MA ENERGY EFFICIENCY ADVISORY COUNCIL

→ CONSULTANT TEAM

C&I SAVINGS OPPORTUNITIES

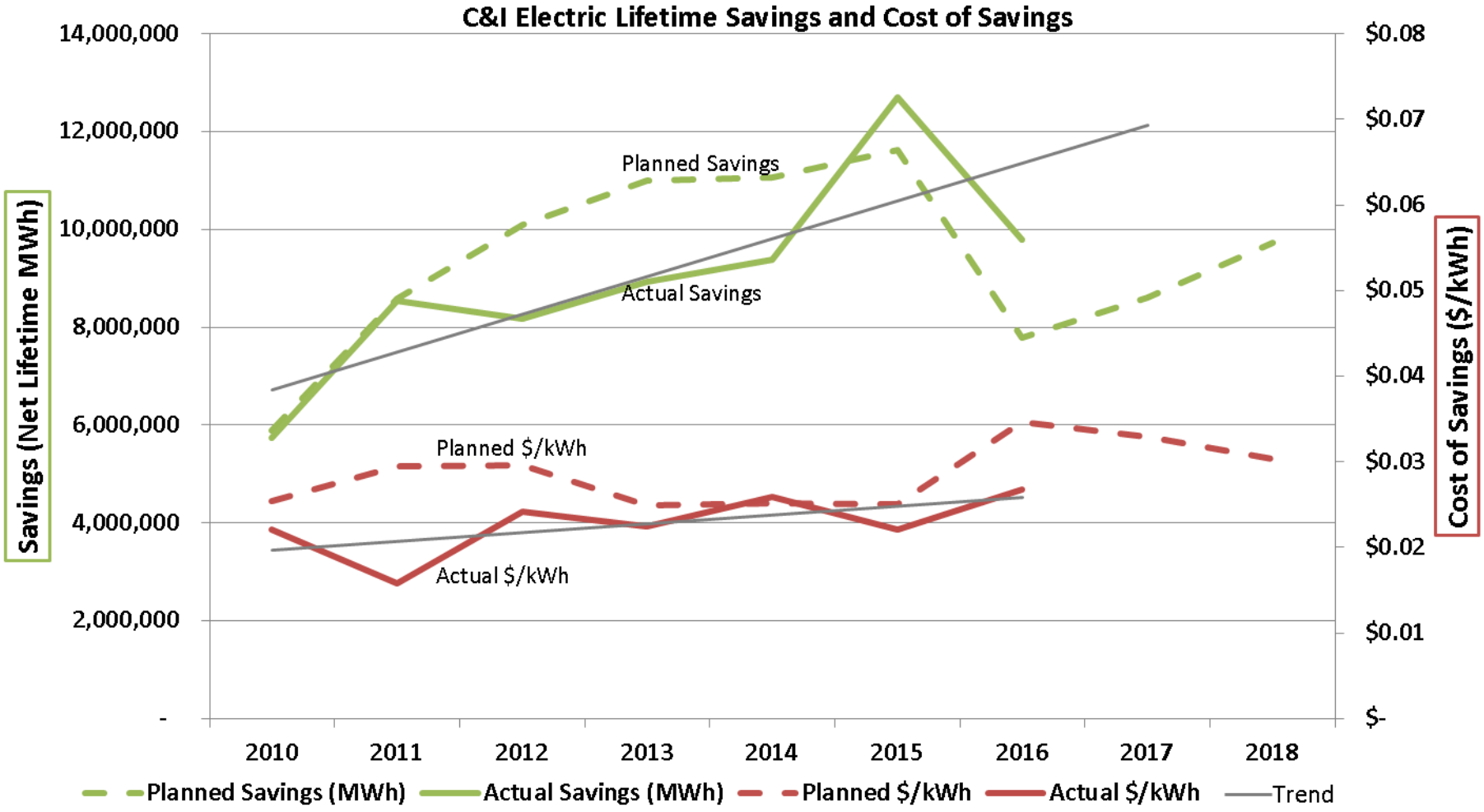
February 15, 2017

www.ma-eeac.org

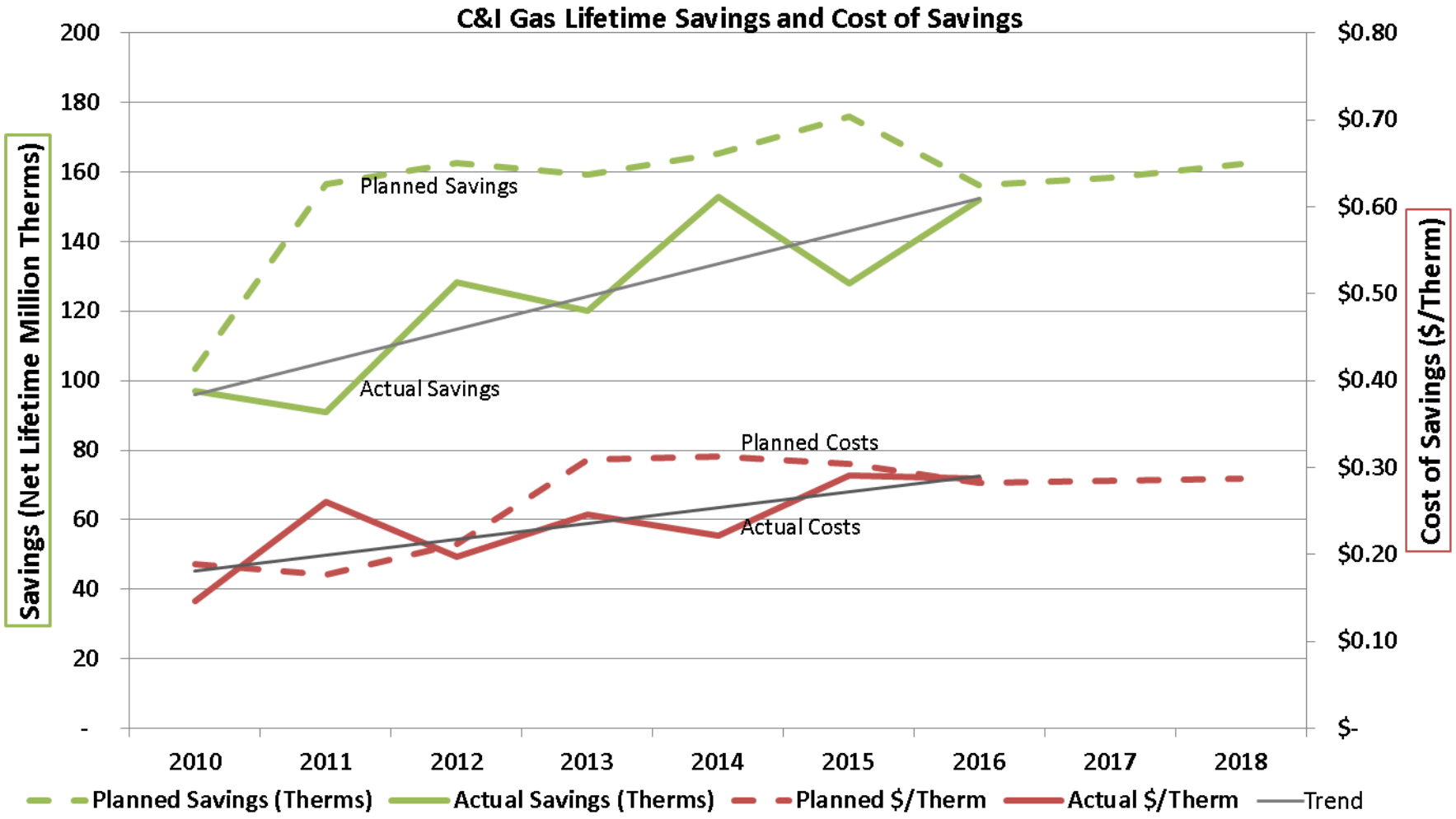
PRESENTATION OVERVIEW

- **Demonstrate that robust C&I savings opportunities remain across a spectrum of measures**
  - Lighting
  - HVAC
  - Process
  - CHP
- **Discuss barriers to acquiring remaining savings**
- **Share strategies and tactics that will advance C&I savings in the current and future plans**
- **Conclusions**
  - C&I savings can help close the gap from expected residential lighting sector losses

