

EEAC COMMERCIAL WORKSHOP #2

Potential Innovative Options to Explore

► **October 31st, 2017**

AGENDA



- ▶ **9:00** **Introduction and Overview**
- ▶ **9:05** **Lighting & Controls**
- ▶ **10:00** **HVAC & Controls**
- ▶ **10:55** *Break*
- ▶ **11:15** **New Demand Management Opportunities**
- ▶ **12:00** **Fuel Switching**
- ▶ **12:45** **Wrap Up and Next Steps**
- ▶ **1:00** **Public Comment**
- ▶ **1:15** **Adjourn**

C&I WORKSHOPS



C&I #1	C&I#2
Advancing/Enhancing Existing Initiatives, Approaches, & Measures	Opportunities for Innovation in C&I
Existing Initiatives, Approaches, & Measures to Discuss Potential Improvements:	Potential Innovative Areas to Explore:
Combined Heat & Power	Lighting & Controls
C&I Process Savings	HVAC & Controls
Data-Driven Customer Acquisition and Engagement Strategies; Big Data	New Demand Management Opportunities
Small Business	Fuel Switching
New Construction	

APPROACH TO EACH C&I TOPIC (E.G., LIGHTING & CONTROLS)

- ▶ *(10) Short presentation including draft potential strategic recommendation*
- ▶ *(15) Q&A -- (From individual Councilors — Consultants/PAs respond)*
- ▶ *(10/5) Discuss any proposed modifications/additions/alternatives (small groups/report out); and*
- ▶ *(15) Finalize recommendation(s)—All Councilors*
- ▶ *Note: Total time for each topic (and hence sub-times may differ slightly)*

GROUND RULES



- ▶ **Allow all Councilors to actively participate, be succinct**
- ▶ **Use name table tents to queue**
- ▶ **Minimize electronic distractions**

LIGHTING & CONTROLS

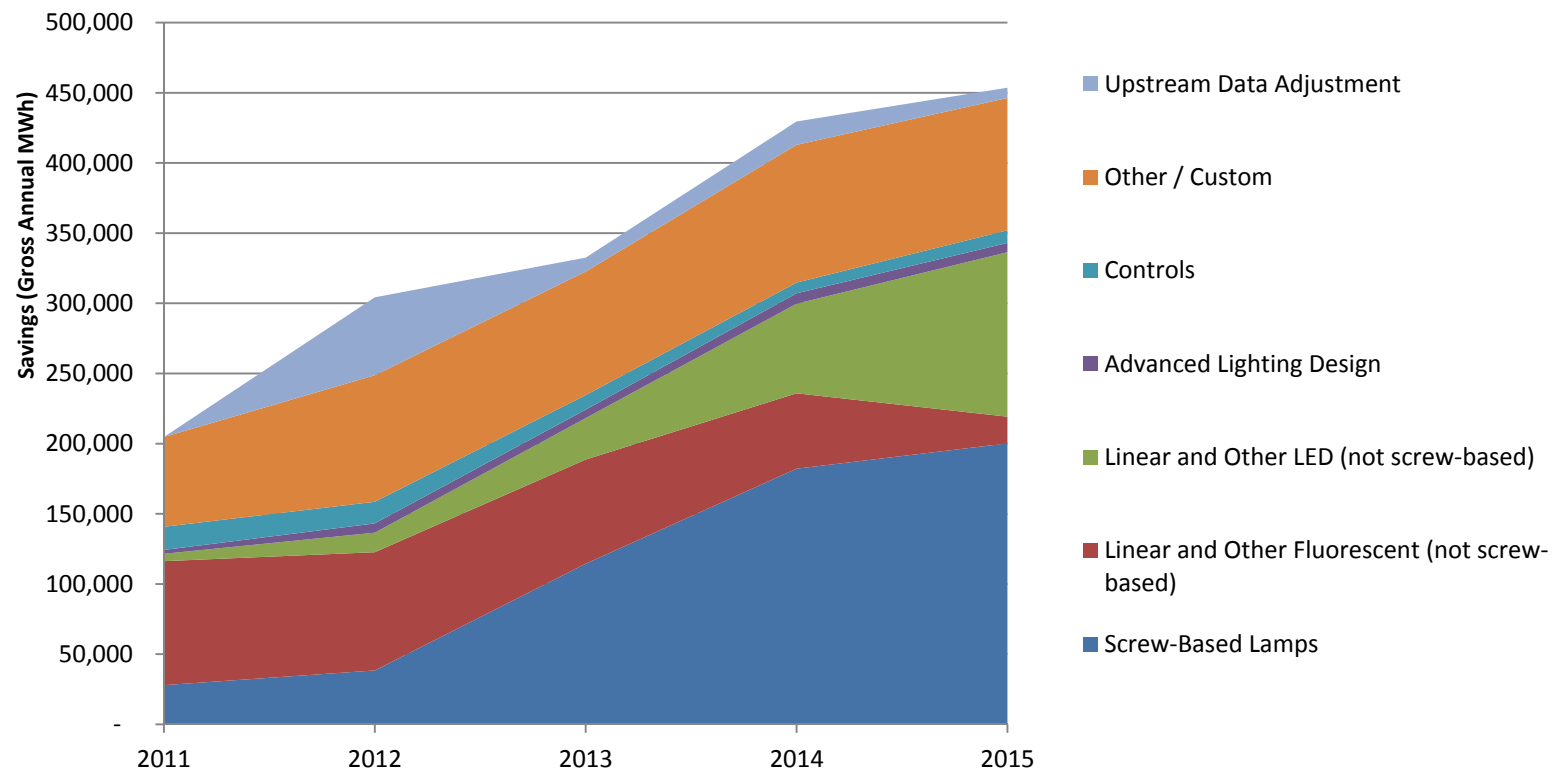
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BACKGROUND

