



C&I PLANNING WORKSHOP #1

TECHNOLOGY

Presented by DOER, The Massachusetts PAs, Raab Associates, and the EEAC Consultants

February 6, 2015

www.ma-eeac.org

C&I 2/6 WORKSHOP AGENDA

- ▶ 9:00 Introduction, Context Summary, Workshop(s) Overview
- ▶ 9:20 Combined Heat and Power (CHP)
- ▶ 10:10 Retro-Commissioning
- ▶ 11:00 Break
- ▶ 11:15 Controls
- ▶ 12:05 Sub-Metering
- ▶ 12:50 Next Steps/Wrap Up
- ▶ 1:00 Adjourn

APPROACH TO EACH TOPIC

- ▶ Brief presentation/clarifying questions (10 minutes)
- ▶ Discussion (2-4 questions) (30 minutes)
- ▶ Next steps/recommendations (10 minutes)
- ▶ Important Notes:
 1. Discussion among Councilors (will not likely have time to include non-Councilors)
 2. Next steps/recommendations are to the full EEAC, who will in turn endorse, modify, or reject—and forward to PAs
 3. As such, next steps/recommendations primarily from voting Councilors, but note in meeting summary if consensus, or, if not list alternatives (including non-voting Councilor alternatives)

GROUND RULES

- ▶ Participate/Weigh-In (indicate w/table tent when want to speak)
- ▶ But Stay on Topic
- ▶ Be Succinct, Share Air Time
- ▶ Be Respectful/Civil
- ▶ Minimize Electronic Distractions
- ▶ If Can't Support Next Steps/Recommendations, Explain Why Can't and Try to Offer Alternative
- ▶ Note: Facilitator May Need to Establish and Enforce Per Person Time Limits and/or other ground rules as needed

WORKSHOP #2

WEDNESDAY, FEBRUARY 12, 2015

- ▶ 9am – 1pm
- ▶ Massachusetts Department of Fish & Wildlife
Headquarters
- ▶ One Rabbit Hill Road, Westborough, MA 01581 United
States

TOPICS –

- ▶ Small Business
- ▶ Commercial Real Estate
- ▶ Behavioral Programs
- ▶ Hockey Stick

WORKSHOP #3

TUESDAY MARCH 3, 2015

- ▶ 9am – 1pm
- ▶ 100 Cambridge St, Boston (Tentative)

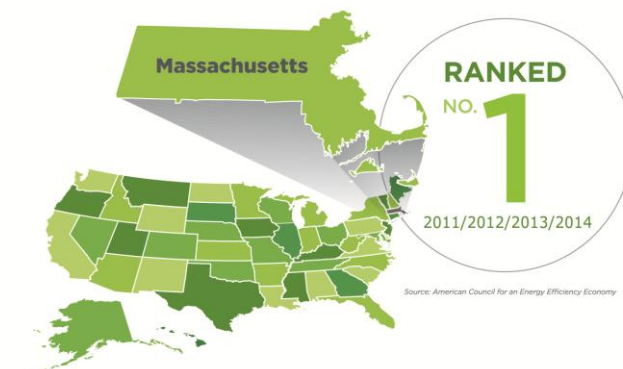
TOPICS UNDER DISCUSSION – POLICY

- ▶ Demand Response
 - ▶ Financing/PACE & Oil as Regulatory Topics
 - ▶ Geo-targeting and Gas Constraints
- ▶ Note: Topics may change base on feedback from first two workshops.