C&I OVERVIEW-ELECTRIC

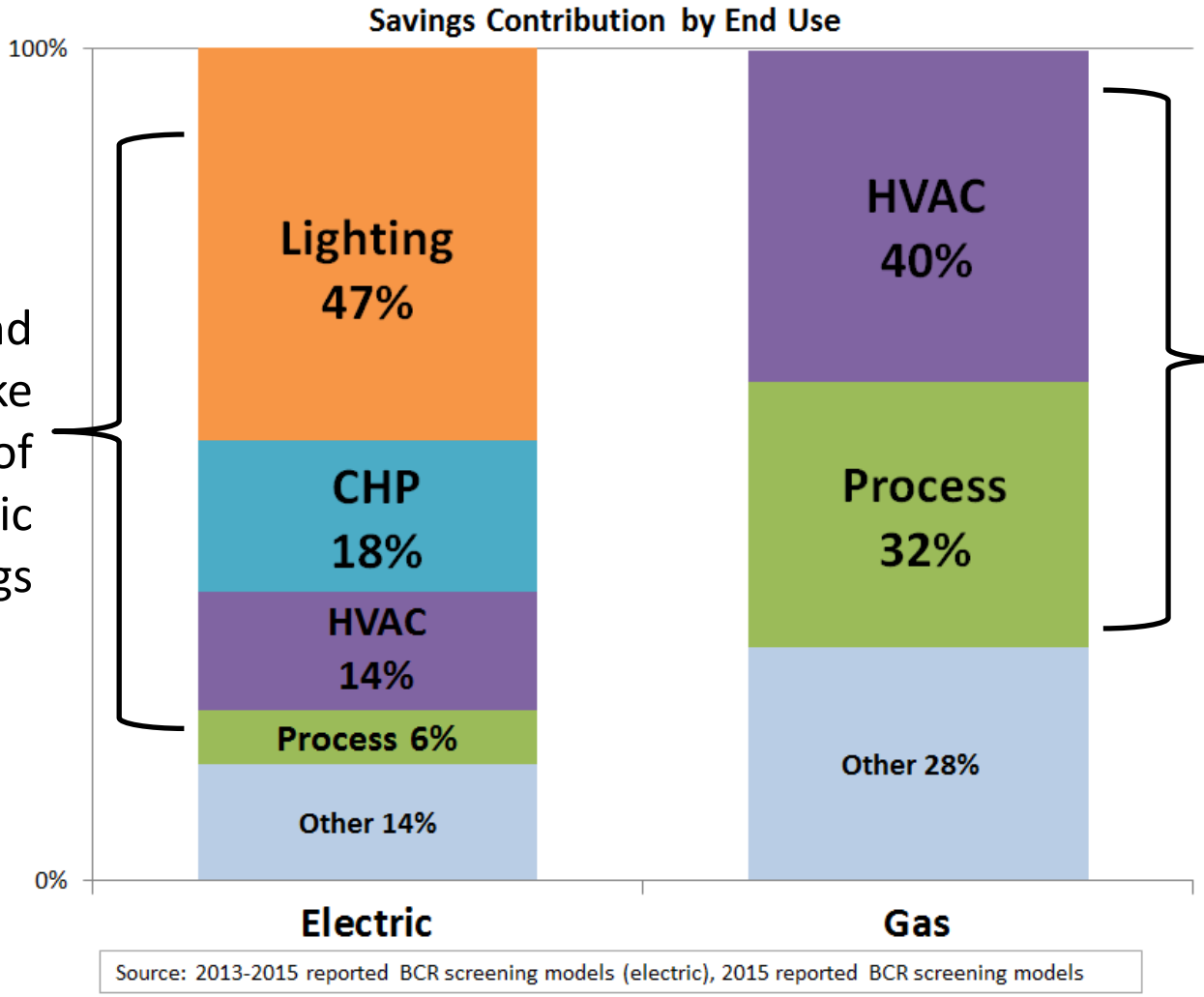


C&I OVERVIEW-GAS



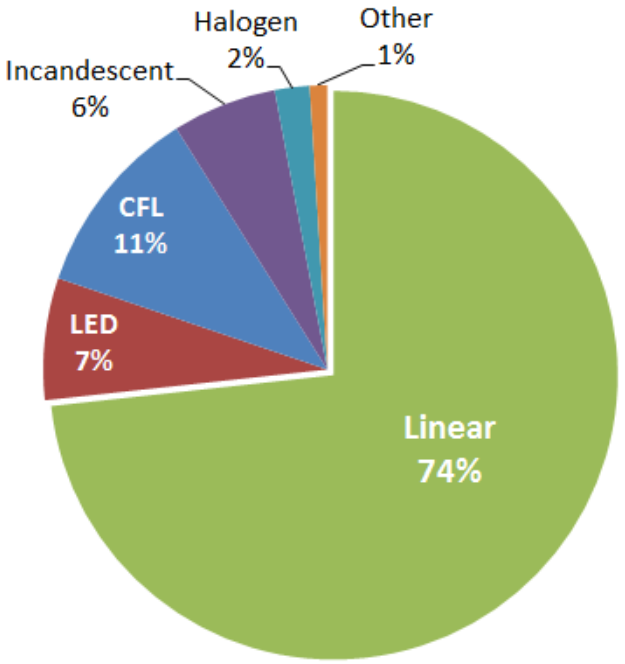
WHERE C&I SAVINGS COME FROM

Four end uses make up **85%** of C&I electric savings



Two end uses make up **72%** of C&I gas savings

LIGHTING OPPORTUNITIES



Interior Lighting Distribution

Figure 3-5 C&I Market Characterization Study

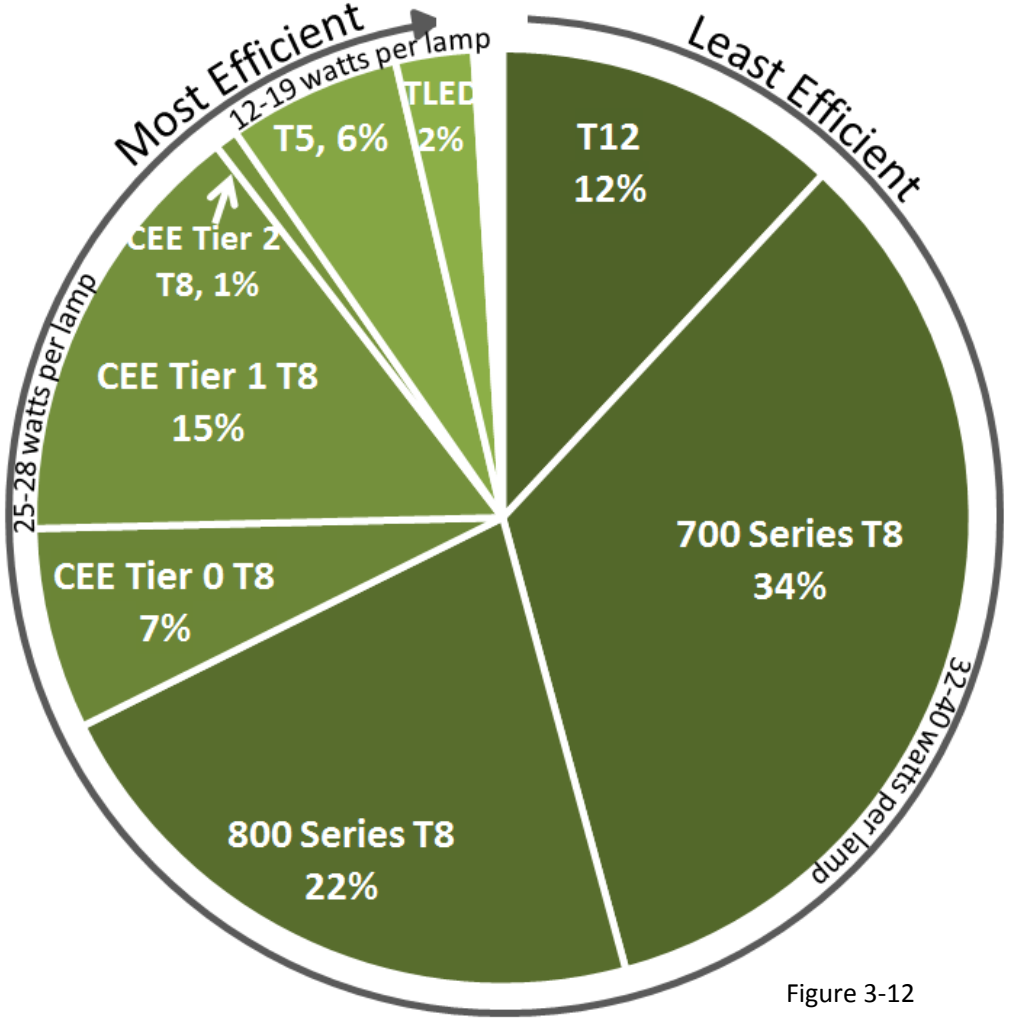
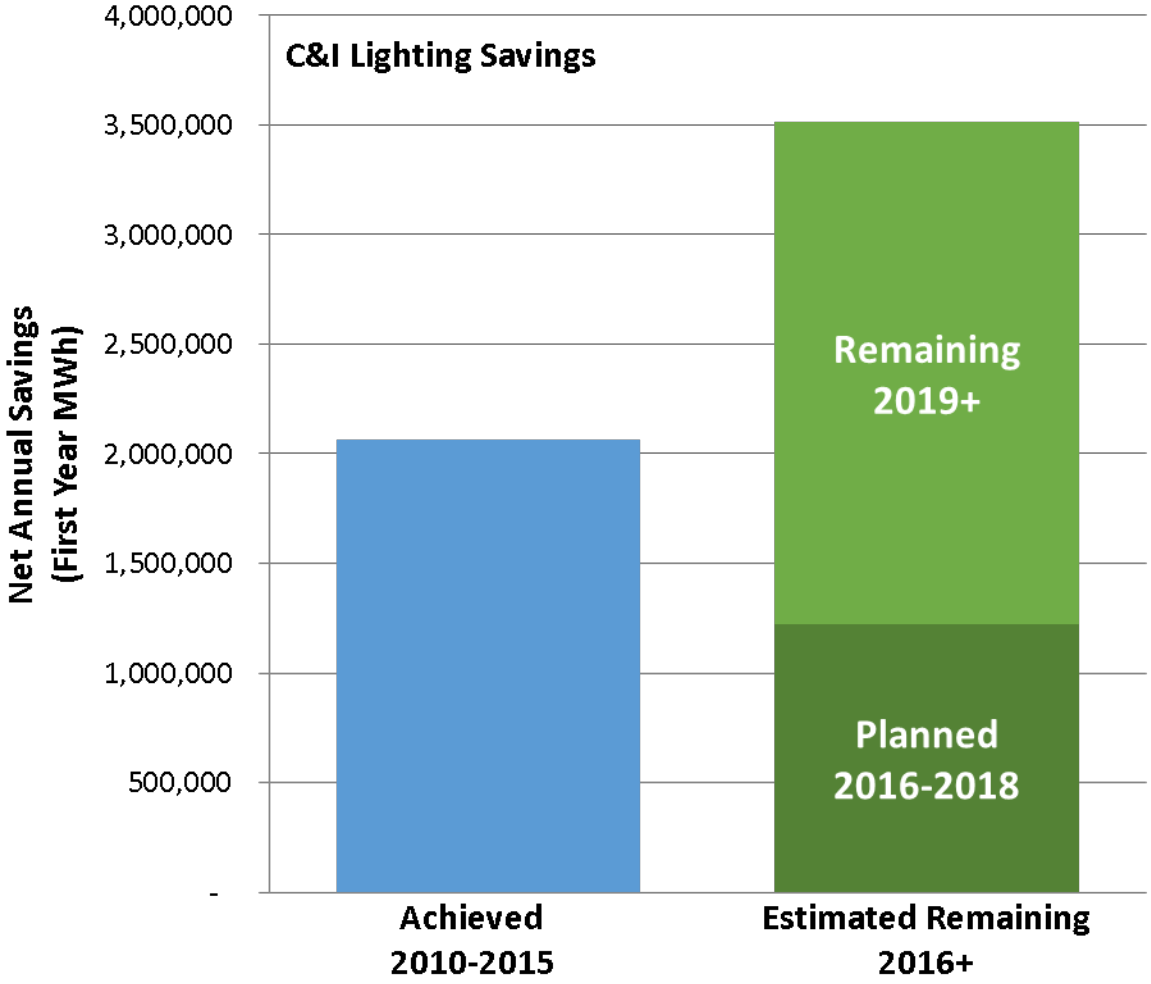
