



Advanced Lighting Baseline Study

Phases 1 and 2



Pacific Gas & Electric, Southern California Edison, San Diego Gas & Electric

Prepared by KEMA, Inc.

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1. Introduction

The purpose of the Advanced Lighting Baseline Study is to provide baseline data for key advanced lighting market indicators. These data will enable tracking of market progress during the 2010-2012 energy-efficiency program period and beyond.

The study involves two phases:

- **Phase 1**, which involves mining and analyzing available data from recent impact and process evaluation studies to yield information on retail store stocking and pricing of advanced lamps as well as the proportion of installed and stored lamps in California households that are advanced lamps; and
- **Phase 2**, which involves research into advanced lamp sales in California and the U.S. as a whole, non-residential installations in California, advanced lamp stocking outside of California, and a literature review of recent research conducted on advanced lamp markets outside of California.

The California Public Utilities Commission (CPUC) has provided approval for California’s investor-owned electric utilities (IOU) – Pacific Gas & Electric (PG&E), Southern California Edison (SCE), San Diego Gas & Electric (SDG&E) – to conduct both study phases. The study was designed to address the key baseline indicators shown in Table 1-1.

**Table 1-1
Advanced Lighting Baseline Study Baseline Indicators – Phases 1 and 2**

Residential Advanced Lighting Baseline Indicator	Data Source
Phase 1	
Availability, stocking of advanced lamps	2009 California shelf survey data
Estimated average prices for advanced lamps	2009 California shelf survey data
% of household sockets filled w/advanced lamps	2008-2009 socket inventory data
% of lamps in storage that are advanced lamps	2008-2009 socket inventory data
Phase 2	
% of 2008-2009 lamp sales for which advanced lamps account	2008-2009 ACNielsen, Activant data
Prices for advanced lamps (drug, grocery, hardware channels)	2008-2009 ACNielsen, Activant data
Availability, stocking of advanced lamps outside of California	Data from the 2010 California CFL Market Effects study
% of CFLs installed in small commercial applications that are advanced lamps	2006-2008 Upstream Nonresidential CFL Data

In this report, we provide results from both phases of the study (Phase 1 and Phase 2). The report begins with the definition of the term “advanced lighting” and the other various lamp categories used in the report, then moves into a discussion of the methods employed in analyzing data from the key data sources analyzed in support of this study. It then provides results on advanced lamp stocking, installation and pricing from both within California and outside of California. The memo closes with a summary of findings.

Appendix A provides additional details on the shelf survey findings. Appendix B provides a summary of a high-level level literature review conducted to assess whether any additional comparable non-California data are available for comparison with California data.

2. Definitions

This section provides the definition of “advanced lighting” used in the report as well as definitions of lamp categories and lamp types mentioned throughout the report.

2.1 Advanced Lighting

In its description of the Advanced Consumer Lighting Program, the California Public Utilities Commission (CPUC) stated, “this program targets lighting products other than standard, screw-in CFLs of less than 30 watts, including dimmable, three-way, and specialty CFLs, so-called “super” CFLs, light emitting diodes (LEDs), halogen, and other lighting products.”¹

For the purpose of guiding this baseline research, in April 2010 we asked the California IOUs to provide a list of lighting products that they would put under the category of residential “advanced lighting.” The list agreed upon by the IOUs included:

- 3-way CFLs;
- A-shaped CFLs;
- Bare & covered dimmable CFLs;
- Bare spiral CFLs greater than 30 watts²;
- Candelabra CFLs;
- Dimmable reflector CFLs;
- Globe CFLs;
- GU-24 products;
- Halogens that are compliant with new legislation (must meet AB1109 standards reflected in California's Title 20 Equipment Code);
- Advanced incandescent lamps;
- Indoor and outdoor fluorescent fixtures;
- LED lamps;
- LED fixtures; and

¹ California Public Utilities Commission, Decision Approving 2010 To 2012 Energy Efficiency Portfolios and Budgets, Decision 09-09-047 (Issued 9/24/2009). It should be noted that the entities that working on developing the “super CFL” have decided to rename the product an “enhanced lamp” to make it more technologically neutral.

² Note that the draft results from Phase 1 of this study categorized 30 Watt non-dimmable single wattage spiral style CFLs as “advanced lamps.” Further discussion with IOU representatives lead to reclassification of these lamp types as basic (i.e., not advanced lamps).

-
- Reflector CFLs.

For the purposes of this report, we refer to the above lamp types as “advanced lamps.” We refer to all other residential lamp types as “non-advanced” lamps. We further subdivide these categories (as described in section 2.2 below) and use them consistently throughout this report regardless of the data source.

2.2 Lamp Categories

Many of the tables in this report present data on medium screw-base (MSB) lamps. MSB lamps include numerous discrete MSB lamp classifications (such as “high-wattage tube CFL” and “tube CFL”) and as such, a unique lamp cannot be placed into more than one lamp category; for instance, a lamp cannot be classified in both “high-wattage tube” and “tube” categories, but must be in either one category or the other. These discrete MSB lamp classifications are collapsed into six major MSB lamp groups:

- (1) High-wattage CFLs, which are CFLs that are greater than 30 watts;
- (2) Specialty CFLs: Dimmable, which include all dimmable CFLs;
- (3) Specialty CFLs: 3-way, which include all 3-way CFLs,
- (4) Other advanced MSB CFLs, which include non-dimmable, single wattage CFLs that are less than or equal to 30 watts that are not basic spiral CFLs (e.g., single-wattage non-dimmable reflector CFLs that are less than or equal to 30 watts);
- (5) LEDs, which includes light-emitting diode (LED) lamps; and
- (6) Non-Advanced Lamp Types, which includes:
 - *Basic CFLs*: non-dimmable, single wattage spiral CFLs that are less than or equal to 30 watts;
 - *Incandescent lamps*; and
 - *Other lamp types*, which includes ceramic metal halide and cold cathode lamps.

Lamps in the first five groups above are all considered advanced lamps, while the sixth group (“non-advanced lamp types”) includes all non-advanced lamps. Table 2-1 below provides more details on the lamp types included in each of the six lamp groups described above.

**Table 2-1
MSB Lamp Types by Group**

MSB Lamp Group	MSB Lamp Types
1. High-wattage CFLs (>30 Watts)	High-wattage spiral
	High-wattage tube
	High-wattage reflector/flood
2. Specialty CFLs: dimmable	Dimmable spiral
	Dimmable reflector/flood
3. Specialty CFLs: 3-way	3-way spiral (all wattages)
4. Other advanced MSB CFLs (≤30 Watts)	Reflector/flood
	A-lamp
	Globe
	Candelabra (MSB)
	Tube
	Bug Light
5. LEDs	LED
6. Non-advanced lamps	Halogen
	Basic CFLs (≤30 Watts)
	Incandescent
	Other lamp types

Other tables in the report focus exclusively on advanced lamps (rather than all MSB lamps). These tables include the MSB advanced lamp categories above – high-wattage CFLs; specialty CFLs: dimmable; specialty CFLs: 3-way; other advanced MSB CFLs; and LEDs – as well as advanced lamps with other (non-MSB) base types, including:

- Small-Base (Candelabra-Base) CFLs, which includes all CFLs with a small (rather than medium) screw base;
- GU-24 Base CFLs, which are an advanced style of pin-based CFLs designed to fit into a standard Edison socket (note that this does not include standard pin-based CFLs); and
- Other Base CFLs, which includes GX23 base, GX24 base, and Small-Base CFLs sold with Medium Screw-Base adaptors in the same package.

Finally, in some of the report figures, we group advanced lamps into one category and split the non-advanced lamp category into other categories (typically basic CFLs versus other non-advanced lamps) or other groupings. All of these different groupings are intended to illustrate different facets of the advanced and non-advanced lamp markets.

3. Methodology

This report draws on data from key datasets produced as part of the 2006-2008 Upstream Lighting Program (ULP) Evaluation³ (the California retail store shelf survey database and lighting socket inventory database), the California CFL Market Effects Study⁴ (the non-California retail store shelf survey database), the Small Commercial Contract Group Direct Impact Evaluation Report⁵ (nonresidential inventory database), and primary Point-of-Sales (POS) data from two sources. Below we provide brief descriptions of these databases and describe the methods used to analyze these data in support of the Advanced Lighting Baseline Study.

3.1 Retail Store Shelf Survey Databases

This study compares data from California and non-California retail store shelf surveys.

3.1.1 California

As part of the 2006-2008 California ULP process and impact evaluations, field researchers conducted 48 complete inventories (shelf surveys) of lighting products on California store shelves in April and May of 2009.⁶ Researchers conducted these surveys in a variety of retail stores and collected detailed information on product characteristics and prices for both advanced and non-advanced lamps. There are a total of seven store types represented in this study, including discount, drug, grocery, hardware, large home improvement, mass merchandise, and membership stores.

³ KEMA Inc.; PA Consulting Group; Jai J. Mitchell Analytics; The Cadmus Group; Itron, Inc., 2010. Final Evaluation Report: Upstream Lighting Program. Prepared for the CPUC Energy Division. Study ID: CPU0015.01. February 8, 2010.

⁴ The Cadmus Group; Nexus Market Research, Inc.; A. Goett Consulting; Itron, Inc.; and KEMA Inc., 2010. Compact Fluorescent Lamps Market Effects Final Report. Prepared for the CPUC Energy Division. Study ID: CPU0032.01. April 12, 2010.

⁵ Itron, Inc.; Summit Blue; KEMA Inc.; ECONorthwest; PA Consulting Group; and Robert Thomas Brown Co., 2010. Small Commercial Contract Group Direct Impact Evaluation Report. Prepared for the CPUC Energy Division. Study ID: CPU0019.01. February 9, 2010.

⁶ These 48 stores were part of a larger sample of store shelf surveys conducted in 2008 and 2009, but earlier shelf surveys did not inventory the full range of advanced lighting products needed for this baseline study. The shelf surveys were designed to collect data for a variety of impact evaluation objectives and the advanced baseline study was not one of these, since it was conceived after the shelf survey data had already been collected. However, we have included the larger sample of 326 stores for a discussion on the percent of stores carrying medium-screw base lamps in section 4.1.1.1 below.

The California comprehensive shelf survey database has lamp inventories for 48 stores and contains over 5,800 records.⁷ Each record includes key information such as the store type, store name, investor-owned utility (IOU) territory, address, city, and zip code in which the lamps were found as well as the model number, lamp type, base type, lamp shape, manufacturer, wattage, and number of lamps in each package. Additionally, field staff recorded the number of packages, whether or not the lamps are 3-way or dimmable, and the price for each package of lamps.⁸ Field staff recorded these data across seven store types for these comprehensive shelf surveys (see Table 3-1 below).

In addition to the complete inventories conducted in these 48 stores (i.e., inventories including counts of lamps and lamp packages), researchers conducted abbreviated shelf surveys in 278 additional stores across the same seven store types creating a total sample of 326 stores (again, see Table 3-1). The majority of the data presented in this report focuses on the detailed inventory data from the 48 stores, but includes data from the broader set of stores where possible.

Table 3-1
Number of Stores by Store Type - California ULP Retail Lighting Store Shelf Surveys:
Comprehensive (2009) and Abbreviated (2008—2009)

Store Type	Number of Stores		
	Comprehensive Surveys	Abbreviated Surveys	Total Comprehensive + Abbreviated
Discount	4	55	59
Drug	4	21	25
Grocery	3	88	91
Hardware	3	25	28
Large Home Improvement	14	36	50
Mass Merchandise	11	38	49
Membership	9	15	24
Total Number of Stores	48	278	326

⁷ The larger sample of 326 California stores (which also includes the smaller sample of 48 comprehensive shelf surveys) contains over 20,000 lamp records.

⁸ Each record in the database represents a particular lamp model and packaging configuration in a specific store during a shelf survey visit. Researchers may have found the same lamp model in multiple stores. As such, the number of unique models represented by the database (as discussed in section 4.1.2 below) is lower than the total number of records.

3.1.2 Non-California

As part of the CFL Market Effects Study, field researchers conducted 115 complete inventories (shelf surveys) of lighting products on store shelves in March, April, and May of 2009 in Pennsylvania, Georgia, and Kansas. As with the California shelf surveys, researchers conducted these surveys in a variety of retail stores and collected detailed information on product characteristics and prices for both advanced and non-advanced lamps. There are a total of six store types represented in this study, including discount, grocery, hardware, large home improvement, mass merchandise, and membership stores.⁹

The Non-California comprehensive shelf survey database has lamp inventories for 115 stores and contains over 15,000 records. Each record includes the same key information (e.g., store type, store name, lamp type, base type, lamp shape, number of lamps in each package) as the California comprehensive shelf survey database.

Table 3-2 provides a breakdown of stores surveyed by retail store type for the Non-California comprehensive shelf surveys. Note that data on drugstores was not collected as part of this research.

**Table 3-2
Number of Stores by Store Type -
2009 Non-California Retail Lighting Store Comprehensive Shelf Surveys**

Store Type	Number of Stores
Discount	17
Drug	0
Grocery	19
Hardware	6
Large Home Improvement	28
Mass Merchandise	23
Membership	22
Total Number of Stores	115

Before KEMA staff could analyze these non-California shelf survey data in support of the Advanced Lighting Baseline Study, the following steps were necessary:

⁹ Drug stores were not included in the Non-California sample.

-
- (1) **Identify Advanced Lamps.** The first task of our analysis was to identify which lamps in our database are advanced lamps and which are not advanced lamps (see definition of advanced lamps above). To identify advanced lamps, KEMA staff examined key information in the database including lamp type, base type, lamp shape, wattage, dimmability, and 3-way capabilities and categorized each database record as “advanced” or “non-advanced.”
 - (2) **Verify Advanced Lamps.** Once all advanced lamp entries were identified, analysts attempted to verify each advanced lamp record in the database.¹⁰ The first step in the verification process was to match model numbers in the shelf survey database with existing databases that contained model numbers known to be associated with advanced lamps, including the ENERGY STAR® 2008, 2009, and 2010 databases as well as KEMA’s Enhanced Lamp database.¹¹ If a given lamp entry did not match any of those four databases, analysts attempted to verify model numbers through cross checks with lighting manufacturer catalogues and websites or through direct contact with manufacturers’ representatives (note that this additional step was undertaken for lamps inventoried during the California shelf surveys only).
 - (3) **Clean the Data.** After model numbers were verified, analysts cleaned the model numbers in cases in which there were slight variations among the multiple lamp entries. Through internet and telephone research, researchers reassigned model numbers where slight variations in model number represented the same unique model (e.g., in cases where one model number included special characters while another did not) so that each unique lamp entry would have a consistent model number across all database records. KEMA analysts successfully verified 91 percent of all advanced lamp records in the California shelf survey database.¹² With respect to the Non-California shelf survey database, KEMA analysts successfully verified only 29 percent of all advanced lamp

¹⁰ During this process, analysts attempted to determine whether any halogen lamps included in the database were compliant with the Energy Independence and Security Act of 2007 (EISA) standards. None of the product characteristics available (such as wattage, manufacturer, model number) indicated that any of the halogen lamps were EISA-compliant, which is to be expected given that the shelf surveys were conducted in 2008 and 2009 and few of these products were available before 2010.

¹¹ KEMA developed this database for PG&E in 2009/2010 based on the original shelf survey database.

¹² One mass merchandise chain did not have lighting catalogues nor detailed lighting information on their website, and KEMA staff was unable to reach a representative of this chain by telephone to verify the advanced lamps. Unverified advanced lamps from this mass merchandise chain comprised 5 percent of all advanced lamps in the database.

records. As such, we have not included a comparative discussion of advanced model numbers found in the California and Non-California databases.

Upon completion of the advanced lamp model number verification process, analysts conducted various analyses to identify stores that carried advanced medium screw-base (MSB) lamps and non-advanced MSB lamps. After completing analysis of MSB lamps¹³, analysts then determined the number of verified unique advanced lamp model numbers by advanced lamp type, store type, and IOU territory¹⁴ (see Section 5.3 below for further details).

3.2 Residential Lighting Socket Inventory Database

As part of the 2006-2008 California ULP impact evaluation, field researchers conducted complete inventories of lighting products in 1,232 homes throughout California from July 2008 through June 2009. The Residential Lighting Metering Study utilized a sample stratified by IOU and geographic region. Researchers selected sample through a simple random sampling process within each region giving each residential account in the IOU records an equal probability of selection into the sample. The sample included single-family, multi-family, and manufactured homes.

At each lighting study participant's home, researchers conducted a "socket inventory" and recorded information on every lamp installed inside and outside the home, including:

- Location in home (room type);
- How the fixture is controlled (by on/off switch, dimmer, etc.);
- The type of fixture in which each lamp is installed;
- Lamp wattage;
- Lamp technology type (incandescent, CFL, halogen, etc.);
- Lamp shape (spiral, globe, tube, etc.); and
- Base type (small screw-base, pin, MSB, etc.).

¹³ The MSB lamp analysis included both verified and unverified advanced lamp model numbers. We did not attempt to verify non-advanced lamp model numbers.

¹⁴ A breakdown by IOU territory is provided only for California stores.

Additionally, researchers also collected information regarding lamps in storage, including wattage, lamp type, lamp shape, and base type.

The resulting installed lighting database has over 63,000 inventoried lamps while the storage database includes over 13,400 lamps. To support the Advanced Lighting Baseline Study, KEMA staff created a new version of the lighting inventory database by identifying advanced versus non-advanced lamps (see definition of advanced lamps in section 2 above). To identify advanced lamps, KEMA mined key information in the database including lamp type, base type, lamp shape, wattage, dimmability, and 3-way capabilities.

All of the results that relate to socket inventory are weighted per section 8.5.1.1 of the Final Upstream Lighting Evaluation Report - Volume 1.¹⁵ The weights are adjusted at the household level so that the sample aligns with the 2003 Residential Appliance Saturation Study.

3.3 Non-Residential Socket Inventory Database

3.3.1 Purpose/Plan

Phase 1 of the Advanced Lighting Baseline Study included a re-analysis of the residential lighting inventory data that was collected on-site as part of the 2006-2008 Upstream Lighting Program Evaluation conducted by KEMA et al. for the CPUC. Similarly, as part of the Phase 2 study, there was interest in further analyzing the non-residential on-site data to estimate the percentage of advanced lighting installed.¹⁶

The analysis for this study was completed using data collected for the recently released 2006 – 2008 Small Commercial Contract Group Direct Impact Evaluation Report, prepared by Itron, Inc. et al. CPUC. The primary purpose of the Small Commercial Study was to provide an evaluation of the California IOUs' claimed energy-efficient accomplishments in the commercial sector for the 2006-2008 program cycle.¹⁷ The majority of these claimed savings came by way of efficient

¹⁵ KEMA, Inc., 2010. Final Evaluation Report: Upstream Lighting Program - Volume 1. Supported by The Cadmus Group, Inc.; Itron, Inc.; PA Consulting Group; and Jai J. Mitchell Analytics. Prepared for the California Public Utilities Commission, Energy Division. February 8, 2010.

¹⁶ Note: Unlike the residential on-sites, the non-residential on-sites did not include a full lighting inventory; instead, the objective was to collect data on only CFLs found on-site.

¹⁷ The scope of the Small Commercial Study included the evaluation of claimed lighting savings from all non-residential programs excluding the custom programs. These non-custom programs were typically directed toward small and medium sized customers, while the custom programs typically served large

lighting retrofit projects. Hence, an extensive statewide on-site survey and a time-of-use data collection effort were undertaken by to gather the lighting usage information needed to calculate the energy savings.

