [01. General - 04. Average Number of Lamps by Type]........Report Year: 2012........Group By: None........Filters: None
Table 43: Distribution of Sockets by Lamp Types	• [01. General - 19. Percent of Lamps by Type]........Report Year: 2012........Group By: None........Filters: None
Table 44: Percentage of Homes with General Lamp Types	• [01. General - 16. Percent of Homes with Generic Lamp Types].......Report Year: 2012........Group By: None........Filters: None • [02. Rooms - 07. Percent of Homes with Generic Lamp Types]........Report Year: 2012........Group By: None........Filters: None
Table 45: Distribution of Number of Lamps per Home	• [01. General - 09. Number of Lamps - Bins]........Report Year: 2012........Group By: None........Filters: None
Table 46: Distribution Of Number Of Lamps Per Home By Residence Type	• [01. General - 09. Number of Lamps - Bins]........Report Year: 2012........Group By: None........Filters: None • [01. General - 09. Number of Lamps - Bins]........Report Year: 2012........Group By: [Type of Residence]........Filters: None
Table 47: Average Number of Lamps per Home by Base Type	• [01. General - 06. Average Number of Lamps by Base Type]........Report Year: 2012........Group By: None........Filters: None
Table 48: Distribution of the Number of Recessed Cans per Home	• [01. General - 21. Number of Recessed Cans - Bins]........Report Year: 2012........Group By: None........Filters: None
Table 49: Percentage of Homes with	• [02. Rooms - 05. Percent of Homes by Fixture Type]........Report Year: 2012........Group By:

Table in Report	Query Parameters for 2012 CLASS Webtool
Recessed Cans by Room	[Room]........Filters: None
Table 50: Percentage of Homes with Recessed Cans by Age of Home	• [01. General - 15. Percent of Homes with Fixture Types]........Report Year: 2012........Group By: [Home Age Range]........Filters: None
Table 51: Average Number of Recessed Cans per Home by Age of Home	• [01. General - 01. Average Number of Fixtures by Type]........Report Year: 2012........Group By: [Home Age Range]........Filters: None
Table 52: Distribution of the Number Of Ceiling Fans Per Home	• [01. General - 20. Number of Ceiling Fans - Bins]........Report Year: 2012........Group By: None........Filters: None
Table 53: Percentage of Homes with Ceiling Fans by Room	• [02. Rooms - 05. Percent of Homes by Fixture Type]........Report Year: 2012........Group By: [Room]........Filters: None
Table 54: Distribution of Number of Lamps per Ceiling Fan	• [01. General - 10. Percent of Ceiling Fans with Bulb Count]........Report Year: 2012........Group By: None........Filters: None
Table 55: Distribution of Lamp Types Installed in Ceiling Fans, using Census-adjusted Weights	• [01. General - 11. Percent of Ceiling Fans with Lamp Type]........Report Year: 2012........Group By: None........Filters: None
Table 56: Distribution of the Number of Torchiere Fixtures per Home	• [01. General - 21. Number of Torchieres - Bins]........Report Year: 2012........Group By: None........Filters: None
Table 57: Percentage of Homes with Torchiere Fixtures by Room	• [02. Rooms - 05. Percent of Homes by Fixture Type]........Report Year: 2012........Group By: [Room]........Filters: None
Table 58: Distribution of Lamp Types Installed in Torchiere	• [01. General - 17. Percent of different lamp types contained in Torchiere fixtures]........Report Year: 2012........Group By: None........Filters: None

Table in Report	Query Parameters for 2012 CLASS Webtool
Table 59: Percentage Of Homes With Fixture Type And Lamp Type In Kitchen Table 60: Percentage of Homes with Fixture Type and Lamp Type in Bedroom 1 Table 61: Percentage of Homes with Fixture Type and Lamp Type in Bedroom 2	• [02. Rooms - 06. Percent of Homes with Lamp and Fixture Combinations]........Report Year: 2012........Group By: [Room]........Filters: None • [02. Rooms - 05. Percent of Rooms by Fixture Type]........Report Year: 2012........Group By: [Room]........Filters: None • [02. Rooms - 07. Percent of Homes with Generic Lamp Types]........Report Year: 2012........Group By: [Room]........Filters: None

Table in Report	Query Parameters for 2012 CLASS Webtool
Table 62: Percentage Of Homes With Fixture Type And Lamp Type In Bedroom 3 Table 63: Percentage Of Homes With Fixture Type And Lamp Type In Bedroom 4 Table 64: Percentage of Homes with Fixture Type and Lamp Type in Living Room Table 65: Percentage Of Homes With Fixture Type And Lamp Type In Bathroom 1 Table 66: Percentage of Homes with Fixture Type and Lamp Type in Bathroom 2 Table 67: Percentage of Homes with Fixture Type and Lamp Type in Bathroom 3 Table 68: Percentage of Homes with Fixture Type and Lamp Type in Bathroom 4	• [02. Rooms - 06. Percent of Homes with Lamp and Fixture Combinations]........Report Year: 2012........Group By: [Room]........Filters: None • [02. Rooms - 05. Percent of Rooms by Fixture Type]........Report Year: 2012........Group By: [Room]........Filters: None • [02. Rooms - 07. Percent of Homes with Generic Lamp Types]........Report Year: 2012........Group By: [Room]........Filters: None

Table in Report	Query Parameters for 2012 CLASS Webtool
Table 69: Percentage of Homes with Fixture Type and Lamp Type in Hallway	
Table 70: Percentage of Homes with Fixture Type and Lamp Type in Dining Room	• [02. Rooms - 06. Percent of Homes with Lamp and Fixture Combinations]........Report Year: 2012........Group By: [Room]........Filters: None • [02. Rooms - 05. Percent of Rooms by Fixture Type]........Report Year: 2012........Group By: [Room]........Filters: None • [02. Rooms - 07. Percent of Homes with Generic Lamp Types]........Report Year: 2012........Group By: [Room]........Filters: None
Table 71: Percentage of Homes with Fixture Type and Lamp Type in Home Office	
Table 72: Percentage of Homes with Fixture Type and Lamp Type in Laundry Room	
Table 73: Percentage of Homes with Fixture Type and Lamp Type in Closets	
Table 74: Percentage of Homes with Fixture Type and Lamp Type in Garage	
Table 75: Percentage of Homes with Fixture Type and Lamp Type in Other Room Type	
Table 76: Percentage of Homes with Fixture Type and Lamp Type in Exterior - Entry	
Table 77: Percentage of Homes with Fixture Type and Lamp Type in Exterior - Porch/Patio	
Table 78: Percentage of Homes with Fixture Type and Lamp Type in Exterior - Other	• [02. Rooms - 06. Percent of Homes with Lamp and Fixture Combinations]........Report Year: 2012........Group By: [Room]........Filters: None • [02. Rooms - 05. Percent of Rooms by Fixture Type]........Report Year: 2012........Group By: [Room]........Filters: None • [02. Rooms - 07. Percent of Homes with Generic Lamp Types]........Report Year: 2012........Group By: [Room]........Filters: None
Table 79: Percent Of Installed Lamps By Control Types	• [02. Rooms - 10. Percent of Lamps by Control and Lamp Type]........Report Year: 2012........Group By: None........Filters: None

Table in Report	Query Parameters for 2012 CLASS Webtool
Table 80: Average Wattage by Fixture	• 02. Rooms - 01. Average Fixture Wattage]........Report Year: 2012........Group By: None........Filters: None
Table 81: Average Wattage By Room Type	• [02. Rooms - 03. Average Lamp Wattage by Base Type - Total]........Report Year: 2012........Group By: [Room]........Filters: None
Table 82: Percentage of Homes with Second or Third Refrigerator by Type of Residence	• [15. Refrigerator - 05. Homes With Number of Refrigerators]........Report Year: 2012........Group By: None........Filters: None • [15. Refrigerator - 05. Homes With Number of Refrigerators]........Report Year: 2012........Group By: [Type of Residence]........Filters: None
Table 83: Average Estimated Size of Primary Refrigerators by Type	• [15. Refrigerator - 07. Average Size]........Report Year: 2012........Group By: None........Filters: None • [15. Refrigerator - 07. Average Size]........Report Year: 2012........Group By: [Refrigerator Type]........Filters: None
Table 84: Distribution of Primary Refrigerators within Estimated Size Ranges	• [15. Refrigerator - 08. Size - Bins]........Report Year: 2012........Group By: [Refrigerator Type]........Filters: None • [15. Refrigerator - 08. Size - Bins]........Report Year: 2012........Group By: None........Filters: None
Table 85: Average Age and Distribution of Manufacturer Reported Ages within Size Ranges	• [15. Refrigerator - 03. Manufacture Date]........Report Year: 2012........Group By: None........Filters: None • [15. Refrigerator - 03. Manufacture Date]........Report Year: 2012........Group By: [Size of Refrigerator]........Filters: None • [15. Refrigerator - 03. Manufacture Date]........Report Year: 2012........Group By: [Refrigerator Type]........Filters: None • [15. Refrigerator - 03. Manufacture Date]........Report Year: 2012........Group By: [Refrigerator Type], [Size of Refrigerator]........Filters: None • [15. Refrigerator - 04. Manufacture Date - Bins]........Report Year: 2012........Group By: None........Filters: None • [15. Refrigerator - 04. Manufacture Date - Bins]........Report Year: 2012........Group By: [Size of Refrigerator]........Filters: None • [15. Refrigerator - 04. Manufacture Date - Bins]........Report Year: 2012........Group By: [Refrigerator Type]........Filters: None • [15. Refrigerator - 04. Manufacture Date - Bins]........Report Year: 2012........Group By: [Refrigerator Type], [Size of Refrigerator]........Filters: None
Table 86: Average Age and Distribution of Manufacturer Reported Ages and On-site Estimated Ages within Size Ranges	• [15. Refrigerator - 01. Estimated Manufacture Date]........Report Year: 2012........Group By: None........Filters: None • [15. Refrigerator - 01. Estimated Manufacture Date]........Report Year: 2012........Group By: [Size of Refrigerator]........Filters: None • [15. Refrigerator - 01. Estimated Manufacture Date]........Report Year: 2012........Group By: [Refrigerator

Table in Report	Query Parameters for 2012 CLASS Webtool
	Type]........Filters: None
	• [15. Refrigerator - 01. Estimated Manufacture Date]........Report Year: 2012........Group By: [Refrigerator Type], [Size of Refrigerator]........Filters: None
	• [15. Refrigerator - 02. Estimated Manufacture Date - Bins]........Report Year: 2012........Group By: None........Filters: None
	• [15. Refrigerator - 02. Estimated Manufacture Date - Bins]........Report Year: 2012........Group By: [Size of Refrigerator]........Filters: None
	• [15. Refrigerator - 02. Estimated Manufacture Date - Bins]........Report Year: 2012........Group By: [Refrigerator Type]........Filters: None
	• [15. Refrigerator - 02. Estimated Manufacture Date - Bins]........Report Year: 2012........Group By: [Refrigerator Type], [Size of Refrigerator]........Filters: None
Table 87: Average Nameplate Unit Energy Consumption (UEC) by Type of Primary Refrigerator	• [16. Refrigerator Efficiency - 01. Average Unit Energy Consumption]........Report Year: 2012........Group By: None........Filters: None
	• [16. Refrigerator Efficiency - 01. Average Unit Energy Consumption]........Report Year: 2012........Group By: [Size of Refrigerator]........Filters: None
	• [16. Refrigerator Efficiency - 01. Average Unit Energy Consumption]........Report Year: 2012........Group By: [Refrigerator Type]........Filters: None
	• [16. Refrigerator Efficiency - 01. Average Unit Energy Consumption]........Report Year: 2012........Group By: [Refrigerator Type], [Size of Refrigerator]........Filters: None
Table 88: Distribution of Nameplate UEC Ranges within Size Ranges and Type of Primary Refrigerators, using Strata Weights	• [16. Refrigerator Efficiency - 05. Unit Energy Consumption (Bins)]........Report Year: 2012........Group By: None........Filters: None
	• [16. Refrigerator Efficiency - 05. Unit Energy Consumption (Bins)]........Report Year: 2012........Group By: [Size of Refrigerator]........Filters: None
	• [16. Refrigerator Efficiency - 05. Unit Energy Consumption (Bins)]........Report Year: 2012........Group By: [Refrigerator Type]........Filters: None
	• [16. Refrigerator Efficiency - 05. Unit Energy Consumption (Bins)]........Report Year: 2012........Group By: [Refrigerator Type], [Size of Refrigerator]........Filters: None
Table 89: Average Estimated Size of Secondary Refrigerators by Type	• [17. Secondary Refrigerator - 06. Average Size]........Report Year: 2012........Group By: None........Filters: None
	• [17. Secondary Refrigerator - 06. Average Size]........Report Year: 2012........Group By: [Refrigerator Type]........Filters: None
Table 90: Distribution of Estimated Size Ranges within Type of Secondary Refrigerators, using Strata Weights	• [17. Secondary Refrigerator - 07. Size - Bins]........Report Year: 2012........Group By: [Refrigerator Type]........Filters: None
	• [17. Secondary Refrigerator - 07. Size - Bins]........Report Year: 2012........Group By: None........Filters:

Table in Report	Query Parameters for 2012 CLASS Webtool
	None
Table 91: Average Age and Distribution of Manufacturer Reported Ages within Size Ranges of Secondary Refrigerators, using Strata Weights	• [17. Secondary Refrigerator - 03. Manufacture Date]........Report Year: 2012........Group By: None........Filters: None • [17. Secondary Refrigerator - 03. Manufacture Date]........Report Year: 2012........Group By: [Size of Refrigerator].......Filters: None • [17. Secondary Refrigerator - 03. Manufacture Date].......Report Year: 2012........Group By: [Refrigerator Type]........Filters: None • [17. Secondary Refrigerator - 03. Manufacture Date]........Report Year: 2012........Group By: [Refrigerator Type], [Size of Refrigerator]........Filters: None • [17. Secondary Refrigerator - 04. Manufacture Date - Bins].......Report Year: 2012........Group By: None........Filters: None • [17. Secondary Refrigerator - 04. Manufacture Date - Bins]........Report Year: 2012........Group By: [Size of Refrigerator]........Filters: None • [17. Secondary Refrigerator - 04. Manufacture Date - Bins].......Report Year: 2012........Group By: [Refrigerator Type]........Filters: None • [17. Secondary Refrigerator - 04. Manufacture Date - Bins]........Report Year: 2012........Group By: [Refrigerator Type], [Size of Refrigerator]........Filters: None
Table 92: Average Age and Distribution of Manufacturer Reported Ages and On-site Estimated Ages within Size Ranges of Secondary Refrigerators, using Strata Weights	• [17. Secondary Refrigerator - 01. Estimated Manufacture Date]........Report Year: 2012........Group By: None........Filters: None • [17. Secondary Refrigerator - 01. Estimated Manufacture Date]........Report Year: 2012........Group By: [Size of Refrigerator]........Filters: None • [17. Secondary Refrigerator - 01. Estimated Manufacture Date]........Report Year: 2012........Group By: [Refrigerator Type]........Filters: None • [17. Secondary Refrigerator - 01. Estimated Manufacture Date]........Report Year: 2012........Group By: [Refrigerator Type], [Size of Refrigerator]........Filters: None • [17. Secondary Refrigerator - 04. Manufacture Date - Bins]........Report Year: 2012........Group By: None........Filters: None • [17. Secondary Refrigerator - 04. Manufacture Date - Bins]........Report Year: 2012........Group By: [Size of Refrigerator]........Filters: None • [17. Secondary Refrigerator - 02. Estimated Manufacture Date - Bins]........Report Year: 2012........Group By: [Refrigerator Type]........Filters: None • [17. Secondary Refrigerator - 02. Estimated Manufacture Date - Bins]........Report Year: 2012........Group By: [Refrigerator Type], [Size of Refrigerator]........Filters: None
Table 93: Distribution of Nameplate UEC	• [18. Secondary Refrigerator Efficiency - 01. Average Unit Energy Consumption]........Report Year:

Table in Report	Query Parameters for 2012 CLASS Webtool
Ranges within Size Ranges and Type of Secondary Refrigerators, using Strata Weights	2012........Group By: None........Filters: None • [18. Secondary Refrigerator Efficiency - 01. Average Unit Energy Consumption]........Report Year: 2012........Group By: [Size of Refrigerator]........Filters: None • [18. Secondary Refrigerator Efficiency - 01. Average Unit Energy Consumption].......Report Year: 2012........Group By: [Refrigerator Type]........Filters: None • [18. Secondary Refrigerator Efficiency - 01. Average Unit Energy Consumption]........Report Year: 2012........Group By: [Refrigerator Type], [Size of Refrigerator]........Filters: None • [18. Secondary Refrigerator Efficiency - 05. Unit Energy Consumption (Bins)]........Report Year: 2012........Group By: None........Filters: None • [18. Secondary Refrigerator Efficiency - 05. Unit Energy Consumption (Bins)]........Report Year: 2012........Group By: [Size of Refrigerator]........Filters: None • [18. Secondary Refrigerator Efficiency - 05. Unit Energy Consumption (Bins)]........Report Year: 2012........Group By: [Refrigerator Type]........Filters: None • [18. Secondary Refrigerator Efficiency - 05. Unit Energy Consumption (Bins)]........Report Year: 2012........Group By: [Refrigerator Type], [Size of Refrigerator]........Filters: None
Table 94: Average Size of Primary Freezers by Type	• [07. Freezer - 04. Average Manufacture Matched Volume]........Report Year: 2012........Group By: None........Filters: None • [07. Freezer - 04. Average Manufacture Matched Volume]........Report Year: 2012........Group By: [Freezer Type]........Filters: None
Table 95: Distribution of Size of Primary Freezers by Type	• [07. Freezer - 05. Size of Freezer]........Report Year: 2012........Group By: [Freezer Type]........Filters: None • [07. Freezer - 05. Size of Freezer]........Report Year: 2012........Group By: None........Filters: None
Table 96: Distribution of Nameplate Annual Energy Usage (AEC) of Primary Freezers by Type	• [08. Freezer Efficiency - 02. Unit Energy Consumption - Bins]........Report Year: 2012........Group By: [Freezer Type]........Filters: None • [08. Freezer Efficiency - 02. Unit Energy Consumption - Bins]........Report Year: 2012........Group By: None........Filters: None
Table 97: Average Manufacture Date of Primary Freezers by Type	• [07. Freezer - 01. Estimated Average Age of Freezers]........Report Year: 2012........Group By: None........Filters: None • [07. Freezer - 01. Estimated Average Age of Freezers]........Report Year: 2012........Group By: [Freezer Type]........Filters: None
Table 98: Distribution of Manufacture Date of Primary Freezers by Type	• [07. Freezer - 02. Age - Bins]........Report Year: 2012........Group By: None........Filters: None • [07. Freezer - 02. Age - Bins]........Report Year: 2012........Group By: [Freezer Type]........Filters: None
Table 99: Percentage of Homes with Number of Heating System	• [10. Heating - 06. Number of Heating Systems]........Report Year: 2012........Group By: None........Filters: None

Table in Report	Query Parameters for 2012 CLASS Webtool
Table 100: Distribution of Primary Heating Systems by Type of System	• [10. Heating - 05. Heating proportions]........Report Year: 2012........Group By: [Pri. Heating Central or Space], [Pri. Heating System Type]........Filters: None
Table 101: Distribution of Fuel Type within Type of Heating System, using Strata Weights	• [10. Heating - 04. Fuel Types]........Report Year: 2012........Group By: None........Filters: None • [10. Heating - 04. Fuel Types]........Report Year: 2012........Group By: [Pri. Heating Central or Space]........Filters: None • [10. Heating - 04. Fuel Types]........Report Year: 2012........Group By: [Pri. Heating Central or Space], [Pri. Heating System Type]........Filters: None
Table 102: Average Estimated Age and Distribution of Heating Systems across Age Ranges within Type, using Strata Weights	• [10. Heating - 02. Primary System Estimated Average Age]........Report Year: 2012........Group By: None........Filters: None • [10. Heating - 02. Primary System Estimated Average Age]........Report Year: 2012........Group By: [Pri. Heating Central or Space]........Filters: None • [10. Heating - 02. Primary System Estimated Average Age]........Report Year: 2012........Group By: [Pri. Heating Central or Space], [Pri. Heating System Type]........Filters: None
Table 103: Distribution of Furnaces by Capacity Ranges and Fuel Type	• [10. Heating - 01. Capacity - Bins]........Report Year: 2012........Group By: None........Filters: None
Table 104: Average AFUE by System Type	• [11. Heating Efficiency - 01. Average AFUE]........Report Year: 2012........Group By: [Heating Central or Space], [Heating System Type]........Filters: None • [11. Heating Efficiency - 01. Average AFUE]........Report Year: 2012........Group By: None........Filters: None • [11. Heating Efficiency - 01. Average AFUE]........Report Year: 2012........Group By: [Heating Central or Space]........Filters: None
Table 105: Distribution of AFUE Ranges within Heating System Type, using Strata Weights	• [11. Heating Efficiency - 02. AFUE - Bins]........Report Year: 2012........Group By: [Heating Central or Space]........Filters: None • [11. Heating Efficiency - 02. AFUE - Bins]........Report Year: 2012........Group By: [Heating Central or Space], [Heating System Type]........Filters: None
Table 106: Distribution of Cooling System Types in Residences with Cooling Equipment	• [01. Cooling - 04. Primary System Type]........Report Year: 2012........Group By: None........Filters: None
Table 107: Distribution of Primary Cooling System Types by Classes	• [01. Cooling - 03. Cooling Proportions]........Report Year: 2012........Group By: [Pri. Cooling System Type]........Filters: [Pri. Cooling Central or Space] IN ('Central') • [01. Cooling - 03. Cooling Proportions]........Report Year: 2012........Group By: [Pri. Cooling System Type]........Filters: [Pri. Cooling Central or Space] IN ('Space')
Table 108: Average Age of Primary Cooling Equipment	• [01. Cooling - 01. Estimated Average age]........Report Year: 2012........Group By: None........Filters: [Cooling System Type] IN ('1 - Split System AC','2 - Package System AC','3 - Split System Heat Pump','4 - Package System Heat Pump','8 - Common Building','9 - Evaporative Cooler (EVAP Cooler)')