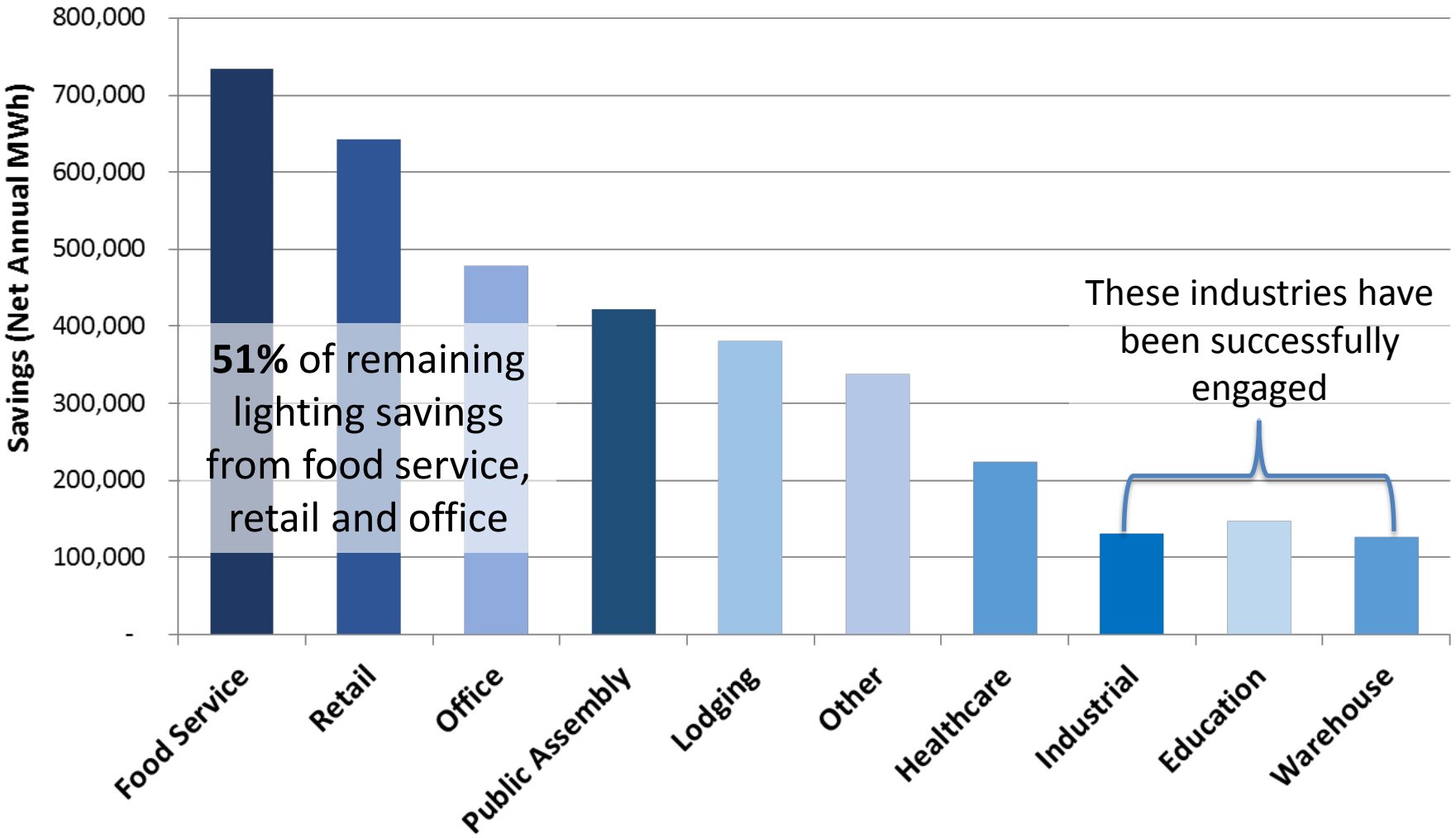


Figure 3-12

LIGHTING OPPORTUNITIES



ESTIMATED REMAINING LIGHTING SAVINGS BY BUILDING TYPE



LIGHTING OPPORTUNITIES

- **Potential for upgrading all MA C&I lighting to LED**
  - Retail
  - Food Service →
  - Office

- **Lighting savings continue to be inexpensive**

C&I Lighting Costs 2013-2015 (Incentive $/kWh)		
	Upstream Lighting	All Lighting
Annual	$ 0.12	$ 0.25
Lifetime	$ 0.01	$ 0.02