► Lighting 57% of C&I electric lifetime savings in 2016



MARKET OVERVIEW

- ▶ Almost 75% of C&I interior lighting is linear
- ▶ 68% of linear lighting is baseline efficiency
- ▶ Linear lighting technology is advancing
- ▶ Linear LED costs declining
- ▶ LEDs are more easily controlled for tuning or daylight sensing (dimming), and occupancy

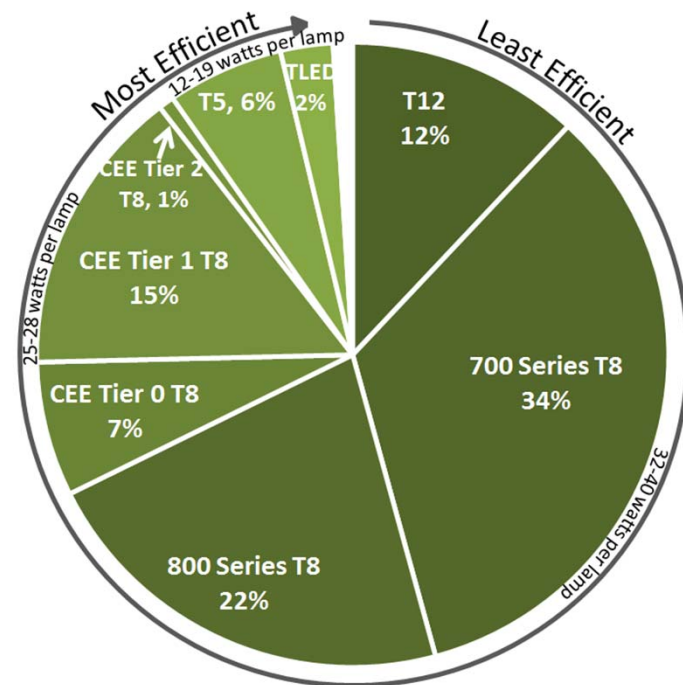


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Efficiency by Linear Lamp Type



PA PERSPECTIVE



- ▶ **The PAs constantly work to find new approaches to deliver more lighting savings opportunities with a focus on quality for customers and the Commonwealth.**
- ▶ **The PAs use a suite of approaches for the delivery of lighting solutions to customers of all types and sizes. Some are:**
 - Turnkey approaches,
 - Through distributors at a point-of-sale, and
 - Complex engineered solutions using technical assistance support.
- ▶ **High efficiency market transformation and related Evaluation baseline adjustments are expected to continue pressuring claimable savings during the next planning cycle. This effect will be felt most in the New Construction/ Equipment Replacement space, but also more generally, for any measures where the evidence supporting broader market transformation is mounting.**
- ▶ **The PAs are currently investigating the implications of dual baseline and industry standard practice considerations and impacts on Lighting savings.**

CONSULTANT PERSPECTIVE



- ▶ **Linear lighting represents the greatest opportunity for savings**
- ▶ **Controls provide both energy and demand savings**
 - Demand includes both passive and active demand
- ▶ **Drive customers to custom and upstream initiatives**
- ▶ **Lighting as a Service (LaaS) may be a way to drive more full fixture retrofits with design and controls**

STRATEGIC RECOMMENDATIONS

- ▶ **The Council would like to see the PAs maximize C&I lighting savings, with an emphasis the linear lighting market. Methods to consider include:**
 - A new offering to increase the penetration of advanced controls
 - A broad-based linear lighting delivery strategy, that also identifies other potential customer energy efficiency opportunities to use as lead generation for the PAs and their vendors
 - Expanding lighting design service support through a lighting design initiative
 - Increase participation in lighting initiatives (including upstream) by increasing marketing, outreach and technical support to customers, contractors, and trade associations