Table in Report	Query Parameters for 2012 CLASS Webtool
	• [01. Cooling - 01. Estimated Average age]........Report Year: 2012........Group By: [Cooling System Type]........Filters: None • [01. Cooling - 01. Estimated Average age]........Report Year: 2012........Group By: None........Filters: [Cooling System Type] IN ('5 - Window/Wall AC','6 - Window Wall Heat Pump','7 - Portable/Stand Alone AC')
Table 109: Distribution of Cooling System Manufacture Date Ranges within Types	• [01. Cooling - 02. Age - Bins]........Report Year: 2012........Group By: None........Filters: [Cooling System Type] IN ('1 - Split System AC','2 - Package System AC','3 - Split System Heat Pump','4 - Package System Heat Pump','8 - Common Building','9 - Evaporative Cooler (EVAP Cooler)') • [01. Cooling - 02. Age - Bins]........Report Year: 2012........Group By: None........Filters: [Cooling System Type] IN ('5 - Window/Wall AC','6 - Window Wall Heat Pump','7 - Portable/Stand Alone AC') • [01. Cooling - 02. Age - Bins]........Report Year: 2012........Group By: [Cooling System Type]........Filters: None
Table 110: Distribution of Cooling System Size Ranges within Type	• [01. Cooling - 05. Size in Tons]........Report Year: 2012........Group By: None........Filters: [Cooling System Type] IN ('1 - Split System AC','2 - Package System AC','3 - Split System Heat Pump','4 - Package System Heat Pump','8 - Common Building') • [01. Cooling - 05. Size in Tons]........Report Year: 2012........Group By: None........Filters: [Cooling System Type] IN ('5 - Window/Wall AC','6 - Window Wall Heat Pump','7 - Portable/Stand Alone AC') • [01. Cooling - 05. Size in Tons]........Report Year: 2012........Group By: [Cooling System Type]........Filters: [Cooling System Type] IN ('1 - Split System AC','2 - Package System AC','3 - Split System Heat Pump','4 - Package System Heat Pump','5 - Window/Wall AC','6 - Window Wall Heat Pump','7 - Portable/Stand Alone AC','8 - Common Building')
Table 111: Distribution of Manufacture Date Ranges for Central Cooling Systems within Capacity Ranges and Types	• [01. Cooling - 02. Age - Bins]........Report Year: 2012........Group By: None........Filters: [Cooling System Type] IN ('1 - Split System AC','2 - Package System AC','3 - Split System Heat Pump','4 - Package System Heat Pump','8 - Common Building','9 - Evaporative Cooler (EVAP Cooler)') • [01. Cooling - 02. Age - Bins]........Report Year: 2012........Group By: [Size in Tons]........Filters: [Cooling System Type] IN ('1 - Split System AC','2 - Package System AC','3 - Split System Heat Pump','4 - Package System Heat Pump','8 - Common Building','9 - Evaporative Cooler (EVAP Cooler)') • [01. Cooling - 02. Age - Bins].......Report Year: 2012........Group By: [Cooling System Type]........Filters: [Cooling System Type] IN ('1 - Split System AC','2 - Package System AC','3 - Split System Heat Pump','4 - Package System Heat Pump','8 - Common Building','9 - Evaporative Cooler (EVAP Cooler)') • [01. Cooling - 02. Age - Bins]........Report Year: 2012........Group By: [Cooling System Type], [Size in Tons]........Filters: [Cooling System Type] IN ('1 - Split System AC','2 - Package System AC','3 - Split System Heat Pump','4 - Package System Heat Pump','8 - Common Building','9 - Evaporative Cooler (EVAP Cooler)')
Table 112: Distribution of Manufacture Date Ranges for Space Cooling Systems within Capacity Ranges and Types, using Strata Weights	• [01. Cooling - 02. Age - Bins]........Report Year: 2012........Group By: None........Filters: [Cooling System Type] IN ('5 - Window/Wall AC','6 - Window Wall Heat Pump','7 - Portable/Stand Alone AC') • [01. Cooling - 02. Age - Bins]........Report Year: 2012........Group By: [Size in Tons]........Filters: [Cooling System Type] IN ('5 - Window/Wall AC','6 - Window Wall Heat Pump','7 - Portable/Stand Alone AC')

Table in Report	Query Parameters for 2012 CLASS Webtool
	• [01. Cooling - 02. Age - Bins]........Report Year: 2012........Group By: [Cooling System Type]........Filters: [Cooling System Type] IN ('5 - Window/Wall AC','6 - Window Wall Heat Pump','7 - Portable/Stand Alone AC') • [01. Cooling - 02. Age - Bins]........Report Year: 2012........Group By: [Cooling System Type], [Size in Tons]........Filters: [Cooling System Type] IN ('5 - Window/Wall AC','6 - Window Wall Heat Pump','7 - Portable/Stand Alone AC')
Table 113: Distribution of Cooling Systems by SEER/EER Ranges within Cooling System Type	• [02. Cooling Efficiency - 02. SEER - Bins]........Report Year: 2012........Group By: None........Filters: None • [02. Cooling Efficiency - 02. SEER - Bins]........Report Year: 2012........Group By: [Cooling System Type]........Filters: None • [02. Cooling Efficiency - 04. EER - Bins]........Report Year: 2012........Group By: None........Filters: None • [02. Cooling Efficiency - 04. EER - Bins]........Report Year: 2012........Group By: [Cooling System Type]........Filters: None
Table 114: Average Efficiency of Cooling Systems by Type and Tonnage Range	• [02. Cooling Efficiency - 01. Average SEER]........Report Year: 2012........Group By: [Size in Tons]........Filters: None • [02. Cooling Efficiency - 03. Average EER]........Report Year: 2012........Group By: [Size in Tons]........Filters: None • [02. Cooling Efficiency - 03. Average EER]........Report Year: 2012........Group By: [Cooling System Type], [Size in Tons]........Filters: None • [02. Cooling Efficiency - 01. Average SEER]........Report Year: 2012........Group By: [Cooling System Type], [Size in Tons]........Filters: None
Table 115: Average Size of Water Heaters by Fuel Type	• [23. Water Heater - 03. Average Size]........Report Year: 2012........Group By: None........Filters: None • [23. Water Heater - 03. Average Size]........Report Year: 2012........Group By: [Water Heater Fuel Type]........Filters: None
Table 116: Distribution of Water Heaters by Size Range within Fuel Type	• [23. Water Heater - 04. Size - Bins]........Report Year: 2012........Group By: None........Filters: None • [23. Water Heater - 04. Size - Bins]........Report Year: 2012........Group By: [Water Heater Fuel Type]........Filters: None
Table 117: Distribution of Water Heaters within Size Ranges and Fuel Types Among all Water Heaters	• [23. Water Heater - 07. Water Heater Proportions]........Report Year: 2012........Group By: [Pri. Water Heater Fuel Type], [Pri. Water Heater Size]........Filters: None • [23. Water Heater - 07. Water Heater Proportions]........Report Year: 2012........Group By: [Pri. Water Heater Fuel Type], [Pri. Water Heater Size]........Filters: None
Table 118: Average Age of Water Heaters by Fuel Type within Size Ranges	• [23. Water Heater - 01. Average Age]........Report Year: 2012........Group By: None........Filters: None • [23. Water Heater - 01. Average Age]........Report Year: 2012........Group By: [Water Heater Fuel Type]........Filters: None • [23. Water Heater - 01. Average Age]........Report Year: 2012........Group By: [Water Heater Fuel Type],

Table in Report	Query Parameters for 2012 CLASS Webtool
	[Size of Water Heater]........Filters: None
	• [23. Water Heater - 01. Average Age]........Report Year: 2012........Group By: [Size of Water Heater]........Filters: None
Table 119: Distribution of Water Heaters in Purchase Date Ranges by Fuel Type	• [23. Water Heater - 02. Age - Bins]........Report Year: 2012........Group By: None........Filters: None
	• [23. Water Heater - 02. Age - Bins]........Report Year: 2012........Group By: [Size of Water Heater]........Filters: None
	• [23. Water Heater - 02. Age - Bins]........Report Year: 2012........Group By: [Water Heater Fuel Type]........Filters: None
	• [23. Water Heater - 02. Age - Bins]........Report Year: 2012........Group By: [Water Heater Fuel Type], [Size of Water Heater]........Filters: None
Table 120: Average Energy Factor for Water Heaters and Comparison	• [24. Water Heater Efficiency - 01. Average Energy Factor]........Report Year: 2012........Group By: [Water Heater Fuel Type], [Size of Water Heater]........Filters: None
Table 121: Average Energy Factor by Fuel Type in Size Ranges	• [24. Water Heater Efficiency - 01. Average Energy Factor]........Report Year: 2012........Group By: [Water Heater Fuel Type], [Size of Water Heater]........Filters: None
	• [24. Water Heater Efficiency - 01. Average Energy Factor]........Report Year: 2012........Group By: [Water Heater Fuel Type]........Filters: None
Table 122: Percentage of Water Heaters in Energy Factor Ranges by Size (Gallons) for Electric and Solar with Electric Fuel Types	• [24. Water Heater Efficiency - 02. Energy Factor - Bins]........Report Year: 2012........Group By: [Water Heater Fuel Type]........Filters: None
	• [24. Water Heater Efficiency - 02. Energy Factor - Bins]........Report Year: 2012........Group By: [Water Heater Fuel Type], [Size of Water Heater]........Filters: None
Table 123: Percentage of Water Heaters in Energy Factor Ranges by Size (Gallons) for Gas, Propane, and Solar with Gas Fuel Types	
Table 124: Percentage Of Water Heaters that were Wrapped and Unwrapped	• [23. Water Heater - 06. Tank Wrap]........Report Year: 2012........Group By: None........Filters: None
	• [23. Water Heater - 06. Tank Wrap]........Report Year: 2012........Group By: [Size of Water Heater]........Filters: None
Table 125: Percentage of Homes with Clothes Washers by Type of Residence	• [21. Washing Machine - 03. Homes With Washing Machines]........Report Year: 2012........Group By: [Type of Residence]........Filters: None
Table 126: Distribution of Clothes Washers by Type of Washer and by Type of Residence	• [21. Washing Machine - 04. Type of Washer]........Report Year: 2012........Group By: [Type of Residence]........Filters: None
Table 127: Distribution of Manufacture Date of Clothes Washers	• [21. Washing Machine - 02. Age - Bins]........Report Year: 2012........Group By: None........Filters: None

Table in Report	Query Parameters for 2012 CLASS Webtool
Table 128: Average Modified Energy Factor for Clothes Washers and Comparison to Standards	• [22. Washing Machine Efficiency - 03. Average Modified Energy Factor]........Report Year: 2012........Group By: [Clothes Washer Type]........Filters: None • [22. Washing Machine Efficiency - 03. Average Modified Energy Factor]........Report Year: 2012........Group By: None........Filters: None
Table 129: Distribution of Clothes Washers in Modified Energy Factor Ranges	• [22. Washing Machine Efficiency - 04. Modified Energy Factor - Bins]........Report Year: 2012........Group By: [Clothes Washer Type]........Filters: None • [22. Washing Machine Efficiency - 04. Modified Energy Factor - Bins]........Report Year: 2012........Group By: None........Filters: None
Table 130: Percentage of Homes with Dryers by Type of Residence	• [05. Dryer - 04. Homes with dryers]........Report Year: 2012........Group By: None........Filters: None • [05. Dryer - 04. Homes with dryers]........Report Year: 2012........Group By: [Type of Residence]........Filters: None
Table 131: Distribution of Estimated Manufacture Date of Dryers	• [05. Dryer - 02. Estimated Age - Bins]........Report Year: 2012........Group By: None........Filters: None
Table 132: Percentage of Homes with Dishwasher by Type of Residence	• [03. Dishwasher - 03. Homes with dishwashers]........Report Year: 2012........Group By: [Type of Residence]........Filters: None • [03. Dishwasher - 03. Homes with dishwashers]........Report Year: 2012........Group By: None........Filters: None
Table 133: Distribution of Manufacture Date of Dishwashers	• [03. Dishwasher - 02. Age - Bins]........Report Year: 2012........Group By: None........Filters: None
Table 134: Distribution of Dishwashers by Energy Factor	• [04. Dishwasher Efficiency - 02. Energy Factor - Bins]........Report Year: 2012........Group By: None........Filters: None
Table 135: Percentage of Fuel Types Used by Ranges	• [14. Ranges and Ovens - 01. Range Fuel Type]........Report Year: 2012........Group By: None........Filters: None
Table 136: Percentage of Fuel Types Used by Ovens	• [14. Ranges and Ovens - 02. Oven Fuel Type]........Report Year: 2012........Group By: None........Filters: None
Table 137: Average Number of TVs by Type of Residence	• [20. Televisions and Connected Devices - 02. Homes with Number of Televisions]........Report Year: 2012........Group By: None........Filters: None • [20. Televisions and Connected Devices - 02. Homes with Number of Televisions]........Report Year: 2012........Group By: [Type of Residence]........Filters: None • [20. Televisions and Connected Devices - 11. Average Number of TVs]........Report Year: 2012........Group By: None........Filters: None • [20. Televisions and Connected Devices - 11. Average Number of TVs]........Report Year: 2012........Group By: [Type of Residence]........Filters: None
Table 138: Distribution of Most-Used TVs in	• [20. Televisions and Connected Devices - 04. Television Screen Sizes]........Report Year: 2012........Group By:

Table in Report	Query Parameters for 2012 CLASS Webtool
Size Ranges by Type of TV	None........Filters: None • [20. Televisions and Connected Devices - 04. Television Screen Sizes]........Report Year: 2012........Group By: [Television Type]........Filters: None
Table 139: Average Age and Percentage of TVs Manufacturer Reported Ages	• [20. Televisions and Connected Devices - 06. Age Bins for Televisions]........Report Year: 2012........Group By: None........Filters: None • [20. Televisions and Connected Devices - 06. Age Bins for Televisions]........Report Year: 2012........Group By: [Television Type]........Filters: None • [20. Televisions and Connected Devices - 05. Average Age of Televisions]........Report Year: 2012........Group By: None........Filters: None • [20. Televisions and Connected Devices - 05. Average Age of Televisions]........Report Year: 2012........Group By: [Television Type]........Filters: None
Table 140: Percentage of Homes with Peripheral Connected and Connected to Most-Used TV	• [20. Televisions and Connected Devices - 07. Percent of Homes with TV Peripheral Type]........Report Year: 2012........Group By: None........Filters: None • [20. Televisions and Connected Devices - 08. Percent of Homes with TV Peripheral Type for Most Used TV]........Report Year: 2012........Group By: None........Filters: None
Table 141: Average Number of TV Peripherals by Type of Residence	• [20. Televisions and Connected Devices - 10. Average number of TV Peripheral – Total]........Report Year: 2012........Group By: None........Filters: None • [20. Televisions and Connected Devices - 10. Average number of TV Peripheral – Total]........Report Year: 2012........Group By: [Type of Residence]........Filters: None
Table 142: Average Number of PCs by Type of Residence	• [12. Personal Computers and Peripherals - 02. Homes with Number of Personal Computers]........Report Year: 2012........Group By: None........Filters: None • [12. Personal Computers and Peripherals - 10. Average Number of Personal Computers]........Report Year: 2012........Group By: None........Filters: None • [12. Personal Computers and Peripherals - 02. Homes with Number of Personal Computers]........Report Year: 2012........Group By: [Type of Residence]........Filters: None • [12. Personal Computers and Peripherals - 10. Average Number of Personal Computers]........Report Year: 2012........Group By: [Type of Residence]........Filters: None
Table 143: Average Age and Percentage of PCs Manufacturer Reported Ages	• [12. Personal Computers and Peripherals - 04. Average Age of Personal Computers]........Report Year: 2012........Group By: None........Filters: None • [12. Personal Computers and Peripherals - 05. Age Bins for Personal Computers]........Report Year: 2012........Group By: None........Filters: None • [12. Personal Computers and Peripherals - 04. Average Age of Personal Computers]........Report Year: 2012........Group By: [Personal Computer Type]........Filters: None • [12. Personal Computers and Peripherals - 05. Age Bins for Personal Computers]........Report Year:

Table in Report	Query Parameters for 2012 CLASS Webtool
	2012........Group By: [Personal Computer Type]........Filters: None
Table 144: Percentage of Homes with Peripheral Connected and Connected to Most-Used PC	• [12. Personal Computers and Peripherals - 06. Percent of Homes with Computer Peripheral Type]........Report Year: 2012........Group By: None........Filters: None • [12. Personal Computers and Peripherals - 07. Percent of Homes with Computer Peripheral Type for Most Used Computer]........Report Year: 2012........Group By: None........Filters: None
Table 145: Average Number of PC Peripherals by Type of Residence	• [12. Personal Computers and Peripherals - 09. Average number of Computer Peripheral – Total]........Report Year: 2012........Group By: [Type of Residence]........Filters: None\ • [12. Personal Computers and Peripherals - 09. Average number of Computer Peripheral – Total]........Report Year: 2012........Group By: None........Filters: None
Table 146: Percentage of Homes by Frame Type and Pane Type by Type of Residence	• [06. Envelope - 10. Window frame type by number of frames]........Report Year: 2012........Group By: None........Filters: None • [06. Envelope - 10. Window frame type by number of frames]........Report Year: 2012........Group By: [Type of Residence]........Filters: None
Table 147: Percentage of Homes by Frame Type and Pane Type by Age of Residence	• [06. Envelope - 10. Window frame type by number of frames]........Report Year: 2012........Group By: None........Filters: None • [06. Envelope - 10. Window frame type by number of frames]........Report Year: 2012........Group By: [Home Age Range]........Filters: None
Table 148: Percentage of Homes by Glazing Type and Age of Residence, using Strata Weights	• [06. Envelope - 03. Low E]........Report Year: 2012........Group By: None........Filters: None • [06. Envelope - 03. Low E]........Report Year: 2012........Group By: [Home Age Range]........Filters: None
Table 149: Average R-Value and Percentage of Homes with Attic Insulation R-Value	• [06. Envelope - 02. Attic Insulation Average R-value]........Report Year: 2012........Group By: None........Filters: None • [06. Envelope - 01. Attic insulation R-value Bins]........Report Year: 2012........Group By: None........Filters: None • [06. Envelope - 02. Attic Insulation Average R-value]........Report Year: 2012........Group By: [Home Age Range]........Filters: None • [06. Envelope - 01. Attic insulation R-value Bins]........Report Year: 2012........Group By: [Home Age Range]........Filters: None
Table 150: Percentage of Homes by Wall Construction Type by Percentage of Walls Insulated	• [06. Envelope - 05. Pct of walls insulated]........Report Year: 2012........Group By: None........Filters: None • [06. Envelope - 05. Pct of walls insulated]........Report Year: 2012........Group By: [Wall Construction Type]........Filters: None
Table 151: Percentage Of Homes With Wall Insulation By Type Of Residence	• [06. Envelope - 08. Wall insulated]........Report Year: 2012........Group By: None........Filters: None • [06. Envelope - 08. Wall insulated]........Report Year: 2012........Group By: [Type of Residence]........Filters:

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Table in Report	Query Parameters for 2012 CLASS Webtool
	None
Table 152: 2012 Model Number Match Rates by Appliance	Not generated from webtool
Table 153: 2005 Model Number Match Rates by Appliance	Not generated from webtool
Table 154: 2000 Model Number Match Rates by Appliance	Not generated from webtool
Table 155: Percentage Of Homes With Fixture Type And Lamp Type In Kitchen	
Table 156: Percentage of Homes with Fixture Type and Lamp Type in Bedroom 1	
Table 157: Percentage of Homes with Fixture Type and Lamp Type in Bedroom 2	• [02. Rooms - 06. Percent of Homes with Lamp and Fixture Combinations]........Report Year: 2012........Group By: [Room]........Filters: None
Table 158: Percentage Of Homes With Fixture Type And Lamp Type In Bedroom 3	• [02. Rooms - 05. Percent of Rooms by Fixture Type]........Report Year: 2012........Group By: [Room]........Filters: None
Table 159: Percentage Of Homes With Fixture Type And Lamp Type In Bedroom 4	• [02. Rooms - 07. Percent of Homes with Generic Lamp Types]........Report Year: 2012........Group By: [Room]........Filters: None
Table 160: Percentage of Homes with Fixture Type and Lamp Type in Living Room	
Table 161: Percentage Of Homes With Fixture Type And Lamp Type In Bathroom 1	
Table 162: Percentage of Homes with Fixture Type and Lamp Type in Bathroom 2	
Table 163: Percentage of Homes with Fixture Type and Lamp Type in Bathroom 3	
Table 164: Percentage of Homes with Fixture Type and Lamp Type in Bathroom 4	• [02. Rooms - 06. Percent of Homes with Lamp and Fixture Combinations]........Report Year: 2012........Group By: [Room]........Filters: None
Table 165: Percentage of Homes with Fixture Type and Lamp Type in Hallway	• [02. Rooms - 05. Percent of Rooms by Fixture Type]........Report Year: 2012........Group By: [Room]........Filters: None
Table 166: Percentage of Homes with Fixture Type and Lamp Type in Dining	• [02. Rooms - 07. Percent of Homes with Generic Lamp Types]........Report Year: 2012........Group By:

Table in Report	Query Parameters for 2012 CLASS Webtool
Room	[Room]........Filters: None
Table 167: Percentage of Homes with Fixture Type and Lamp Type in Home Office	
Table 168: Percentage of Homes with Fixture Type and Lamp Type in Laundry Room	
Table 169: Percentage of Homes with Fixture Type and Lamp Type in Closets	
Table 170: Percentage of Homes with Fixture Type and Lamp Type in Garage	
Table 171: Percentage of Homes with Fixture Type and Lamp Type in Other Room Type	
Table 172: Percentage of Homes with Fixture Type and Lamp Type in Exterior - Entry	
Table 174: Percentage of Homes with Second or Third Refrigerator by Type of Residence using Census-adjusted Weights	• [15. Refrigerator - 05. Homes With Number of Refrigerators]........Report Year: 2012........Group By: None........Filters: None • [15. Refrigerator - 05. Homes With Number of Refrigerators]........Report Year: 2012........Group By: [Type of Residence]........Filters: None
Table 175: Distribution of Primary Refrigerators within Estimated Size Ranges within Type using Census-adjusted Weights	• [15. Refrigerator - 08. Size - Bins]........Report Year: 2012........Group By: [Refrigerator Type]........Filters: None • [15. Refrigerator - 08. Size - Bins]........Report Year: 2012........Group By: None........Filters: None
Table 176: Average Age and Distribution of Manufacturer Reported Ages within Size Ranges of Primary Refrigerators using Census-adjusted Weights	• [15. Refrigerator - 03. Manufacture Date]........Report Year: 2012........Group By: None........Filters: None • [15. Refrigerator - 03. Manufacture Date]........Report Year: 2012........Group By: [Size of Refrigerator]........Filters: None • [15. Refrigerator - 03. Manufacture Date]........Report Year: 2012........Group By: [Refrigerator Type]........Filters: None • [15. Refrigerator - 03. Manufacture Date]........Report Year: 2012........Group By: [Refrigerator Type], [Size of Refrigerator]........Filters: None • [15. Refrigerator - 04. Manufacture Date - Bins]........Report Year: 2012........Group By: None........Filters: None • [15. Refrigerator - 04. Manufacture Date - Bins]........Report Year: 2012........Group By: [Size of Refrigerator]........Filters: None

Table in Report	Query Parameters for 2012 CLASS Webtool
	• [15. Refrigerator - 04. Manufacture Date - Bins]........Report Year: 2012........Group By: [Refrigerator Type]........Filters: None • [15. Refrigerator - 04. Manufacture Date - Bins]........Report Year: 2012........Group By: [Refrigerator Type], [Size of Refrigerator]........Filters: None
Table 177: Average Age and Distribution of Manufacturer Reported Ages and On-site Estimated Ages within Size Ranges of Primary Refrigerators using Census-Adjusted Weights	• [15. Refrigerator - 01. Estimated Manufacture Date]........Report Year: 2012........Group By: None........Filters: None • [15. Refrigerator - 01. Estimated Manufacture Date]........Report Year: 2012........Group By: [Size of Refrigerator]........Filters: None • [15. Refrigerator - 01. Estimated Manufacture Date]........Report Year: 2012........Group By: [Refrigerator Type]........Filters: None • [15. Refrigerator - 01. Estimated Manufacture Date]........Report Year: 2012........Group By: [Refrigerator Type], [Size of Refrigerator]........Filters: None • [15. Refrigerator - 02. Estimated Manufacture Date - Bins]........Report Year: 2012........Group By: None........Filters: None • [15. Refrigerator - 02. Estimated Manufacture Date - Bins]........Report Year: 2012........Group By: [Size of Refrigerator]........Filters: None • [15. Refrigerator - 02. Estimated Manufacture Date - Bins]........Report Year: 2012........Group By: [Refrigerator Type]........Filters: None • [15. Refrigerator - 02. Estimated Manufacture Date - Bins]........Report Year: 2012........Group By: [Refrigerator Type], [Size of Refrigerator]........Filters: None
Table 178: Distribution of Nameplate UEC Ranges within Size Ranges and Type of Primary Refrigerators using Census-adjusted Weights	• [16. Refrigerator Efficiency - 05. Unit Energy Consumption (Bins)]........Report Year: 2012........Group By: None........Filters: None • [16. Refrigerator Efficiency - 05. Unit Energy Consumption (Bins)]........Report Year: 2012........Group By: [Size of Refrigerator]........Filters: None • [16. Refrigerator Efficiency - 05. Unit Energy Consumption (Bins)]........Report Year: 2012........Group By: [Refrigerator Type]........Filters: None • [16. Refrigerator Efficiency - 05. Unit Energy Consumption (Bins)]........Report Year: 2012........Group By: [Refrigerator Type], [Size of Refrigerator]........Filters: None
Table 183: Distribution of Size of Primary Freezers by Type using Census-adjusted Weights	• [07. Freezer - 05. Size of Freezer]........Report Year: 2012........Group By: [Freezer Type]........Filters: None • [07. Freezer - 05. Size of Freezer]........Report Year: 2012........Group By: None........Filters: None
Table 184: Distribution of Nameplate Annual Energy Consumption (AEC) of Primary Freezers by Type using Census-adjusted Weights	• [08. Freezer Efficiency - 02. Unit Energy Consumption - Bins]........Report Year: 2012........Group By: [Freezer Type]........Filters: None • [08. Freezer Efficiency - 02. Unit Energy Consumption - Bins]........Report Year: 2012........Group By:

Table in Report	Query Parameters for 2012 CLASS Webtool
	None........Filters: None
Table 185: Distribution of Manufacture Date of Primary Freezers by Type using Census-adjusted Weights	• [07. Freezer - 02. Age - Bins]........Report Year: 2012........Group By: None........Filters: None • [07. Freezer - 02. Age - Bins]........Report Year: 2012........Group By: [Freezer Type]........Filters: None
Table 186: Distribution of Heating Systems by Fuel Type within Type of Heating System using Census-adjusted Weights	• [10. Heating - 04. Fuel Types]........Report Year: 2012........Group By: None........Filters: None • [10. Heating - 04. Fuel Types]........Report Year: 2012........Group By: [Pri. Heating Central or Space]........Filters: None • [10. Heating - 04. Fuel Types]........Report Year: 2012........Group By: [Pri. Heating Central or Space], [Pri. Heating System Type]........Filters: None
Table 187: Average Estimated Age and Distribution of Heating Systems across Age Ranges within Type using Census-adjusted Weights	• [10. Heating - 02. Primary System Estimated Average Age]........Report Year: 2012........Group By: None........Filters: None • [10. Heating - 02. Primary System Estimated Average Age]........Report Year: 2012........Group By: [Pri. Heating Central or Space]........Filters: None • [10. Heating - 02. Primary System Estimated Average Age]........Report Year: 2012........Group By: [Pri. Heating Central or Space], [Pri. Heating System Type]........Filters: None
Table 188: Distribution of AFUE Ranges within Heating System Type using Census-adjusted Weights	• [11. Heating Efficiency - 02. AFUE - Bins]........Report Year: 2012........Group By: [Heating Central or Space]........Filters: None • [11. Heating Efficiency - 02. AFUE - Bins]........Report Year: 2012........Group By: [Heating Central or Space], [Heating System Type]........Filters: None
Table 189: Distribution of Cooling System Manufacture Date Ranges within Types using Census-adjusted Weights	• [01. Cooling - 02. Age - Bins]........Report Year: 2012........Group By: None........Filters: [Cooling System Type] IN ('1 - Split System AC','2 - Package System AC','3 - Split System Heat Pump','4 - Package System Heat Pump','8 - Common Building','9 - Evaporative Cooler (EVAP Cooler)') • [01. Cooling - 02. Age - Bins]........Report Year: 2012........Group By: None........Filters: [Cooling System Type] IN ('5 - Window/Wall AC','6 - Window Wall Heat Pump','7 - Portable/Stand Alone AC') • [01. Cooling - 02. Age - Bins]........Report Year: 2012........Group By: [Cooling System Type]........Filters: None
Table 190: Distribution of Cooling System Size Ranges within Type using Census-adjusted Weights	• [01. Cooling - 05. Size in Tons]........Report Year: 2012........Group By: None........Filters: [Cooling System Type] IN ('1 - Split System AC','2 - Package System AC','3 - Split System Heat Pump','4 - Package System Heat Pump','8 - Common Building') • [01. Cooling - 05. Size in Tons]........Report Year: 2012........Group By: None........Filters: [Cooling System Type] IN ('5 - Window/Wall AC','6 - Window Wall Heat Pump','7 - Portable/Stand Alone AC') • [01. Cooling - 05. Size in Tons]........Report Year: 2012........Group By: [Cooling System Type]........Filters: [Cooling System Type] IN ('1 - Split System AC','2 - Package System AC','3 - Split System Heat Pump','4 - Package System Heat Pump','5 - Window/Wall AC','6 - Window Wall Heat Pump','7 - Portable/Stand Alone AC','8 - Common Building')

Table in Report	Query Parameters for 2012 CLASS Webtool
Table 191: Distribution of Manufacture Date Ranges for Central Cooling Systems within Capacity Ranges and Types using Census-adjusted Weights	• [01. Cooling - 02. Age - Bins]........Report Year: 2012........Group By: None........Filters: [Cooling System Type] IN ('1 - Split System AC','2 - Package System AC','3 - Split System Heat Pump','4 - Package System Heat Pump','8 - Common Building','9 - Evaporative Cooler (EVAP Cooler)') • [01. Cooling - 02. Age - Bins]........Report Year: 2012........Group By: [Size in Tons]........Filters: [Cooling System Type] IN ('1 - Split System AC','2 - Package System AC','3 - Split System Heat Pump','4 - Package System Heat Pump','8 - Common Building','9 - Evaporative Cooler (EVAP Cooler)') • [01. Cooling - 02. Age - Bins]........Report Year: 2012........Group By: [Cooling System Type]........Filters: [Cooling System Type] IN ('1 - Split System AC','2 - Package System AC','3 - Split System Heat Pump','4 - Package System Heat Pump','8 - Common Building','9 - Evaporative Cooler (EVAP Cooler)') • [01. Cooling - 02. Age - Bins]........Report Year: 2012........Group By: [Cooling System Type], [Size in Tons]........Filters: [Cooling System Type] IN ('1 - Split System AC','2 - Package System AC','3 - Split System Heat Pump','4 - Package System Heat Pump','8 - Common Building','9 - Evaporative Cooler (EVAP Cooler)')
Table 192: Distribution of Manufacture Date Ranges for Space Cooling Systems within Capacity Ranges and Types using Census-adjusted Weights	• [01. Cooling - 02. Age - Bins]........Report Year: 2012........Group By: None........Filters: [Cooling System Type] IN ('5 - Window/Wall AC','6 - Window Wall Heat Pump','7 - Portable/Stand Alone AC') • [01. Cooling - 02. Age - Bins]........Report Year: 2012........Group By: [Size in Tons]........Filters: [Cooling System Type] IN ('5 - Window/Wall AC','6 - Window Wall Heat Pump','7 - Portable/Stand Alone AC') • [01. Cooling - 02. Age - Bins]........Report Year: 2012........Group By: [Cooling System Type]........Filters: [Cooling System Type] IN ('5 - Window/Wall AC','6 - Window Wall Heat Pump','7 - Portable/Stand Alone AC') • [01. Cooling - 02. Age - Bins]........Report Year: 2012........Group By: [Cooling System Type], [Size in Tons]........Filters: [Cooling System Type] IN ('5 - Window/Wall AC','6 - Window Wall Heat Pump','7 - Portable/Stand Alone AC')
Table 193: Distribution of Cooling Systems by SEER/EER Ranges within Cooling System Type using Census-adjusted Weights	• [02. Cooling Efficiency - 02. SEER - Bins]........Report Year: 2012........Group By: None........Filters: None • [02. Cooling Efficiency - 02. SEER - Bins]........Report Year: 2012........Group By: [Cooling System Type]........Filters: None • [02. Cooling Efficiency - 04. EER - Bins]........Report Year: 2012........Group By: None........Filters: None • [02. Cooling Efficiency - 04. EER - Bins]........Report Year: 2012........Group By: [Cooling System Type]........Filters: None
Table 194: Distribution of Water Heaters by Size Range within Fuel Type using Census-adjusted Weights	• [23. Water Heater - 04. Size - Bins]........Report Year: 2012........Group By: None........Filters: None • [23. Water Heater - 04. Size - Bins]........Report Year: 2012........Group By: [Water Heater Fuel Type]........Filters: None
Table 195: Distribution of Water Heaters within Size Ranges and Fuel Types Among all Water Heaters using Census-adjusted Weights	• [23. Water Heater - 07. Water Heater Proportions]........Report Year: 2012........Group By: [Pri. Water Heater Fuel Type], [Pri. Water Heater Size]........Filters: None • [23. Water Heater - 07. Water Heater Proportions]........Report Year: 2012........Group By: [Pri. Water Heater Fuel Type], [Pri. Water Heater Size]........Filters: None

Table in Report	Query Parameters for 2012 CLASS Webtool
Table 196: Average Age of Water Heaters by Fuel Type within Size Ranges using Census-adjusted Weights	• [23. Water Heater - 01. Average Age]........Report Year: 2012........Group By: None........Filters: None • [23. Water Heater - 01. Average Age]........Report Year: 2012........Group By: [Water Heater Fuel Type]........Filters: None • [23. Water Heater - 01. Average Age]........Report Year: 2012........Group By: [Water Heater Fuel Type], [Size of Water Heater]........Filters: None • [23. Water Heater - 01. Average Age]........Report Year: 2012........Group By: [Size of Water Heater]........Filters: None
Table 197: Distribution of Water Heaters in Purchase Date Ranges by Fuel Type using Census-adjusted Weights	• [23. Water Heater - 02. Age - Bins]........Report Year: 2012........Group By: None........Filters: None • [23. Water Heater - 02. Age - Bins]........Report Year: 2012........Group By: [Size of Water Heater]........Filters: None • [23. Water Heater - 02. Age - Bins]........Report Year: 2012........Group By: [Water Heater Fuel Type]........Filters: None • [23. Water Heater - 02. Age - Bins]........Report Year: 2012........Group By: [Water Heater Fuel Type], [Size of Water Heater]........Filters: None
Table 198: Average Energy Factor by Fuel Type in Size Ranges using Census-adjusted Weights	• [24. Water Heater Efficiency - 01. Average Energy Factor]........Report Year: 2012........Group By: [Water Heater Fuel Type], [Size of Water Heater]........Filters: None • [24. Water Heater Efficiency - 01. Average Energy Factor]........Report Year: 2012........Group By: [Water Heater Fuel Type]........Filters: None
Table 199: Percentage of Water Heaters in Energy Factor Ranges by Size (Gallons) for Electric and Solar with Electric Fuel Types using Census-adjusted Weights	• [24. Water Heater Efficiency - 02. Energy Factor - Bins]........Report Year: 2012........Group By: [Water Heater Fuel Type]........Filters: None • [24. Water Heater Efficiency - 02. Energy Factor - Bins]........Report Year: 2012........Group By: [Water Heater Fuel Type], [Size of Water Heater]........Filters: None
Table 200: Percentage of Water Heaters in Energy Factor Ranges by Size (Gallons) for Gas, Propane, and Solar with Gas Fuel Types using Census-adjusted Weights	
Table 201: Percentage Of Water Heaters that were Wrapped and Unwrapped with Insulation in Conditioned or Unconditioned Space, within Size Ranges using Census-adjusted Weights	• [23. Water Heater - 06. Tank Wrap]........Report Year: 2012........Group By: None........Filters: None • [23. Water Heater - 06. Tank Wrap]........Report Year: 2012........Group By: [Size of Water Heater]........Filters: None
Table 202: Distribution of Clothes Washers by Type of Washer and by Type of Residence using Census-adjusted Weights	• [21. Washing Machine - 04. Type of Washer]........Report Year: 2012........Group By: [Type of Residence]........Filters: None
Table 203: Percentage of Homes by Frame Type and Panes Type by Type of Residence	• [06. Envelope - 10. Window frame type by number of frames]........Report Year: 2012........Group By:

Table in Report	Query Parameters for 2012 CLASS Webtool
using Census-adjusted Weights	None........Filters: None • [06. Envelope - 10. Window frame type by number of frames]........Report Year: 2012........Group By: [Type of Residence]........Filters: None
Table 204: Percentage of Homes by Frame Type and Panes Type by Age of Residence using Census-adjusted Weights	• [06. Envelope - 10. Window frame type by number of frames].......Report Year: 2012........Group By: None........Filters: None • [06. Envelope - 10. Window frame type by number of frames].......Report Year: 2012........Group By: [Home Age Range]........Filters: None
Table 205: Percentage of Homes by Glazing Type and Age of Residence using Census-adjusted Weights	• [06. Envelope - 03. Low E]........Report Year: 2012........Group By: None........Filters: None • [06. Envelope - 03. Low E]........Report Year: 2012........Group By: [Home Age Range]........Filters: None
Table 206: Average R-Value and Percentage of Homes with Attic Insulation R-Value Ranges by Age of Residence using Census-adjusted Weights	• [06. Envelope - 02. Attic Insulation Average R-value].......Report Year: 2012........Group By: None........Filters: None • [06. Envelope - 01. Attic insulation R-value Bins]........Report Year: 2012........Group By: None........Filters: None • [06. Envelope - 02. Attic Insulation Average R-value]........Report Year: 2012........Group By: [Home Age Range]........Filters: None • [06. Envelope - 01. Attic insulation R-value Bins]........Report Year: 2012........Group By: [Home Age Range]........Filters: None
Table 207: Percentage of Homes by Wall Construction Type by Percentage of Walls Insulated using Census-adjusted Weights	• [06. Envelope - 05. Pct of walls insulated]........Report Year: 2012........Group By: None........Filters: None • [06. Envelope - 05. Pct of walls insulated]........Report Year: 2012........Group By: [Wall Construction Type]........Filters: None
Table 208: Webtool Queries Used to Develop Tables in 2012 CLASS Final Report	Not generated from webtool

12 Appendix G: Statistical Significance Testing

This section describes the method of calculating test statistics to identify significant differences of comparisons presented in the 2012 CLASS Final Report. The comparisons in the report primarily address population estimates expressed as averages (i.e. equipment age, efficiency rating, number present, etc.) and proportions (i.e. of homes having specified equipment, % equipment with certain attributes, etc.).