- **Controls drive down runtimes and peak demand**

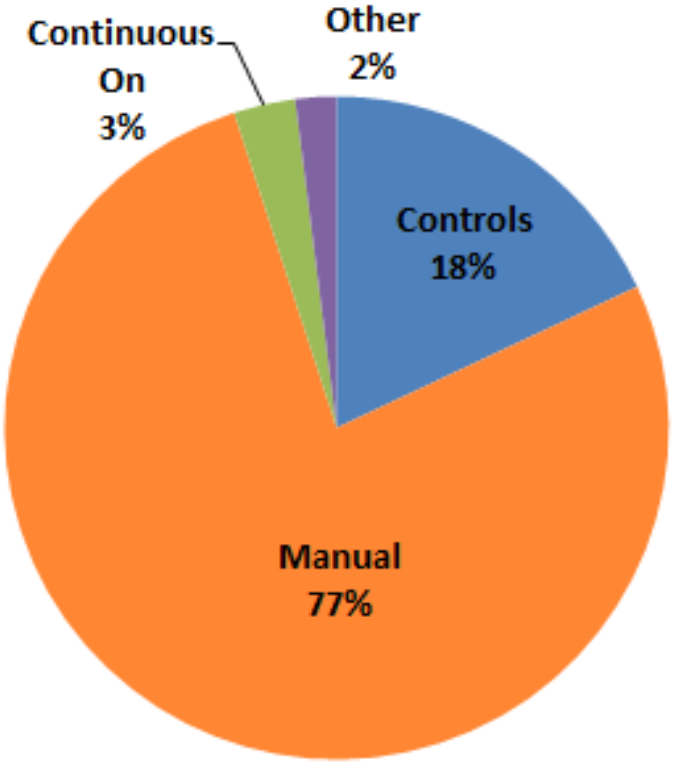
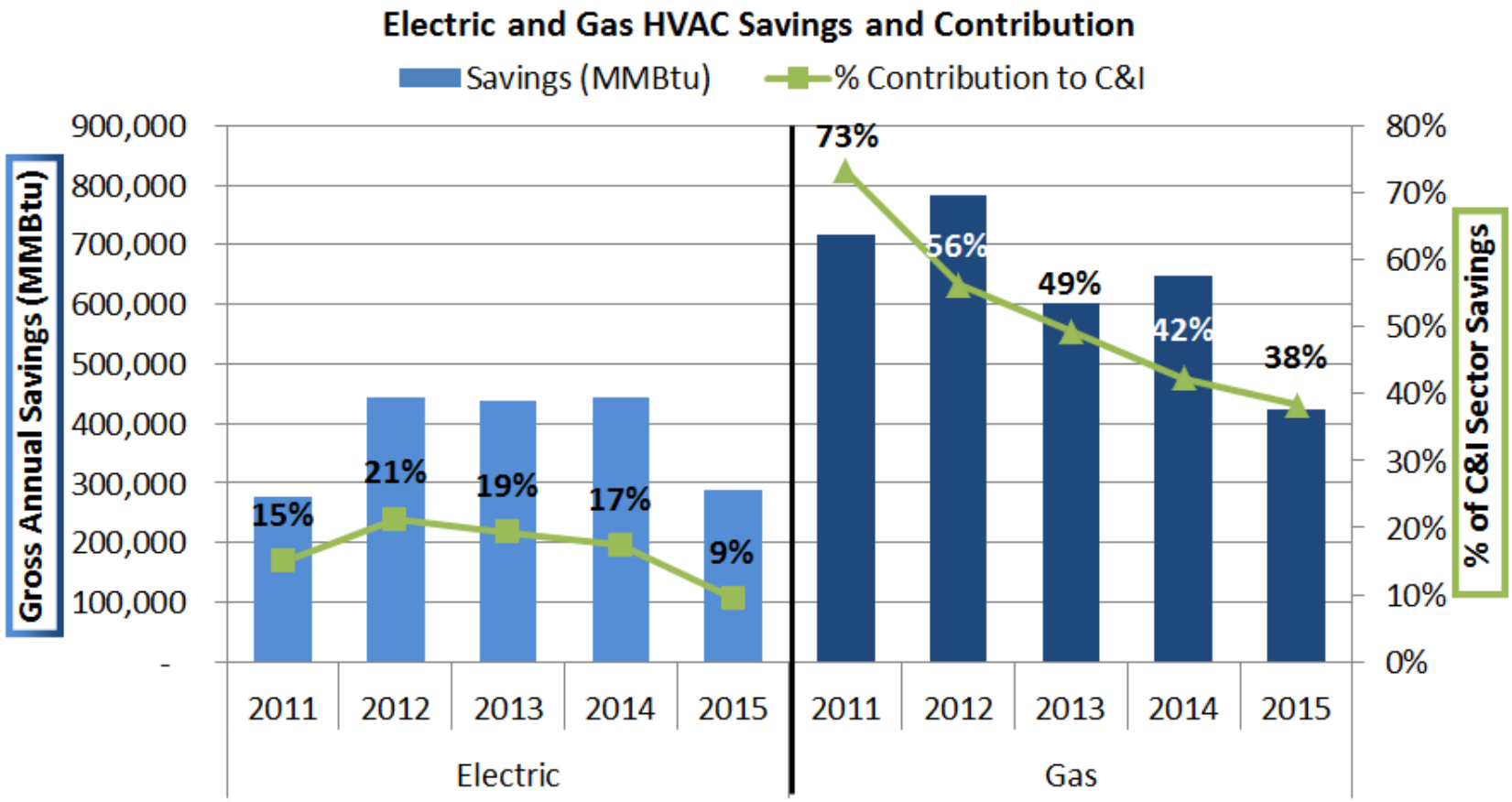


Figure 3-27 MA C&I Onsite Assessment

LIGHTING OPPORTUNITIES

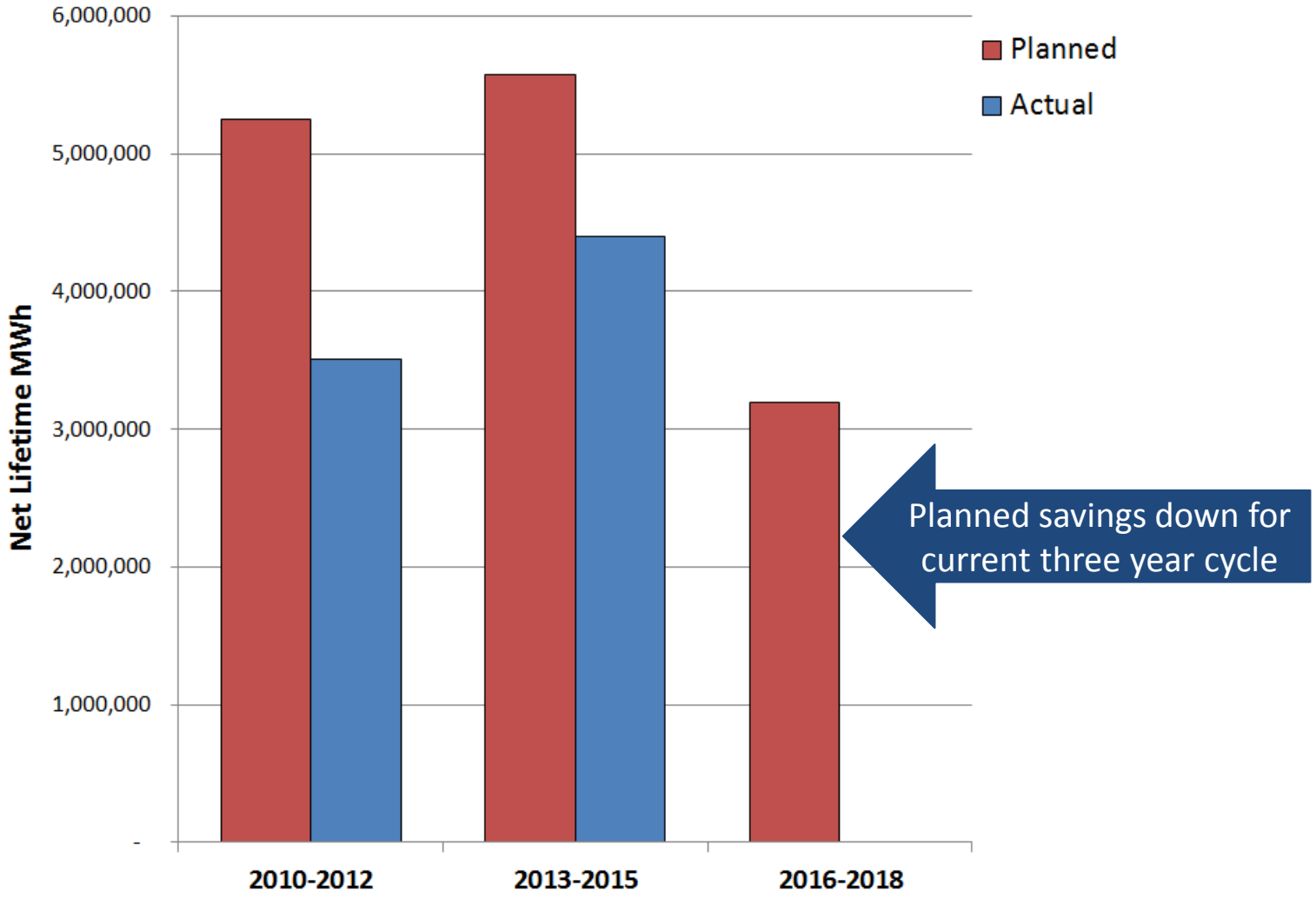
- **LED costs falling while efficacy increases**
- **Upstream Lighting**
  - Delivered 20% of 2015 C&I Savings
  - Rapid growth expected for TLEDs
  - Filament style LEDs for retail and food service
  - Provide transparency on tests for lighting fixtures and controls
- **Non-Upstream Lighting - Retrofits**
  - Lighting system redesign with controls
  - Remaining opportunities in all sectors, especially:
    - Food Services
    - Retail
    - Office