As part of the evaluation, field researchers conducted on-site surveys and collected detailed data on CFLs installed in 696 non-residential buildings throughout California from September 2008 through December 2009. The Small Commercial Lighting Study utilized a sample of self-reported recent CFL purchasers stratified by IOU and building type. The data in this report incorporates information about CFLs at 677 sites of the 696 visited (as there were 19 sites where field researchers were unable to gather the necessary information for the needs of this study). Table 3-3 shows a breakdown of these sites by building type.

**Table 3-3
Number of Sites by Building Type**

Building Type	Number of Sites
Assembly	88
Health/Medical - Clinic	46
Lodging	90
Office - Small	100
Other	103
Restaurant	119
Retail - Small	131
Total	677

At each lighting study participant’s site, researchers recorded information on every CFL installed, including:

- Location (activity area);
- How the fixture is controlled (by on/off switch, dimmer, etc.);
- The type of fixture in which each lamp is installed;
- Lamp wattage;
- Lamp shape (spiral, globe, tube, etc.); and

customers. For this reasons, the Study was named “Small Commercial” even though the participants were not exclusively “small.”

- Base type (small screw-base, pin, medium screw-base (MSB), etc.).

Additionally, researchers also collected information regarding lamps in storage, including wattage, lamp type, lamp shape, and base type.

Appendix G of the CPUC 2006-2008 Small Commercial Evaluation Report includes all of the results that relate to the CFL inventory presented in this report.

Section 4.3 below presents the results of the nonresidential CFL lighting inventory.

3.4 Retail Point-of-Sales (POS) Lamp Sales Databases

The proposed plan included in the initial scope of work for this portion of the Phase 2 Advanced Lighting Baseline Study included:

- Purchase ACNielsen and Activant POS scanner data for 2008-2009.
- Compile information on the percentage of 2008-2009 retail lamp sales for which advanced lamps accounted.
- Update the database that cross-matches SKU information with manufacturer model numbers.
- Conduct Internet research for product model numbers not already identified.
- Compile price information for advanced lighting products from the scanner data.

3.4.1 Background

The Residential Market Share Tracking Study (RMST) project monitored the market penetration of energy efficient measures in California from 1999 through 2007. The Lighting sub-project of the RMST tracked the sales of lighting equipment (including all types of CFLs, halogens, and incandescent) for nine years. The data used for RMST contain the level of detail needed to offer a comprehensive look at the market for lamps. Specifically, point-of-sales (POS) data representing four major retail channels through which lamps are sold (food, drug, mass merchandiser, and hardware stores) contain line-item detail¹⁸ on monthly lamp sales for both

¹⁸ Each line item contains detailed information, such as the manufacturer, UPC, watts, package size, price, and quantity sold.

California¹⁹ and the U.S. These data are analyzed and aggregated to estimate overall lamp sales in the residential lighting market and to characterize lamp sales and price trends over time, by lamp type, in different geographic regions, and through various retail channels. Including a national comparison area provides a context in which to evaluate the success of California's energy efficiency programs at increasing the sales and reducing the relative prices of energy efficient lighting.

3.4.2 Point-of-Sales Data

Most large retail stores today employ bar code scanners and computers to maintain product inventory, pricing, and sales data. Specialized market research firms sample and aggregate these data for a wide range of consumer products. We identified the numerous research firms that supply POS data and evaluated their data for use in this study. Ultimately, POS data were purchased for some of the retail channels through which residential lamps are typically sold: large grocery stores, drug stores, some mass merchandisers, and hardware stores. The data analyzed in this report do not include sales through other channels, such as large home improvement stores, club warehouse stores, the Internet, small independent grocery stores, discount stores, and direct sales from the manufacturer to the consumer.

We received the POS lamp data in an unprocessed spreadsheet format and then converted these data into a structured electronic database categorized by various levels of product efficiency and performance. These data include Universal Product Code (UPC), lamp-type indicator, location sold, retail sales channel, and monthly counts of units sold.

3.4.3 Pricing Analysis

The POS data include pricing data. The results presented in this report include sales-weighted data on advanced lamp prices in drug, large grocery, and hardware stores.

¹⁹ The California data are further subdivided into the California electric IOU service territories: Pacific Gas & Electric Company (PG&E), Southern California Edison (SCE), and San Diego Gas & Electric Company (SDG&E).

4. Results

This section presents results from analyses of the shelf survey database, the socket inventory database, the retail point-of-sales database, and the non-residential on-site surveys.

4.1 Shelf Survey Data Analyses

The following two sections detail the availability of medium screw-base lighting products in the California and Non-California stores visited by field researchers as part of the 2006-2008 Upstream Lighting Program Evaluation study and CFL Market Effects study. For California stores, we also provide the number of unique model numbers available for a variety of advanced lamp types (for California stores only).²⁰

4.1.1 Medium Screw-Base (MSB) Lamps

This section provides details on the stocking patterns of both advanced and non-advanced MSB lamps across the California and non-California stores in which researchers conducted shelf inventories. These tables present data by store type. Appendix A provides additional detail on these findings by IOU service territory.

4.1.1.1 Percentage of Stores Carrying Lamps by Lamp Type

The percentage of stores carrying a particular lamp type may provide one measure of the products' availability. Table 4-1 below shows the percentage of California stores carrying MSB lamps by lamp type and retail store type. These results represent both the comprehensive and abbreviated shelf surveys conducted in April/May 2009 and August—December 2008, respectively for a total of 326 California stores. In this table, the percentages in each cell represent the number of stores in a particular store type (of the total 326 stores) in which a particular lamp type was found divided by the total number of stores for that store type. Appendix A (Table A-1) provides additional detail on these findings by IOU service territory.

²⁰ We do not include a discussion on the availability of unique advanced lamp model numbers found in Non-California stores because few lamp models could be verified in those stores.

Key findings for the California sample include:

- Basic CFLs are the most commonly carried lamp types, found in 98 percent of the retail stores in our sample. Researchers found incandescent lamps in a smaller proportion of stores (87 percent of stores) than basic CFLs, largely due to the relative absence of incandescent lamps in membership stores (only 8% of membership stores in the sample stocked incandescent lamps in 2008/2009).
- Among advanced lamp types, reflector/floods and A-lamps are the most common (reflector/floods found in 68 percent of all stores and A-lamps found in 65 percent of all stores) followed by globes (58 percent).
- Large home improvement and mass merchandise stores carry the greatest variety of advanced MSB lamps. Of the 13 advanced MSB lamp type categories identified in this study, 10 were found in at least half of the 50 large home improvement and 49 mass merchandise stores in the sample. The only advanced MSB lamp types found in less than 50 percent of the large home improvement and mass merchandise stores were high-wattage tubes, high-wattage reflector/floods, and standard tubes (≤ 30 watts).
- Membership stores do not carry as many MSB lamp types as large home improvement or mass merchandise stores. As mentioned above they are also unique for having a low percentage of incandescent lamps (found in only 8% of membership stores). However, all 24 of the membership stores we surveyed carry reflector/flood CFLs and basic spiral CFLs. Furthermore, 79 percent of membership stores carried LEDs—the largest percentage across all store types.
- Like home improvement and mass merchandise stores, hardware stores carry a wide variety of MSB lamp types. In the 28 hardware stores in the sample, researchers found every MSB lamp type except high-wattage reflector/flood CFLs and “other” lamp types (the “other” category is comprised of cold cathode and high intensity discharge [HID] lamps).
- Discount, grocery, and drug stores tend to carry smaller inventories compared with large home improvement, mass merchandise, membership, and hardware stores for MSB lamps in general and for advanced MSB lamps in particular. Discount stores have the smallest variety of MSB lamps: researchers found only 8 varieties of MSB lamps at the 59 discount stores we surveyed (3-way spiral CFLs, reflector/floods, A-lamps, globes, tubes, LEDs, basic spiral CFLs, and incandescents).

For the purpose of comparison with the California data in Table 4-1, Table 4-2 shows the percentage of non-California stores carrying MSB lamps by lamp type and retail store type.

There were a total of 115 non-California stores²¹ surveyed in the spring of 2009 in Georgia, Pennsylvania, and Kansas. As with Table 4-1 above, the percentages in each cell represent the number of stores in a particular store type (of the total 115 stores) in which a particular lamp type was found divided by the total number of stores for that store type.

Key findings include:

- Overall (across all store types), the results for the non-California stores are similar to the results presented above for the California stores. With few exceptions, the percentage of non-California stores carrying a given MSB lamp type tends to be close to the percentage of California stores carrying the same MSB lamp type.
 - For instance, basic spiral CFLs were found in nearly all non-California and California stores (96 percent and 98 percent respectively).
 - Incandescents are the next most commonly available lamp in non-California and California stores (81 percent and 87 percent respectively).
- Within the advanced lamp categories, there are a few notable differences between non-California and California stores across all store types:
 - Dimmable reflector/flood CFLs were found in nearly two-thirds of non-California stores but less than one-third of California stores.
 - Tube CFLs, on the other hand, were found in 8 percent of non-California stores and 15 percent of California stores. In other words, tubes were found in nearly double the proportion of California stores vis-à-vis non-California stores.
- Within store types, there are notable differences between non-California stores and California stores for specific lamp types within a given store type.
 - High-wattage tube CFLs were found in 14 percent of California mass merchandise and hardware stores (and 4 percent of California membership stores), but were not available in any non-California mass merchandise, hardware, or membership stores.
 - Three-way spiral CFLs were found two-thirds of California membership stores, but only 14 percent of non-California membership stores. These numbers are nearly reversed for grocery stores; three-way spiral CFLs were found in 63 percent of non-California grocery stores, but only 21 percent of California grocery stores. In the category of globes, this lamp type was found in 79 percent of non-California grocery stores, but less than one-third of California grocery stores.

²¹ Drug stores were not included in the Non-California sample.



**Table 4-1
Expanded California Stores: Percent of Stores Carrying MSB Lamps by Lamp Type and Store Type, 2008-2009**

Medium Screw-Base (MSB) Lamp Type	Store Type							Overall
	Large Home Improv	Mass Merch	Membership	Hardware	Discount	Grocery	Drug	
ADVANCED								
High-wattage CFLs (>30 Watts)								
High-wattage spiral	80%	65%	-	61%	-	2%	40%	33%
High-wattage tube	8%	14%	4%	14%	-	-	-	5%
High-wattage reflector/flood	2%	2%	-	-	-	-	-	2%
Specialty CFLs: dimmable								
Dimmable spiral	66%	84%	4%	50%	-	16%	48%	36%
Dimmable reflector/flood	50%	61%	71%	39%	-	12%	20%	29%
Specialty CFLs: 3-way								
3-way spiral	82%	82%	67%	86%	2%	21%	68%	48%
Other advanced MSB CFLs (≤30 Watts)								
Reflector/flood	100%	94%	100%	82%	22%	55%	76%	68%
A-lamp	98%	100%	75%	68%	10%	54%	88%	65%
Globe	98%	100%	79%	68%	17%	31%	64%	58%
Candelabra (MSB)	52%	86%	50%	64%	-	31%	60%	43%
Tube	30%	29%	12%	50%	3%	1%	-	15%
Bug Light	84%	79%	-	50%	-	20%	48%	38%
LEDs*	66%	71%	79%	36%	22%	12%	12%	38%
NON-ADVANCED								
Halogen^	28%	16%	-	11%	-	3%	16%	10%
Basic CFLs (≤30 Watts)	100%	94%	100%	100%	95%	99%	100%	98%
Incandescents	100%	100%	8%	100%	92%	84%	96%	87%
Other lamp types#	8%	4%	-	-	-	-	-	2%
Number of Stores	50	49	24	28	59	91	25	326

* Includes non-MSB LEDs. ^ Halogen lamps were surveyed in only 48 of 326 stores. # “Other lamp types” category is comprised primarily of cold cathode and HID lamps.

**Table 4-2
Non-California Stores: Percent of Stores Carrying MSB Lamps by Lamp Type and Store Type, 2009**

Medium Screw-Base (MSB) Lamp Type	Store Type						Overall
	Large Home Improv	Mass Merch	Membership	Hardware	Discount	Grocery	
ADVANCED							
High-wattage CFLs (>30 Watts)							
High-wattage spiral	86%	70%	-	50%	-	53%	46%
High-wattage tube	7%	-	-	-	-	-	2%
High-wattage reflector/flood	11%	-	-	-	-	-	3%
Specialty CFLs: dimmable							
Dimmable spiral	93%	78%	9%	50%	6%	26%	48%
Dimmable reflector/flood	89%	87%	68%	50%	-	63%	65%
Specialty CFLs: 3-way							
3-way spiral	68%	74%	14%	83%	-	63%	49%
Other advanced MSB CFLs (≤30 Watts)							
Reflector/flood	100%	100%	100%	100%	35%	84%	88%
A-lamp	86%	74%	41%	67%	6%	26%	52%
Globe	100%	100%	73%	67%	6%	79%	76%
Candelabra (MSB)	50%	91%	23%	50%	-	63%	48%
Tube	14%	-	-	67%	-	5%	8%
Bug Light	82%	83%	-	33%	-	53%	47%
LEDs	11%	52%	86%	-	-	-	30%
NON-ADVANCED							
Halogen	100%	100%	14%	100%	29%	89%	71%
Basic CFLs (≤30 Watts)	100%	100%	100%	100%	82%	89%	96%
Incandescents	100%	100%	5%	100%	94%	100%	81%
Other lamp types*	18%	4%	-	17%	-	-	6%
Number of Stores	28	23	22	6	17	19	115

* "Other lamp types" category is comprised primarily of cold cathode and high intensity discharge lamps.

4.1.1.2 Percent of Total Lamps and Total Packages by Lamp Type

Figure 4-1 below shows the percentage of all MSB lamps and lamp packages stocked within each California retail store type for advanced lamps, basic CFLs, and incandescent lamps. Table 4-3 and Table 4-5 below provide additional detail on the percentage of lamps and packages. This can be considered a measure of the diversity of product types available in California stores. Only 48 of the 326 California stores are included in total lamp and total package tables and figures below, because researchers conducted lamp and package counts only at these 48 stores in the spring of 2009. Appendix A (Tables A-2 and A3) provide additional details for California stores on the percent of total lamps and packages by lamp type and store type within each IOU service territory.

Key findings for the California sample include:

- Lamp packages
 - Advanced lamps comprise 40 percent of total lamps in California mass merchandise stores, 32 percent of lamps in membership stores (primarily CFL reflectors/floods) and 25 percent in grocery stores (primarily A-lamp CFLs). In other store types, advanced lamps comprise smaller percentages of all MSB lamps, the lowest being discount stores (in which advanced lamps comprise only 1 percent of total lamps). The low penetration of advanced lamps in discount stores may be a concern in terms of getting these products to hard-to-reach customers, as the discount channel is an important one for reaching this customer segment.
 - Incandescent lamps dominate the inventory of MSB lamps in California drugstores at 80 percent of total MSB lamps. Large home improvement stores have the second highest proportion of MSB incandescent lamps across all store types with 63 percent of MSB lamps comprised by incandescent lamps. Notably, less than one percent of MSB lamps in membership clubs were comprised by incandescent lamps.
 - Basic CFLs comprise a similar proportion of total lamps in California discount stores and membership stores (72% and 68% respectively) and much lower proportions of the total lamps stocked lamps in other store types.
- Lamps
 - Halogen lamps comprise less than or equal to 5 percent of MSB lamp packages across all California store types except large home improvement stores, in which they account for approximately 11 percent of all MSB packages. These results may suggest that large home improvement stores are beginning the EISA-driven transition from incandescent toward halogen lamps.

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- When the percentage of total lamps in stock for each lamp type is compared to the percentage of total lamp packages for each lamp type within a store, one can draw conclusions regarding the packaging sizes (number of lamps per package) stocked within a store type. For example, in California membership stores, basic CFLs comprise only 48 percent of MSB packages but 68 percent of total lamps. Conversely, advanced lamps comprise 52 percent of MSB packages and only 32 percent of total lamps at membership stores. Based on these data one can conclude that in membership stores, basic CFLs are typically sold in larger package sizes and advanced lamps are typically sold in smaller packaging sizes.

For the purpose of comparison with the California data, Figure 4-2 below shows the percentage of all MSB lamps and lamp packages stocked within each Non-California retail store type for advanced lamps, basic CFLs, and incandescent lamps. Table 4-4 and Table 4-6 below provide additional detail on the percentage of lamps and packages in Non-California stores.

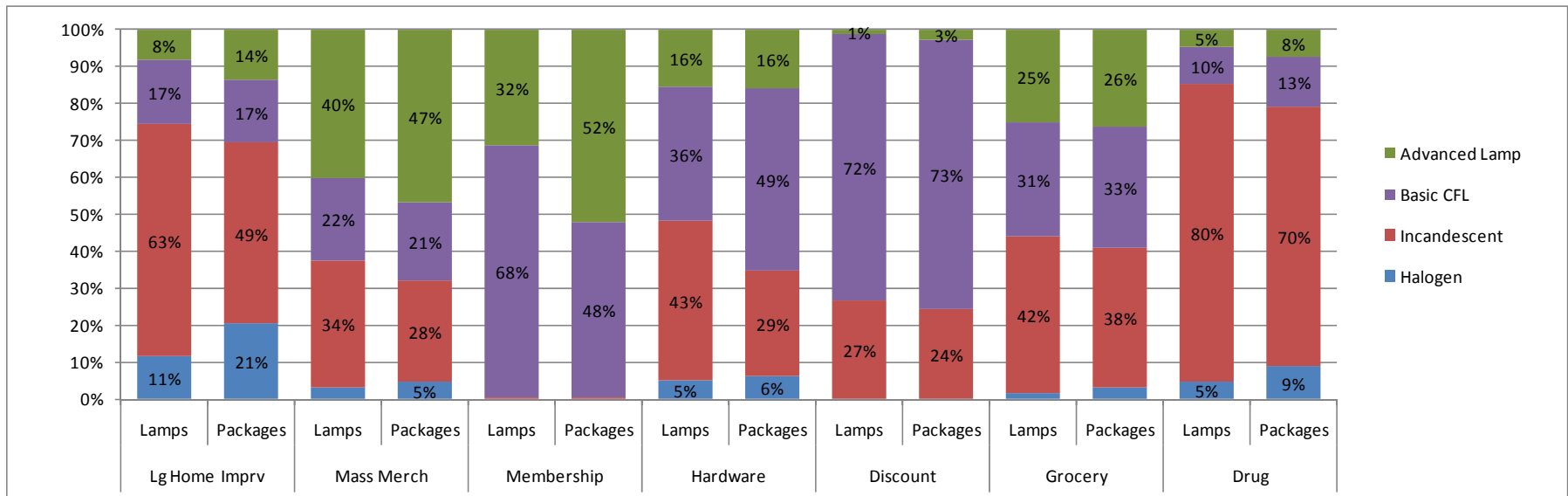
Key findings include:

- The proportion of a given MSB lamp type in Non-California stores tends to mirror the proportion found in Non-California stores for that lamp type, particularly when viewing the aggregated data across all store types. For instance, basic CFLs represented 31 percent of all lamps found in Non-California stores and 31 percent of all lamps found in California stores. With respect to advanced lamps, 15 percent of all lamps are advanced lamps in Non-California stores compared to 19 percent of all lamps in California stores.
- There are some notable differences between the Non-California and California data. A-lamp CFLs comprise only 2 percent on all Non-California lamps whereas A-lamp CFLs comprise 6 percent of all California lamps. Similarly, tube CFLs comprise less than one-half of one percent of all Non-California lamps whereas tube CFLs represent 3 percent of all California lamps.
- Further differences can be found among some MSB lamp categories at the store type level when comparing the Non-California and California data. This is particularly true for incandescents. Whereas the overall proportion of incandescents is similar across all store types for Non-California and California stores (incandescents comprise 48 percent of all lamps in Non-California stores and 43 percent of all lamps in California stores), there are notable differences for certain store types. For hardware stores, incandescents comprise 74 percent of all lamps found at Non-California hardware stores compared to only 43 percent of all lamps found at California hardware stores. Incandescent lamps

represent 83 percent of all lamps found at Non-California discount stores compared to only 27 percent of all lamps found at California discount stores. For grocery stores, incandescents comprise 82 percent of all lamps found at Non-California grocery stores versus 42 percent of all lamps found at California grocery stores.