DISCUSSION



HVAC & CONTROLS

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BACKGROUND



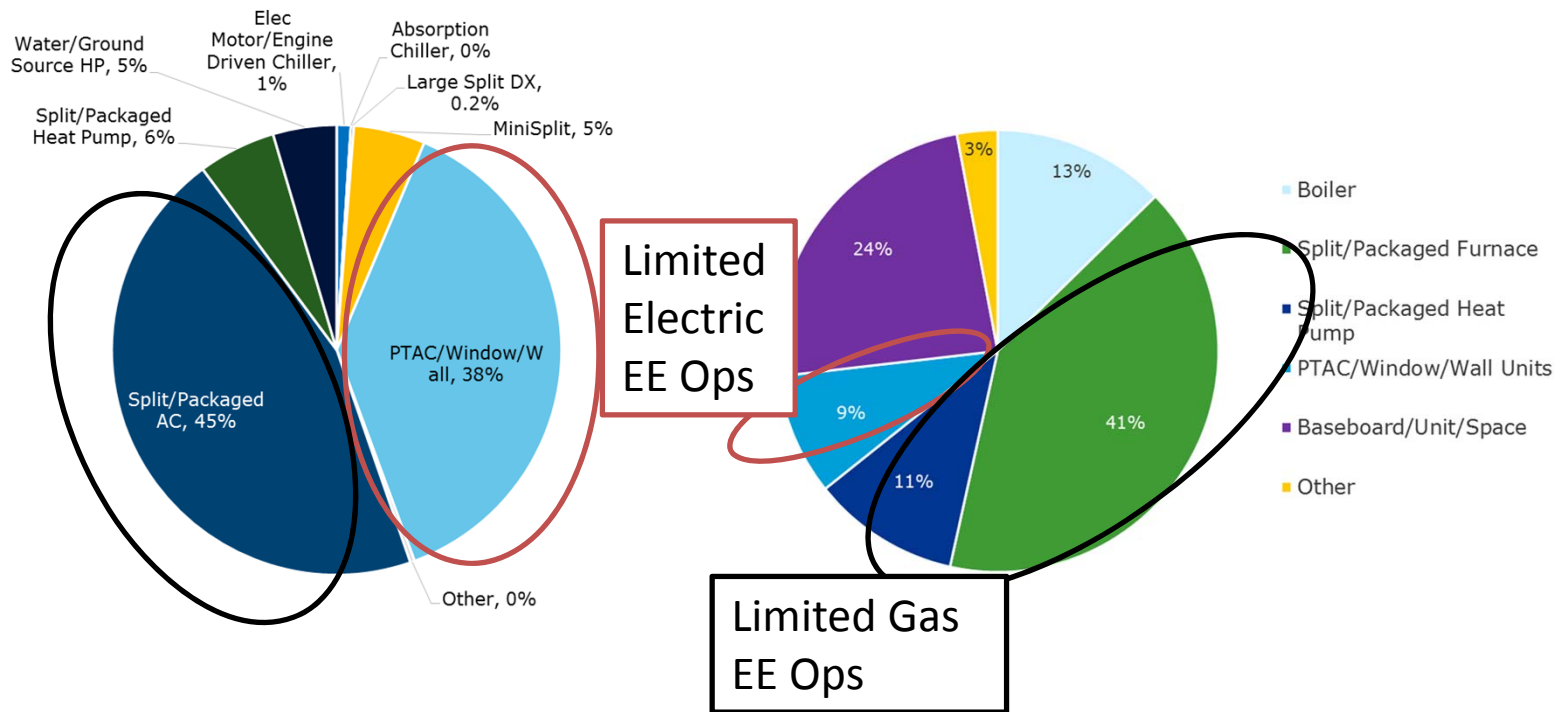
- ▶ **Largest end use for C&I**
 - 25% of electricity
 - 50% of fossil fuel
- ▶ **PA overall savings correlate with savings achieved in HVAC**
- ▶ **Savings from HVAC have been decreasing**
- ▶ **PAs have multiple pathways to address this end use**
 - Most success in affecting equipment efficiency
 - Lower participation in system efficiency and operating efficiency

HVAC BACKGROUND/ MARKET OVERVIEW



Cooling Equipment Distribution

Heating Equipment Distribution



Data from MA CI Market Characterization Study

PA PERSPECTIVE

- ▶ **The PAs use a suite of approaches for the delivery of HVAC solutions to customers of all types and sizes. Some are turnkey approaches and others are delivered through distributors at a point-of-sale where customers/trade allies can essentially self-serve. This wide array of approaches allows the PAs to effectively deliver efficient solutions to the thousands of customers annually in the Commonwealth.**
- ▶ **New Approaches & Demonstrations proposed and tried during 2016-2018**
 - *Equipment Replacement Initiatives*
 - *National Accounts Franchise Strategy*
 - *Custom Express Tools*
 - HVAC Specific Trainings for Workforce and Business Partners
- ▶ **High efficiency market transformation and related Evaluation baseline adjustments are expected to continue pressuring claimable savings during the next planning cycle. This effect will be felt most in the New Construction/Equipment Replacement space, but also more generally, for any measures where the evidence supporting broader market transformation is mounting.**
 - The PAs are currently investigating the implications of dual baseline and industry standard practice considerations and impacts on HVAC savings.