HVAC SAVINGS DECLINING



- **HVAC delivers electric AND gas savings**

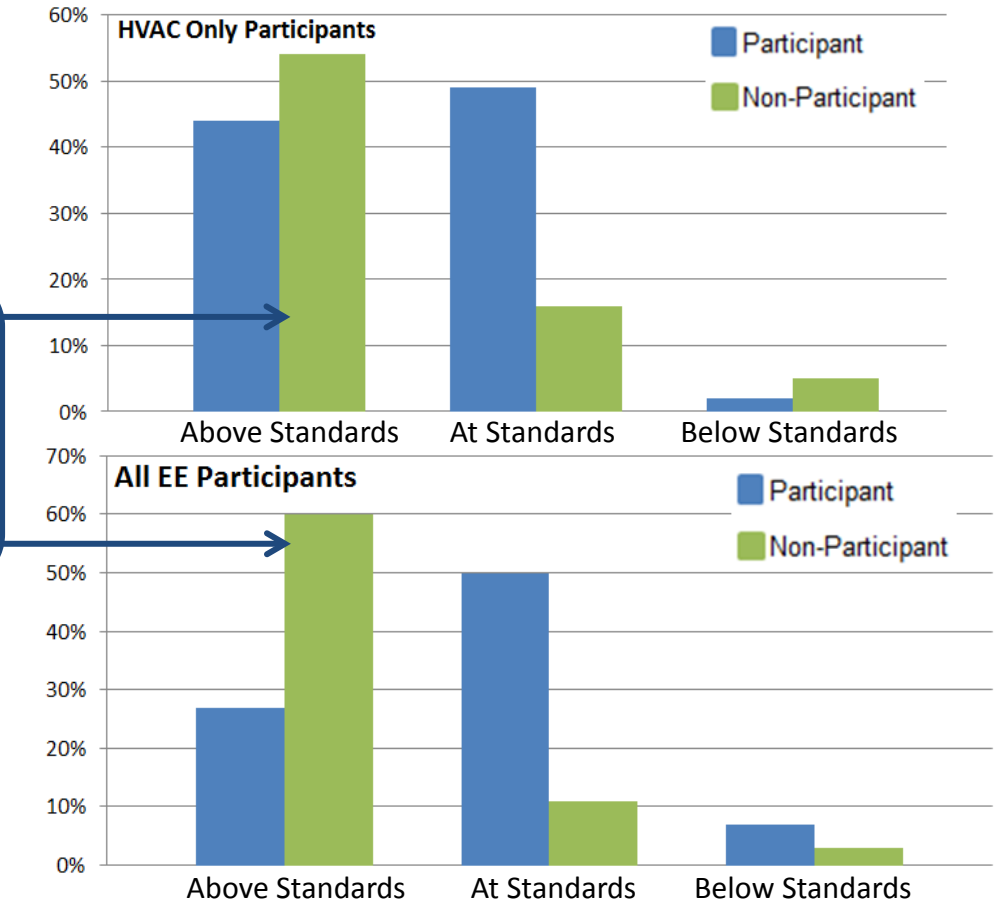
HVAC ELECTRIC SAVINGS



HVAC EQUIPMENT OPPORTUNITIES-ELECTRIC

- PAs need to increase efficiency thresholds

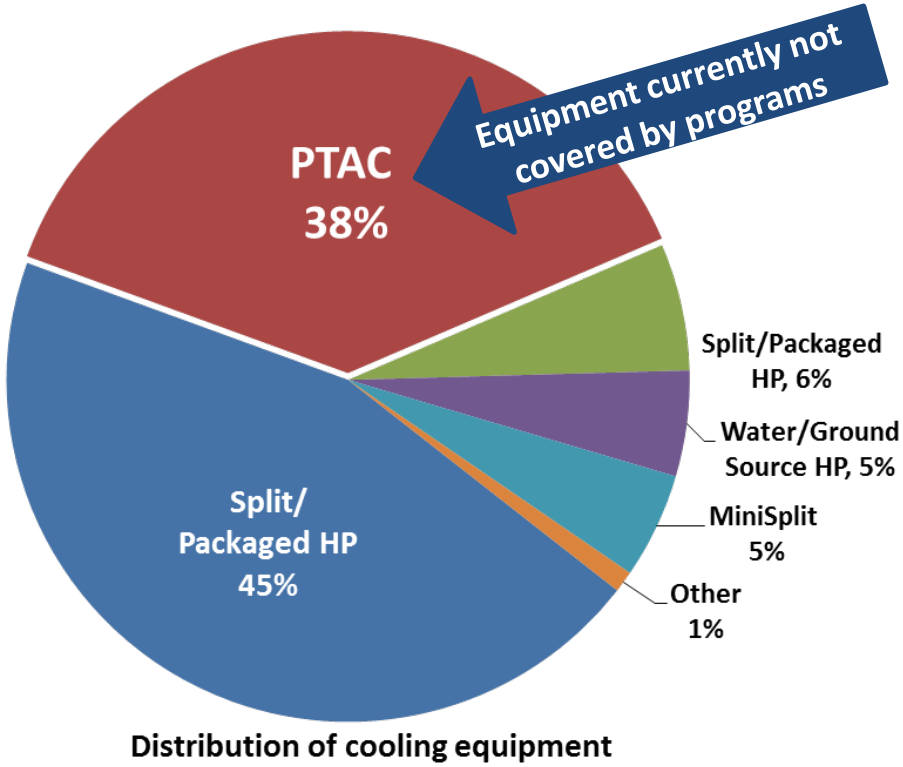
New Split and Packaged AC/HP Efficiency ratings, by EE Participation



Non-Participants are adopting high efficiency

HVAC EQUIPMENT OPPORTUNITIES-ELECTRIC

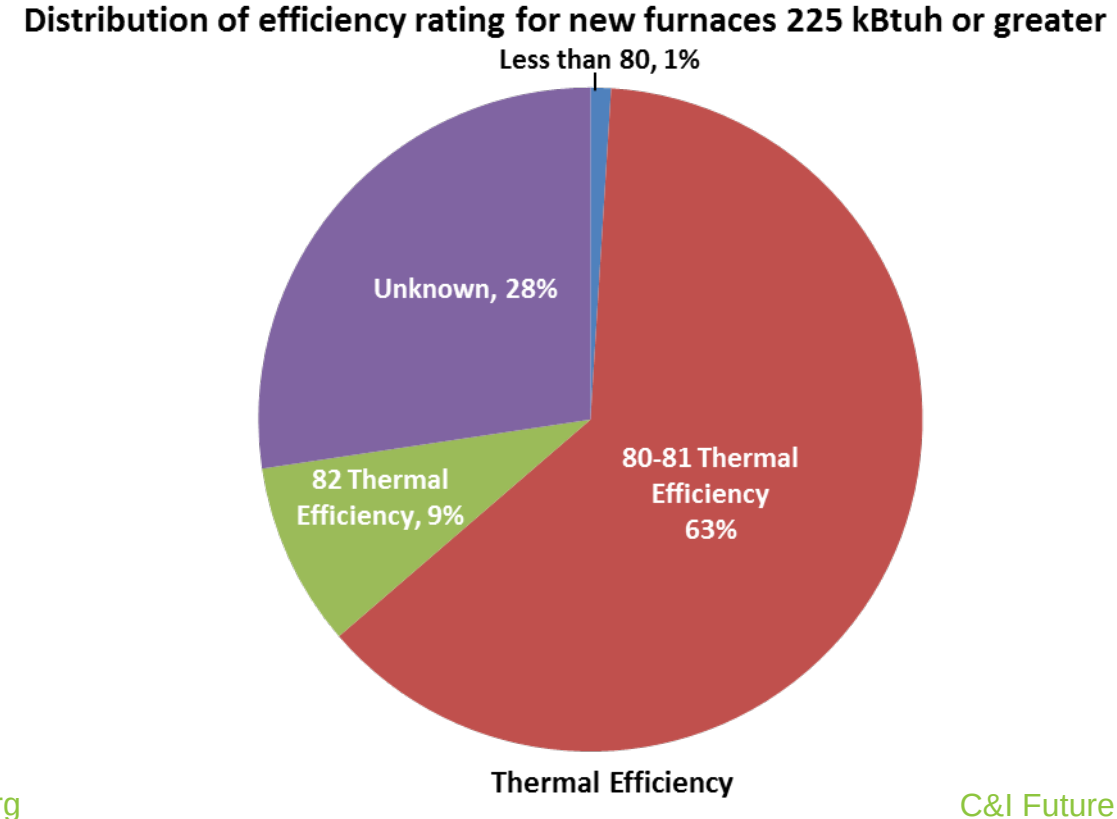
- **Large number of C&I PTACs**
  - opportunity to drive market to top end of EE