- LEDs comprise double the proportion of all lamps across all store types in California stores when compared with Non-California stores (1.59 percent versus 0.79 percent).

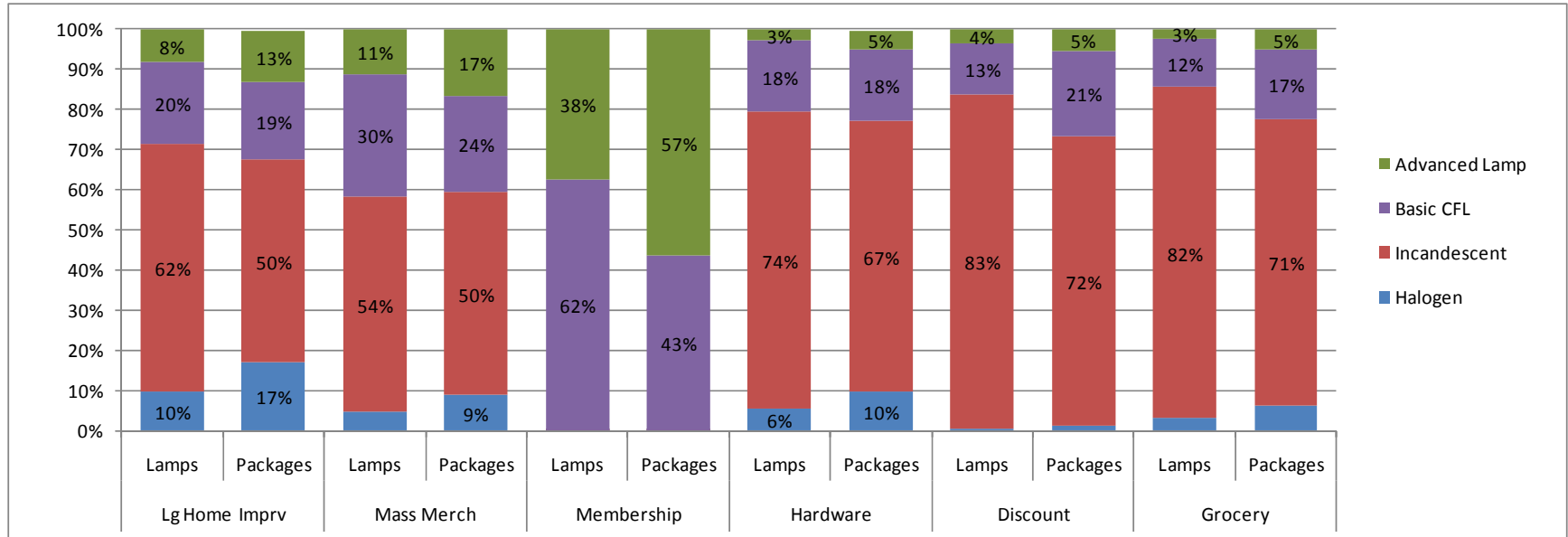
Figure 4-1
California Stores: Percent of MSB Lamps and MSB Lamp Packages by Lamp Type and Store Type, 2009*



* See Table 4-3 for the number of MSB lamps by store type and Table 4-5 for the number of MSB lamp packages by store type.

Figure 4-2

Non-California Stores: Percent of MSB Lamps and MSB Lamp Packages by Lamp Type and Store Type, 2009*



* See Table 4-4 for the number of MSB lamps by store type and Table 4-6 for the number of MSB lamp packages by store type.

**Table 4-3
California Stores: Percent of MSB Lamps by Lamp Type and Store Type, 2009**

Medium Screw-Base (MSB) Lamp Type	Store Type							Overall
	Large Home Improv	Mass Merch	Membership	Hardware	Discount	Grocery	Drug	
ADVANCED								
High-wattage CFLs (>30 Watts)								
High-wattage spiral	0%	0%	0%	0%	0%	0%	2%	0%
High-wattage tube	0%	0%	0%	0%	0%	0%	0%	0%
High-wattage reflector/flood	0%	0%	0%	0%	0%	0%	0%	0%
Specialty CFLs: dimmable								
Dimmable spiral	1%	0%	1%	8%	0%	0%	0%	1%
Dimmable reflector/flood	0%	0%	5%	0%	0%	0%	0%	1%
Specialty CFLs: 3-way								
3-way spiral	0%	0%	1%	0%	0%	0%	0%	0%
Other advanced MSB CFLs (≤30 Watts)								
Reflector/flood	3%	1%	13%	2%	0%	0%	1%	4%
A-lamp	2%	22%	3%	3%	0%	24%	1%	6%
Globe	2%	2%	4%	0%	1%	0%	0%	2%
Candelabra (MSB)	0%	1%	0%	0%	0%	0%	1%	0%
Tube	0%	14%	0%	0%	0%	0%	0%	3%
Bug Light	0%	0%	0%	0%	0%	0%	0%	0%
LEDs	0%	0%	3%	1%	0%	0%	0%	1%
NON-ADVANCED								
Halogen	11%	3%	0%	5%	0%	2%	5%	7%
Basic CFLs (≤30 Watts)	17%	22%	68%	36%	72%	31%	10%	31%
Incandescents	63%	34%	1%	43%	27%	42%	80%	43%
Other lamp types*	0%	0%	0%	0%	0%	0%	0%	0%
Total MSB Lamps	100%	100%	100%	100%	100%	100%	100%	100%
Number of MSB Lamps	121,690	46,818	43,484	12,350	8,807	3,658	2,528	239,335

* "Other lamp types" category is comprised primarily of cold cathode and high intensity discharge lamps.

**Table 4-4
Non-California Stores: Percent of MSB Lamps by Lamp Type and Store Type, 2009**

Medium Screw-Base (MSB) Lamp Type	Store Type						Overall
	Large Home Improv	Mass Merch	Membership	Hardware	Discount	Grocery	
ADVANCED							
High-wattage CFLs (>30 Watts)							
High-wattage spiral	0%	0%	0%	0%	0%	0%	0%
High-wattage tube	0%	0%	0%	0%	0%	0%	0%
High-wattage reflector/flood	0%	0%	0%	0%	0%	0%	0%
Specialty CFLs: dimmable							
Dimmable spiral	0%	0%	1%	0%	2%	0%	0%
Dimmable reflector/flood	0%	1%	4%	0%	0%	0%	1%
Specialty CFLs: 3-way							
3-way spiral	0%	0%	0%	0%	0%	0%	0%
Other advanced MSB CFLs (≤30 Watts)							
Reflector/flood	4%	2%	14%	1%	1%	1%	6%
A-lamp	1%	3%	3%	0%	1%	0%	2%
Globe	1%	3%	7%	0%	0%	0%	3%
Candelabra (MSB)	0%	1%	2%	0%	0%	0%	1%
Tube	0%	0%	0%	0%	0%	0%	0%
Bug Light	0%	0%	0%	0%	0%	0%	0%
LEDs	0%	0%	6%	0%	0%	0%	2%
NON-ADVANCED							
Halogen	10%	5%	0%	6%	0%	3%	6%
Basic CFLs (≤30 Watts)	20%	30%	62%	18%	13%	12%	31%
Incandescents	62%	54%	0%	74%	83%	82%	48%
Other lamp types*	0%	0%	0%	0%	0%	0%	0%
Total MSB Lamps	100%	100%	100%	100%	100%	100%	100%
Number of MSB Lamps	315,712	81,106	137,972	10,240	10,705	28,617	584,352

* "Other lamp types" category is comprised primarily of cold cathode and high intensity discharge lamps.



**Table 4-5
California Stores: Percent of MSB Lamp Packages by Lamp Type and Store Type, 2009**

Medium Screw-Base (MSB) Lamp Type	Store Type							Overall
	Large Home Improv	Mass Merch	Membership	Hardware	Discount	Grocery	Drug	
ADVANCED								
High-wattage CFLs (>30 Watts)								
High-wattage spiral	0%	0%	0%	0%	0%	0%	2%	0%
High-wattage tube	0%	0%	1%	0%	0%	0%	0%	0%
High-wattage reflector/flood	0%	0%	0%	0%	0%	0%	0%	0%
Specialty CFLs: dimmable								
Dimmable spiral	2%	0%	1%	6%	0%	0%	0%	2%
Dimmable reflector/flood	1%	0%	9%	1%	0%	0%	0%	1%
Specialty CFLs: 3-way							0%	
3-way spiral	1%	0%	1%	1%	0%	0%	0%	1%
Other advanced MSB CFLs (≤30 Watts)								
Reflector/flood	4%	1%	15%	2%	0%	1%	1%	4%
A-lamp	2%	24%	5%	3%	1%	24%	1%	8%
Globe	2%	3%	6%	0%	2%	1%	1%	2%
Candelabra (MSB)	0%	2%	0%	0%	0%	0%	1%	0%
Tube	0%	16%	0%	0%	0%	0%	0%	4%
Bug Light	0%	0%	0%	0%	0%	0%	0%	0%
LEDs	0%	0%	13%	2%	0%	0%	0%	2%
NON-ADVANCED								
Halogen	21%	5%	0%	6%	0%	3%	9%	12%
Basic CFLs (≤30 Watts)	17%	21%	48%	49%	73%	33%	13%	26%
Incandescents	49%	28%	0%	29%	24%	38%	70%	37%
Other lamp types*	0%	0%	0%	0%	0%	0%	0%	0%
Total MSB Lamp Packages	100%	100%	100%	100%	100%	100%	100%	100%
Number of MSB Lamp Packages	48,490	21,948	8,592	8,291	4,136	1,863	1,326	94,646

* "Other lamp types" category is comprised primarily of cold cathode and high intensity discharge lamps.

**Table 4-6
Non-California Stores: Percent of MSB Lamp Packages by Lamp Type and Store Type, 2009**

Medium Screw-Base (MSB) Lamp Type	Store Type						Overall
	Large Home Improv	Mass Merch	Membership	Hardware	Discount	Grocery	
ADVANCED							
High-wattage CFLs (>30 Watts)							
High-wattage spiral	1%	0%	0%	0%	0%	1%	0%
High-wattage tube	0%	0%	0%	0%	0%	0%	0%
High-wattage reflector/flood	0%	0%	0%	0%	0%	0%	0%
Specialty CFLs: dimmable							
Dimmable spiral	0%	0%	1%	0%	2%	0%	1%
Dimmable reflector/flood	1%	1%	7%	0%	0%	1%	2%
Specialty CFLs: 3-way							
3-way spiral	1%	1%	1%	1%	0%	0%	1%
Other advanced MSB CFLs (≤30 Watts)							
Reflector/flood	6%	3%	16%	1%	2%	1%	6%
A-lamp	2%	4%	3%	0%	1%	0%	2%
Globe	2%	5%	9%	1%	0%	1%	3%
Candelabra (MSB)	0%	2%	2%	0%	0%	1%	1%
Tube	0%	0%	0%	1%	0%	0%	0%
Bug Light	0%	0%	0%	0%	0%	0%	0%
LEDs	0%	0%	18%	0%	0%	0%	3%
NON-ADVANCED							
Halogen	17%	9%	0%	10%	1%	6%	12%
Basic CFLs (≤30 Watts)	19%	24%	43%	18%	21%	17%	23%
Incandescents	50%	50%	0%	67%	72%	71%	46%
Other lamp types*	1%	0%	0%	0%	0%	0%	0%
Total MSB Lamp Packages	100%	100%	100%	100%	100%	100%	100%
Number of MSB Lamp Packages	119,873	31,506	28,049	5,473	4,112	13,141	202,154

* "Other lamp types" category is comprised primarily of cold cathode and high intensity discharge lamps.

4.1.2 Advanced Lighting Products

4.1.2.1 Model Number Diversity

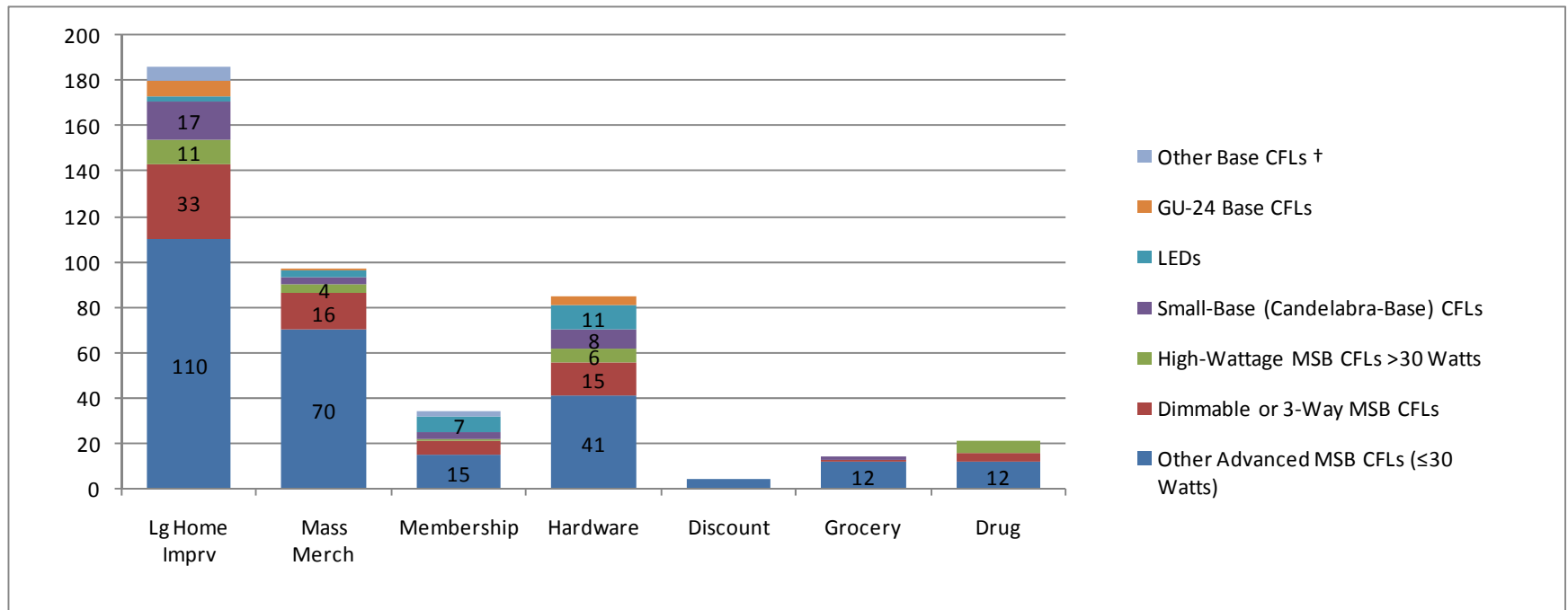
This section provides details on the number of unique model numbers for all advanced lamps across the 48 California stores in which KEMA researchers conducted comprehensive shelf inventories.²² The advanced lamp categories are identical to those found in the tables above in Section 4.1.1, however, we have added small-base (candelabra-base) CFLs, GU-24 base CFLs, and “Other base” CFLs.

Because this discussion focuses on model number diversity for advanced lamps, the figures and tables below do not include non-advanced lamps. Also note that when these data were initially collected, no effort was made to distinguish EISA-compliant incandescent lamps or halogen lamps from others, but we assume penetration of these products was low when these data were collected in 2009 (so halogen lamps are not included in these analyses). Lastly, only verified model numbers are included in the tables below (see Section 3.1 above for a discussion of the model number verification process).

Figure 4-3 below shows the total number of advanced lamp models within each store type by lamp type. As shown, lamps in the “Other Advanced MSB CFLs (≤ 30 Watts)” category, which consists of non-dimmable single-wattage CFLs in reflector/flood, A-lamp, globe, candelabra (MSB), bug light, and tube shapes, comprised the largest number of advanced lamp models in each store type followed by dimmable or 3-way MSB CFLs. Hardware stores had the largest number of LED models across all store types (11 models) followed by membership stores (7 models).

²² We were unable to produce model number figures and tables for Non-California Stores because few lamp models could be verified; thus, the verified model counts are not representative of stores outside of California.

Figure 4-3
California Stores: Number of Advanced Lamp Models by Lamp Type and Store Type, 2009*



* See Table 4-7 for number of advanced lamp models by store type.
 † Excludes standard pin-based CFLs (non-GU based) as these are not considered Advanced Lamps.

Table 4-7 below provides additional detail on the number of advanced lamp models by advanced lamp type and store type. Across all store types, MSB reflector/flood CFLs have the greatest diversity of model numbers among all advanced lamp types (85 models). Also among MSB CFLs, researchers found 57 unique model numbers in the A-lamp category and 37 unique globe models. The categories of MSB high-wattage tube CFLs (three unique model numbers) MSB tube CFLs of less than 30 watts (three unique model numbers), and high-wattage MSB reflector/flood CFLs (zero verified unique model numbers) show the least amount of diversity with respect to available model numbers across all store types. As for other advanced lamp types, there are 17 unique LED model numbers across all store types.

In terms of model number diversity among store types, large home improvement stores show the highest diversity of model numbers among advanced lamps with 186 unique model numbers. There are 97 unique advanced lamp model numbers in the mass merchandise stores²³ surveyed, and 85 among hardware stores surveyed. Discount stores have the lowest diversity of advanced lamp models with only 4 across all advanced lamp types (which is logical, since these products may be expected to cost more than non-advanced lamp types).

Appendix A (Table A-4) provides additional detail on the number of advanced lamp models available in each IOU service territory by lamp type.

²³ Although researchers were able to find high-wattage MSB reflector/flood CFLs and MSB tube CFLs in the stores of one of the mass merchandise chains, we were unable to verify any advanced lamp model numbers for this chain. There is one unique unverified model number for high-wattage reflector/floods and 6 unique unverified model numbers for tubes.