The analysis of the 2012 CLASS data relied on interactive queries in the 2012 CLASS webtool to produce the estimates of interest. The results for the previous CLASS studies presented in the 2012 CLASS report were obtained from either the 2005 CLASS Final Report or from queries of the data using the 2005/2000 CLASS webtool, i.e. Calresest. Both the 2012 CLASS webtool and the 2005/2000 CLASS webtool are able to access only one study year's database for each query, so tests of significance of results between study years are not currently available via the webtools.

Considering the complexities of the databases and queries, the study team leveraged the results previously generated to determine whether differences identified in comparisons in the report are statistically significant. The results presented in the 2012 CLASS report include population estimates and associated error bounds at the 90% level of confidence. Variances were calculated from the error bounds and pooled estimates for the two study years were developed. The pooled estimate was calculated as an average between the 2012 and 2005 estimates.

The pooled estimate and variance were calculated as:

$$\text{Pooled Estimate} = [0.5*(2012 \text{ Estimate})] + [0.5*(2005 \text{ Estimate})]$$

$$\text{Var(Pooled Estimate)} = [(0.5)^2 * \text{var}(2012 \text{ Estimate})] + [(0.5)^2 * \text{var}(2005 \text{ Estimate})] \quad (1)$$

The variance estimates in (1) took into account the complex design features of the 2012 and 2005 study since, as noted above, they were computed from the error bounds. And note the pooled variance estimate presented in Equation (1) is entirely appropriate because the samples for the 2012 and 2005 studies were selected independently and consequently there is no covariance term in the variance estimate.

Table 209 and Table 210 present the comparison of the estimates from 2012 and 2005 along with the pooled estimates, test statistic and an indicator for diference that are significant at the 90/10 level.

Table 209 Summary of Significance Testing for Figures in Report

Chapter in Report	Equipment Type	Figure	Specific Estimate	2012 Estimate	2012 Var.	2005 Estimate	2005 Var.	Pooled Estimate	Pooled Var.	Test Statistic	Significant at 90/10
2	Refrigerator	Figure 3: Comparison of Average Annual Unit Energy Consumption (UEC) for Primary and Secondary Refrigerators 2000-2012	Primary Refrigerator	608.8	34.61	721.2	284.86	665.0	79.87	-12.573	*
			Secondary Refrigerator	579.8	172.26	730.6	4893.11	655.2	1266.34	-4.238	*
2	Major Appliances	Figure 5: Comparison of Average Age for Major Appliances 2000-2012	Primary Refrigerator	8.4	0.04	6.6	0.03	7.5	0.02	13.125	*
			Secondary Refrigerator	10.0	0.18	9.0	0.43	9.5	0.15	2.550	*
			Freezers	10.4	0.21	11.7	0.95	11.1	0.29	-2.422	*
			Hot Water Heaters	8.0	0.03	7.2	0.09	7.6	0.03	4.585	*
			Washers	7.1	0.03	6.7	0.06	6.9	0.02	2.743	*
			Dryers	6.9	0.19	7.6	0.08	7.3	0.07	-2.740	*
			Dishwashers	7.6	0.04	7.4	0.12	7.5	0.04	1.020	
2	HVAC	Figure 6: Comparison of HVAC Average Age 2000-2012	Furnace - Central	15.5	0.30	17.0	0.37	16.3	0.17	-3.668	*
			Furnace - Space	11.9	1.33	29.0	2.90	20.5	1.06	-16.626	*
			HP- Central	15.3	26.93	12.2	7.48	13.8	8.60	1.057	
			A/C - Central	15.1	0.23	10.8	0.30	13.0	0.13	11.813	*
			A/C - Space	9.1	0.95	11.9	5.91	10.5	1.71	-2.138	*
2	Primary Refrigerator	Figure 7: Comparison of Primary Refrigerator Annual Unit Energy Consumption (UEC) 2000-2012	11 to 14	504.2	332.59	622.3	1915.73	563.3	562.08	-4.981	*
			15 to 18	523.3	89.93	650.1	862.11	586.7	238.01	-8.219	*
			19 to 22	620.4	137.65	728.2	768.42	674.3	226.52	-7.163	*
			23+	676.3	85.38	813.0	1230.32	744.7	328.93	-7.537	*
2	Secondary Refrigerator	Figure 8: Comparison of Secondary Refrigerator Annual Unit Energy Consumption (UEC) 2000-2012	1 to 10	331.8	9.24	324.9	12.86	328.4	5.53	2.935	*
			11 to 14	504.6	473.62	585.0	1894.50	544.8	592.03	-3.304	*
			15 to 18	582.0	417.20	701.0	11853.85	641.5	3067.76	-2.149	*
			19 to 22	651.1	419.69	871.0	8448.35	761.1	2217.01	-4.670	*
			23+	803.4	1330.36	1133.7	27159.84	968.6	7122.55	-3.914	*
2	Freezer	Figure 9: Comparison of Stand-alone Freezer Annual Unit Energy Consumption (UEC) 2000-2012	Chest	329.1	906.50	325.3	1606.13	327.2	628.16	0.151	
			Upright	691.8	688.89	726.4	2029.05	709.1	679.49	-1.327	
2	Heating	Figure 10: Comparison of Central and Space Heating System Annual Fuel Utilization Efficiency (AFUE) 2000-2012	Central	80.96	0.03	80.6	0.06	80.8	0.02	2.406	*
			Space	73.15	0.12	72.2	0.53	72.7	0.16	2.350	*
2	Heating	Figure 11: Comparison of Central Heating System Annual Fuel Utilization Efficiency (AFUE) 2000-2012	Split Forced Air	81.3	0.04	80.7	0.08	81.0	0.03	3.850	*
2	Cooling	Figure 12: Comparison of Seasonal	HP- Central	12.2	0.09	10.8	0.87	11.5	0.24	2.804	*

Chapter in Report	Equipment Type	Figure	Specific Estimate	2012		2005		Pooled		Test Statistic	Significant at 90/10
				Estimate	Var.	Estimate	Var.	Estimate	Var.		
		Energy Efficiency Ratios (SEER) for Central Cooling Equipment 2000-2012	A/C - Central	11.3	0.01	10.3	0.03	10.8	0.01	10.797	*
2	Cooling	Figure 13: Comparison of Central Cooling System Seasonal Energy Efficiency Ratios (SEER) 2000-2012	2.0-2.49	11.2	0.07	10.0	0.03	10.6	0.03	7.290	*
			2.5-2.99	11.0	0.03	10.1	0.18	10.5	0.05	3.747	*
			3.0-3.49	11.5	0.02	10.3	0.13	10.9	0.04	6.150	*
			3.5-3.99	11.2	0.02	10.5	0.24	10.8	0.06	2.572	*
			4.0-4.49	12.2	0.03	10.6	0.09	11.4	0.03	9.181	*
			4.5-5	11.3	0.02	10.7	0.18	11.0	0.05	2.748	*
2	Water Heating	Figure 14: Comparison of Storage Water Heater Energy Factor 2000-2012	40 Gallons Gas	0.60	0.00	0.58	0.00	0.6	0.00	14.713	*
			40 Gallons Propane	0.60	0.00	0.59	0.00	0.6	0.00	1.884	*
			40 Gallons Electric	0.91	0.00	0.89	0.00	0.9	0.00	6.391	*
			50 Gallons Electric	0.91	0.00	0.89	0.00	0.9	0.00	2.819	*
2		Figure 15: Comparison of Energy Factor Ratings for Clothes Washers and Dishwashers 2000-2012	Washer - Standard	2.7	0.01	1.2	0.00	2.0	0.00	28.080	*
			Washer - Horizontal	7.3	0.02	4.1	0.03	5.7	0.01	28.100	*
			Dishwashers	0.61	0.00	0.50	0.00	0.6	0.00	25.093	*
4	Primary Refrigerator	Figure 23: Market Share Comparison of Primary Refrigerator Type 2000 to 2012	Side-by-Side	39.6%	0.013%	43.2%	0.029%	41.4%	0.011%	-3.513	*
			Standard	44.3%	0.020%	52.0%	0.031%	48.1%	0.013%	-6.834	*
			Freezer on Bottom	13.9%	0.007%	3.8%	0.004%	8.9%	0.003%	18.578	*
			Built in	1.6%	0.001%	0.5%	0.001%	1.0%	0.000%	6.576	*
			Refrigerator Only	0.2%	0.000%	0.4%	0.000%	0.3%	0.000%	-1.691	*
2	Secondary Refrigerator	Figure 24: Distribution of Secondary Refrigerators by Type	Standard Top Freezer	44.4%	0.043%	56.8%	0.156%	50.6%	0.050%	-5.561	*
			Compact	23.3%	0.031%	20.4%	0.104%	21.9%	0.034%	1.579	
			Side-by-Side	14.7%	0.021%	17.7%	0.092%	16.2%	0.028%	-1.780	*
			Bottom Freezer	4.4%	0.006%	3.8%	0.023%	4.1%	0.007%	0.701	
			Refrigerator Only	3.5%	0.006%	1.3%	0.008%	2.4%	0.004%	3.646	*
2	Freezer	Figure 25: Distribution of Primary Freezers by Type	Chest	44.1%	0.082%	34.7%	0.147%	39.4%	0.057%	3.935	*
			Upright	55.9%	0.068%	65.3%	0.147%	60.6%	0.054%	-4.054	*
2	Water Heating	Figure 27: Distribution of Water Heater Type	Instantaneous	4.7%	0.002%	1.4%	0.002%	3.1%	0.001%	10.213	*
			Storage	83.3%	0.009%	85.3%	0.015%	84.3%	0.006%	-2.569	*
			Unknown	12.0%	0.009%	13.2%	0.013%	12.6%	0.006%	-1.589	
2	Water Heating	Figure 28: Distribution of Water Heater Fuel Type	Electric	5.6%	0.003%	5.2%	0.006%	5.4%	0.002%	0.832	
			Gas	78.4%	0.011%	76.9%	0.021%	77.7%	0.008%	1.678	*
			Propane	3.5%	0.002%	3.7%	0.004%	3.6%	0.002%	-0.505	
			Solar/Electric	0.3%	0.000%	0.1%	0.000%	0.2%	0.000%	2.326	*
			Solar/Gas	0.2%	0.000%	0.2%	0.000%	0.2%	0.000%	0.000	
			Unknown	12.0%	0.009%	13.8%	0.015%	12.9%	0.006%	-2.312	*
2	Dryers	Figure 29: Distribution of Clothes	Gas	62.2%	0.020%	57.4%	0.038%	59.8%	0.014%	4.007	*
			Electric	35.3%	0.018%	41.0%	0.036%	38.2%	0.013%	-4.933	*