Distribution of cooling equipment

HVAC EQUIPMENT OPPORTUNITIES-GAS

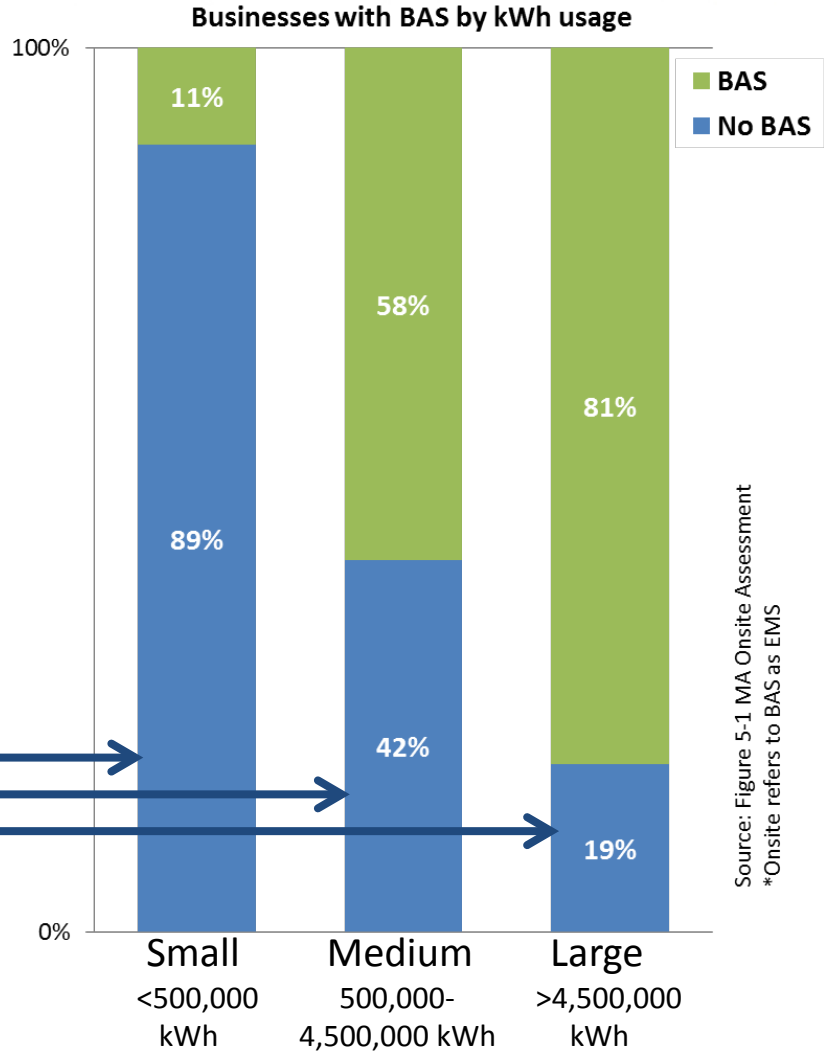
- RTU are common and their gas furnaces are inefficient
- Market opportunity to work with manufacturers and customers to pilot new solutions



HVAC OPPORTUNITIES - CONTROLS

- **Building Automation Systems**
  - Automated controls of building HVAC systems
  - Over 40% of the largest systems are controlled by older BAS
  - Upgrading control systems delivers energy savings through new smart control strategies

Buildings lack automated controls

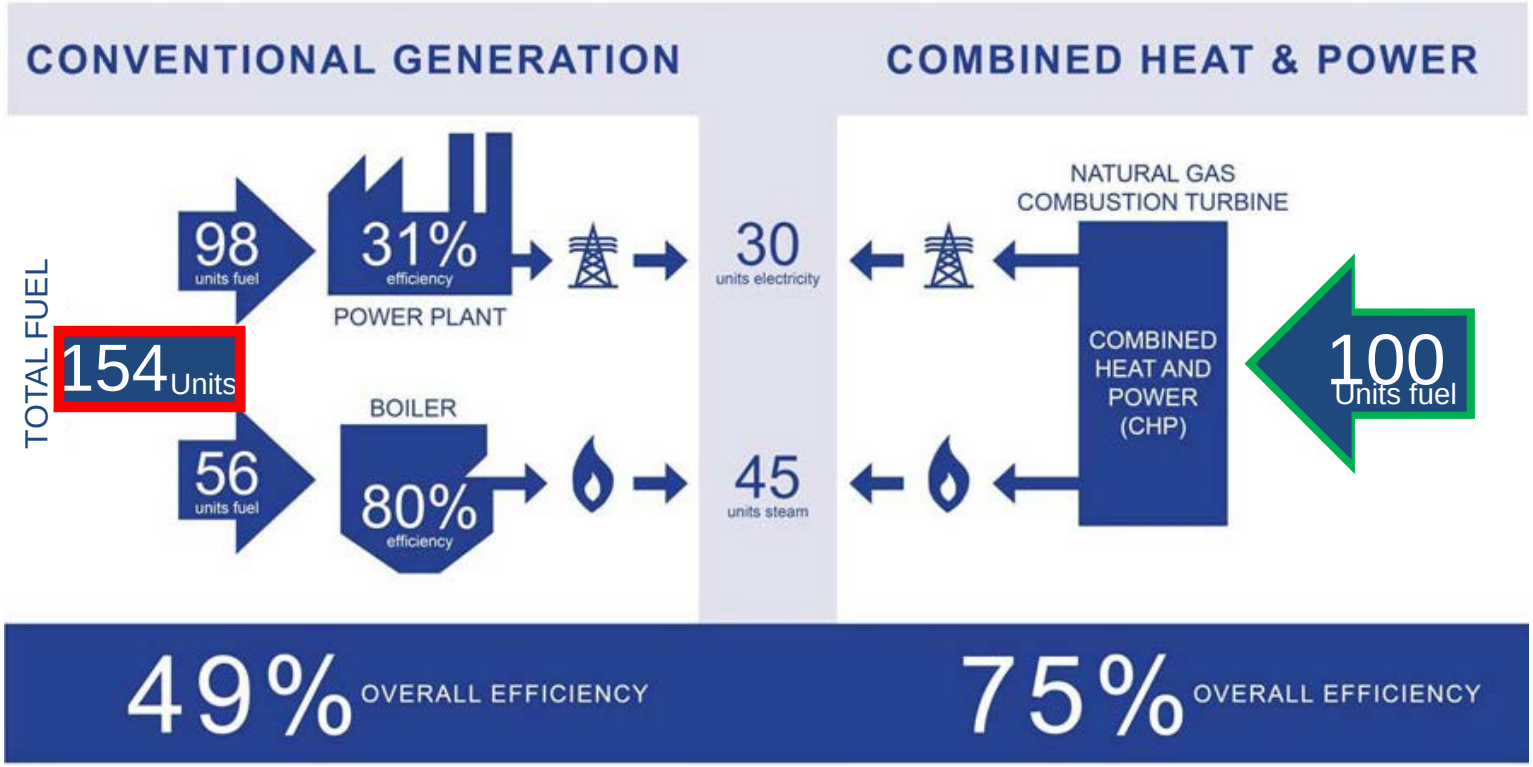


HVAC OPPORTUNITIES

- **Capital investments for HVAC retrofit projects**
  - Chillers
  - Boilers
  - Distribution systems & terminal equipment
- **Offer Incentives on premium efficiency PTACs**
- **Increase program thresholds for common efficient HVAC equipment**
- **Building Automation Systems – smart controls**
  - Retrofit legacy control systems
  - Retro-commissioning – tuning existing control systems
- **Energy Management and Information Systems**
- **Drive market for high efficiency gas RTU furnaces**