Table 4-7

California Stores: Number of Advanced Lamp Models (All Base Types) by Advanced Lamp Type and Store Type, 2009

Advanced Lamp Type	Store Type							Overall
	Large Home Improv	Mass	Membership	Hardware	Discount	Grocery	Drug	
		Merch						
High-wattage MSB CFLs (>30 Watts)								
High-wattage spiral	9	4	-	5	-	-	5	20
High-wattage tube	2	-	1	1	-	-	-	3
High-wattage reflector/flood	-	-	-	-	-	-	-	-
Specialty MSB CFLs: dimmable								
Dimmable spiral	11	5	1	6	-	-	1	18
Dimmable reflector/flood	13	5	3	4	-	1	1	20
Specialty MSB CFLs: 3-way								
3-way spiral	9	6	2	5	-	-	2	18
Other Advanced MSB CFLs (≤30 Watts)								
Reflector/flood	54	19	9	19	1	3	4	85
A-lamp	22	25	2	10	1	4	3	57
Globe	21	12	3	4	2	1	2	37
Candelabra (MSB)	2	11	-	5	-	3	2	18
Tube	2	-	1	-	-	-	-	3
Bug Light	9	3	-	3	-	1	1	13
LEDs	2	3	7	11	-	-	-	17
Small-Base (Candelabra-Base) CFLs	17	3	3	8	-	1	-	25
GU-24 Base CFLs	7	1	-	4	-	-	-	9
Other Base CFLs*	6	-	2	-	-	-	-	8
Number of Advanced Lamp Models	186	97	34	85	4	14	21	351

* "Other Base CFLs" excludes standard pin-based CFLs (non-GU) as these are not considered Advanced Lamps.

4.2 Residential Socket Inventory Data Analyses

This section summarizes the lamps that were found during the lighting inventory completed as part of the Upstream Lighting Program evaluation report.

4.2.1 Installed and Stored Lamps

Table 4-10 below shows the percentage of installed advanced lamps and stored advanced lamps in California households by lamp type by IOU and across all IOUs (“Overall”). The table also includes basic CFLs and other lamp technology types for purposes of comparison. The table shows that lamps are installed and stored similarly across all utilities. For all of the IOUs, advanced lamps represented approximately 5 percent of all installed lamps, but PGE had a slightly higher proportion of stored advanced lamps (6 percent) compared to SCE (4%) and SDG&E (5%). Just under 60 percent of all lamps installed and stored are incandescent lamps.

In general, lamps comprise a similar proportion of overall installed and stored lamps within each lamp type – for example, approximately 60 percent of installed lamps are incandescent and accordingly, around 60 percent of stored lamps are incandescent. The exceptions are basic CFLs, which represent a greater proportion of total stored lamps (27%) than installed lamps (16 percent). Conversely, fluorescent lamps represent a slightly higher proportion of installed lamps (12%) than stored lamps (2%). Advanced lamps comprise the same proportion of installed and stored lamps 5 percent. Overall, 23 percent of all installed lamps are CFLs, while 33 percent of stored lamps are CFLs. Also of note is that dimmable advanced lamps comprise a very small proportion of all installed lamps (less than one-tenth of one percent).



**Table 4-8
California Residential Saturation of Installed and Stored Lamps by Technology and IOU Service Territory, 2008-2009**

Lamp Type	IOU Service Territory						Overall	
	PG&E		SCE		SDG&E			
	Installed	Stored	Installed	Stored	Installed	Stored	Installed	Stored
ADVANCED								
High-wattage MSB CFLs (>30 Watts)								
High-wattage spiral	0.1%	0.1%	0.1%	-	0.1%	0.1%	0.1%	0.1%
High-wattage tube	-	-	-	0.1%	-	0.1%	-	0.1%
High-wattage reflector/flood	-	-	-	-	-	-	-	-
Specialty MSB CFLs: dimmable								
Dimmable spiral	0.1%	0.2%	-	-	0.2%	0.7%	0.1%	0.2%
Dimmable reflector/flood	-	-	0.1%	-	-	-	-	-
Specialty MSB CFLs: 3-way								
3-way spiral	-	0.1%	0.1%	-	-	0.1%	0.1%	0.1%
Other Advanced MSB CFLs (≤30 Watts)								
Reflector/flood	1.4%	1.5%	1.8%	0.9%	1.6%	1.7%	1.6%	1.3%
A-lamp	0.5%	0.8%	0.6%	0.7%	0.3%	1.4%	0.5%	0.8%
Globe	1.0%	1.4%	0.7%	0.6%	0.6%	0.5%	0.8%	1.0%
Candelabra (MSB)	0.5%	0.7%	0.3%	0.1%	0.2%	-	0.4%	0.4%
Tube	0.6%	0.9%	0.6%	0.6%	0.7%	0.7%	0.6%	0.8%
Bug Light	-	0.1%	-	-	-	-	-	-
LEDs	0.1%	0.2%	-	-	0.1%	0.1%	0.1%	0.1%
Small-Base (Candelabra-Base) CFLs	0.3%	0.5%	0.4%	0.5%	0.3%	-	0.3%	0.5%
GU-24 Base CFLs	-	-	0.1%	-	0.1%	-	0.1%	-
Other Base CFLs*	-	-	-	-	-	-	-	-
NON-ADVANCED								
Halogens	8.8%	5.1%	6.7%	5.4%	8.9%	4.6%	8.0%	5.2%
Basic CFLs (≤30 Watts)	17.0%	28.7%	16.8%	25.5%	13.4%	24.3%	16.4%	26.9%
Incandescents	53.4%	55.8%	57.2%	63.4%	57.6%	63.1%	55.5%	59.6%
Standard Pin-Based CFLs	1.8%	0.9%	1.6%	0.3%	1.8%	0.3%	1.7%	0.6%
Fluorescent	12.9%	2.9%	11.4%	1.9%	12.6%	2.2%	12.3%	2.4%
Unknown	-	-	0.2%	-	0.1%	-	0.2%	-
Overall	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Total Lamps	26,072	6,187	22,647	4,596	12,785	2,614	61,504	13,397

4.2.2 Fixture Type

Table 4-9 below shows the percentage of advanced lamps and non-advanced lamps (basic CFLs and other non-advanced lamp types) installed in California households by fixture type. The table illustrates that some fixtures are more likely to have advanced CFLs installed than others -- recessed fixtures in particular. Bathroom wall mounted fixtures, which are mainly bathroom vanities, are also more likely than other wall-mounted fixtures to have advanced lamps installed in them. Interestingly, torchieres have the highest CFL saturation (followed by table or floor lamps) while other fixtures have the lowest advanced lamp and basic CFL saturations.

Table 4-9 includes all screw-base sockets, both medium and small (candelabra) screw base. When only MSB sockets are considered, the statistics for suspended fixtures change the most, with under 3 percent of MSB sockets having advanced lamps installed and the remaining 97 plus percent with non-advanced lamps (10% basic CFLs, 88% other non-advanced lamps).

Table 4-9
California Residential Saturation of Advanced Lamps and Non-Advanced Lamps
(Basic CFLs and Others) by Fixture Type, 2008-2009

Fixture Type	Lamp Type			Overall
	Advanced	Basic CFL (Non-Advanced)	Other Non-Advanced	
Ceiling Mounted	3%	25%	73%	100%
Exterior Fixtures	7%	16%	78%	100%
Ceiling Fan	4%	26%	70%	100%
Table or Floor Lamp	4%	29%	66%	100%
Recessed Fixtures	13%	10%	77%	100%
Suspended Fixtures	3%	10%	88%	100%
Torchiere	5%	35%	61%	100%
Track Lighting	6%	17%	77%	100%
Wall – Bathroom*	7%	16%	78%	100%
Wall – Other Room	6%	23%	71%	100%
Other Fixtures	4%	12%	84%	100%
Total	6%	20%	75%	100%

* Bathroom wall fixtures are typically vanity-style fixtures (i.e., fixtures with a horizontal row of lamps) while wall fixtures in other rooms are typically sconces.

4.3 Non-Residential Socket Inventory Analyses

This section summarizes the lamps that were found during the CFL inventory completed as part of the 2010 Small Commercial Contract Group Direct Impact Evaluation Report.

4.3.1 Installed and Stored Lamps

Table 4-10 shows the percentage of installed advanced lamps and stored advanced lamps both overall and by IOU. The table also includes basic CFLs for purposes of comparison. The table shows that lamps are installed and stored similarly across all utilities. For all of the IOUs, advanced lamps represented approximately 42 percent of all installed CFLs and about 25 percent of all CFLs in storage.

In general, basic CFLs are in storage at a higher rate than advanced CFLs. Reflectors and candelabra-base CFLs are the most commonly installed advanced lamps. However, unlike reflectors, candelabra-base CFLs are not one of the most commonly stored advanced lamps. Reflectors and a-lamp CFLs are the advanced CFLs most often found in storage.²⁴

²⁴ Table 4-10 shows an exceptionally high number of candelabra-base CFLs installed in the SCE territory. This is largely due to one lodging site with this type CFL installed in every guest room.

**Table 4-10
California Non-Residential Saturation of Installed and Stored Lamps by Technology and IOU Service Territory, 2009**

Lamp Type	PG&E		SCE		SDG&E		Overall	
	Installed	Stored	Installed	Stored	Installed	Stored	Installed	Stored
ADVANCED								
High-wattage MSB CFLs (≥30 Watts)								
High-wattage spiral	0.9%	0.4%	2.1%	9.5%	0.2%	0.0%	1.2%	3.0%
High-wattage tube	0.0%	0.0%	0.2%	0.3%	0.1%	0.2%	0.1%	0.1%
High-wattage reflector/flood	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Specialty MSB CFLs: dimmable								
Dimmable spiral	10.2%	0.0%	0.3%	0.0%	0.3%	0.0%	4.9%	0.0%
Dimmable reflector/flood	1.1%	1.8%	0.0%	0.0%	0.0%	0.0%	0.5%	1.1%
Specialty MSB CFLs: 3-way								
3-way spiral	0.4%	0.1%	0.0%	0.0%	0.0%	0.0%	0.2%	0.1%
Other Advanced MSB CFLs (<30 Watts)								
Reflector/flood	10.4%	5.5%	19.6%	17.4%	12.7%	14.5%	14.3%	9.9%
A-lamp	1.4%	4.1%	1.0%	1.2%	0.8%	4.1%	1.2%	3.2%
Globe	1.9%	2.4%	1.1%	0.7%	0.7%	0.3%	1.4%	1.7%
Candelabra (MSB)	0.0%	0.0%	0.1%	0.0%	0.2%	0.0%	0.1%	0.0%
Tube	0.7%	0.0%	0.2%	0.3%	2.4%	1.9%	0.7%	0.3%
Bug Light	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
LEDs	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Small-Base (Candelabra-Base) CFLs	6.1%	0.6%	25.3%	0.0%	1.1%	0.0%	13.0%	0.4%
GU-24 Base CFLs	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Other Base CFLs*	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.1%	0.0%
NON-ADVANCED								
Basic CFLs (<30 Watts)	63.4%	78.4%	45.8%	69.9%	72.7%	77.4%	57.7%	75.8%
Unknown CFLs	3.4%	6.6%	4.2%	.7%	8.9%	1.6%	4.5%	4.4%
Overall	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Total CFLs	2,842,311	586,473	2,410,630	282,451	834,865	85,881	6,087,806	954,805

4.3.2 Control Type

Table 4-11 shows the percentage of advanced versus non-advanced (basic CFL) lamps installed in screw-base sockets by control type. This table illustrates that advanced lighting is installed more frequently than basic CFLs in fixtures controlled by dimmers, motion sensors, timeclocks and twist timers. Basic CFLs are more frequently installed in fixtures controlled by all other control types. Also shown in the table below, some lamps are installed in fixtures with inappropriate controls for that lamp type – for instance, 40.8 percent of the lamps installed in fixtures controlled by dimmers are basic CFLs (which should not be used in dimmable sockets).

**Table 4-11
California Non-Residential Saturation of Advanced Lamps and Non-Advanced Lamps
(Basic CFLs and Others) by Control Type, 2009**

Control Type	Lamp Type	
	Advanced	Basic CFL (Non-Advanced)
Bi-level switch	0.0%	100.0%
Continuous (24 hour use)	35.2%	64.8%
Dimmer	59.2%	40.8%
EMS	0.0%	100.0%
Motion Sensor	58.2%	41.8%
On/Off Switch	37.1%	62.9%
Other	16.9%	83.1%
Photocell	24.2%	75.8%
Photocell/Timeclock	0.0%	100.0%
Timeclock	50.6%	49.4%
Twist Timer	54.4%	45.6%
Unknown	16.9%	83.1%

4.3.3 Room Type

Table 4-12 compares the number of advanced versus basic CFLs installed by building and room type. Offices in small retail buildings have the highest percentage of advanced CFLs (81.3%) compared to basic CFLs (18.7%), while restrooms in health/medical centers have the lowest percentage of advanced CFLs (3.7%).

**Table 4-12
California non-Residential Saturation of Advanced Lamps and Basic CFLs
by Building Type and Room Type, 2009**

Building Type	Room Type	Lamp Type	
		Advanced	Basic CFL (Non-Advanced)
Assembly	Assembly	20.1%	79.9%
Assembly	Hallway/Lobby	38.2%	61.8%
Assembly	Kitchen/Break Room	46.3%	53.7%
Assembly	Office	46.5%	53.5%
Assembly	Other/Misc	48.7%	51.3%
Assembly	Outdoor	30.7%	69.3%
Assembly	Restrooms	23.3%	76.7%
Assembly	Storage	38.3%	61.7%
Health/Medical - Clinic	Hallway/Lobby	24.0%	76.0%
Health/Medical - Clinic	Office	16.7%	83.3%
Health/Medical - Clinic	Other/Misc	6.5%	93.5%
Health/Medical - Clinic	Outdoor	4.9%	95.1%
Health/Medical - Clinic	Restrooms	3.7%	96.3%
Lodging	Guest Rooms	8.6%	91.4%
Lodging	Hallway/Lobby	26.6%	73.4%
Lodging	Kitchen/Break Room	5.1%	94.9%
Lodging	Mechanical/Electrical Room	49.3%	50.7%
Lodging	Office	25.7%	74.3%
Lodging	Other/Misc	37.9%	62.1%
Lodging	Outdoor	7.2%	92.8%
Lodging	Restrooms	17.8%	82.2%
Lodging	Storage	47.4%	52.6%
Office - Small	Hallway/Lobby	22.9%	77.1%
Office - Small	Office	13.9%	86.1%
Office - Small	Other/Misc	28.8%	71.2%
Office - Small	Outdoor	16.3%	83.7%
Office - Small	Restrooms	8.7%	91.3%
Office - Small	Storage	5.4%	94.6%
Other	Hallway/Lobby	50.5%	49.5%
Other	Office	44.1%	55.9%
Other	Other/Misc	67.4%	32.6%
Other	Outdoor	59.7%	40.3%
Other	Restrooms	72.0%	28.0%
Other	Storage	36.2%	63.8%
Retail - Small	Hallway/Lobby	16.5%	83.5%
Retail - Small	Office	81.3%	18.7%

Building Type	Room Type	Lamp Type	
		Advanced	Basic CFL (Non-Advanced)
Retail - Small	Other/Misc	15.3%	84.7%
Retail - Small	Outdoor	67.8%	32.2%
Retail - Small	Restrooms	11.6%	88.4%
Retail - Small	Retail Sales	60.6%	39.4%
Retail - Small	Storage	15.6%	84.4%

4.4 Retail POS Data Analyses

This section provides detailed results on the sales and average prices of both advanced and non-advanced lamps²⁵ sold in large grocery, drug, and hardware stores in 2008, 2009, and 2010. The tables present lighting data by store type and year. For purposes of comparison, the tables include results for both California and the United States. The organization of the tables and figures attempts to make this comparison easier, presenting a graphical representation of the results for California and then for the U.S. next to each other, followed by the tables supporting the graphs for ease of additional comparison and analysis by the reader. To further aid this comparison, the table number and title match the corresponding figure number and title in most cases.

4.4.1 Key Findings

The key findings of the POS data analysis include:

- Sales of CFLs as a percentage of medium screw base lamp (MSB) sales (shares) in California's large food stores and drug stores have decreased since 2008, while CFL shares in hardware stores have remained fairly steady over that time period (see Section 4.4.2).
- Sales of advanced lamps as a percentage of MSB lamp sales have increased slightly in large food stores and hardware stores in California (from 0.6% to 0.8% in large grocery stores and from 2.8% to 3.2% in hardware stores). On the other hand, their share in drug stores has decreased from 2.8 percent to 1.5 percent (Section 4.4.2).
- CFL reflectors account for the largest share of advanced lighting products as a percentage of all CFLs sold in both California and the United States (ranging from approximately 30% to 50% for most regions, retail channels, and years; see Section 4.4.3).
- The average price of an incandescent lamp in California is higher than in the United States as a whole in each of the three retail channels in 2008, 2009, and 2010 (Section 4.4.4).
- The average price of basic CFLs and advanced lighting products sold in California through large grocery, drug and hardware stores has increased over the last three years.

²⁵ The majority of the lamp sales presented in the results below are for medium screw-base (MSB) lamps. However, the results also include information on sales of candelabra-base CFLs and GU-24 base CFLs.

4.4.2 Percent of MSB Lamp Sales by Lamp Type

Figure 4-4 and Figure 4-5 show the percentage of all MSB lamps sold by each retail store type for advanced lamps, basic CFLs, and incandescent lamps in California and the United States respectively. Further, Table 4-13 and Table 4-14 provide additional detail on the percentage of MSB lamps sold by lamp type, store type, and year.

As shown in Figure 4-4 and 4-5, incandescent lamps comprise roughly two-thirds or more of all California medium screw base lamp (MSB) sales in the three retail channels included in this analysis in 2008, 2009 and 2010. Incandescent lamps dominate non-California sales of MSB lamps in food stores to a greater degree than in California stores across all three years.

In 2008, CFLs comprised approximately one-third of the MSB lamps sold in large food stores in California. This percentage has decreased steadily over the last three years. While this decrease can also be seen in drug stores in California (decreasing from 27% in 2008 to 15% in 2010), CFL sales as a percentage of all MSB lamp sales has remained relatively constant in hardware stores (in California and in the U.S. as a whole), as well as in drug stores in the U.S..

For most retail channels, advanced lamp sales as a percentage of MSB lamp sales have been fairly constant (or increasing slightly) and do not vary greatly between California and the U.S.. The exception to this is for drug stores in California in 2008. A possible reason for this is because at least one of the California IOUs rebated a large number of CFL globes through drug stores near the end of the 2006-2008 program cycle.