Chapter in Report	Equipment Type	Figure	Specific Estimate	2012		2005		Pooled		Test Statistic	Significant at 90/10
				Estimate	Var.	Estimate	Var.	Estimate	Var.		
		Dryers by Fuel Type	Propane	2.5%	0.002%	1.7%	0.002%	2.1%	0.001%	2.476	*
2	Envelope	Figure 32: Percentage of Homes by Window Frame Type	Metal	46.0%	0.018%	62.7%	0.029%	54.4%	0.012%	-15.430	*
			Vinyl	45.3%	0.016%	25.3%	0.023%	35.3%	0.010%	20.153	*
			Wood	8.7%	0.006%	11.7%	0.012%	10.2%	0.005%	-4.445	*

Table 210 Summary of Significance Testing for Tables in Report

Chapter in Report	Equipment Type	Table	Specific Estimate	2012		2005		Pooled		Test Statistic	Significant at 90/10
				Estimate	Var.	Estimate	Var.	Estimate	Var.		
2	Home Characteristics	Table 2: Type of Residence 2000-2012	SF homes	64.6%	0.013%	66.0%	0.049%	65.3%	0.016%	-1.117	
			Townhouse/Row/Duplex /1-4 units	14.9%	0.012%	5.8%	0.006%	10.4%	0.005%	13.386	*
			Apt 5+ units	18.6%	0.013%	24.4%	0.024%	21.5%	0.009%	-5.992	*
			Mobile Homes	1.9%	0.001%	2.8%	0.003%	2.4%	0.001%	-2.638	*
2	Home Characteristics	Table 3: Home Ownership 2000-2012	Own/Buying	67.4%	0.013%	69.9%	0.025%	68.7%	0.010%	-2.554	*
			Rent/Lease	32.4%	0.018%	29.8%	0.025%	31.1%	0.011%	2.512	*
2	Home Characteristics	Table 4: Year of Home Construction 2000-2012	Before 1970	41.0%	0.018%	40.9%	0.015%	41.0%	0.008%	0.111	
			1970-1979	16.6%	0.008%	15.9%	0.009%	16.3%	0.004%	1.050	
			1980-1989	15.1%	0.008%	13.5%	0.008%	14.3%	0.004%	2.481	*
			1990 - 1994	4.1%	0.002%	4.7%	0.005%	4.4%	0.002%	-1.369	
			1995 - 1999	3.5%	0.002%	5.7%	0.006%	4.6%	0.002%	-4.902	*
			2000 of after	13.2%	0.007%	6.4%	0.007%	9.8%	0.004%	11.300	*
			Unknown	6.1%	0.004%	12.9%	0.013%	9.5%	0.004%	-10.190	*
2	Home Characteristics	Table 5: Total Heated Floorspace 2000-2012	Less than 600 sq.ft.	2.9%	0.003%	4.9%	0.005%	3.9%	0.002%	-4.387	*
			600 to 999 sq.ft.	16.8%	0.012%	17.4%	0.018%	17.1%	0.007%	-0.694	
			1,000 to 1,599 sq.ft.	33.6%	0.016%	32.2%	0.027%	32.9%	0.011%	1.347	
			1,600 to 1,999 sq.ft.	15.3%	0.007%	19.1%	0.018%	17.2%	0.006%	-4.794	*
			2,000 to 2,399 sq.ft.	10.4%	0.005%	11.2%	0.012%	10.8%	0.004%	-1.217	
			2,400 to 2,999 sq.ft.	8.7%	0.004%	6.8%	0.007%	7.8%	0.003%	3.633	*
			3,000 or more sq.ft.	6.4%	0.002%	4.8%	0.005%	5.6%	0.002%	3.650	*
			Unknown	5.8%	0.005%	3.6%	0.004%	4.7%	0.002%	4.446	*
2	Lighting	Table 6: Average Number of Fixtures by Type of Residence 2005-2012	# Fixtures	29.6	3.33	23.5	0.30	26.6	0.91	6.408	*
			SF homes	36.0	7.89	28.3	0.53	32.2	2.10	5.333	*
			Townhouse/Row/Duplex /1-4 units	21.7	4.95	19.9	2.13	20.8	1.77	1.369	
			Apt 5+ units	14.6	1.97	12.1	0.24	13.3	0.55	3.363	*

Chapter in Report	Equipment Type	Table	Specific Estimate	2012		2005		Pooled		Test Statistic	Significant at 90/10
				Estimate	Var.	Estimate	Var.	Estimate	Var.		
			Mobile Homes	21.0	66.17	19.3	4.02	20.1	17.55	0.400	
2	Lighting	Table 7: Average Number of Lamps by Type of Residence 2005-2012	# Lamps	46.1	8.16	40.6	0.95	43.4	2.28	3.645	*
			SF homes	56.8	19.73	49.6	1.20	53.2	5.23	3.157	*
			Townhouse/Row/Duplex /1-4 units	31.9	10.65	32.7	6.83	32.3	4.37	-0.400	
			Apt 5+ units	21.6	4.40	19.5	0.62	20.6	1.26	1.892	*
			Mobile Homes	33.2	167.3	34.7	16.59	34.0	45.96	-0.215	
2	Lighting	Table 8: Percentages of Homes with Lamp Types 2005-2012	Compact Fluorescent	95.9%	0.021%	56.9%	0.029%	76.4%	0.013%	34.793	*
			Fluorescent T8	18.3%	0.015%	4.4%	0.005%	11.4%	0.005%	19.607	*
			Fluorescent T12	59.8%	0.031%	65.0%	0.027%	62.4%	0.015%	-4.318	*
			Halogen	46.2%	0.045%	31.3%	0.025%	38.8%	0.018%	11.243	*
			HID	1.1%	0.001%	0.1%	0.000%	0.6%	0.000%	7.357	*
			Incandescent	96.7%	0.023%	99.2%	0.001%	98.0%	0.006%	-3.226	*
2	Lighting	Table 10: Percentage of Sockets by Lamp Types 2005-2012	Compact Fluorescent	28.6%	0.001%	8.6%	0.003%	18.6%	0.001%	66.810	*
			Fluorescent	11.5%	0.001%	11.7%	0.002%	11.6%	0.001%	-0.816	
			Halogen	7.8%	0.000%	3.8%	0.004%	5.8%	0.001%	12.605	*
			Incandescent	48.9%	0.001%	75.6%	0.006%	62.3%	0.002%	-61.352	*
4	Lighting	Table 33: Average Number of Fixtures by Fixture Type	All Fixture Types	29.6	3.33	23.5	0.30	26.6	0.91	6.408	*
			Ceiling Mounted	6.4	0.06	6.5	0.03	6.5	0.02	-0.658	
			Floor/Table Lamp	5.0	0.03	4.5	0.01	4.8	0.01	4.573	*
			Torchiere	0.6	0.00	0.5	0.00	0.6	0.00	3.290	*
			Wall Mounted	4.3	0.01	3.4	0.00	3.9	0.00	13.242	*
			Recessed	7.6	0.06	4.8	0.13	6.2	0.05	13.007	*
			Suspended	1.6	0.00	1.3	0.00	1.5	0.00	9.870	*
			Ceiling Fan	1.9	0.00	1.4	0.00	1.7	0.00	16.450	*
			Track Lighting	0.4	0.00	0.3	0.00	0.4	0.00	3.290	*
			Under Counter	0.8	0.00	0.4	0.00	0.6	0.00	9.306	*
			Garage Door	0.1	0.00	0.3	0.00	0.2	0.00	0.000	
4	Lighting	Table 34: Percentage of Homes with Fixture Types	Ceiling Mounted	98.2%	0.006%	98.7%	0.002%	98.5%	0.002%	-1.114	
			Torchiere	32.1%	0.025%	28.6%	0.025%	30.4%	0.012%	3.132	*
			Wall Mounted	96.2%	0.009%	95.2%	0.005%	95.7%	0.004%	1.645	
			Suspended	60.9%	0.033%	61.4%	0.029%	61.2%	0.016%	-0.401	
			Ceiling Fan	60.5%	0.045%	56.0%	0.029%	58.3%	0.019%	3.303	*
			Track Lighting	14.3%	0.015%	12.6%	0.013%	13.5%	0.007%	2.027	*
			Under Counter	22.4%	0.016%	23.0%	0.021%	22.7%	0.009%	-0.619	
			Garage Door	8.2%	0.004%	21.7%	0.021%	15.0%	0.006%	-16.823	*
4	Lighting	Table 37: Percent of Fixtures Containing Compact Fluorescent Lamps	Overall	32.1%	0.018%	10.6%	0.004%	21.4%	0.006%	28.758	*
4	Lighting	Table 42: Average Number of	All Lamp Types	46.1	8.00	40.6	0.90	43.4	2.23	3.686	*

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Chapter in Report	Equipment Type	Table	Specific Estimate	2012		2005		Pooled		Test Statistic	Significant at 90/10
				Estimate	Var.	Estimate	Var.	Estimate	Var.		
		Lamps by General Lamp Type	Compact Fluorescent	13.1	0.22	3.5	0.04	8.3	0.06	37.702	*
			Fluorescent	5.3	0.01	4.8	0.04	5.1	0.01	4.538	*
			Halogen	3.6	0.00	1.6	0.05	2.6	0.01	17.046	*
			Incandescent	22.5	0.25	30.7	0.36	26.6	0.15	-20.882	*
4	Lighting	Table 47: Average Number of Lamps per Home by Base Type	Screw Base	36.0	4.27	34.6	0.62	35.3	1.22	1.265	
			Pin Base	8.8	0.09	6.0	0.09	7.4	0.05	13.028	*
4	Lighting	Table 49: Percentage of Homes with Recessed Cans by Room	Bathroom - 1	25.1%	0.016%	6.6%	0.008%	15.9%	0.006%	23.585	*
			Bathroom - 2	29.0%	0.013%	19.5%	0.027%	24.3%	0.010%	9.467	*
			Bathroom - 3	37.7%	0.007%	10.7%	0.036%	24.2%	0.011%	26.115	*
			Bathroom - 4	45.4%	0.001%	21.2%	0.392%	33.3%	0.098%	7.717	*
			Bedroom - 1	9.7%	0.006%	2.2%	0.003%	6.0%	0.002%	15.606	*
			Bedroom - 2	6.7%	0.003%	6.1%	0.009%	6.4%	0.003%	1.075	
			Bedroom - 3	8.4%	0.003%	1.5%	0.003%	5.0%	0.001%	17.836	*
			Bedroom - 4	10.6%	0.001%	1.3%	0.007%	6.0%	0.002%	20.582	*
			Bedroom - 5	17.3%	0.000%	7.2%	0.237%	12.3%	0.059%	4.151	*
			Closet	12.8%	0.004%	7.9%	0.025%	10.4%	0.007%	5.787	*
			Dining Room	13.3%	0.004%	7.2%	0.012%	10.3%	0.004%	9.514	*
			Exterior - Entry	8.9%	0.003%	7.1%	0.012%	8.0%	0.004%	2.943	*
			Garage	1.8%	0.001%	0.5%	0.001%	1.2%	0.000%	6.049	*
			Hallway	38.1%	0.027%	23.7%	0.025%	30.9%	0.013%	12.639	*
			Kitchen	47.1%	0.027%	25.7%	0.023%	36.4%	0.013%	19.134	*
			Laundry/Utility Room	17.4%	0.004%	8.4%	0.023%	12.9%	0.007%	10.841	*
			Living Room	22.8%	0.020%	9.6%	0.013%	16.2%	0.008%	14.557	*
			Office	15.0%	0.003%	8.2%	0.029%	11.6%	0.008%	7.607	*
4	Lighting	Table 53: Percentage of Homes with Ceiling Fans by Room	Bathroom - 1	0.6%	0.000%	0.7%	0.001%	0.7%	0.000%	-0.564	
			Bathroom - 2	0.9%	0.000%	2.6%	0.004%	1.8%	0.001%	-4.905	*
			Bathroom - 3	0.6%	0.000%	1.5%	0.006%	1.1%	0.002%	-2.271	*
			Bathroom - 4	0.3%	0.000%	4.8%	0.112%	2.6%	0.028%	-2.692	*
			Bedroom - 1	33.5%	0.015%	21.9%	0.023%	27.7%	0.009%	11.920	*
			Bedroom - 2	33.5%	0.013%	33.7%	0.036%	33.6%	0.012%	-0.181	
			Bedroom - 3	39.1%	0.011%	27.4%	0.043%	33.3%	0.013%	10.126	*
			Bedroom - 4	38.6%	0.004%	31.8%	0.133%	35.2%	0.034%	3.678	*
			Bedroom - 5	32.8%	0.001%	13.9%	0.423%	23.4%	0.106%	5.807	*
			Closet	0.4%	0.000%	0.7%	0.002%	0.6%	0.001%	-1.224	
			Dining Room	24.8%	0.009%	23.6%	0.031%	24.2%	0.010%	1.192	
			Exterior - Entry	0.1%	0.000%	0.7%	0.001%	0.4%	0.000%	-3.245	*
			Garage	1.5%	0.001%	0.7%	0.002%	1.1%	0.001%	3.265	*
			Hallway	1.9%	0.001%	1.7%	0.002%	1.8%	0.001%	0.658	
			Kitchen	14.4%	0.009%	7.9%	0.009%	11.2%	0.005%	9.451	*