CONSULTANT PERSPECTIVE



► Programs address HVAC

- Increasing adoption of EE equipment
 - Upstream & Prescriptive
- System optimization
 - Pay for Performance & Retrocommissioning
- Custom – spans increasing EE equipment and optimization

► Challenges include:

- Lack of available equipment for EE PTAC and gas RTUs
- Speed of replacement transactions
- Claiming savings for controls system replacements and EMIS
- Persistence
- Lack of market capacity to deliver most efficient solutions for all buildings

HVAC CONSIDERATIONS



- ▶ **Equipment efficiency and right sizing are important**
 - Long measure life drives good lifetime savings
- ▶ **System optimization requires sophisticated engineering and the market generally does not seek or reward this approach.**
 - Savings of 30-50%
- ▶ **Ongoing operations and control have a major impact on system energy use.**
 - Quality control sequences with a positive feedback loop for operators (EMIS) can save 10-30%

STRATEGIC RECOMMENDATION



► The Council would like to see the PAs increase HVAC savings and reverse the trend of diminishing HVAC savings and participation. As lighting and other end use baselines change, it is important for the PAs to build market capacity for future HVAC savings growth to reflect the increasing importance of HVAC savings in the C&I portfolio in both the 2019-2021 and 2022-2024 Plans. The PAs should work toward transformation in the HVAC market to make energy efficient HVAC systems the norm and by taking a system optimization approach for existing and new systems.

METHODS MAY INCLUDE:



- ▶ Change market practices so that optimally efficient and right sized HVAC equipment become the norm at the time of purchase for retrofit, upstream and new construction applications.
- ▶ Promote building automation systems that are designed for optimal function including retro-commissioning of existing systems and rigorous design review and commissioning of new control systems (for existing and new buildings).
- ▶ Address known market barriers to upfront investment in the engineering services necessary for system optimization through innovative program offerings.
- ▶ Support performance verification and ongoing system tuning so that providers and operators learn what works, identify new opportunities, and improve practices over time as a savings strategy.
- ▶ Build a strong and growing market capacity for high efficiency HVAC system design, installation, operation and management

DISCUSSION



NEW DEMAND MANAGEMENT OPPORTUNITIES

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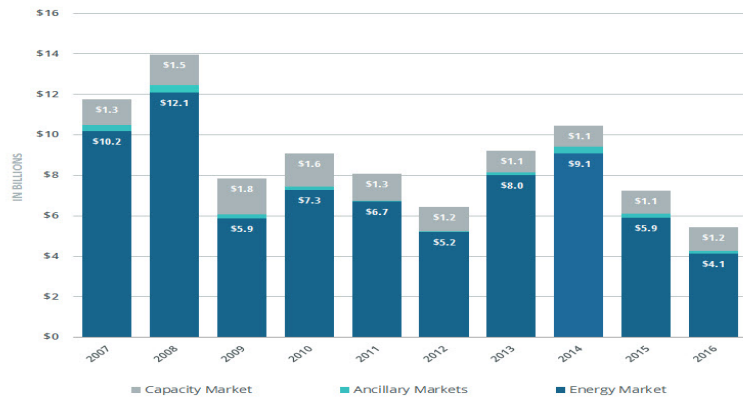
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BACKGROUND

- ▶ MA summer demand has flattened
- ▶ MA winter demand has declined
- ▶ Energy efficiency is responsible for the divergence between gross and net demand
- ▶ Demand makes up 10-20% of wholesale market costs for customers and potentially higher