Figure 4-4
Percent of MSB Lamps Sold by Store Type and Year, 2008-2010 – California

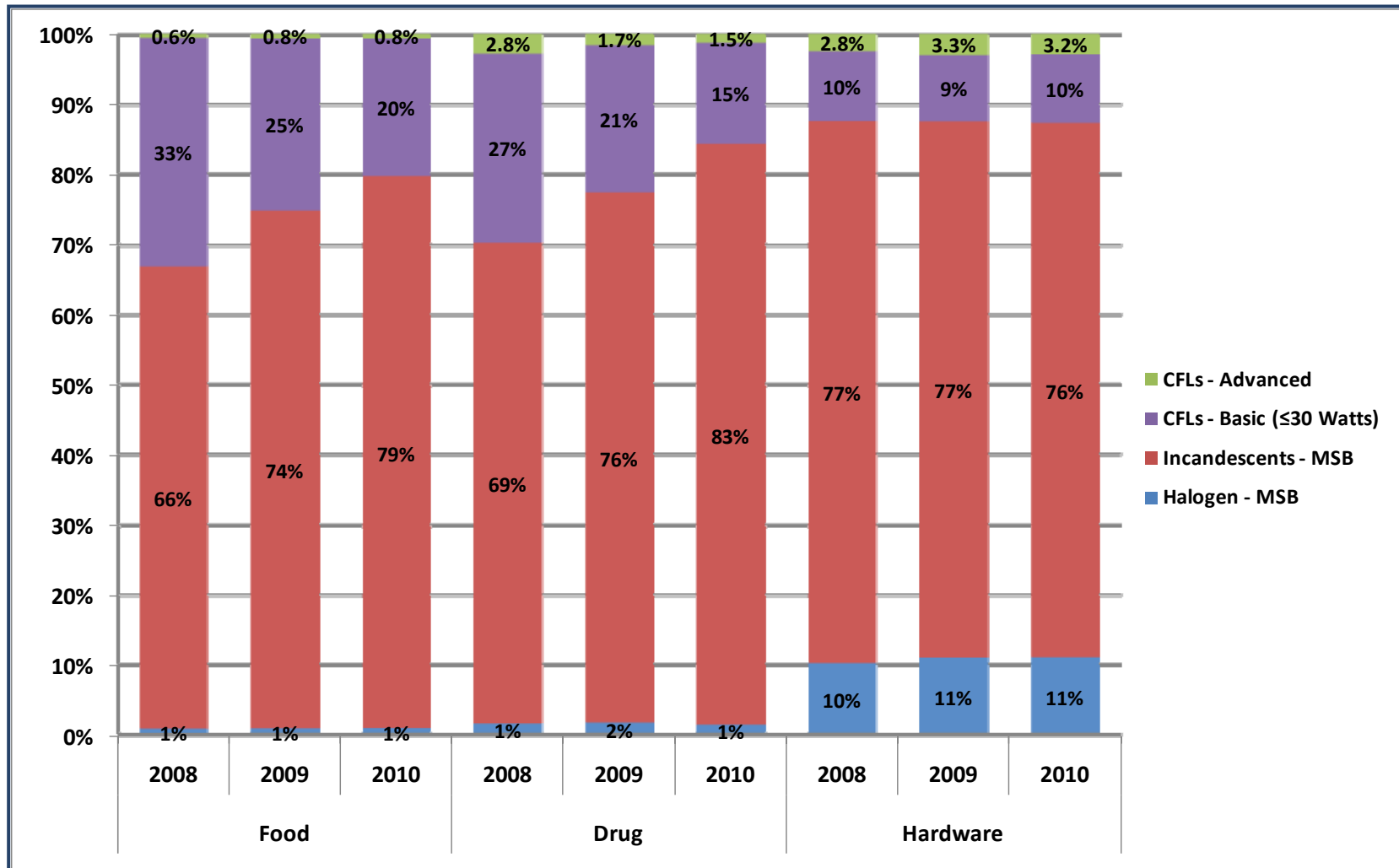


Figure 4-5
Percent of MSB Lamps Sold by Store Type and Year – United States

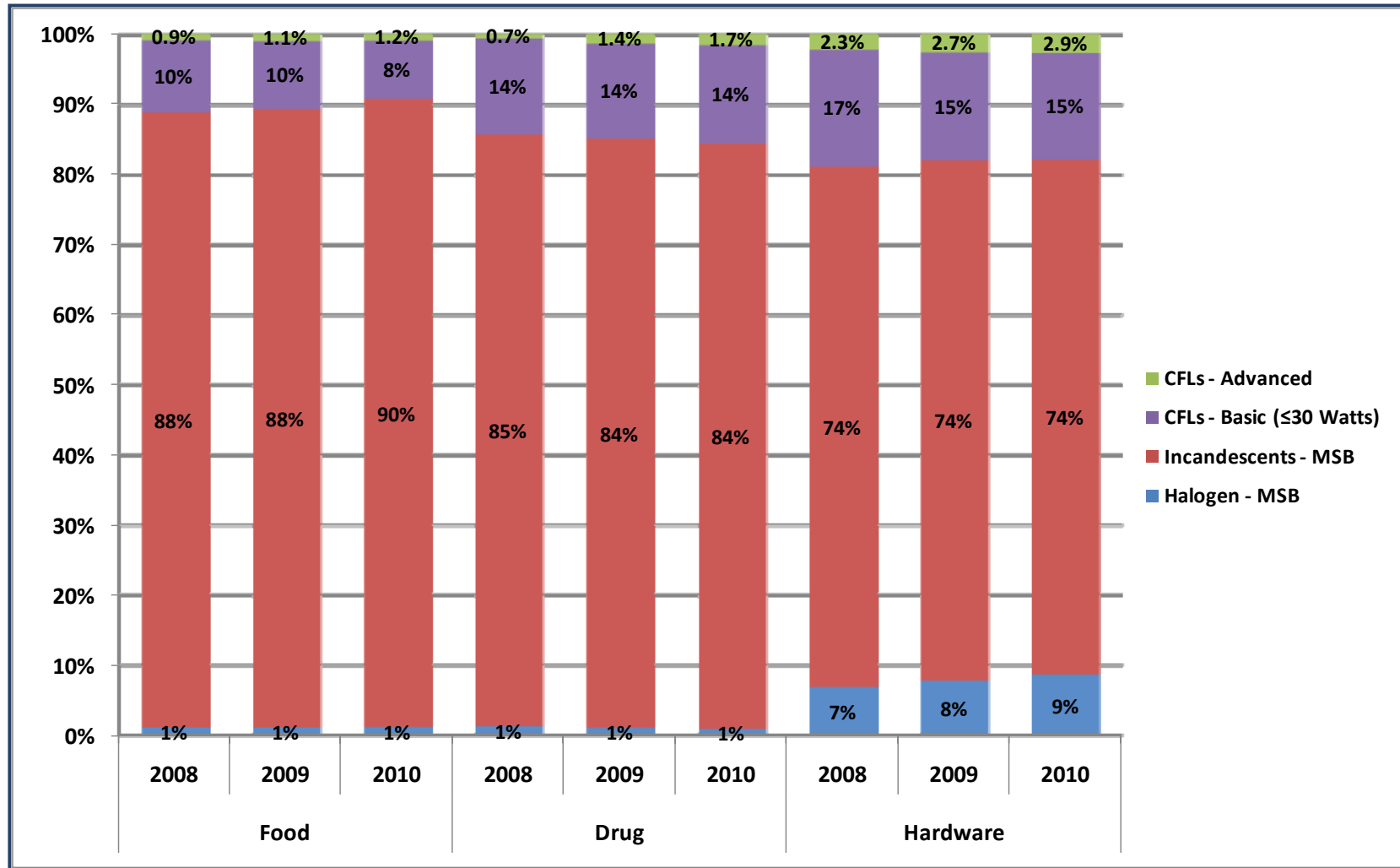


Table 4-13
Percent of MSB Lamps Sold by Lamp Type, Store Type and Year, 2008-2010 – California

% of Medium Screw-Base (MSB) Lamps	Large Grocery			Drug			Hardware		
	2008	2009	2010	2008	2009	2010	2008	2009	2010
ADVANCED									
High-wattage CFLs (>30 Watts)									
High-wattage spiral	0.00%	0.00%	0.00%	0.01%	0.03%	0.02%	0.05%	0.08%	0.08%
High-wattage A-lamp	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%
High-wattage tube	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.02%	0.03%
High-wattage reflector/flood	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Specialty CFLs: dimmable									
Dimmable spiral	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.23%	0.12%	0.09%
Dimmable reflector/flood	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.19%	0.21%	0.20%
Specialty CFLs: 3-way									
3-way spiral	0.09%	0.08%	0.06%	0.10%	0.19%	0.19%	0.08%	0.04%	0.03%
Other advanced MSB CFLs (≤30 Watts)									
Reflector/flood	0.30%	0.32%	0.31%	0.21%	0.41%	0.55%	1.04%	1.23%	1.10%
A-lamp	0.07%	0.10%	0.13%	0.03%	0.07%	0.08%	0.25%	0.40%	0.40%
Globe	0.08%	0.04%	0.04%	2.06%	0.65%	0.13%	0.15%	0.19%	0.21%
Candelabra (MSB)	0.08%	0.09%	0.06%	0.01%	0.04%	0.10%	0.02%	0.02%	0.02%
LEDs	0.00%	0.01%	0.01%	0.00%	0.00%	0.00%	0.04%	0.23%	0.24%
Small-Base (Candelabra-Base) CFLs	0.01%	0.02%	0.05%	0.01%	0.02%	0.05%	0.20%	0.13%	0.10%
GU-24 Base CFLs	0.00%	0.05%	0.11%	0.00%	0.05%	0.17%	0.02%	0.07%	0.12%
Other Base CFLs	0.06%	0.04%	0.02%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%
Total Advanced	0.6%	0.8%	0.8%	2.8%	1.7%	1.5%	2.8%	3.3%	3.2%
NON-ADVANCED									
Halogen	0.7%	0.8%	0.8%	1.4%	1.6%	1.3%	10.1%	10.9%	11.0%
Basic CFLs (<30 Watts)	32.6%	24.5%	19.7%	26.9%	21.1%	14.5%	10.0%	9.5%	9.8%
Incandescent lamps	66.1%	73.9%	78.6%	68.8%	75.6%	82.7%	77.1%	76.5%	76.0%

Table 4-14
Percent of MSB Lamps Sold by Lamp Type, Store Type and Year, 2008-2010 – United States

% of Medium Screw-Base (MSB) Lamps	Large Grocery			Drug			Hardware		
	2008	2009	2010	2008	2009	2010	2008	2009	2010
ADVANCED									
High-wattage CFLs (>30 Watts)									
High-wattage spiral	0.02%	0.02%	0.02%	0.00%	0.01%	0.01%	0.08%	0.08%	0.09%
High-wattage A-lamp	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%
High-wattage tube	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.03%
High-wattage reflector/flood	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Specialty CFLs: dimmable									
Dimmable spiral	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.03%	0.03%
Dimmable reflector/flood	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.18%	0.18%	0.18%
Specialty CFLs: 3-way									
3-way spiral	0.12%	0.10%	0.09%	0.08%	0.20%	0.22%	0.10%	0.08%	0.07%
Other advanced MSB CFLs (≤30 Watts)									
Reflector/flood	0.27%	0.40%	0.42%	0.23%	0.63%	0.60%	1.14%	1.30%	1.24%
A-lamp	0.07%	0.10%	0.08%	0.04%	0.18%	0.25%	0.21%	0.28%	0.33%
Globe	0.04%	0.06%	0.06%	0.24%	0.20%	0.21%	0.21%	0.24%	0.28%
Candelabra (MSB)	0.26%	0.21%	0.19%	0.01%	0.04%	0.15%	0.02%	0.02%	0.02%
LEDs	0.00%	0.01%	0.02%	0.00%	0.00%	0.00%	0.02%	0.12%	0.12%
Small-Base (Candelabra-Base) CFLs	0.01%	0.03%	0.07%	0.00%	0.01%	0.04%	0.03%	0.03%	0.06%
GU-24 Base CFLs	0.00%	0.02%	0.05%	0.00%	0.00%	0.00%	0.00%	0.01%	0.03%
Other Base CFLs	0.02%	0.01%	0.01%	0.00%	0.00%	0.00%	0.02%	0.01%	0.01%
Total Advanced	0.9%	1.1%	1.2%	0.7%	1.4%	1.7%	2.3%	2.7%	2.9%
NON-ADVANCED									
Halogen	1.0%	1.0%	1.0%	1.1%	0.9%	0.7%	6.7%	7.7%	8.5%
Basic CFLs (≤30 Watts)	10.3%	9.7%	8.3%	13.7%	13.6%	14.1%	16.7%	15.4%	15.2%
Incandescent lamps	87.8%	88.2%	89.5%	84.5%	84.1%	83.5%	74.3%	74.2%	73.5%

4.4.3 Percent of CFL Sales by Lamp Type

Figure 4-6 and Figure 4-7 present the percentage of sales for each detailed advanced lamp type as a percentage all CFLs²⁶ sold by retail channel and year. Table 4-15 and Table 4-16 provide additional detail on the percentage of CFLs sold by lamp type, channel, and year.

As mentioned above and shown in Figure 4-6, sales of advanced lighting products in large food stores in California make up less than 5 percent of the CFL sales in that retail channel. While the share has increased, the total number of lamps designated as advanced lighting sold has decreased over the last three years. Sales of advanced lighting products have also remained relatively steady in hardware stores in California with reflectors making up approximately 40 percent of the total advanced lamps sold.

The shares of LED sold in hardware stores, as a percentage of basic CFLs plus advanced lighting, in California have increased over the last three years from 0.4 percent to 2.3 percent²⁷. The sales of several other advanced lighting products have increased over the last three years in California including A-lamps (in all three channels), candelabra base CFLs (in large food and drug stores), and GU-24 base CFLs (in all three channels).

Unlike in California, the sales (and shares) of advanced lighting products in the U.S. has increased over the last three years in drug stores and has remained fairly steady in large food and hardware stores. Sales and shares of CFL A-lamps, LEDs, and candelabra base CFL have all increased in the U.S. in the last three years.

²⁶ This section contains information on shares of advanced lighting products as a share of percentage of basic CFLs plus advanced lighting. Since CFLs make up over 98% of this denominator and for convenience, this section uses the phrase “as a percentage of all CFLs”.

²⁷ A small number of LEDs were sold in large food stores, but these are very low wattage lamps that would not be likely to be used for area or task lighting. Future research should investigate the sales of LEDs by wattage. The POS data includes the detail to make this analysis possible, but it was not included in the scope of this study.

Figure 4-6
Percent of CFLs Sold by Lamp Type, Store Type, and Year, 2008-2010 – California

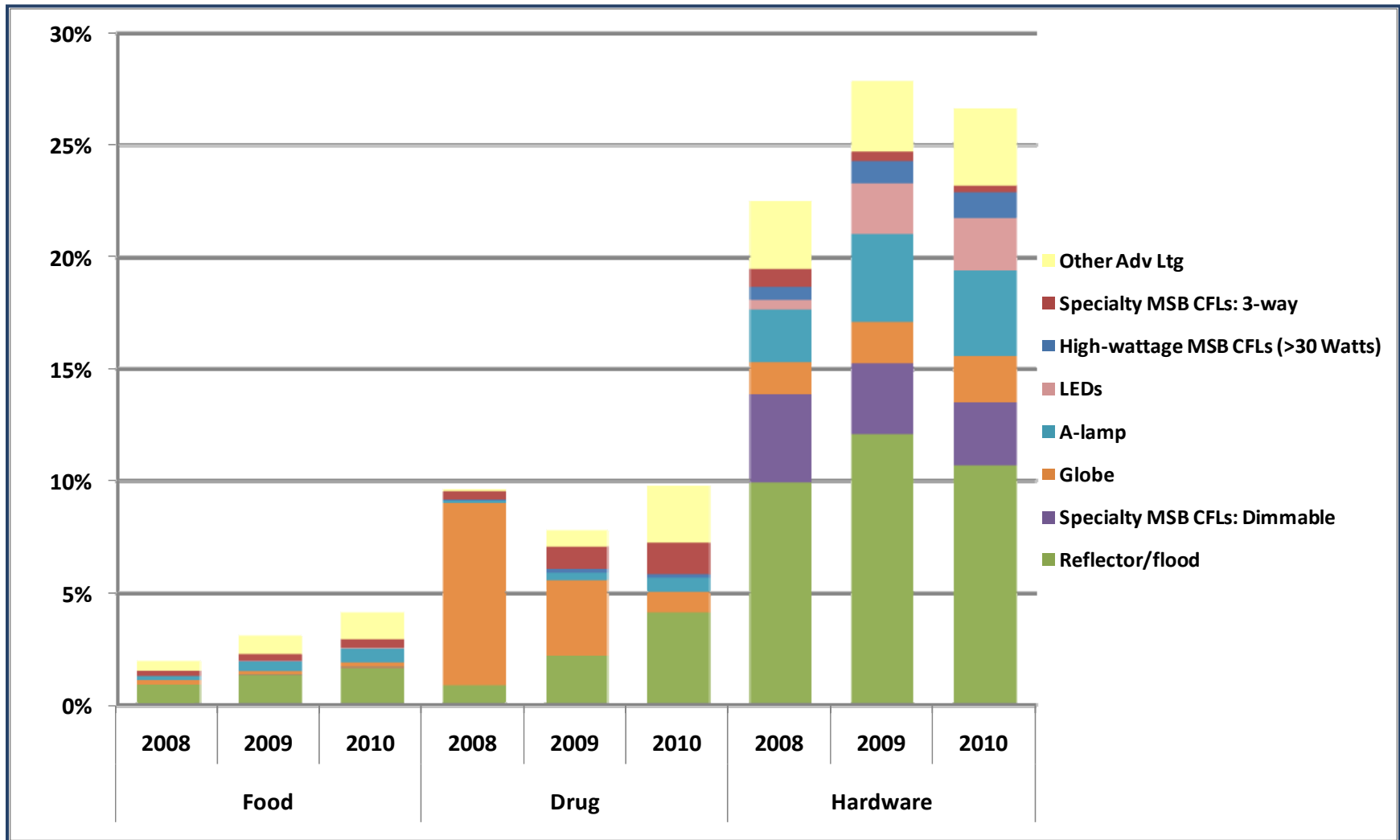


Figure 4-7
Percent of CFLs Sold by Lamp Type, Store Type, and Year, 2008-2010 – United States

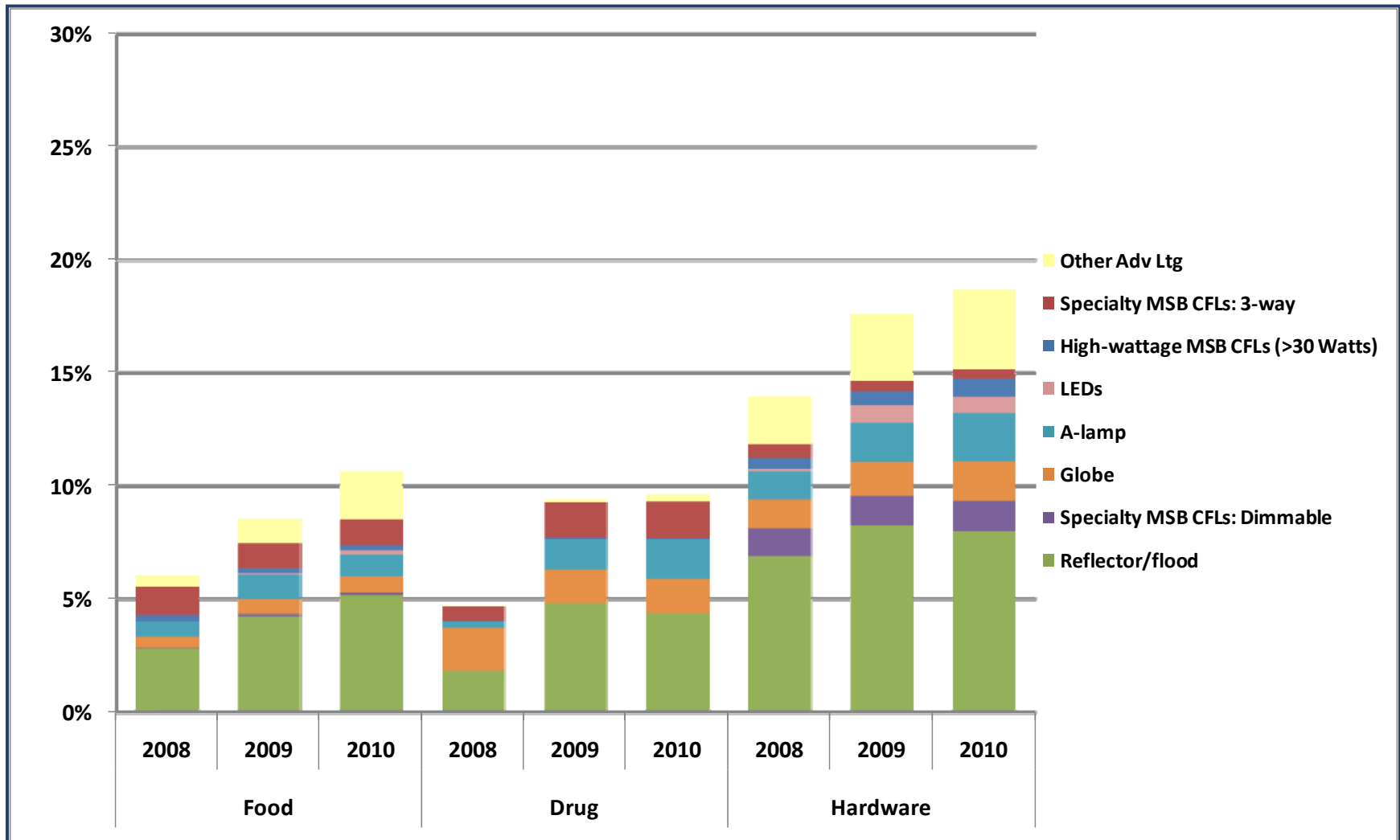


Table 4-15
Percent of CFLs Sold by Lamp Type, Store Type, and Year, 2008-2010 – California