CHP OVERVIEW

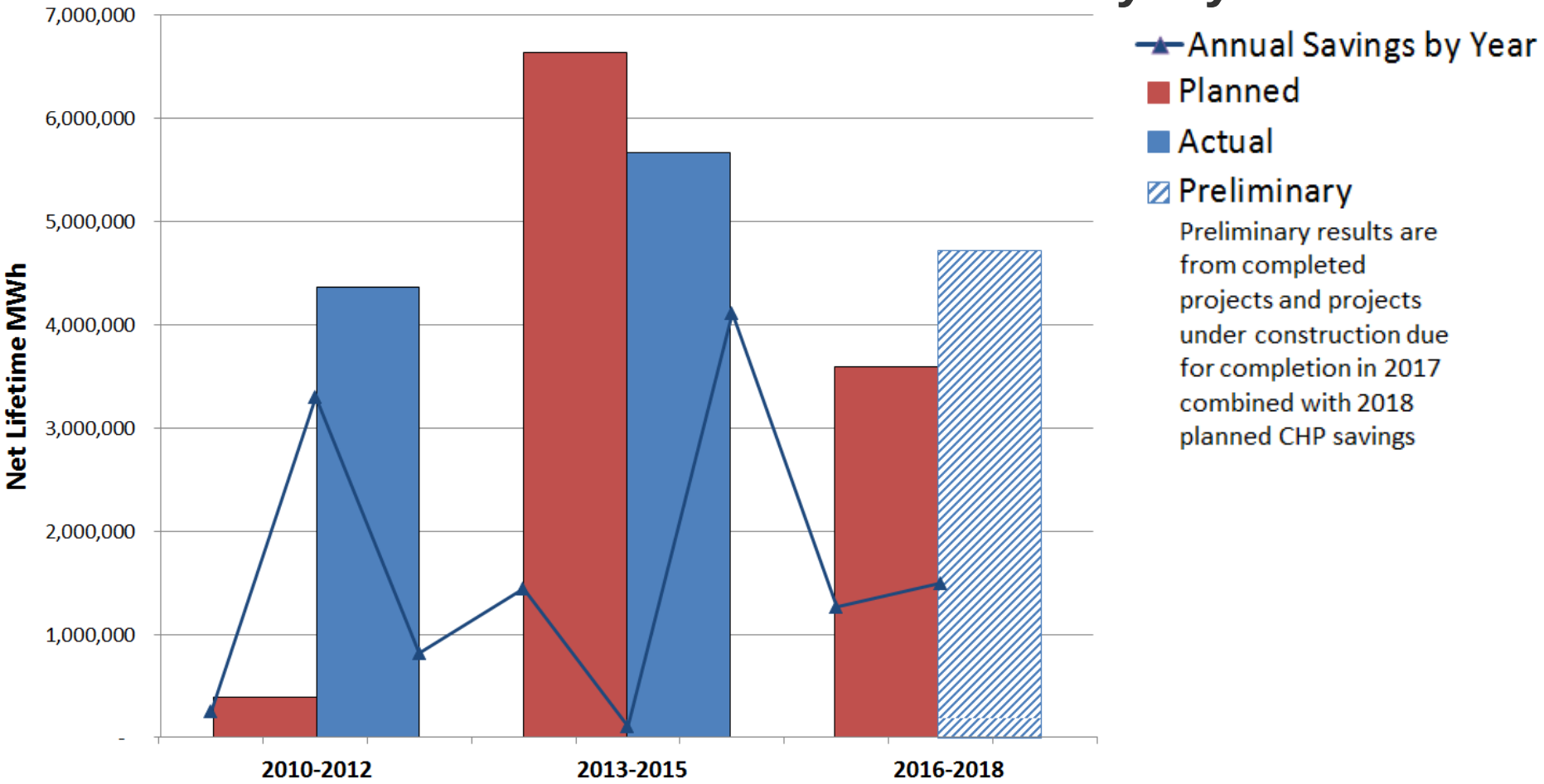
- **Electric measure**
- **Increases on site fuel consumption**
- **Lowers total source energy consumption**



Source: UMN Facilities Management CHP

CHP SAVINGS TREND

- **CHP is a stable resource when viewed by 3 year term**



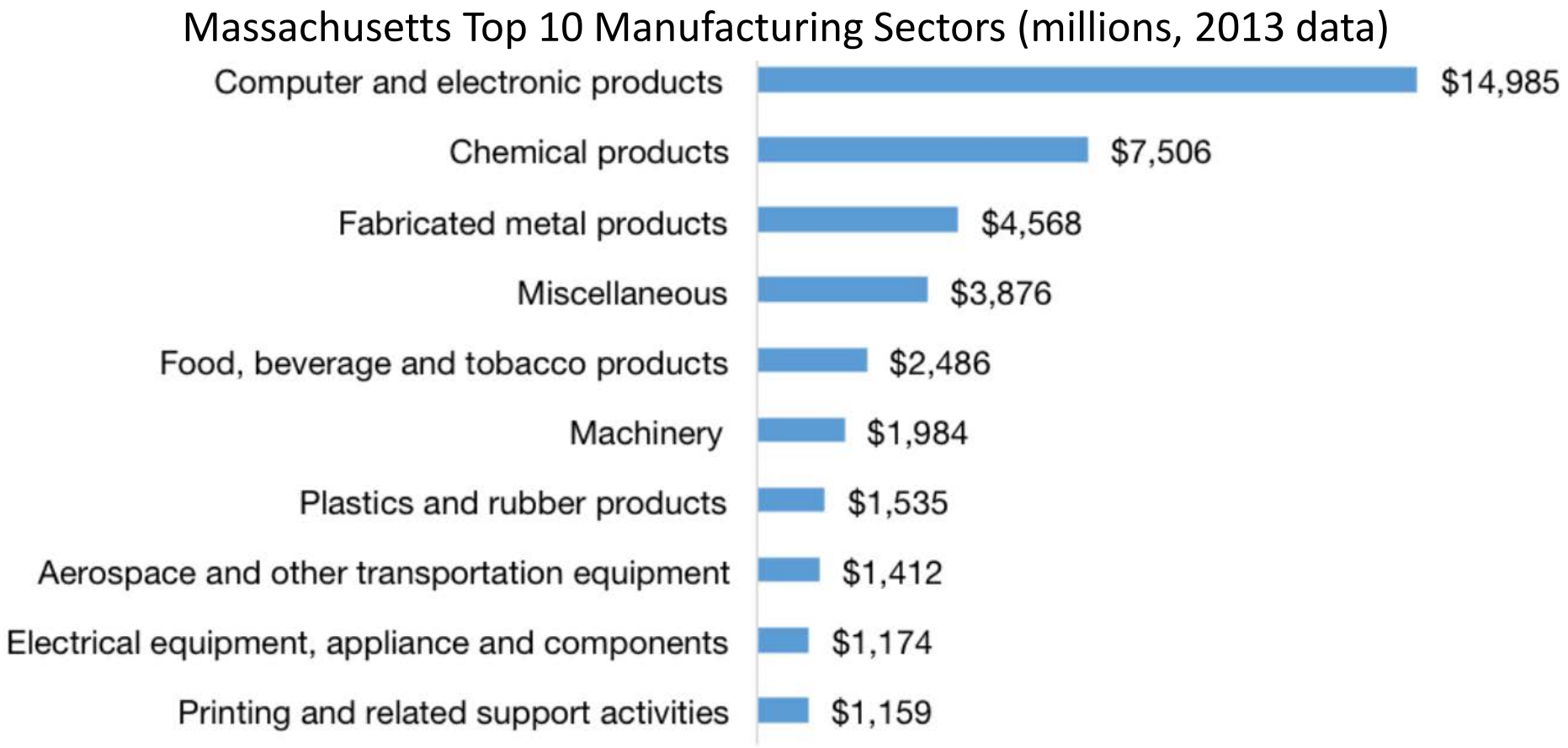
CHP OPPORTUNITIES

- **Focus on CHP has yielded stable contributions to the portfolio**
- **Fit with customer dictated by**
  - Consistent thermal load
  - Availability of a fuel (gas, methane, wood chips)
  - Willingness to integrate CHP into their operations or have a 3rd party provider
- **Dedicated CHP people at Eversource and National Grid doing direct outreach**
- **Monitor results of recent program changes**
  - Increase project quality (net benefits)
  - Minimize programmatic barriers to the market