Figure 3: Annual Value of Wholesale Electricity Markets



*Data subject to adjustments
Source: ISO New England

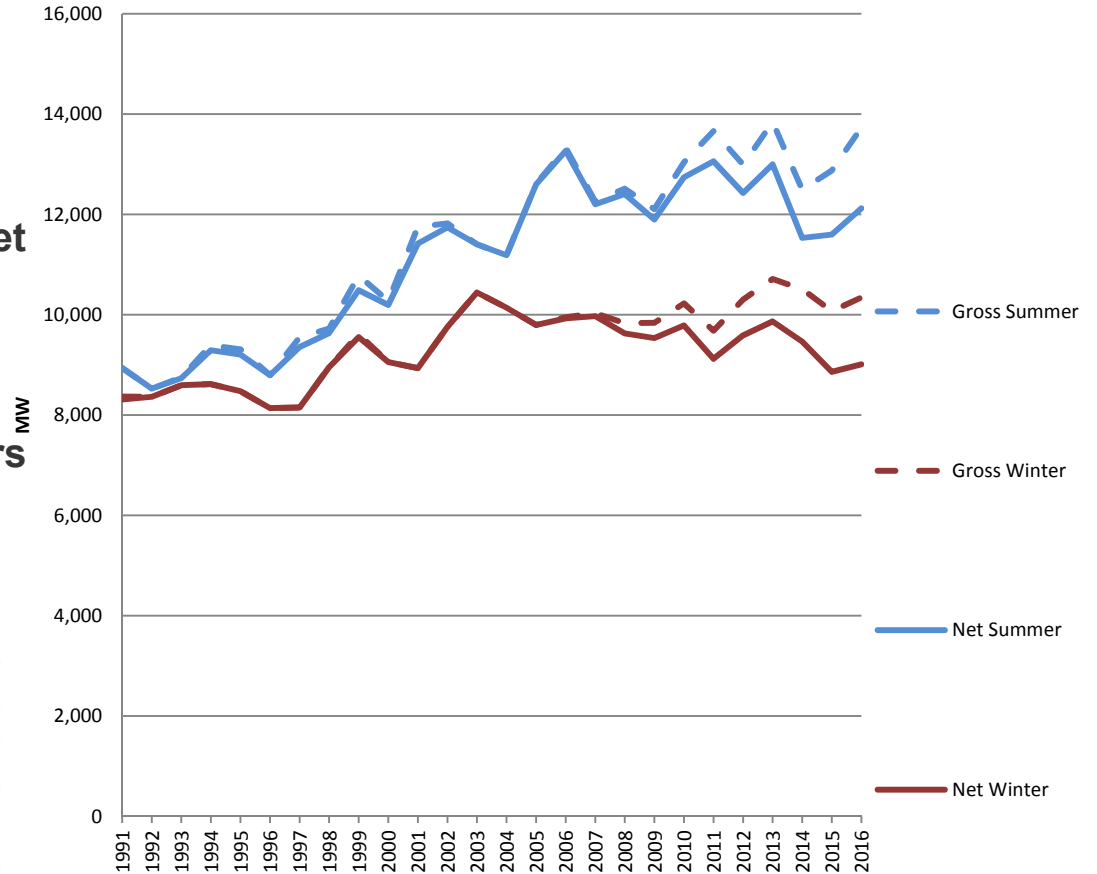


Figure 1: Massachusetts Demand Overtime - Gross & Net

MARKET FORECAST

► **Due to long lives of EE measures ISO-NE is forecasting:**

- Flat net summer demand growth over 10 years
- Declining net winter demand growth over 10 years

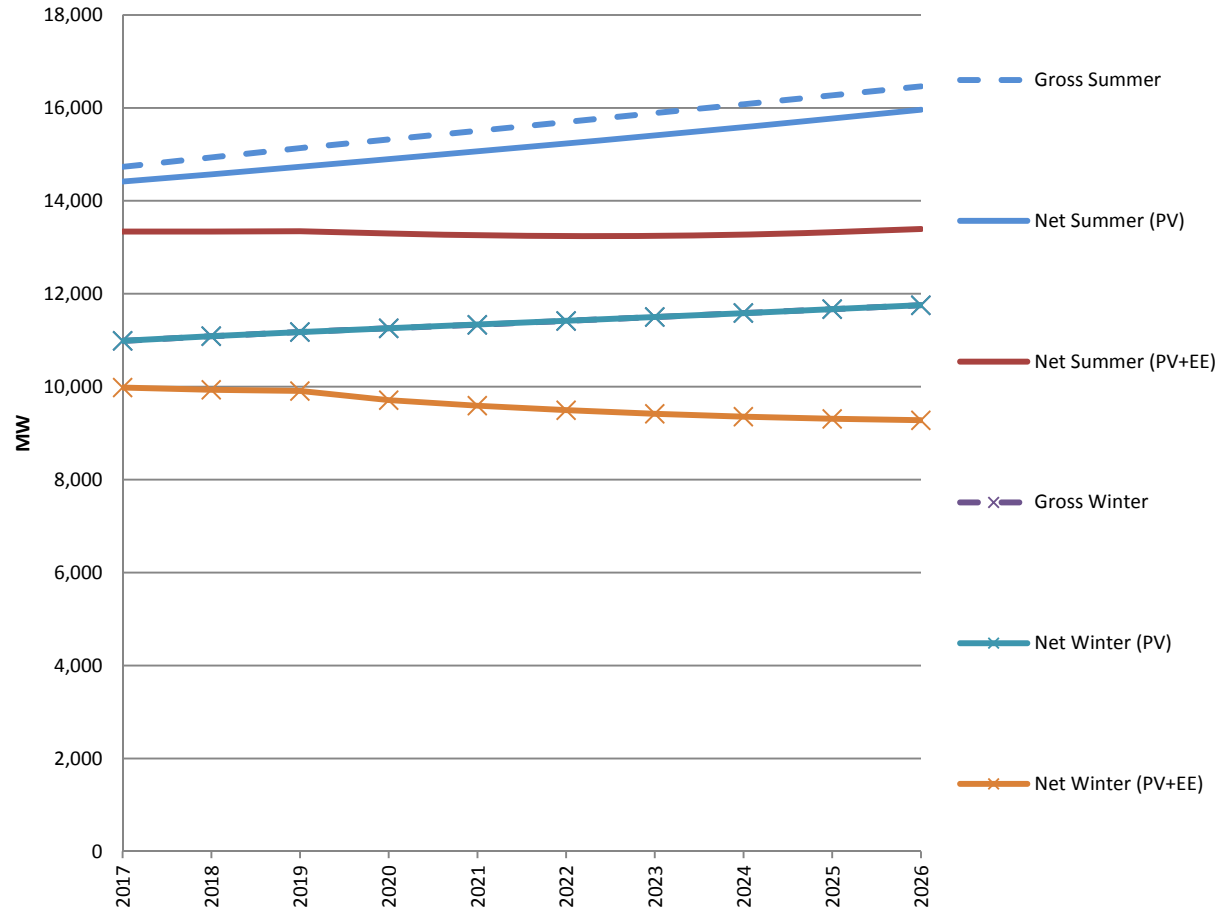
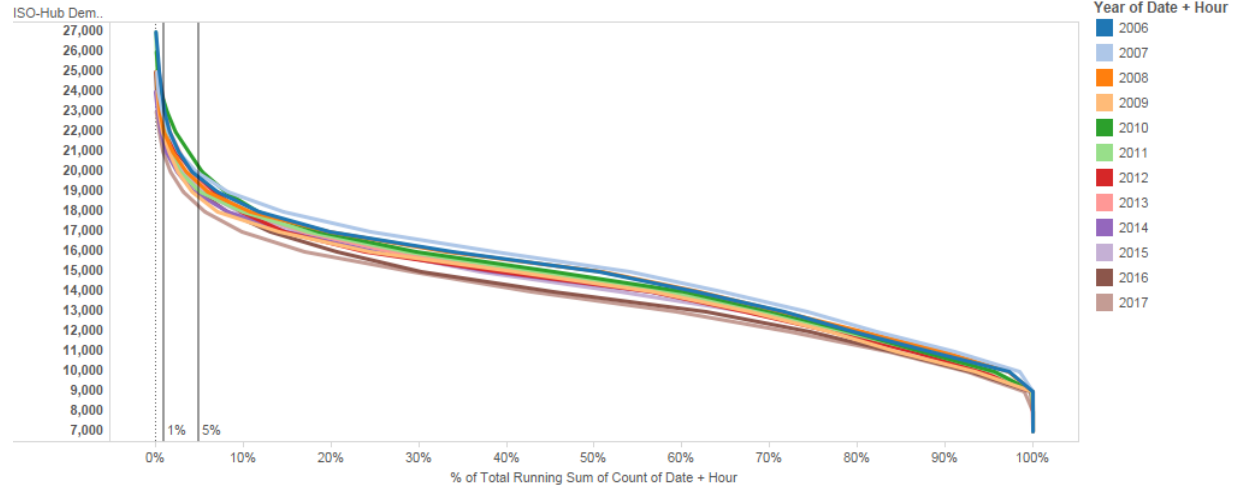