% of All CFLs Sold	Large Grocery			Drug			Hardware		
	2008	2009	2010	2008	2009	2010	2008	2009	2010
ADVANCED									
High-wattage CFLs (>30 Watts)	0.01%	0.02%	0.01%	0.05%	0.18%	0.16%	0.62%	0.98%	1.16%
High-wattage spiral	0.01%	0.01%	0.01%	0.05%	0.18%	0.16%	0.51%	0.76%	0.80%
High-wattage A-lamp	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.08%
High-wattage tube	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.11%	0.20%	0.28%
High-wattage reflector/flood	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Specialty CFLs: dimmable	0.00%	0.01%	0.02%	0.00%	0.00%	0.00%	3.97%	3.20%	2.79%
Dimmable spiral	0.00%	0.01%	0.02%	0.00%	0.00%	0.00%	2.18%	1.14%	0.90%
Dimmable reflector/flood	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.79%	2.06%	1.89%
Specialty CFLs: 3-way	0.24%	0.31%	0.33%	0.40%	0.98%	1.42%	0.78%	0.39%	0.31%
3-way spiral	0.24%	0.31%	0.33%	0.40%	0.98%	1.42%	0.78%	0.39%	0.31%
Other advanced MSB CFLs (≤30 Watts)	1.46%	2.21%	2.79%	9.10%	6.06%	6.41%	13.83%	18.02%	16.71%
Reflector/flood	0.84%	1.31%	1.61%	0.82%	2.14%	4.07%	9.87%	12.03%	10.67%
A-lamp	0.19%	0.39%	0.64%	0.11%	0.35%	0.61%	2.35%	3.96%	3.85%
Globe	0.21%	0.17%	0.21%	8.14%	3.37%	0.96%	1.44%	1.82%	2.05%
Candelabra (MSB)	0.22%	0.35%	0.33%	0.03%	0.19%	0.77%	0.16%	0.22%	0.15%
LEDs	0.00%	0.03%	0.04%	0.00%	0.00%	0.00%	0.39%	2.26%	2.33%
Small-Base (Candelabra-Base) CFLs	0.02%	0.09%	0.23%	0.03%	0.08%	0.33%	1.88%	1.31%	0.96%
GU-24 Base CFLs	0.00%	0.21%	0.54%	0.00%	0.26%	1.23%	0.23%	0.66%	1.16%
Other Base CFLs	0.16%	0.15%	0.10%	0.00%	0.00%	0.00%	0.13%	0.03%	0.03%
Total Advanced	1.89%	3.02%	4.06%	9.57%	7.56%	9.55%	21.83%	26.86%	25.45%

Table 4-16
Percent of CFLs Sold by Lamp Type, Store Type, and Year, 2008-2010 – United States

% of All CFLs Sold	Large Grocery			Drug			Hardware		
	2008	2009	2010	2008	2009	2010	2008	2009	2010
ADVANCED									
High-wattage CFLs (>30 Watts)	0.25%	0.23%	0.23%	0.02%	0.09%	0.06%	0.49%	0.59%	0.79%
High-wattage spiral	0.25%	0.22%	0.22%	0.02%	0.09%	0.06%	0.46%	0.49%	0.59%
High-wattage A-lamp	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.03%
High-wattage tube	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.08%	0.16%
High-wattage reflector/flood	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Specialty CFLs: dimmable	0.03%	0.07%	0.11%	0.00%	0.00%	0.00%	1.23%	1.31%	1.35%
Dimmable spiral	0.03%	0.03%	0.04%	0.00%	0.00%	0.00%	0.17%	0.17%	0.19%
Dimmable reflector/flood	0.00%	0.04%	0.08%	0.00%	0.00%	0.00%	1.06%	1.14%	1.16%
Specialty CFLs: 3-way	1.24%	1.11%	1.16%	0.62%	1.51%	1.58%	0.59%	0.49%	0.43%
3-way spiral	1.24%	1.11%	1.16%	0.62%	1.51%	1.58%	0.59%	0.49%	0.43%
Other advanced MSB CFLs (≤30 Watts)	6.60%	8.23%	9.11%	4.04%	7.92%	8.66%	9.47%	11.61%	11.97%
Reflector/flood	2.79%	4.21%	5.15%	1.77%	4.77%	4.31%	6.83%	8.19%	7.93%
A-lamp	0.70%	1.08%	0.94%	0.29%	1.34%	1.76%	1.23%	1.75%	2.13%
Globe	0.45%	0.68%	0.70%	1.91%	1.49%	1.53%	1.28%	1.52%	1.77%
Candelabra (MSB)	2.65%	2.27%	2.33%	0.06%	0.32%	1.05%	0.12%	0.15%	0.15%
LEDs	0.00%	0.07%	0.20%	0.00%	0.00%	0.00%	0.13%	0.76%	0.74%
Small-Base (Candelabra-Base) CFLs	0.08%	0.33%	0.83%	0.01%	0.04%	0.25%	0.17%	0.19%	0.37%
GU-24 Base CFLs	0.00%	0.24%	0.58%	0.00%	0.00%	0.00%	0.03%	0.08%	0.21%
Other Base CFLs	0.17%	0.14%	0.16%	0.00%	0.01%	0.00%	0.11%	0.07%	0.06%
Total Advanced	8.37%	10.41%	12.38%	4.70%	9.57%	10.55%	12.21%	15.09%	15.92%

4.4.4 Average Prices by Lamp Type

As mentioned above, the POS data include pricing data at the same level of detail as the sales data. This provides valuable insight when reviewing lamp sales. The results in this section present the average price of a lamp, by lamp type, retail channel, and year for California and the U.S.

Figure 4-8 and Figure 4-9 show the average sales price of MSB lamps by retail store type and year for advanced lamps, basic CFLs, and incandescent lamps²⁸. Figure 4-10 and Figure 4-11 illustrate similar pricing data for several other advanced lighting types by store type and year. Table 4-17 and Table 4-18 provide the values presented in the graphs.

Comparing the results presented in Figure 4-8 and Figure 4-9 reveals that the average price of incandescent lamps (both A-lamp and all MSB lamps) in California is higher in every year and in each of the three retail channels than in the United States. Without further research, it is unclear whether the incandescent lamps sold in California are typically higher wattages or if they are simply more expensive in California.

As shown in Figure 4-8, the average price of a basic CFL sold in drug stores in California has increased over the last three years while the price has remained more constant in the U.S.. The average price of a basic CFL has also remained fairly constant, decreasing slightly, in hardware stores in the U.S., including California.

Figure 4-10 illustrates pricing data for several advanced lighting types in California. As shown, the average price of a CFL globe increased dramatically in large food stores and drug stores between 2008 and 2010. As mentioned above, at least one IOU rebated CFL globes in food and drug stores during this period resulting in a lower average price. The effect of the rebated globes sold in drug stores can also be seen in the U.S. results in Figure 4-11. Since a large percentage of the CFL globes sold in the U.S. were sold in California, the average price in 2008 was driven down by the rebated lamps.

²⁸ The tables and graphs present the average price of all incandescent lamps (“All MSBs”) and for incandescent lamps A-lamps separately. Since reflectors, globes, and other lamp types are included in the “Incandescent lamps All MSBs”, it is important present the average price of just the incandescent lamps A-lamps since basic CFL twistors are typically considered a replacement for these A-lamps.

Figure 4-8
Average Sale Prices per Lamp Sold by Store Type and Year, 2008-2010 – California

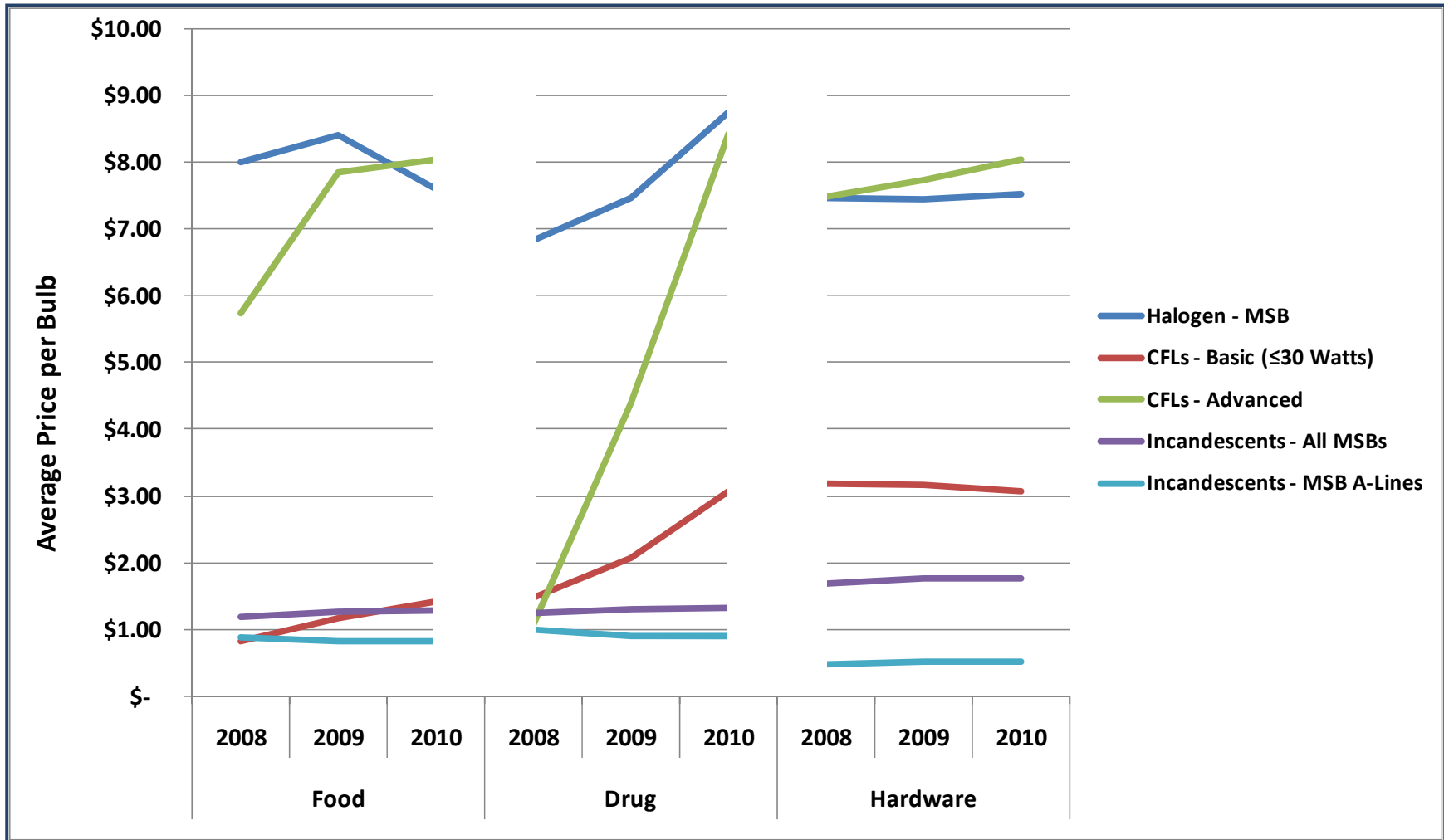


Figure 4-9
Average Sale Prices per Lamps Sold by Store Type and Year, 2008-2010 – United States

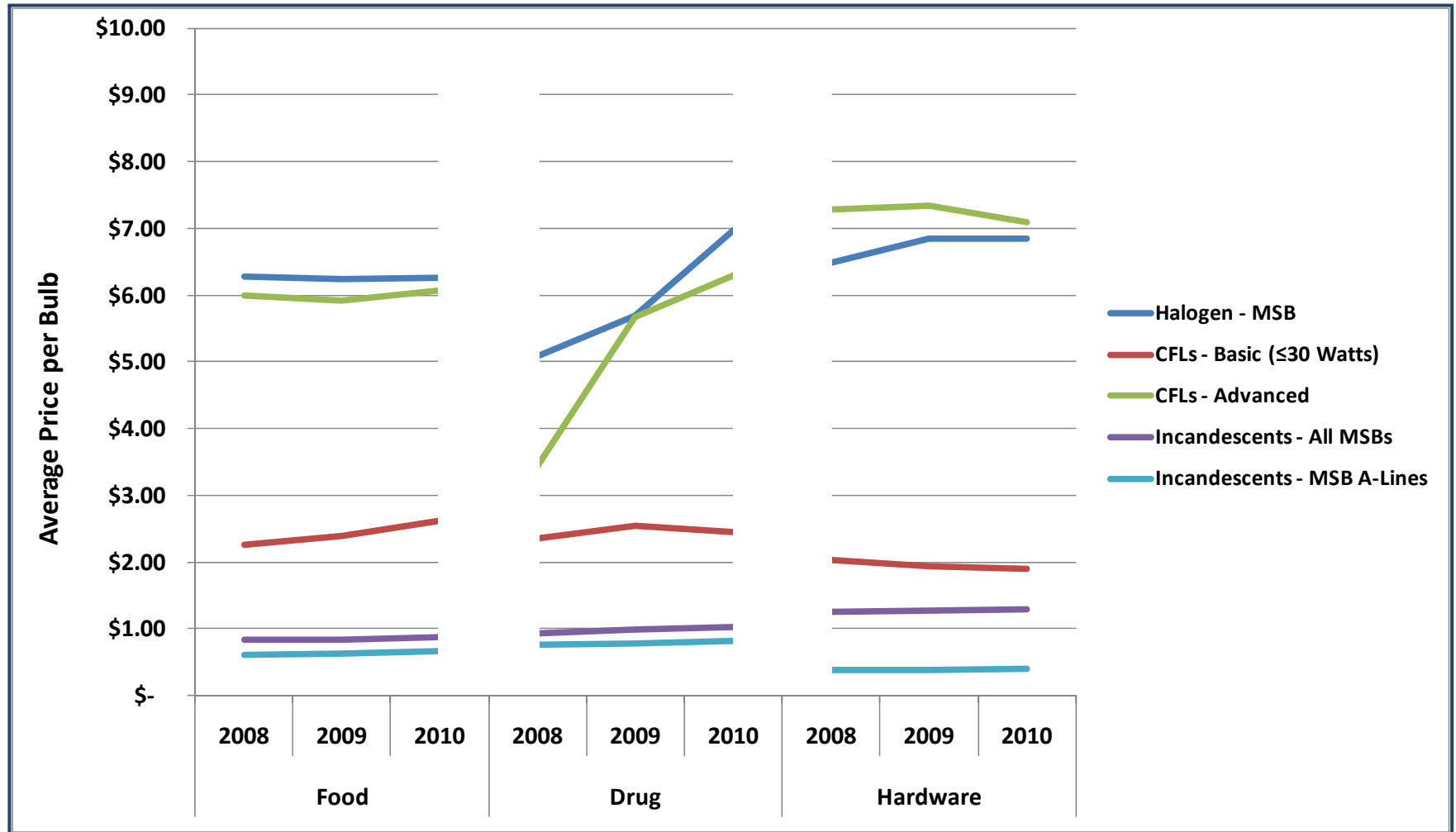


Figure 4-10
Average Sale Prices per Lamps Sold by Store Type and Year, 2008-2010 – California

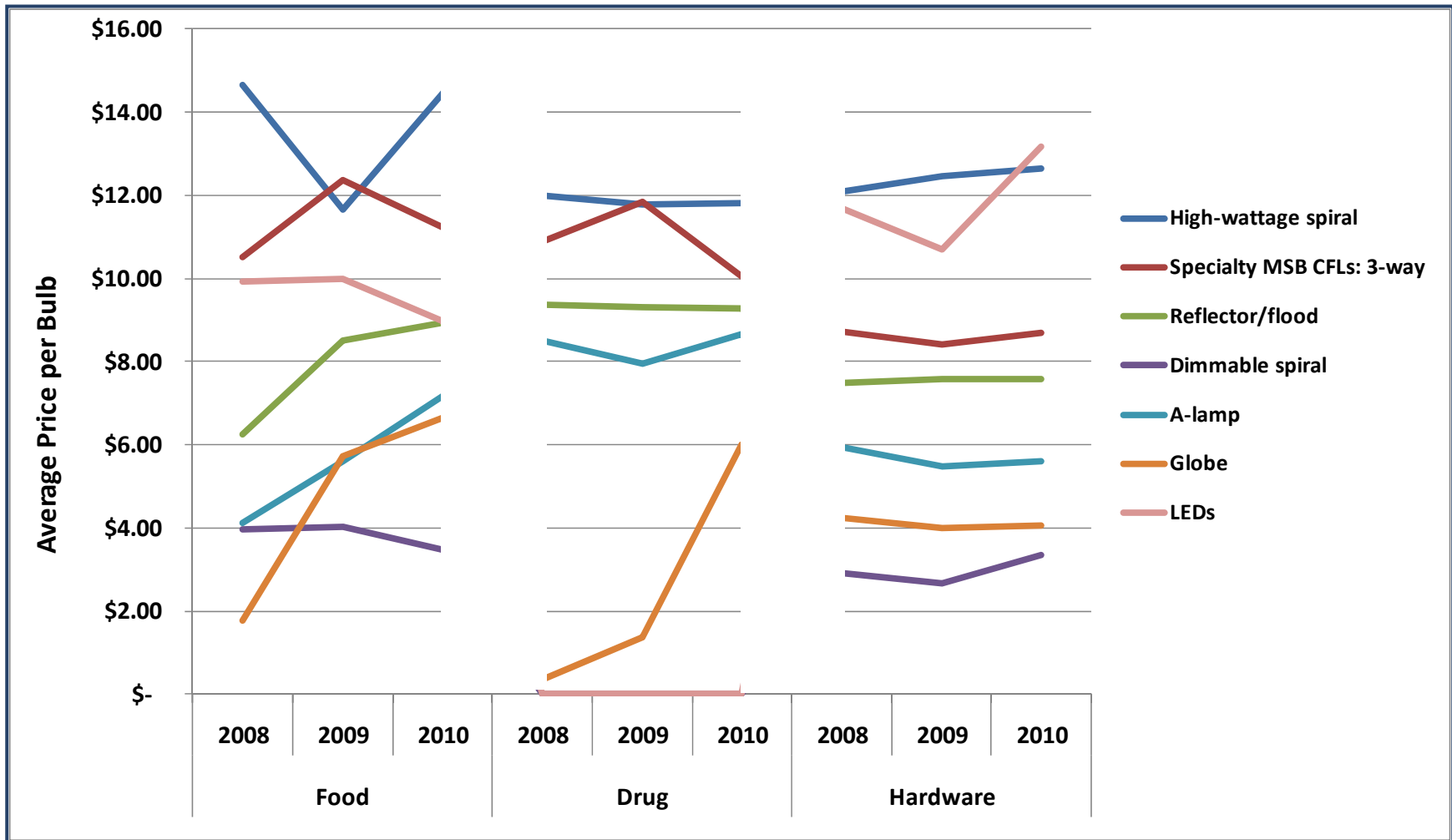


Figure 4-11
Average Sale Prices per Lamps Sold by Store Type and Year, 2008-2010 – United States