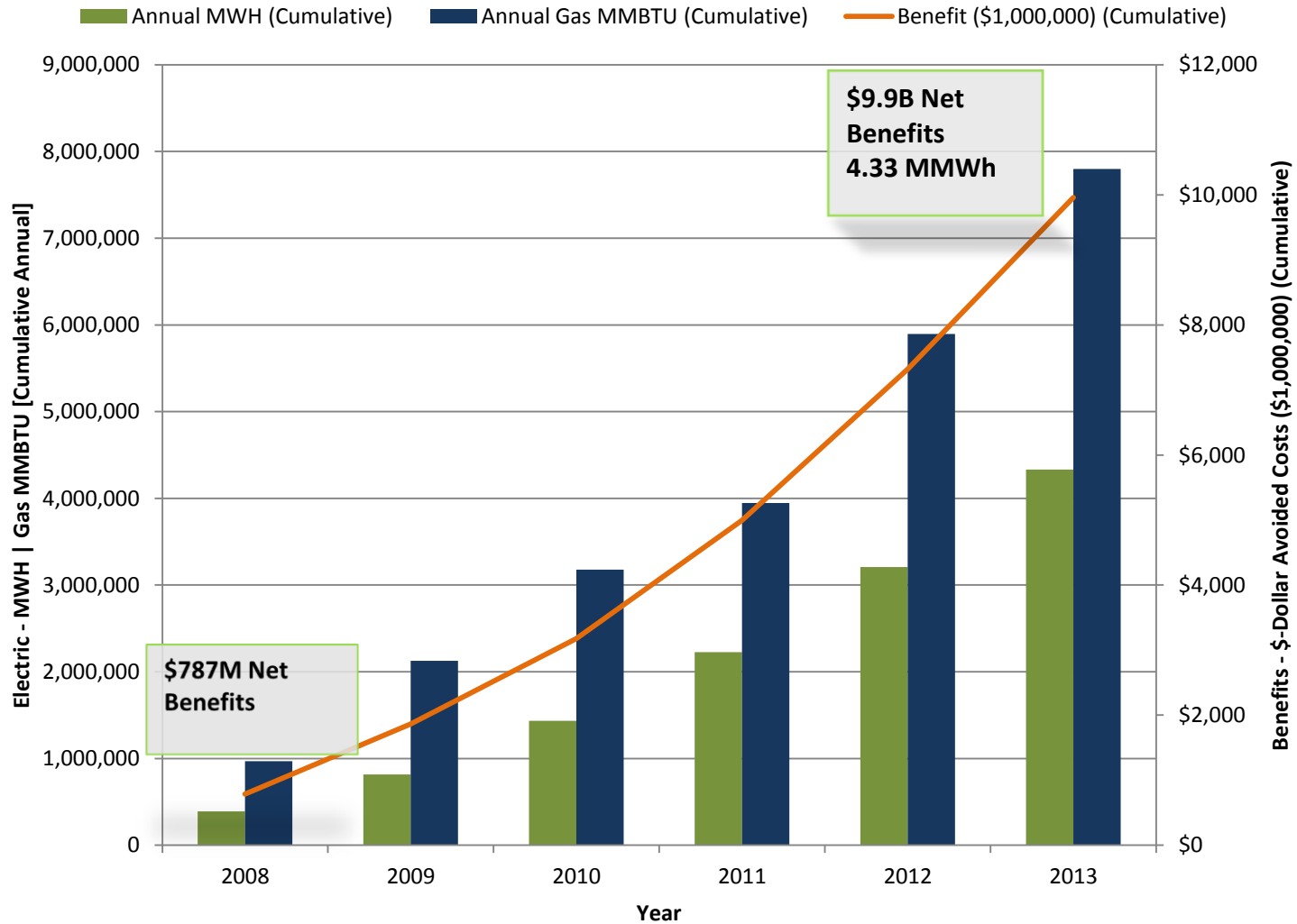
C&I OVERVIEW AND CONTEXT BRIEFING

- ▶ MA Ranked #1 by ACEEE (2011-2014) for our energy efficiency programs and policies
- ▶ All cost effective energy efficiency
- ▶ Statewide energy efficiency programs are offered to all customer segments under Mass Save[®] brand

