

## Massachusetts C&I Evaluation Contract Project Summary: C&I Customer On-site Assessments and Market Share and Sales Trends Study

Project Timeframe: Aug 2014–Sept 2016  
Research Area: Market Characterization

High-level study objectives: Provide a clear understanding of the existing C&I building market in Massachusetts and assess the market share and sales trends for recently purchased high efficiency equipment.

**Project design and outreach:** This study used field data collection methods to gather detailed on-site facility-level data on a wide range of energy-consuming building equipment, including HVAC, lighting, refrigeration, hot water, EMS, and others. To complete this study, the DNV GL team recruited and visited 800 businesses of different types and different sizes from across the Commonwealth.

### Key findings:

**While LEDs represent an increasing share of linear lighting purchases, many business segments still have a large share of base linear lighting technologies (T12 and 700- and 800-Series T8s).**

- The 3 business types with the highest share of base efficiency linears are offices (86%), retail (88%), and public assembly (94%). These business types represent 65% of the population on a site-weighted basis.
- Prior to 2012, linear LEDs were seldom observed in the Massachusetts commercial sector. From 2012-2014, linear LEDs represented 18% of linear purchases.

**Massachusetts businesses are rapidly retrofitting incandescent and CFL lamps with LEDs**

- CFL lamps are 44% of the existing stock of socket and pin-based lamps; however, recent purchase data showed a marked decline in CFL lamps (6%) a dramatic increase in recent LED purchases (44%).

**Opportunities for greater efficiency remain in certain segments within the HVAC sector.**

- Incentives for high-efficiency PTAC and window/wall air conditioners, which account for 40% of all cooling units, are not currently offered under the MA Energy Efficiency programs.
- Most large furnaces in C&I businesses were standard efficiency units.
- Over half of recently purchased split and package cooling systems (53%) were above federal energy efficiency standards.

**Only larger energy consumers were found to regularly perform preventative maintenance for HVAC equipment.**

- Overall, only 50% of all businesses perform preventative maintenance.

**The trend of purchasing high-efficiency water heaters has declined.**

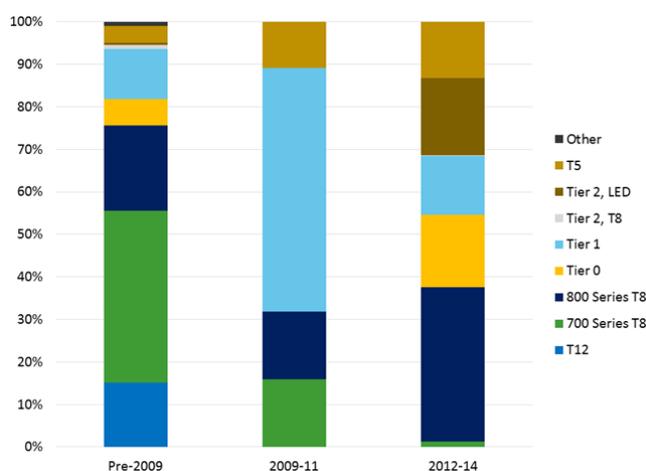
- While 15% of all existing waters exceed efficiency standards, only 10% of recent purchases exceed federal standards.

**Approximately 50% of the electricity usage in Massachusetts is associated with businesses using an EMS.**

**Market characterization:** intensities (EUIs) for all Massachusetts building types except warehouses are below the EUIs from 2012 Commercial Business Energy Consumption Survey (CBECS). The data show that manufacturing and industrial businesses consume more electricity than any of the other 12 business types used in the study, and account for 19% of the electricity consumed by Massachusetts businesses.

- Approximately 74% of all non-residential lamps are linear lamps. The next most popular commercial lamp type is the CFL, at about 11%, followed by LEDs at 7%.
- 45% of the cooling systems identified onsite were found to be split or packaged air conditioners, followed by 38% that were classified as PTAC or window/wall units.
- Standard storage water heaters represent 89% of the water heating units in non-residential facilities in Massachusetts.
- Food sales, food service, and retail businesses account for 78% of Massachusetts commercial refrigeration.

Linear efficiency distribution, 4-ft linear lamps (interior lighting) by time period



## C&I Customer On-site Assessments and Market Share and Sales Trends Study Report Summary (cont.)

### Comprehensive findings and observations matrix

Key Observations		
Program design and outreach	Observation 1	Based on the results, the PA's may want to consider targeting Tier 2 fluorescents and TLEDs retrofits to the building types with highest shares of base efficiency linears: public assembly, retail, offices, other businesses and education.
	Observation 2	Based on the results, the PA's may want to consider targeting purchasing and replacing incandescent bulbs in public assembly and food service building types.
	Observation 3	Consider increasing the minimum EER and SEER incentive requirements for split and package systems.
	Observation 4	Consider offering incentives for high-efficiency PTAC and window/wall air conditioners.
	Observation 5	Based on the results, the PA's may want to consider developing and distributing materials describing the efficiency benefits associated with high-efficiency large furnaces.
	Observation 6	Based on the results, the PA's may want to consider developing educational materials about the business advantages (e.g., energy savings, less down time, lower production costs) of preventative maintenance.
	Observation 7	Consider conducting a broad-base marketing campaign to promote high-efficiency water heaters.
	Observation 8	Investigate the cost-effectiveness of offering an electric water heater program to encourage customers to install high-efficiency electric water heaters.
Market characterization	Observation 9	Consider using data including the EUI findings from this study to guide the energy baseline for the Massachusetts Clean Energy and Climate Plan for 2020.

Findings	Observations								
	Observation 1	Observation 2	Observation 3	Observation 4	Observation 5	Observation 6	Observation 7	Observation 8	Observation 9
<b>Program design and outreach</b>									
Substantial gains in lighting efficiency in Massachusetts, but savings opportunities remain in targeted business sectors.	X	X							
Opportunities remain in segments within the HVAC sector.			X	X	X				
Preventative maintenance for HVAC equipment typically undertaken by larger energy consumers.						X			
The trend of purchasing high-efficiency water heaters has declined.							X	X	
<b>Market characterization</b>									
Energy consumption among Massachusetts customers is below the U.S. national average.									X