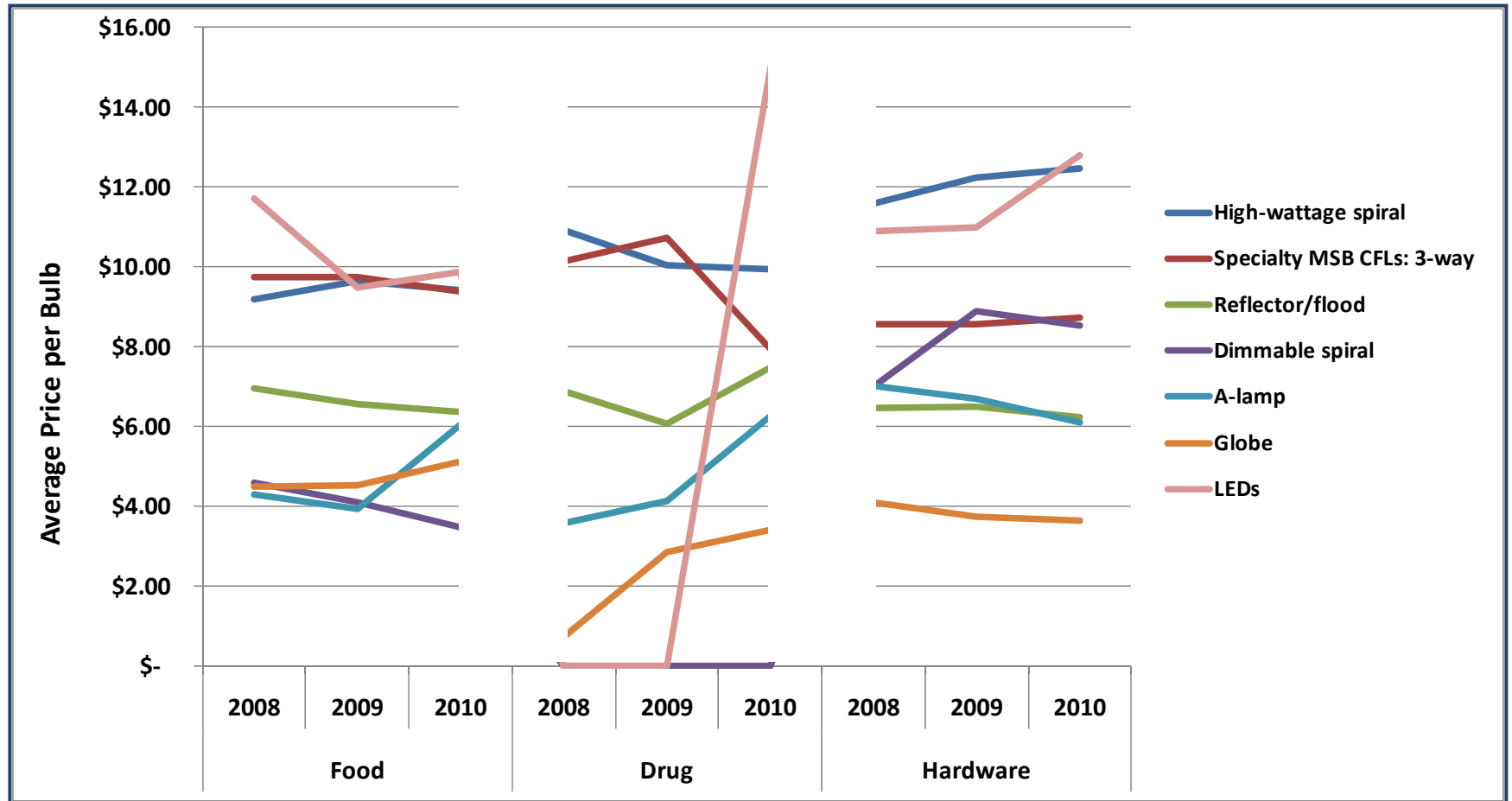


Table 4-17
Average Sale Prices per Lamps Sold by Store Type and Year, 2008-2010 – California

Average Price per Lamp	Large Grocery			Drug			Hardware		
	2008	2009	2010	2008	2009	2010	2008	2009	2010
ADVANCED									
High-wattage CFLs (>30 Watts)									
High-wattage spiral	\$14.66	\$11.65	\$14.48	\$11.99	\$11.78	\$11.81	\$12.10	\$12.46	\$12.64
High-wattage A-lamp								\$9.96	\$9.91
High-wattage tube	\$19.81	\$19.72	\$14.13				\$17.83	\$17.00	\$16.82
High-wattage reflector/flood									
Specialty CFLs: dimmable									
Dimmable spiral	\$3.98	\$4.01	\$3.46				\$2.91	\$2.68	\$3.36
Dimmable reflector/flood							\$15.34	\$14.34	\$13.86
Specialty CFLs: 3-way									
3-way spiral	\$10.50	\$12.37	\$11.21	\$10.89	\$11.85	\$10.06	\$8.72	\$8.41	\$8.71
Other advanced MSB CFLs (≤30 Watts)									
Reflector/flood	\$6.25	\$8.51	\$8.95	\$9.38	\$9.32	\$9.28	\$7.48	\$7.58	\$7.56
A-lamp	\$4.11	\$5.61	\$7.18	\$8.49	\$7.93	\$8.66	\$5.93	\$5.47	\$5.61
Globe	\$1.77	\$5.73	\$6.66	\$0.36	\$1.36	\$5.99	\$4.24	\$3.98	\$4.04
Candelabra (MSB)	\$6.32	\$6.68	\$7.11	\$6.09	\$7.34	\$5.40	\$5.35	\$5.20	\$5.21
LEDs	\$9.94	\$9.98	\$8.97				\$11.68	\$10.69	\$13.17
Small-Base (Candelabra-Base) CFLs	\$9.78	\$6.32	\$5.85	\$7.00	\$7.14	\$6.85	\$3.46	\$3.03	\$3.27
GU-24 Base CFLs		\$6.66	\$6.94		\$6.33	\$8.07	\$7.30	\$7.40	\$6.93
Other Base CFLs	\$5.19	\$5.45	\$5.02				\$2.74	\$5.75	\$4.37
Advanced	\$5.73	\$7.84	\$8.03	\$1.08	\$4.40	\$8.42	\$7.49	\$7.72	\$8.04
NON-ADVANCED									
Halogen	\$7.99	\$8.41	\$7.60	\$6.82	\$7.46	\$8.75	\$7.45	\$7.43	\$7.51
Basic CFLs (≤30 Watts)	\$0.83	\$1.16	\$1.42	\$1.48	\$2.06	\$3.07	\$3.19	\$3.16	\$3.06
Incandescent lamps (All MSB)	\$1.18	\$1.27	\$1.29	\$1.25	\$1.31	\$1.33	\$1.69	\$1.77	\$1.77
Incandescent lamps (MSB A-lamp)	\$0.88	\$0.83	\$0.83	\$0.99	\$0.91	\$0.90	\$0.47	\$0.53	\$0.52

Table 4-18
Average Sale Prices per Lamps Sold by Store Type and Year, 2008-2010 – United States

Average Price per Lamp	Large Grocery			Drug			Hardware		
	2008	2009	2010	2008	2009	2010	2008	2009	2010
ADVANCED									
High-wattage CFLs (>30 Watts)									
High-wattage spiral	\$9.19	\$9.65	\$9.40	\$10.94	\$10.03	\$9.94	\$11.57	\$12.25	\$12.46
High-wattage A-lamp		\$8.94	\$8.81				\$13.04	\$9.95	\$10.72
High-wattage tube	\$17.93	\$17.71	\$14.41				\$15.92	\$14.30	\$13.79
High-wattage reflector/flood	\$18.07	\$17.12	\$16.48						
Specialty CFLs: dimmable									
Dimmable spiral	\$4.61	\$4.11	\$3.47				\$6.98	\$8.91	\$8.54
Dimmable reflector/flood	\$15.07	\$14.38	\$13.58			\$19.14	\$14.17	\$13.92	\$13.00
Specialty CFLs: 3-way									
3-way spiral	\$9.75	\$9.75	\$9.38	\$10.13	\$10.75	\$7.93	\$8.56	\$8.57	\$8.72
Other advanced MSB CFLs (≤30 Watts)									
Reflector/flood	\$6.95	\$6.56	\$6.36	\$6.88	\$6.08	\$7.48	\$6.46	\$6.50	\$6.25
A-lamp	\$4.29	\$3.93	\$6.04	\$3.56	\$4.13	\$6.27	\$7.03	\$6.71	\$6.11
Globe	\$4.49	\$4.52	\$5.12	\$0.73	\$2.86	\$3.42	\$4.10	\$3.74	\$3.63
Candelabra (MSB)	\$3.73	\$3.77	\$3.62	\$5.43	\$5.69	\$3.89	\$5.36	\$5.24	\$5.28
LEDs	\$11.73	\$9.49	\$9.88			\$15.00	\$10.88	\$10.98	\$12.79
Small-Base (Candelabra-Base) CFLs	\$5.57	\$4.62	\$4.67	\$6.85	\$6.77	\$6.39	\$5.22	\$4.49	\$3.72
GU-24 Base CFLs		\$6.21	\$6.41				\$7.48	\$7.59	\$6.97
Other Base CFLs	\$5.63	\$6.09	\$5.60	\$6.00	\$5.76	\$6.48	\$6.97	\$7.62	\$6.94
Advanced	\$6.00	\$5.92	\$6.06	\$3.43	\$5.67	\$6.30	\$7.29	\$7.33	\$7.09
NON-ADVANCED									
Halogen	\$6.28	\$6.25	\$6.25	\$5.09	\$5.69	\$6.98	\$6.49	\$6.85	\$6.84
Basic CFLs (≤30 Watts)	\$2.26	\$2.39	\$2.62	\$2.35	\$2.55	\$2.44	\$2.04	\$1.93	\$1.90
Incandescent lamps (All MSB)	\$0.84	\$0.83	\$0.87	\$0.92	\$0.99	\$1.03	\$1.26	\$1.27	\$1.29
Incandescent lamps (MSB A-lamp)	\$0.62	\$0.63	\$0.66	\$0.76	\$0.78	\$0.82	\$0.39	\$0.38	\$0.39

5. Summary of Findings

This section presents a summary of findings based on analyses the California and non-California retail store shelf survey databases, the California residential and nonresidential lighting socket inventory databases, and the California and United States POS data.

5.1 Stocking

Analyses of the California and non-California retail store shelf survey databases yielded several key findings related to advanced lamp stocking – that is, the percentage of stores within each store type that carry advanced lamps – including:

- Among the retail stores visited throughout California in 2008-2009 and non-California states in 2009, all carried at least one MSB advanced lighting product.
 - The percentage of California discount, grocery, and drug stores carrying specific MSB advanced lamp products was typically lower than the percentage of large home improvement, mass merchandise, membership, and hardware stores carrying corresponding products.
 - In California, the large home improvement, mass merchandise, and membership categories included a significant percentage of stores that carry LEDs as part of their advanced lamp inventory (two-thirds of stores or greater for each store type).
 - A somewhat smaller proportion of California membership stores carried LEDs as compared with non-California membership stores (79% versus 86%, respectively), but a far larger proportion of California home improvement stores carried LEDs than non-California home improvement stores (66% versus 11 percent, respectively).
- Reflector/floods and a-lamps were the most common MSB advanced lamp types stocked in California stores (found in 68% and 65% of stores respectively) followed by globes (58% of stores).

5.2 Lamp Inventory

The California and non-California shelf survey database analyses yielded inventory-related information on the percentage of total MSB lamps and MSB lamp packages in retail stores represented by advanced lamps.

- In California, advanced lamps comprise 40 percent of total MSB lamps in mass merchandise stores, 32 percent of lamps in membership stores (primarily CFL

reflectors/floods) and 25 percent in grocery stores (primarily A-lamp CFLs). In other store types, advanced lamps comprise smaller percentages of all MSB lamps, the lowest being discount stores (in which advanced lamps comprise only 1 percent of total lamps). Again, low availability of advanced lamps in discount stores may be a concern with regard to making these products available to hard-to-reach customers.

- The proportion of stock represented by a given MSB lamp type in Non-California stores tends to mirror the proportion found in non-California stores for that lamp type, particularly when viewing the aggregated data across all store types. For instance, basic CFLs represented 31 percent of all lamps found in non-California stores and 31 percent of all lamps found in California stores. With respect to advanced lamps, 15 percent of all lamps are advanced lamps in non-California stores compared to 19 percent of all lamps in California stores.
- LEDs comprise double the proportion of all lamps across all store types in California stores when compared with Non-California stores (1.59 percent versus 0.79 percent).
- Basic CFLs (MSB) are typically sold in larger package sizes than MSB advanced lamps regardless of store type or location.

5.3 Advanced Lamp Diversity

Further analysis of the California shelf survey database revealed some patterns in the number of unique advanced lamp models stocked by the various store types. These include:

- Large home improvement stores in California show the highest diversity of model numbers among advanced lamps with 186 unique model numbers (across all lamp types). There are 97 unique advanced lamp model numbers in the mass merchandise stores surveyed, and 85 among the hardware stores surveyed. Discount stores have the lowest diversity of advanced lamp models with only 4 across all advanced lamp types.
- Advanced lamps in the “Other Advanced MSB CFLs (\leq 30 Watts)” category – non-dimmable single-wattage CFLs in reflector/flood, A-lamp, globe, candelabra (MSB), bug light, or tube shapes – comprised the largest number of advanced lamp models in each store type in California. Researchers found 110 unique models in this category at large home improvement stores followed by 70 unique models in this category at mass merchandise stores.
 - Within this category, MSB reflector/flood CFLs have the greatest diversity of model numbers among all advanced lamp types (85 models).

- Also among MSB CFLs, researchers found 57 unique model numbers in the A-lamp category and 37 unique globe models.
- Hardware stores had the largest number of LED models across all California store types (11 models) followed by membership stores (7 models).

5.4 Lamp Installation and Storage

Analyses of the California residential and nonresidential (small commercial) socket inventories suggest the following:

- Residential
 - Approximately 60 percent of lamps installed and stored in California residences in 2009 were incandescent lamps.
 - Basic CFLs comprised a greater percentage of lamps in storage in California households (27%) than lamps installed in California households (16%). Conversely, fluorescent lamps represented a larger proportion of installed lamps (12%) than stored lamps (2%).
 - Advanced lamps represented approximately 5 percent of both installed and stored lamps in California residences in 2009.
- Nonresidential²⁹
 - Of the CFLs installed in California businesses included in the sample in 2009, 42 percent were advanced lamps.
 - Of the CFLs in storage in California businesses included in the sample in 2009, 25 percent were advanced lamps.

5.5 Advanced Lamp Sales

Analyses of the point-of-sales data suggest the following regarding lamp sales:

- Incandescent lamps comprised roughly two-thirds or more of all MSB lamp sales in California food, drug, and hardware stores in 2008, 2009 and 2010 and roughly three-quarters or more of sales in these store types across the U.S. as a whole.

²⁹ Recall that the non-residential inventories included CFLs only (i.e., did not include incandescent lamps or other lamp types).

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- In 2010, incandescent lamps comprised similar proportions of MSB lamp sales in drug and grocery stores in California compared to the U.S. as a whole. In food stores, incandescent lamps comprised a larger proportion of total lamp sales in the U.S. as a whole than in California (90% versus 79%, respectively).
 - Advanced lamps comprised approximately 1 percent or less of MSB lamps sold through food stores in California or the U.S. in 2008—2010. In drug stores, with the exception of 2008 in California (likely an anomaly because one IOU sold many globe-style CFLs through California drugstores), advanced lamps comprised between 1 and 1.7 percent of all MSB lamps sold in 2008—2010 in California and the U.S.. Advanced lamps comprised approximately 3 percent of all MSB lamps sold in California hardware stores between 2008 and 2010, very slightly higher than the percentage of MSB lamps sold in U.S. hardware stores during the same timeframe.

5.6 Advanced Lamp Prices

Analyses of the point-of-sales data suggest the following regarding lamp prices:

- The average price of incandescent lamps is higher in California in food, drug, and hardware stores in 2008, 2009 and 2010 than in the United States. Without further research, it is unclear whether the incandescent lamps sold in California are typically higher wattages or if they are simply more expensive in California.
- The average price of a basic CFL sold in California drugstores has increased over the last three years while the price has remained relatively constant in the U.S.. The average price of a basic CFL has also remained fairly constant, decreasing slightly, in hardware stores in California and in the U.S. as a whole.
- The average price of a CFL globe in California increased dramatically in large food stores and drug stores between 2008 and 2010. As mentioned above, at least one IOU rebated CFL globes in food and drug stores during this period resulting in a lower average price in 2008. A large percentage of the CFL globes sold in the U.S. were sold in California, the average price in 2008 was driven down by the discounted globes in California.

A. Additional Shelf Survey Data Tables

This appendix provides additional detail on the following shelf survey results by IOU service territory:

- Percentage of stores carrying MSB lamps;
- Percentage of MSB packages by lamp type;
- Percentage of MSB lamps by lamp type; and
- Number of advanced lamp models by lamp type.

Percentage of Stores Carrying MSB Lamps

Table A-1 below shows the percentage of stores carrying MSB lamps by lamp type and by Investor-Owned Utility (IOU) territory. The percentage of stores carrying MSB lamps within each of the 3 IOU territories is, for the most part, similar to the percentage of stores carrying MSB lamps across all stores and all IOU territories. Nearly 100 percent of stores in PG&E, SCE, and SDG&E carry basic CFLs. With respect to incandescents, more than eighty percent of PG&E and SCE stores and nearly all of the stores surveyed in SDG&E territory carry incandescents. The distribution of advanced CFLs is relatively even across all 3 IOUs. In terms of the distribution of stores that carry LEDs, 40 percent of PG&E stores that researchers surveyed have LEDs, 34 percent of SCE stores stock LEDs, and 43 percent of SDG&E stores carry LEDs.