ACEEE STATE ENERGY EFFICIENCY SCORECARD



GROWTH IN ENERGY EFFICIENCY SAVINGS AND BENEFITS 2008-2013

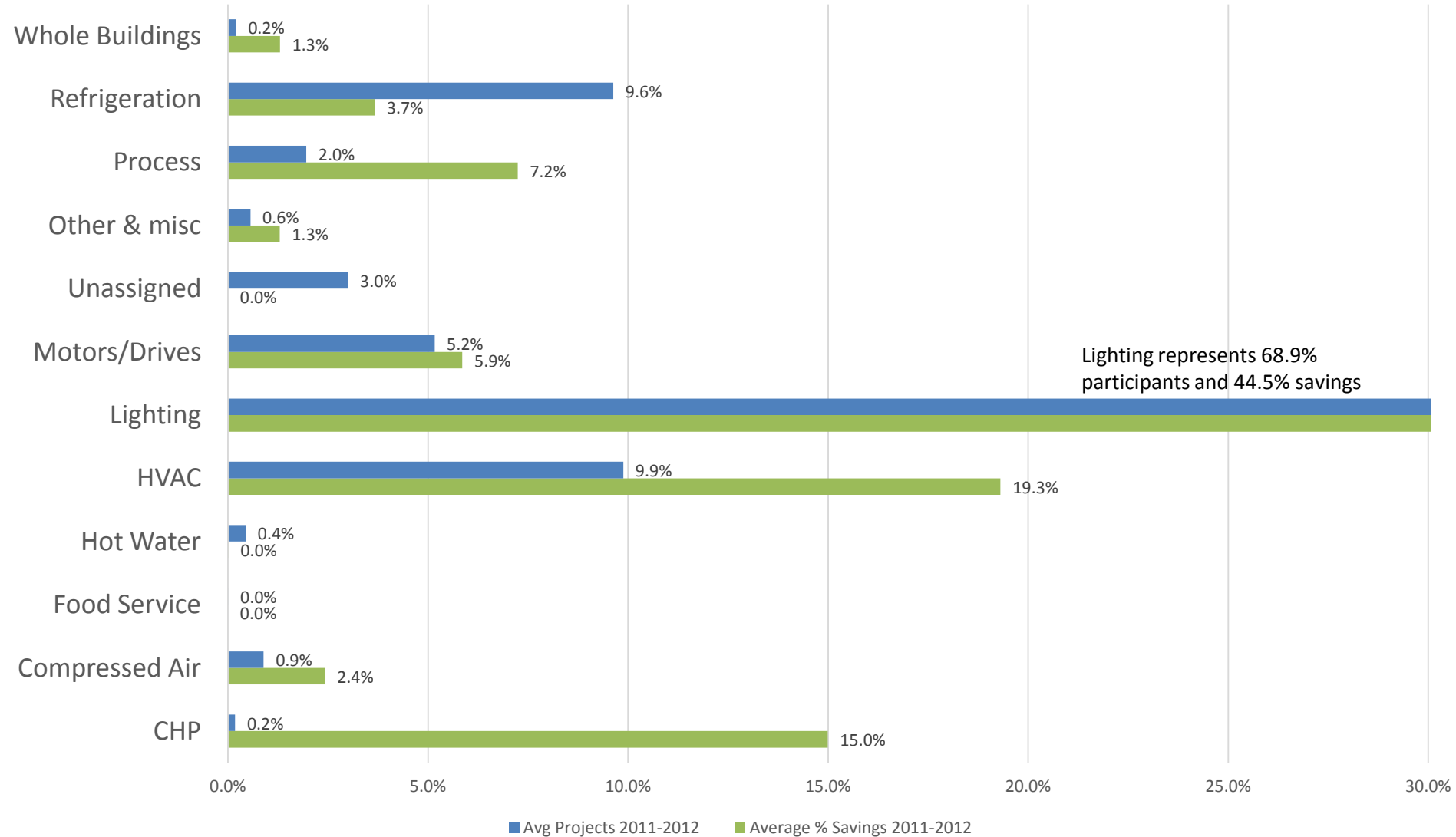


GOALS AND RESULTS

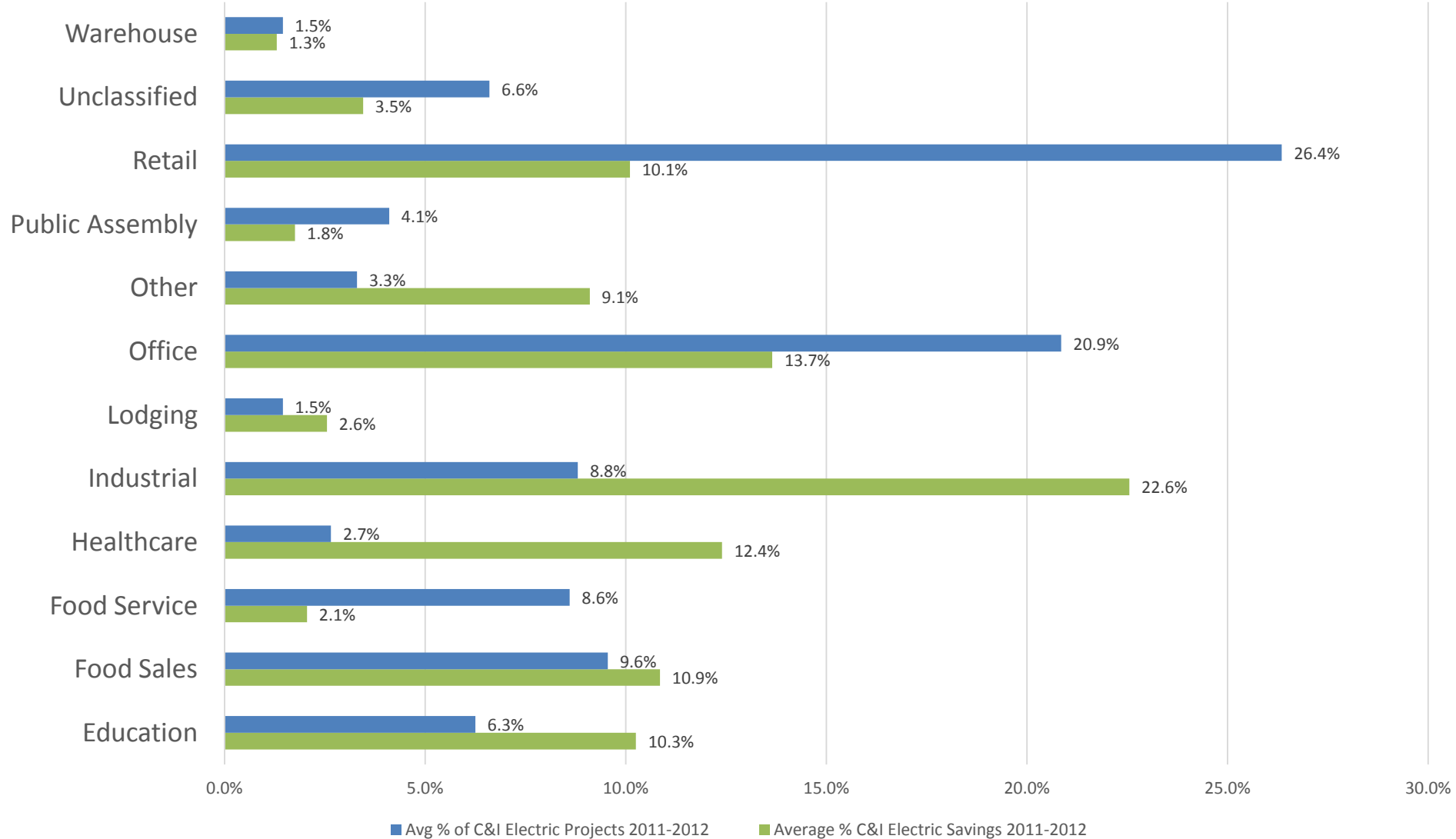
- ▶ 2013-2015 plan goals as a percent of retail sales are among the highest in the country, with statewide aggregate electric and gas goals of 2.55% and 1.14%, respectively
- ▶ In 2013, C&I reduced its electricity load by 2.2% and gas load by 0.9%

2013 C&I Savings	Electric		Gas	
	Annual savings (MWh)	% of sector savings	Annual savings (therms)	% of sector savings
Program/Initiative				
New Construction	215,009	32%	2,796,731	32%
Large Retrofit	349,260	52%	5,635,981	65%
Small Business	103,293	15%	236,658	3%
C&I TOTAL	667,562	100%	8,669,370	100%