Figure 2: MA Summer & Winter Demand Forecast Gross vs. Net (90/10)

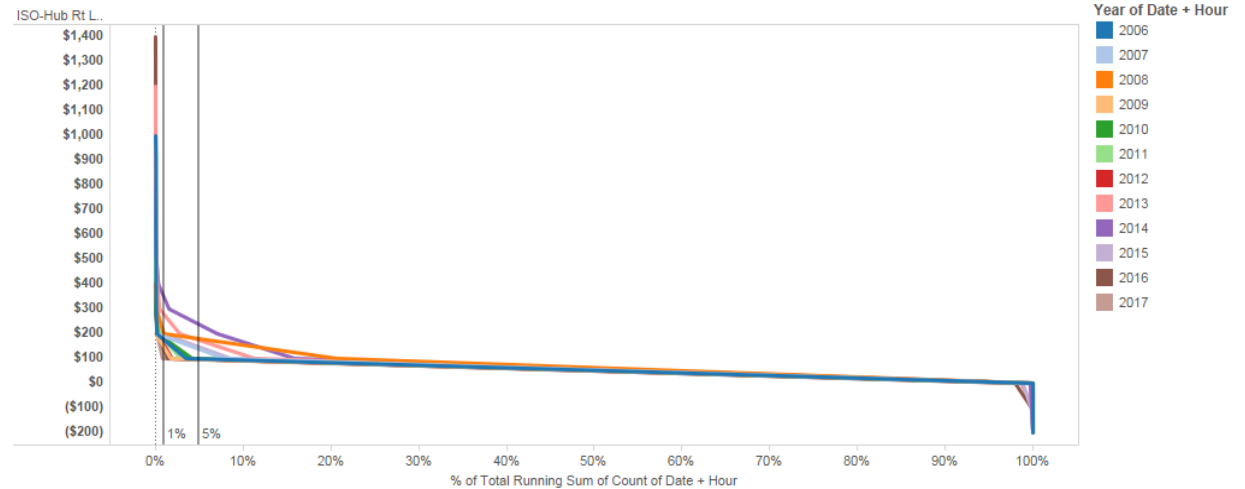
SO WHY SHOULD WE CARE?