Table A-1
Expanded California Stores: Percent of Stores Carrying MSB Lamps by Lamp Type and IOU Territory, 2009

Medium Screw-Base (MSB) Lamp Type	IOU Territory			Overall
	PG&E	SCE	SDG&E	
ADVANCED				
High-wattage CFLs (>30 Watts)				
High-wattage spiral	33%	27%	33%	31%
High-wattage tube	2%	5%	10%	5%
High-wattage reflector/flood	0%	1%	1%	1%
Specialty CFLs: dimmable				
Dimmable spiral	38%	27%	46%	36%
Dimmable reflector/flood	31%	26%	38%	30%
Specialty CFLs: 3-way				
3-way spiral	48%	45%	56%	48%
Other advanced MSB CFLs (≤30 Watts)				
Reflector/flood	63%	66%	85%	69%
A-lamp	63%	66%	68%	65%
Globe	58%	53%	68%	58%
Candelabra (MSB)	39%	41%	54%	43%
Tube	11%	15%	22%	15%
Bug Light	30%	38%	53%	38%
LEDs*	40%	34%	43%	38%
NON-ADVANCED				
Halogen^	11%	9%	10%	10%
Basic CFLs (≤30 Watts)	98%	98%	96%	98%
Incandescents	86%	82%	96%	87%
Other lamp types#	3%	2%	0%	2%
Number of Stores	123	131	72	326

* Includes non-MSB LEDs. ^ Halogen lamps were surveyed in only 48 of 326 stores. # "Other lamp types" category is comprised primarily of cold cathode and HID lamps.

Percentage of MSB Lamps by Lamp Type

Table A-2 below shows the percentage of MSB lamps by lamp type and IOU territory. Similar to MSB packages, the distribution of MSB lamps within each of the 3 IOU territories tracks closely with the distribution of MSB lamps across all IOU territories. In the category of incandescent lamps, 41 percent of 85,559 total MSB lamps in PG&E territory are incandescents, 44 percent of 108,122 total lamps in SCE territory are incandescents, and 47 percent of 45,654 lamps in

SDG&E territory are incandescents. With respect to the combined number of lamps for advanced CFLs, 19 percent of all MSB lamps in PG&E territory are advanced CFLs, 16 percent of all MSB lamps in SCE territory are advanced CFLs, and 22 percent of all MSB lamps in SDG&E territory are advanced CFLs. For basic spiral CFLs, 31 percent of all MSB lamps in PG&E territory are basic CFLs, 34 percent of all MSB lamps in SCE territory are basic CFLs, and 23 percent of all MSB lamps in SDG&E territory are basic CFLs.

**Table A-2
California Stores: Percentage of MSB Lamps by Lamp Type and IOU Territory, 2009**

Medium Screw-Base (MSB) Lamp Type	IOU Territory			Overall
	PG&E	SCE	SDG&E	
ADVANCED				
High-wattage CFLs (>30 Watts)				
High-wattage spiral	0%	0%	0%	0%
High-wattage tube	0%	0%	0%	0%
High-wattage reflector/flood	0%	0%	0%	0%
Specialty CFLs: dimmable				
Dimmable spiral	1%	1%	3%	1%
Dimmable reflector/flood	2%	1%	1%	1%
Specialty CFLs: 3-way				
3-way spiral	0%	1%	0%	0%
Other advanced MSB CFLs (≤30 Watts)				
Reflector/flood	5%	3%	3%	4%
A-lamp	5%	7%	6%	6%
Globe	2%	1%	3%	2%
Candelabra (MSB)	1%	0%	0%	0%
Tube	3%	2%	5%	3%
Bug Light	0%	0%	0%	0%
LEDs	1%	1%	1%	1%
NON-ADVANCED				
Halogen	8%	6%	7%	7%
Basic CFLs (≤30 Watts)	31%	34%	23%	31%
Incandescents	41%	44%	47%	43%
Other lamp types*	0%	0%	0%	0%
Total MSB Lamps	100%	100%	100%	100%
Number of MSB Lamps	85,559	108,122	45,654	239,335

* "Other lamp types" category is comprised primarily of cold cathode and HID lamps.

Percentage of MSB Lamp Packages by Lamp Type

Table A-3 below shows the percentage of MSB packages by lamp type and IOU territory. The distribution of MSB packages within each of the 3 IOU territories tracks closely with the distribution of MSB packages across all IOU territories. For instance, the distribution of incandescent packages across the three IOUs is nearly identical at 38 percent of 33,338 total MSB packages in PG&E territory, 35 percent of 42,982 total packages in SCE territory, and 37 percent of 18,326 packages in SDG&E territory. With respect to the combined number of packages for advanced CFLs, 23 percent of all MSB packages in PG&E territory are advanced CFLs, 22 percent of all MSB packages in SCE territory are advanced CFLs, and 28 percent of all MSB packages in SDG&E territory are advanced CFLs. As for basic spiral CFLs, 23 percent of all MSB packages in PG&E territory are basic CFLs, 30 percent of all MSB packages in SCE territory are basic CFLs, and 23 percent of all MSB packages in SDG&E territory are basic CFLs.

Table A-3
California Stores: Percent of MSB Packages by Lamp Type and IOU Territory, 2009

Medium Screw-Base (MSB) Lamp Type	IOU Territory			Overall
	PG&E	SCE	SDG&E	
ADVANCED				
High-wattage CFLs (>30 Watts)				
High-wattage spiral	0%	0%	0%	0%
High-wattage tube	0%	0%	0%	0%
High-wattage reflector/flood	0%	0%	0%	0%
Specialty CFLs: dimmable				
Dimmable spiral	2%	2%	3%	2%
Dimmable reflector/flood	2%	1%	1%	1%
Specialty CFLs: 3-way				
3-way spiral	0%	1%	0%	1%
Other advanced MSB CFLs (≤30 Watts)				
Reflector/flood	4%	4%	3%	4%
A-lamp	7%	9%	8%	8%
Globe	3%	2%	3%	2%
Candelabra (MSB)	1%	0%	0%	0%
Tube	4%	2%	7%	4%
Bug Light	0%	0%	0%	0%
LEDs	2%	1%	1%	2%
NON-ADVANCED				
Halogen	14%	11%	11%	12%
Basic CFLs (≤30 Watts)	23%	30%	23%	26%
Incandescents	38%	35%	37%	37%
Other lamp types*	0%	0%	0%	0%
Total MSB Lamp Packages	100%	100%	100%	100%
Number of MSB Lamp Packages	33,338	42,982	18,326	94,646

* "Other lamp types" category is comprised primarily of cold cathode and HID lamps.

Number of Advanced Lamp Models

Table A-4 below shows the number of unique advanced lamp model numbers by advanced by lamp type and IOU territory. The stores surveyed in SCE territory have the greatest number of unique advanced lamp model numbers with 264. PG&E stores have 202 unique model numbers and SDG&E has 113 unique model numbers. Stores that were surveyed in SCE territory have the highest number of unique MSB reflector/flood model numbers with 71 as compared with 47 unique reflector/flood model numbers in PG&E territory and 28 in SDG&E territory. SCE territory stores also have the greatest number of unique small-base CFLs with 23 as compared with 9 unique small-base CFL model numbers in PG&E stores and 7 in SDG&E stores.

Table A-4
California Stores: Number of Unique Advanced Lamp Models (All Base Types)
by Advanced Lamp Type and IOU Territory, 2009

Advanced Lamp Type	IOU Territory			Overall
	PG&E	SCE	SDG&E	
High-wattage MSB CFLs (>30 Watts)				
High-wattage spiral	9	15	4	20
High-wattage tube	1	3	1	3
High-wattage reflector/flood	-	-	-	-
Specialty MSB CFLs: dimmable				
Dimmable spiral	9	15	7	18
Dimmable reflector/flood	10	14	9	20
Specialty MSB CFLs: 3-way				
3-way spiral	10	13	6	18
Other Advanced MSB CFLs (≤30 Watts)				
Reflector/flood	47	71	28	85
A-lamp	39	41	15	57
Globe	22	27	12	37
Candelabra (MSB)	11	11	4	18
Tube	-	2	1	3
Bug Light	9	8	5	13
LEDs	12	13	8	17
Small-Base (Candelabra-Base) CFLs	9	23	7	25
GU-24 Base CFLs	7	7	5	9
Other Base CFLs*	7	1	1	8
Number of Advanced Lamp Models	202	264	113	351

* "Other Base CFLs" excludes standard pin-based CFLs (non-GU) as these are not considered Advanced Lamps.

B. Advanced Lighting Literature Review (Non-California)

As part of the Phase 2 Advanced Lighting Baseline Study, KEMA staff conducted a literature search to identify sources of non-California information on advanced lighting product sales, stocking, saturation, and pricing to provide points of comparison with the baseline data collected in California.

To locate non-California baseline data on advanced lighting products, we relied on the following resources:

- **NEEP Repository of State and Topical EM&V Studies** (<http://neep.org/emv-forum/emv-library/research-evaluation-studies>), which contains links to state-level and regional studies performed in the New England and Mid-Atlantic states;
- **CEE Evaluation/Research Clearinghouse** (<http://www.cee1.org/search/search.php>), which contains links to studies performed throughout the United States and Canada;
- **Internet Searches** using advanced lighting product-related search terms; and
- **Canvass of KEMA, Inc. Lighting Experts**, including principals and project managers who have been or are currently are involved in energy-efficient lighting evaluation projects.

To be most useful for comparative purposes, we initially restricted our literature search to research reports containing primary data from non-California sources in the public domain that had been collected during the California baseline period (2008-2009). Subsequently, having found few data sources meeting these criteria, we expanded our search to include data from 2006-2007 and 2010-2011, as well.

We found few studies containing detailed data on specific advanced lighting lamp types. Two state-level studies we found were exceptionally useful, reporting detailed data from surveys of residential households during the 2008-2009 period that were statistically representative of households in their respective states. These studies, performed for consortia of electric utilities in Massachusetts and Connecticut, respectively, contain a wealth of information, including detailed breakouts of sales, availability, market penetration, and socket saturation for specific types of advanced lighting products. We found a number of older state-level and regional studies containing some useful information on these products, as well, albeit at much lower levels of detail. And we found two recent national studies released by the U.S. Department of

Energy which provide longer-range overviews of broad trends in shipments and pricing of CFLs in general. These are described below.

Recent State-Level Market Evaluations

The two most directly comparable studies we found, evaluations of CFL markets in Northeastern states, are shown in Table B-1. Following this, we describe the key findings of each study.

Table B–1
Non-California Studies with Advanced Lighting Baseline Data for 2008-2009 Period

State / Region	Title of Report	Pub. Date	Author(s)	Client(s)	Year(s) of data
CT	The Market for CFLs in Connecticut	Mar-10	NMR Group, KEMA, SRBI	Conn. Energy Conservation Management Board, CL&P, United Illuminating Co.	2009
MA	The Market for CFLs in Massachusetts	Jan-10	NMR Group, KEMA, Abt-SRBI	Cape Light Compact, National Grid, NSTAR Electric, Unitil, Western Mass. Electric	2008, 2009

Connecticut (2009 data, 2010 report)

The Connecticut market evaluation study reports 2009 primary data from a random digit dial (RDD) telephone survey of 500 residential customers in the state, an in-store intercept survey of 17 customers in retail outlets, and on-site home surveys of 95 customers conducted with a subset of the RDD respondents. The RDD and on-site survey data were weighted to reflect the population proportions for home ownership in the state. Because the RDD results differed substantially from those obtained with the on-site surveys, the findings discussed below are based solely on the weighted on-site data.

The on-site survey collected data on each socket in the home, including lamp type and style, wattage, application, socket type, room location, and specialty features if any; respondents were also asked to recall the date and store where the item was purchased. More than 4 out of 5 (85%) of Connecticut households were found to have at least one CFL installed, but fewer than one-third had one or more “specialty” CFL installed (30%).³⁰ The number of specialty CFLs in

³⁰ In the Connecticut and Massachusetts studies, “specialty” CFLs included dimmable, three-way, recessed/flood, candelabra, globe, A-lamp, bullet/torpedo shaped, and bug-light varieties; note that this

use in the average Connecticut home was found to be 1.8, compared to 8.7 standard spiral CFLs. Of the specialty CFLs in current use in homes, three-way and flood/recessed were the most common varieties, with nearly 1 in 5 (19%) of homes containing at least one lamp in each category. Twelve percent of homes had one or more A-lamp CFLs installed, and lesser proportions reported having other specialty styles. Somewhat surprisingly, no dimmable CFLs were encountered during the on-site surveys.³¹

In terms of socket saturation, the Connecticut study found that CFLs were installed in roughly one-quarter (23%) of residential sockets. Of these, the standard spiral style remained the dominant type, accounting for 74 percent of CFL sockets, or about 17 percent of all state residential sockets. By contrast, all styles of advanced CFLs combined accounted for 26 percent of CFL sockets, or roughly 6 percent of all residential sockets in the state. Flood and tube style CFLs accounted for 2 percent of all residential sockets each, with each of the other advanced lamp styles accounting for less than 1 percent each.

The Connecticut study found that about 1 in 4 households reported purchasing CFLs in 2009. Of these, 21% purchased the standard spiral style, and 4% purchased specialty varieties. Standard CFLs represented more than four-fifths (84%) of all CFL purchases in 2009, and all specialty CFL styles combined accounted for the other 16%. The most numerous specialty CFLs purchased in 2009 were the globe, three-way, flood/recessed, and candelabra styles.

Massachusetts (2009 data, 2010 report)

The aforementioned Massachusetts market evaluation study reports 2009 primary data from RDD surveys of 503 state residents, and an on-site socket inventory of 100 homes. As was the case with the Connecticut study, notable differences were observed between the RDD and on-site results for CFL usage, storage and purchases, and thus only the weighted on-site results are discussed here, since they are more reliable.

The Massachusetts on-site surveys gathered data very similar to what was collected for the Connecticut study. The study authors found that while overall CFL penetration in Massachusetts

set of products encompasses many advanced lighting products per the California IOUs' definitions, but CT and MA do not include CFLs greater than 30 watts in their definitions of "specialty lamps" as would be included in the California definition of "advanced lamps."

³¹ Dimmable CFL purchases and current use were reported in the Connecticut RDD and store intercept results; and dimmables in current use were encountered in the Massachusetts RDD and on-site surveys (see below). The authors of the Connecticut report suggest that their respondents may have been confused by the term, blurring the distinction between dimmable lamps and dimmer switches.

homes was high, with 88 percent of homes having at least one CFL installed, only 25 percent of homes had one or more specialty CFLs installed. The number of specialty CFLs in use in the average Massachusetts home was found to be 1.3 lamps per home, compared to 8.1 standard spiral CFLs. Of the specialty CFLs in current use in homes throughout the state, the most common varieties were the flood/recessed and A-lamp styles, one or more of which were installed in 8 and 9 percent of homes, respectively. Bullet/torpedo CFLs were found in 6 percent of homes, globe CFLs in 5 percent of homes, and dimmable and three-way CFLs were each found in 4 percent of homes.

In terms of socket saturation, the Massachusetts study found that overall, 26 percent of Massachusetts residential sockets contained a CFL in 2009.³² Of all residential sockets in the state, about 30 percent contain specialty lamps; about 12 percent of these, or 4 percent of the total lamps, are specialty CFLs. Roughly 22 percent of Massachusetts household sockets contain A-shape or spiral CFLs; about 21 percent of these are spirals, and about 1 percent are A-lamp. The other specialty CFL styles account for much smaller shares of residential sockets: for example, dimmable and three-way CFLs account for less than 1 percent of residential sockets in the state.

In terms of purchases, 19 percent of Massachusetts households bought one or more CFLs of any type in 2008. Eighteen percent purchased the standard spiral variety, and 5 percent purchased one or more specialty styles.³³ Among the specialty styles purchased in 2008, dimmables, globe, and flood/recessed were the most popular, one or more having been purchased by 2 percent of state households. The candelabra, A-lamp and bug light varieties were each reported to have been purchased by 1 percent of households.

Studies with Less Comprehensive Data on Advanced Lighting Products

Casting our net more broadly, we found a relatively large number of studies that provide some limited information on advanced lamps or fixtures, including sales, retail outlet stocking, pricing, saturation and market penetration, albeit for a limited number of specialty CFL types or for all

³² By contrast, roughly two-thirds of sockets contained either an incandescent (62%) or a halogen (5%).

³³ The standard and specialty percentages don't add to the total because some respondents reported purchasing both types.

specialty types combined. These are presented in Table B-2. Following the table, we briefly describe each study.

**Table B–2
Non-California Studies Containing Less Comprehensive Advanced Lighting Data**

State / Region	Title of Report	Pub. Date	Author(s)	Client(s)	Year(s) of data
Pacific Northwest	2008-09 CFL Tracking Study, ENERGY STAR Consumer Products Lighting Project, Market Progress Evaluation Report	Jul-09	KEMA	Northwest Energy Efficiency Alliance	2008
MA	Market Progress and Evaluation Report for the 2007 Massachusetts ENERGY STAR Lighting Program, Final (Vol. 1, Findings and Analysis)	Jul-08	NMR Group, RLW Analytics, Dorothy Conant	Cape Light Compact, Mass. Electric Co., Nantucket Electric Co., NSTAR Electric, Unutil, Western Mass. Electric Co., Unutil	Thru 2007
Puget Sound Area	Puget Sound Area Residential Compact Fluorescent Lighting Market Saturation Study	Nov-07	EMI	Puget Sound Energy, Seattle City Light, Snohomish County PUD	2006, 2007
APS Service Territory	APS Measurement, Evaluation & Research (MER) Report: Consumer Products Program (CPP)	Sep-08	Summit Blue, Opinion Dynamics Corp.	APS	Thru 2007
National	CFL Market Profile 2009	Mar-09	U.S. DOE	n/a	Up to 2008
National	CFL Market Profile 2010	Sep-10	U.S. DOE	n/a	Up to 2009

NEEA’s 2008-2009 CFL Tracking Study contains information on trends in the Pacific Northwest region on product availability in stores and retail pricing of CFLs. Data were collected in a series of interviews with retailers and manufacturers, and 58 retail outlet shelf surveys. No data were collected from consumers. Among the key findings was that the proportion of lighting retailers carrying CFLs increased between 2006 and 2008. The average number of spiral-type lamps rose dramatically during this period, while the average number of specialty CFL types³⁴ held constant. Prices for CFLs in the Northwest region remained constant on average over the period.

The Market Progress and Evaluation Report done for the Massachusetts Energy Star lighting program for the 2007 program year contains statewide information on retail outlet stocking of

³⁴ NEEA includes all a-lamps in their definition of “general purpose” CFLs (not in the specialty lamp category) and does not include wattage in its classification of CFLs as general purpose or specialty.

advanced lighting products by lamp type, as well as annual sales and saturation data for CFLs as a whole for 2003-2007.

The Puget Sound Area study contains limited saturation data from 2006-2007 for several advanced lamp and fixture types, as well as sales, saturation and penetration data for CFLs as a whole.

The APS MER Report contains detailed data from 2005-2007 by lamp type for a limited number of advanced CFL styles, including sales and pricing.

Finally, the two DOE reports on the state of the national CFL market, while not reporting CFL data separately by lamp type, do contain information on long-term trends in price, socket saturation and market share for CFLs in general. One notable finding reported in the 2010 DOE report is that the overall market for CFLs has declined by more than 30 percent from its peak in 2007 to 2009. During this period, shipments of incandescents remained relatively constant. Despite this recent decline, shipments of CFLs remain much higher than in 2000. Incandescent lamp shipments were essentially flat during this interval.