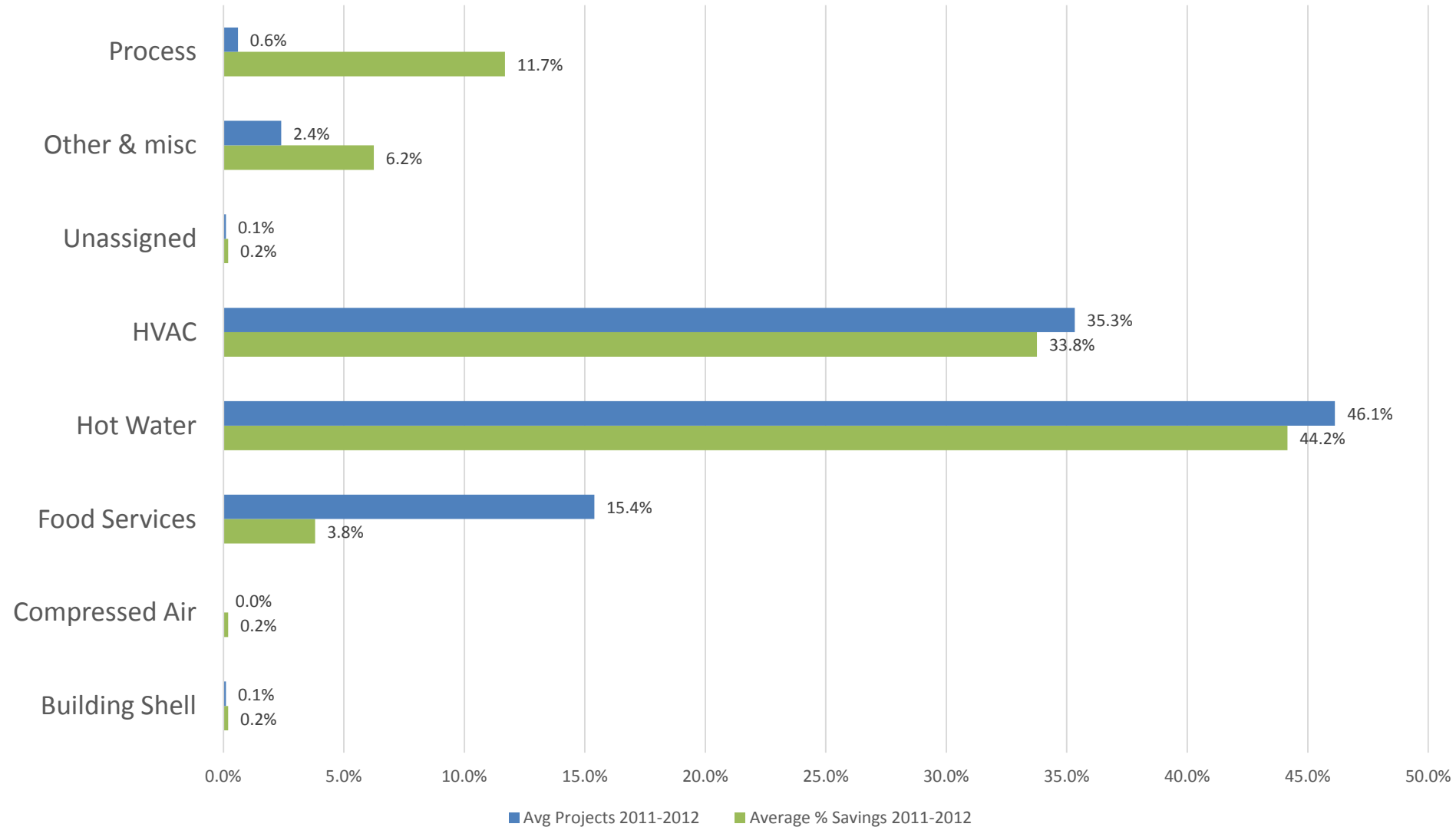
ELECTRIC SAVINGS 2011-2012 (TECHNOLOGIES)