- ▶ **Top hours drive generation, transmission, and distribution build-out costs**
- ▶ **Passive and active demand reductions reduce these costs and benefit all electric customers in MA**

ISO-NE - Load Duration Curve

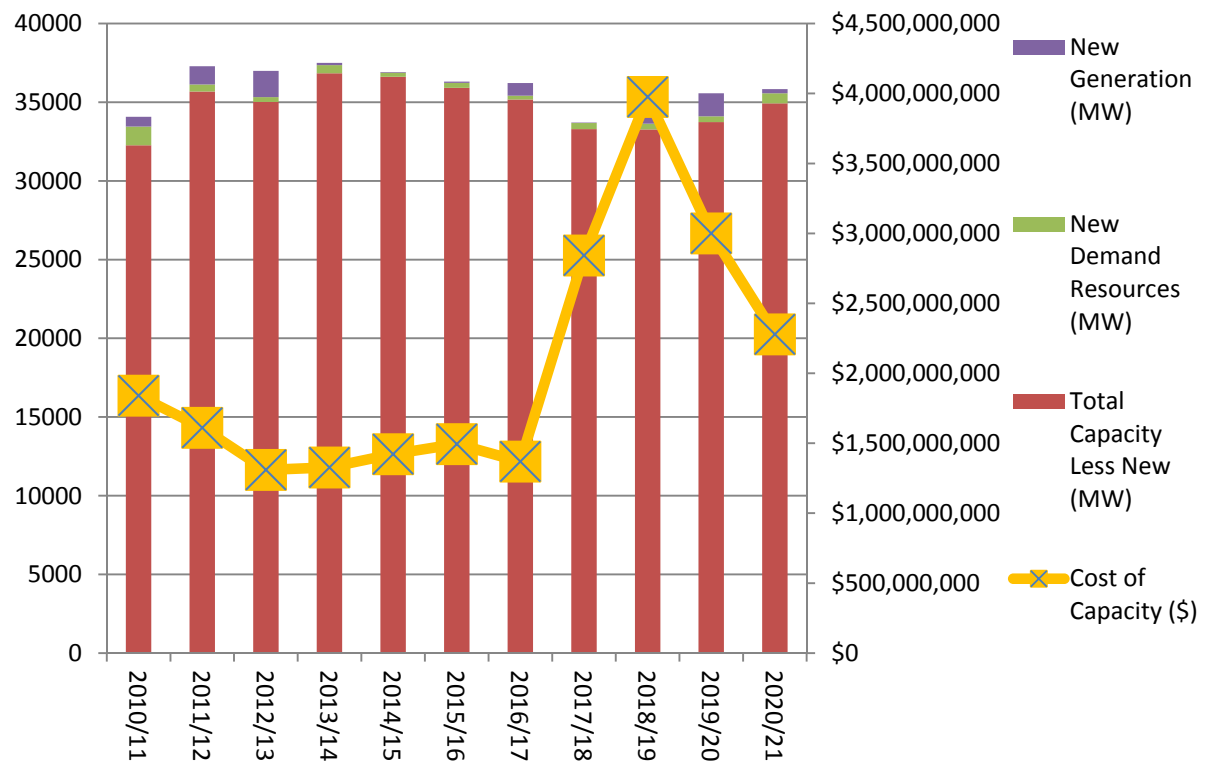


ISO-NE - LMP Duration Curve



NEAR-TERM COST OF CAPACITY INCREASING FOR CUSTOMERS

- ▶ **FCA results for commitment periods 2017-2020 show elevated cost of capacity compared to prior FCAs driven by generation retirements**
- ▶ **Customers will pay this cost and will look for solutions to mitigate impacts on their businesses:**
 - EE & Demand Management offer solutions for customers to manage demand charges



PA PERSPECTIVE



- ▶ **The Massachusetts PAs have been investigating adding active demand reduction and demand management to the portfolio since the start of the 2016-2018 Three Year Plan.**
 - National Grid and Cape Light Compact (CLC) included demand demonstrations in the 2016-2018 plan and have been delivering on the approved demonstrations during the summers of 2016 and 2017.

- ▶ **The PAs recognize the continued importance of achieving demand reduction and mitigating peak load growth incrementally from the approved energy efficiency plans.**
 - Issues related to demand reduction are complex, and it is important to design efforts that take into account both positive attributes of these programs and possible unintended negative consequences, such as increased energy usage or fossil fuel use.

- ▶ **Through a highly collaborative and expert driven process, the PAs are exploring approaches to new cost-effective demand reduction initiatives.**

CONSULTANT PERSPECTIVE



► **We see the following areas of opportunity to advance demand management to manage system costs in the future:**

- Integrate demand management (continuous active customer demand management coupled with capability for demand response) into the energy efficiency programs.
- LED lighting with integrated controls, an energy efficiency measure, offers an opportunity for the PAs to work with customers to install systems that enable both customer demand management, tuning of light levels to maximize productivity, and provide a resource for demand response. Imagine if the lighting load of MA could be automatically dimmed by 10% to reduce loads when needed.
- The guidelines the Electric Power Research Institute (EPRI) has developed is intended to instruct in the design and development of studies, including sample design, the use of control groups, etc. to ensure that results are statistically valid and can be evaluated. We urge the PAs to review and follow these guidelines developed within their industry to provide best practices in the design and deployment of the demand demonstrations.