Chapter in Report	Equipment Type	Table	Specific Estimate	2012		2005		Pooled		Test Statistic	Significant at 90/10
				Estimate	Var.	Estimate	Var.	Estimate	Var.		
			Laundry/Utility Room	1.3%	0.000%	0.3%	0.001%	0.8%	0.000%	5.642	*
			Living Room	27.9%	0.015%	13.3%	0.018%	20.6%	0.008%	16.156	*
			Office	28.9%	0.007%	19.0%	0.056%	24.0%	0.016%	7.860	*
4	Lighting	Table 57: Percentage of Homes with Torchiere Fixtures by Room	Bathroom - 1	0.1%	0.000%	0.3%	0.000%	0.2%	0.000%	-1.825	*
			Bathroom - 2	0.1%	0.000%	0.2%	0.000%	0.2%	0.000%	-1.040	
			Bathroom - 3	0.3%	0.000%	0.4%	0.001%	0.4%	0.000%	-0.541	
			Bedroom - 1	8.2%	0.006%	7.3%	0.009%	7.8%	0.004%	1.436	
			Bedroom - 2	7.2%	0.004%	6.6%	0.009%	6.9%	0.003%	1.046	
			Bedroom - 3	7.7%	0.002%	8.4%	0.016%	8.1%	0.005%	-1.025	
			Bedroom - 4	5.9%	0.001%	5.2%	0.031%	5.6%	0.008%	0.787	
			Dining Room	3.0%	0.001%	1.9%	0.003%	2.5%	0.001%	3.346	*
			Hallway	0.5%	0.000%	0.1%	0.000%	0.3%	0.000%	3.650	*
			Kitchen	0.4%	0.000%	0.1%	0.000%	0.3%	0.000%	2.737	*
			Laundry/Utility Room	0.3%	0.000%	0.3%	0.001%	0.3%	0.000%	0.000	
			Living Room	19.4%	0.013%	15.5%	0.020%	17.5%	0.008%	4.301	*
			Office	8.7%	0.002%	11.0%	0.036%	9.9%	0.009%	-2.364	*
4	Lighting	Table 80: Average Wattage by Fixture	Ceiling Mounted	60.4	267.41	80.2	8.51	70.3	68.98	-2.384	*
			Floor/Table Lamp	49.4	91.09	76.8	11.67	63.1	25.69	-5.401	*
			Torchiere	92.8	4.79	165.1	346.03	129.0	87.70	-7.720	*
			Wall Mounted	84.2	166.09	118.6	22.48	101.4	47.14	-5.010	*
			Recessed	51.5	147.82	65.1	34.93	58.3	45.69	-2.019	*
			Suspended	126.3	15.61	149.9	89.93	138.1	26.39	-4.594	*
			Ceiling Fan	89.6	12.01	125.8	67.35	107.7	19.84	-8.127	*
			Track Lighting	120.0	2.69	117.6	429.71	118.8	108.10	0.231	
			Under Counter	29.5	2.50	42.1	27.97	35.8	7.62	-4.565	*
			Garage Door	69.6	0.37	77.8	94.60	73.7	23.74	-1.683	*
4	Lighting	Table 81: Average Wattage By Room Type	Bathroom - 1	164.8	12.80	184.1	21.91	174.5	8.68	-6.548	*
			Bathroom - 2	183.2	31.57	274.4	74.52	228.8	26.52	-17.713	*
			Bathroom - 3	214.7	184.79	192.6	66.36	203.6	62.79	2.788	*
			Bathroom - 4	203.8	271.46	228.3	585.38	216.0	214.21	-1.677	*
			Bedroom - 1	145.0	9.85	142.1	14.21	143.6	6.01	1.199	
			Bedroom - 2	124.7	7.45	207.3	33.35	166.0	10.20	-25.855	*
			Bedroom - 3	127.1	12.07	133.7	19.69	130.4	7.94	-2.346	*
			Bedroom - 4	121.6	25.33	141.5	53.21	131.6	19.64	-4.489	*
			Bedroom - 5	137.7	210.38	168.8	1089.60	153.3	325.00	-1.723	*
			Closet	105.6	6.84	113.3	23.06	109.4	7.48	-2.835	*
			Dining Room	214.7	25.90	215.1	43.10	214.9	17.25	-0.091	
			Exterior - Entry	101.2	8.13	96.3	46.36	98.8	13.62	1.333	
			Garage	201.4	25.77	232.2	95.79	216.8	30.39	-5.594	*

Chapter in Report	Equipment Type	Table	Specific Estimate	2012 Estimate	2012 Var.	2005 Estimate	2005 Var.	Pooled Estimate	Pooled Var.	Test Statistic	Significant at 90/10
			Hallway	198.5	19.25	206.4	55.00	202.5	18.56	-1.824	*
			Kitchen	256.5	33.02	245.2	48.87	250.9	20.47	2.506	*
			Laundry/Utility Room	72.5	4.06	82.4	7.82	77.4	2.97	-5.768	*
			Living Room	286.3	47.98	253.5	74.52	269.9	30.62	5.927	*
			Office	174.3	37.67	197.5	110.60	185.9	37.07	-3.819	*
4	Refrigerator	Table 82: Percentage of Homes with Second or Third Refrigerator by Type of Residence	Two or more	29.7%	0.014%	18.9%	0.018%	24.3%	0.008%	12.102	*
			Three or more	4.9%	0.002%	1.1%	0.001%	3.0%	0.001%	12.694	*
4	Primary Refrigerator	Table 83: Average Estimated Size of Primary Refrigerators by Type	Overall	21.5	0.01	21.0	0.03	21.3	0.01	4.562	*
			Bottom Freezer	22.9	0.09	21.1	0.24	22.0	0.08	6.277	*
			Side by Side with Ice	24.7	0.00	24.5	0.01	24.6	0.00	2.943	*
			Side by Side w/0 Ice	22.8	0.13	22.9	0.24	22.9	0.09	-0.329	
			Top Freezer with Ice	20.5	0.24	19.0	0.83	19.8	0.27	2.903	*
			Top Freezer w/o Ice	18.2	0.01	18.2	0.03	18.2	0.01	0.000	
4	Primary Refrigerator	Table 85: Average Age and Distribution of Manufacturer Reported Ages within Size Ranges	Overall	8.4	0.03	6.6	0.03	7.5	0.02	13.958	*
			1 to 10	6.4	0.00						
			11 to 14	7.9	1.07	8.5	0.62	8.2	0.42	-0.922	
			15 to 18	8.2	0.18	7.1	0.13	7.7	0.08	3.925	*
			19 to 22	8.6	0.18	6.8	0.13	7.7	0.08	6.423	*
			23+	7.7	0.09	5.2	0.09	6.5	0.05	11.632	*
			Unknown	10.7	0.24	9.1	27.97	9.9	7.05	0.603	
4	Primary Refrigerator	Table 86: Average Age and Distribution of Manufacturer Reported Ages and On-site Estimated Ages within Size Ranges	Overall	8.1	0.03	7.4	0.03	7.8	0.02	5.428	*
			1 to 10	7	0.00						
			11 to 14	9.2	0.95	10.4	1.07	9.8	0.50	-1.691	*
			15 to 18	8.1	0.13	8.0	0.18	8.1	0.08	0.357	
			19 to 22	8.4	0.09	7.4	0.09	7.9	0.05	4.653	*
			23+	6.9	0.03	6.0	0.09	6.5	0.03	5.078	*
			Unknown	9.9	0.13	16.2	20.79	13.1	5.23	-2.755	*
4	Primary Refrigerator	Table 87: Average Nameplate Unit Energy Consumption (UEC) by Type of Primary Refrigerator	Overall	608.8	34.77	720.7	287.66	664.8	80.61	-12.464	*
			11 to 14	504.2	332.59	622.3	1915.73	563.3	562.08	-4.981	*
			15 to 18	523.3	89.93	650.1	862.11	586.7	238.01	-8.219	*
			19 to 22	620.4	137.65	728.2	768.42	674.3	226.52	-7.163	*
			23+	676.3	85.38	813.0	1230.32	744.7	328.93	-7.537	*
4	Secondary Refrigerator	Table 89: Average Estimated Size of Secondary Refrigerators by Type	Overall	16.8	0.13	17.8	0.62	17.3	0.19	-2.298	*
4	Secondary Refrigerator	Table 92: Average Age and Distribution of Manufacturer Reported Ages and On-site	Overall	9.4	0.37	10.8	0.67	10.1	0.26	-2.742	*
			1 to 10	7.7	0.37	5.0	1.28	6.4	0.41	4.206	*
			11 to 14	8.0	0.95	13.4	6.06	10.7	1.75	-4.080	*
			15 to 18	9.6	0.37	12.3	3.09	11.0	0.86	-2.905	*

Chapter in Report	Equipment Type	Table	Specific Estimate	2012 Estimate	2012 Var.	2005 Estimate	2005 Var.	Pooled Estimate	Pooled Var.	Test Statistic	Significant at 90/10
		Estimated Ages within Size Ranges of Secondary Refrigerators, using **Strata Weights**	19 to 22	10.9	0.37	11.4	0.79	11.2	0.29	-0.930	
			23+	11.8	0.53	11.5	10.22	11.7	2.69	0.183	
			Unknown	8.7	0.24						
4	Water Heating	Table 115: Average Size of Water Heaters by Fuel Type	Overall	43.5	0.06	42.5	0.18	43.0	0.06	4.081	*
4	Water Heating	Table 118: Average Age of Water Heaters by Fuel Type within Size Ranges	Overall	8.0	0.03	7.2	0.09	7.6	0.03	4.585	*
4	Washers	Table 125: Percentage of Homes with Clothes Washers by Type of Residence	Overall Homes with Washers	80.7%	0.009%	82.1%	0.018%	81.4%	0.007%	-1.693	*
4	Washers	Table 126: Distribution of Clothes Washers by Type of Washer and by Type of Residence	Horizontal	30.2%	0.015%	8.8%	0.012%	19.5%	0.007%	26.166	*
			Standard	65.4%	0.018%	88.6%	0.015%	77.0%	0.008%	-25.672	*
			Stacked	4.4%	0.004%	2.6%	0.004%	3.5%	0.002%	4.187	*
4	Dishwashers	Table 132: Percentage of Homes with Dishwasher by Type of Residence	Overall Homes with Dishwashers	73.7%	0.012%	68.8%	0.025%	71.3%	0.009%	5.098	*
4	Envelope	Table 149: Average R-Value and Percentage of Homes with Attic Insulation R-Value	Overall Average R-Value	20.8	0.03	18.2	0.09	7.6	0.03	14.901	*
4	Envelope	Table 151: Percentage Of Homes With Wall Insulation By Type Of Residence	Overall, Homes with Insulated walls	71.6%	0.016%	66.4%	0.040%	69.0%	0.014%	4.374	*