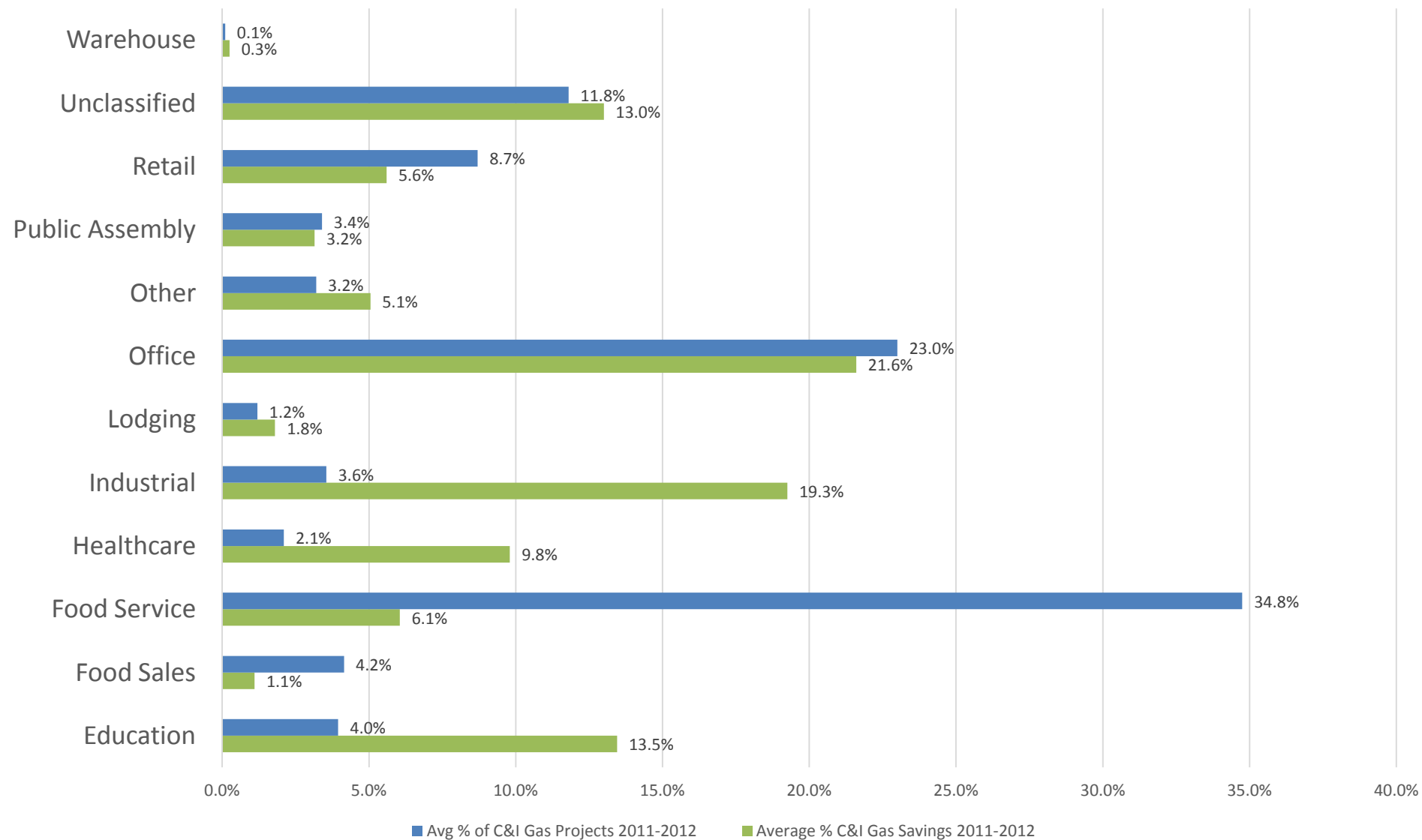
ELECTRIC SAVINGS 2011-2012 (SECTORS)



GAS SAVINGS 2011-2012 (TECHNOLOGIES)



GAS SAVINGS 2011-2012 (SECTORS)



CHANGES SINCE 2012-2014 THREE-YEAR PLAN

MARKET CHANGES

- ▶ EISA - lowered savings for CFLS and some LEDs
- ▶ LED lighting improvements
- ▶ Gas pricing tightness, electricity price increases
- ▶ More focus on optimizing whole building systems

PA CHANGES

- ▶ Upstream lighting program
- ▶ Better Small Business program electric and gas integration
- ▶ Greater focus on customer market segments
 1. Municipalities
 2. Grocery

EM&V RESULTS

FOCUS ON MID-SIZED CUSTOMERS

- ▶ Average peak demand between 300 and 750 kW
- ▶ Recommendations from the report included:
 1. Increase # energy service firms providing comprehensive solutions
 2. Lower capital and administrative costs to improve paybacks
 3. Increase multi-measure program offerings
 4. Continue to improve marketing strategies