MANUFACTURING PROCESS OVERVIEW

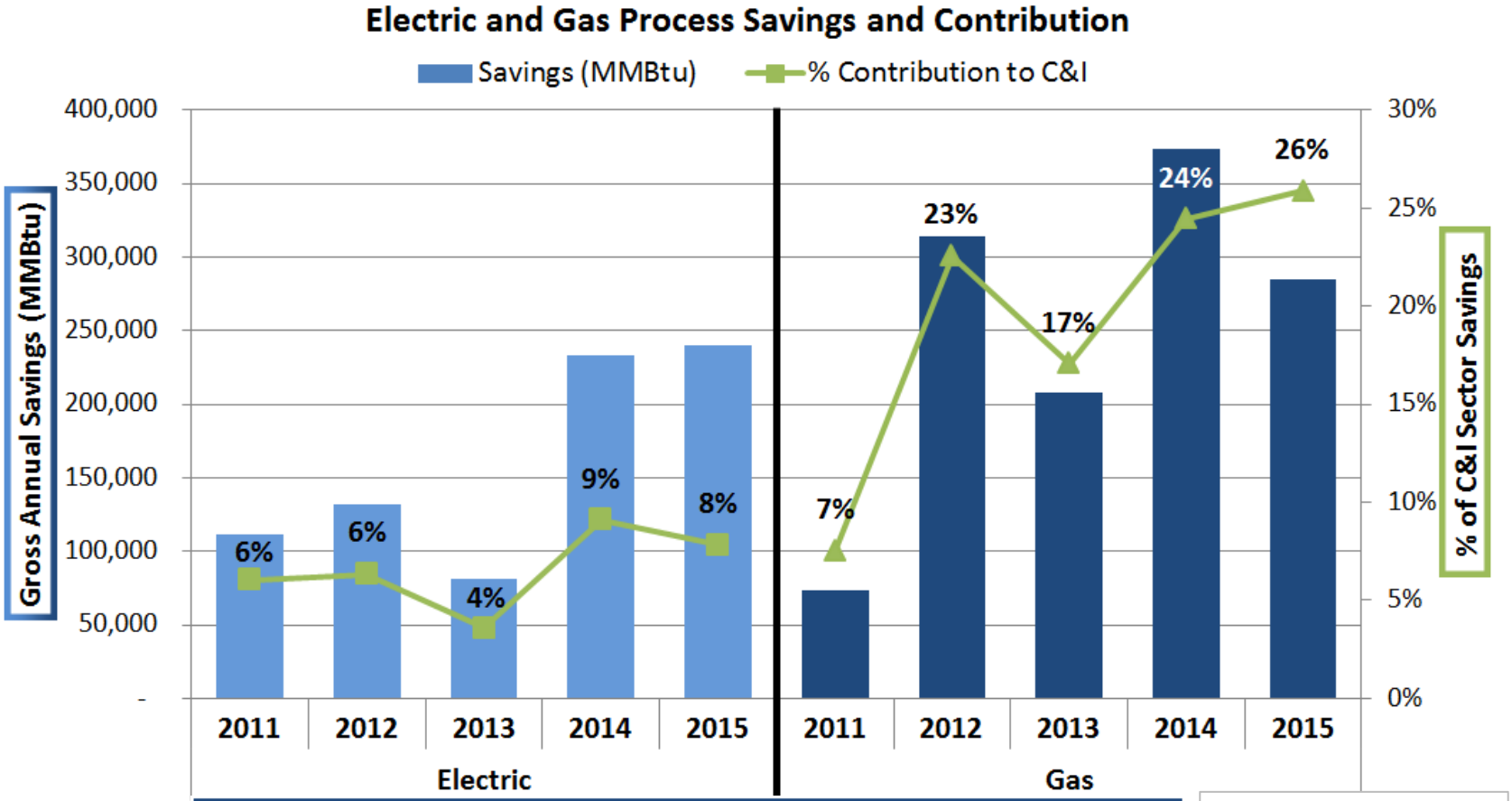
- **Production of items, usually on a large scale**
- **Sources of savings**
  - Technology and equipment upgrades
  - Operations and maintenance changes
- **Outreach methods**
  - Account management
  - Leidos Engineering
- **Customers range from very large to small**
- **56% percent of facilities run 3 shifts/day, 19% run 2 shifts - long hours increase savings**
- **Measures predominantly custom**

TOP INDUSTRIAL PROCESSES IN MA



Source: National Association of Manufacturers, MA Manufacturing Facts

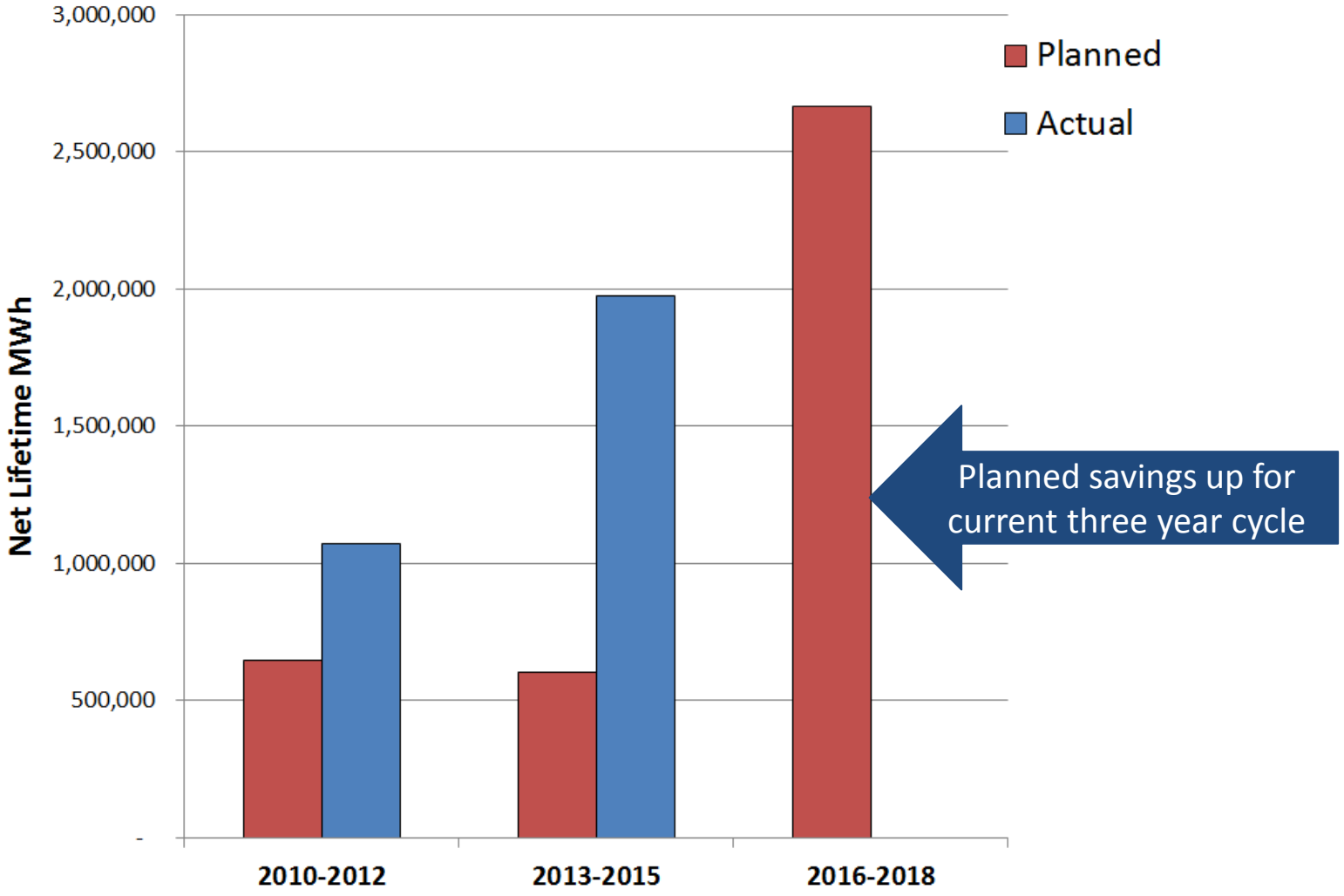
PROCESS GROWING CONTRIBUTION TO C&I



Process Savings (Gross Annual)					
	2011	2012	2013	2014	2015
Electric Savings (kWh)	32,690,209	38,759,417	23,931,131	68,334,656	70,470,168
Gas Savings (Therms)	733,015	3,142,780	2,076,087	3,740,540	2,852,881

Conversion key
1 kWh=0.00341 MMBtu
1 Therm=0.1 MMBtu

PROCESS ELECTRIC SAVINGS



PROCESS OPPORTUNITIES

- **Build on current successes**
- **Strategic Energy Management**
- **Customer engagement**
  - Large
  - More sophisticated approaches needed for medium and smaller producers
    - Increase resources and market capacity to address
- **Share resources and strategies to advance process measures across PAs**

CHALLENGES

- **Baselines**
  - Lighting & HVAC market baseline increasing
  - Dual baselines
- **Hard to deliver complex projects**
  - HVAC
  - Smaller customers – cost effectiveness
- **CHP**
  - Limited customer pool
  - Marginally cost effective measure
- **Process**
  - Long development cycle
  - High ROI requirements for manufacturers
  - Lack of EMIS hinders understanding of energy use

MAXIMIZE AVAILABLE SAVINGS

- **Programs already nation leading**
- **Continue and expand multiple points of engagement**
  - Target specific groups
    - Upstream, new construction, trade ally networks
  - Extrapolate large customer success to small and mid-sized customers
  - Support workforce development
- **Build on successful PA-specific strategies and tactics**
  - Provide highest levels of service state-wide
- **Understand market baselines and continue to raise program thresholds above market**

SUMMARY

- Significant C&I savings remain
- Lighting – need to drive LED retrofits to stay in front of the market
- HVAC – opportunities across electric and gas and all systems types and sizes
- Process – deep engagement with manufacturing customers to build awareness and trust

QUESTIONS?