SMALL BUSINESS PROCESS EVALUATION

- ▶ Relatively few gas measures are being installed through this program
- ▶ 89% of the electric savings come from lighting
- ▶ 6% of the electric savings from refrigeration for food service customers
- ▶ PAs have been actively planning changes

REPORTING IN THE C&I SECTOR

INITIATIVES

- ▶ C&I programs are categorized into two programs and three initiatives
- ▶ In contrast, the residential sector divided into seven initiatives

CHALLENGE

- ▶ With the C&I sector generating the majority of portfolio savings, the low number of C&I initiatives makes it difficult to know which C&I program offerings are succeeding and which are underperforming

OPPORTUNITIES

- ▶ Potential initiatives for reporting are upstream lighting, other upstream efforts, CHP, true new construction as opposed to replacement on failure, and equipment replacement



COMBINED HEAT & POWER

February 6, 2015

www.ma-eeac.org

CHP BACKGROUND

- ▶ CHP, also known as cogeneration, is the simultaneous production of electricity and heat from a single input fuel source such as natural gas, biomass, biogas, coal, waste heat, or oil.
- ▶ CHP system technologies include reciprocating engines, fuel cells, microturbines, combustion turbines, and steam turbines
- ▶ Most CHP projects are in the 50-500 kW range with typical capacity ranges available from 1kW to multiple MWs
- ▶ CHP represents a large potential for savings and demand reduction
- ▶ From 2011-2013, the PAs produced a total of roughly 255 thousand MWh of savings from CHP projects

CHP OPPORTUNITIES

- ▶ Best candidates have a thermal load (heat and/or water heat) greater than 6,000 hours per year and access to natural gas supply
- ▶ Modular, packaged systems reduce engineering and installation costs
- ▶ A third party operating model may persuade more customers to adopt CHP, but it is important to understand this approach comes at a cost to the customer

CHP

KEY QUESTIONS

DISCUSSION

- ▶ How can more CHP projects be promoted and developed?
- ▶ How do these recommendations differ between small and large CHP installations?
- ▶ Does it make sense to develop standard CHP designs for certain customer types?
 1. Then approach those customers with the pre-engineered design?
 2. Or, are customer profiles too diverse to establish a standard for CHP design?

CHP NEXT STEPS

NEXT STEPS

- ▶ Identify barriers to doing more CHP projects with customers of each size, and determine if the barriers are technical, policy, financial, or market issues. How do the barriers for each customer size correlate with their market potential?
- ▶ Identify potential solutions to overcome the identified barriers, and determine the feasibility, costs and ability of the Program Administrators to implement the solutions.

COUNCIL RECOMMENDATIONS



RETROCOMMISSIONING

February 6, 2015

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RETROCOMMISSIONING BACKGROUND

RETROCOMMISSIONING

- ▶ Rigorous testing, verification and upgrades to existing building control systems
- ▶ Identify and correct operational deficiencies
- ▶ Identify longer term EE investment opportunities

MA PAS OFFER TWO PATHS FOR RCX

- ▶ Standardized MBCx Program
- ▶ Custom large RCx

LBNL COMMISSIONING STUDIES

- ▶ 640 Cx Case Studies (split between new construction and RCx)
- ▶ RCx Verified Results: 16% median whole building savings, average cost \$0.30/sq ft, 1.1 year simple payback

RETROCOMMISSIONING OPPORTUNITIES

INCREASE COST SHARE AND LINK TO IMPLEMENTATION

- ▶ Addresses first cost barrier and increases likelihood of moving from study to implementation

DEVELOP STANDARDIZED TOOLS

- ▶ Increase efficiency of project development
- ▶ Improve consistency across the market

DEVELOP FOCUSED SCOPE OF WORK DURING PLANNING PHASE

- ▶ Increase buy-in of owner, PA, controls contractor and understanding of scope by Cx provider
- ▶ Targeted scope accelerates implementation and savings

INVOLVE CX PROVIDER OVER LIFE OF PROJECT

- ▶ Increases persistence

RETROCOMMISSIONING KEY QUESTIONS

DISCUSSION

- ▶ Is RCx a good entry point for looking holistically at building systems and energy use to identify comprehensive savings?
 1. If not, what are the alternatives?
- ▶ What approaches will most effectively address barriers to RCx?
 1. Customer upfront first cost barrier
 2. PA short measure life issue and difficulty claiming savings for control upgrades
- ▶ Is RCx a market transformation opportunity? What resources are required for expanding RCx offerings?
 1. Do those resources currently exist in MA?
 2. If no – what can be done to build resources?

RETROCOMMISSIONING NEXT STEPS

NEXT STEPS

- ▶ PAs to provide estimates of savings potential in MA
- ▶ PAs to include specific commitments to advance RCx in the three year plan to take advantage of the opportunities for improvement noted above.

COUNCIL RECOMMENDATIONS



BUILDING & LIGHTING CONTROL SYSTEMS

February 6, 2015

www.ma-eeac.org

BUILDING AND LIGHTING CONTROLS BACKGROUND

BUILDING CONTROLS

- ▶ New building controls are eligible for incentives for existing buildings, but can't replace an existing, operating Energy Management System
- ▶ In 2013, Custom Building Controls accounted for 3.2% of all C&I savings

LIGHTING CONTROLS

- ▶ Historically, most incentivized lighting controls have been occupancy sensors
- ▶ Lighting control savings have dropped 60% between 2010-2013
- ▶ Daylighting, dimming, networked, and integrated controls are increasing in availability and popularity

BUILDING AND LIGHTING CONTROLS OPPORTUNITIES

BUILDING CONTROLS

- ▶ Find a way to help upgrade existing operational, but outdated controls systems
- ▶ Integrate control system upgrades with possible sub-metering and commissioning initiatives
- ▶ Require open source in new controls systems to make upgrades easier in the future
- ▶ Encourage fault diagnostics to identify energy optimization opportunities

LIGHTING CONTROLS

- ▶ Promote all types of lighting controls, but especially dimming, daylighting, and network systems

BUILDING AND LIGHTING CONTROLS

KEY QUESTIONS

DISCUSSION

- ▶ How should the 3 Year Plan address legacy control and lighting systems?
- ▶ What are the market and program barriers, if any, to advancing a legacy controls initiative?
- ▶ What is the best way engage partners and market experts to target cost-effective lighting and building controls?

BUILDING AND LIGHTING CONTROLS

NEXT STEPS

NEXT STEPS

- ▶ Identify barriers (technical, cost effectiveness, policy, financial, market)
- ▶ Identify potential solutions to overcome the barriers
- ▶ Understand cost-effectiveness impacts

COUNCIL RECOMMENDATIONS



SUBMETERING & DATA ANALYTICS

February 6, 2015

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SUBMETERING & DATA ANALYTICS BACKGROUND

- ▶ Sub-metering is the practice of installing meters downstream (on the customer side) of the utility meter to determine how energy is being used for a specific area or process.
 1. Offers potential insight to complex systems and building management systems that can potentially be acted upon.
 2. Submeters are not an energy efficiency measure, but can be coupled with strategies that may result in energy savings.

- ▶ Data analytics is the practice of analyzing building and system data to better understand operating patterns and draw conclusions from that data

SUBMETERING & DATA ANALYTICS OPPORTUNITIES

- ▶ Develop baseline building and system energy performance with sub-metering and performance monitoring,
- ▶ Utilizing meter data to identify energy and demand saving opportunities through RCx
 1. Help operators maintain energy savings from RCx
- ▶ Compare operating energy and data to benchmark and identify faults through data analytics,
- ▶ Allocate energy use to specific areas to potentially drive behavioral changes in energy use,

SUBMETERING & DATA ANALYTICS

KEY QUESTIONS

DISCUSSION

- ▶ What level of sub-metering and data analytics is necessary for energy efficiency?
 1. How best can these technologies impact energy efficiency,
- ▶ What programs are in place to verify savings from controls, RCx, and behavioral programs?
- ▶ What incentive structure would be attractive enough to customers such that they would invest in sub-metering or data analytics as a standalone energy efficiency measure?

SUBMETERING & DATA ANALYTICS

NEXT STEPS

NEXT STEPS

- ▶ Understand the potential for these technologies and it's role in an effective energy efficiency strategic approach,
- ▶ Identify potential solutions to overcome the identified barriers, and determine the feasibility, costs and ability of the PAs to implement the solutions.

COUNCIL RECOMMENDATIONS



WORKSHOP #2

FEBRUARY 12, 2015