STRATEGIC RECOMMENDATIONS

- ▶ **The Council would like to see all electric PAs include active demand management programs, and/or demand management strategies integrated within efficiency programs, in the 2019-2021 plan, in addition to achieving passive demand reductions through efficiency.**

DISCUSSION



FUEL SWITCHING

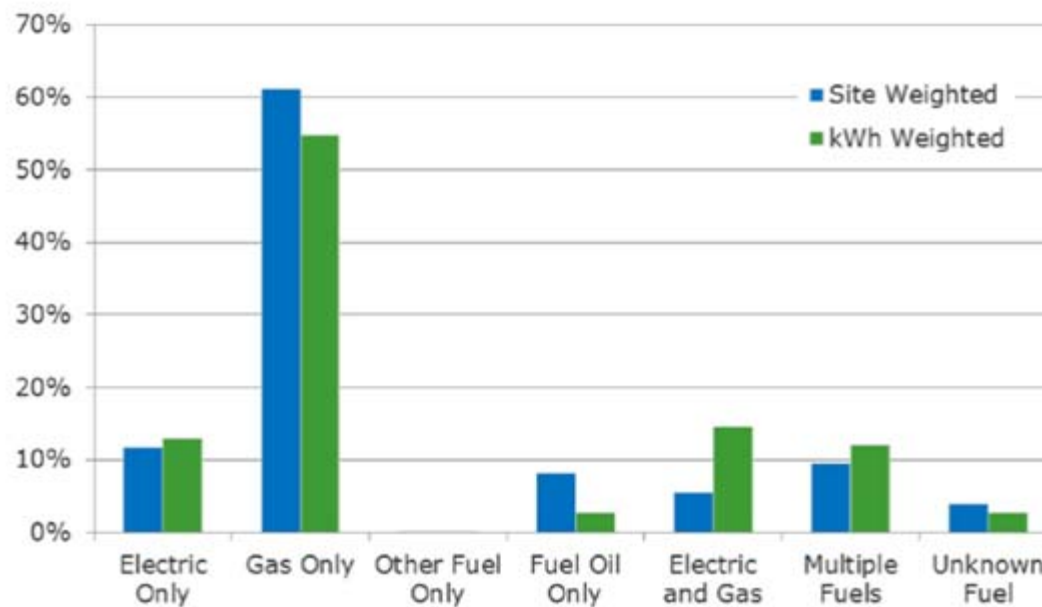
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BACKGROUND

- ▶ Fuel switching can be total or partial
- ▶ A partial switch may offset some original fuel use, while keeping the original equipment in place
- ▶ Most used fuel for heat in Massachusetts is gas



MARKET OVERVIEW



- ▶ **Fuel switching at the request of the customer currently occurs and may be incentivized by the PAs, consistent with regulatory restrictions, in the following places:**
 - At the time of construction or at time of equipment replacement
 - ▶ Absorption Chillers – uses excess steam available
Fewer than 25 incentivized since 2010
 - ▶ Heat pumps in Upstream HVAC – simply incentivizing new equipment
>20,000 incentivized statewide since 2013
 - ▶ Variable Refrigerant Flow (VRF) – at the time of construction, the customer/builder may decide to use VRF even if gas is available
Fewer than 50 incentivized since 2015
 - ▶ Customers installing High Efficient Gas Equipment when Oil Equipment is at EUL.
 - In Existing Buildings – Retrofit (early retirement)
 - ▶ Custom case-by-case typically for Process, HVAC, or Domestic Hot Water end uses
Possibly 60-100 since 2010

PA PERSPECTIVE



- ▶ **The Massachusetts PAs assist C&I customers in switching fuels and equipment when requested by customers and when cost-effective and more efficient.**
- ▶ **Incentives are only available for energy efficiency measures that save regulated fuels (electricity and natural gas). However, an increase in usage of fuels is currently allowed, if the measure(s) save electricity or natural gas cost-effectively.**
- ▶ **The PAs view fuel switching measures in two distinct categories:**
 - The shift from existing fuel to a new fuel ‘baseline’ efficient system
 - Incremental improvements in efficiency above the ‘baseline’ new fuel system
- ▶ **In either category, the PAs require the installation of high efficiency equipment (prevailing code or industry standard practice baseline) in fuel switching projects.**

CONSULTANT PERSPECTIVE



- ▶ **There are cost effective opportunities to fully or partially fuel switch to increase efficiency and reduce greenhouse gas emissions**
- ▶ **There is the opportunity when a customer switches to a regulated fuel to incentivize efficient equipment**

STRATEGIC RECOMMENDATION

- ▶ **The Council recommends that the 2019-2021 Plan include support for some forms of fuel switching. The Council would like to see the PAs identify opportunities and support fuel switching where cost-effective, provided that the program impacts are consistent with Global Warming Solutions Act compliance. These include opportunities to strategically electrify energy uses, and to switch from inefficient equipment to more efficient fuel and/or equipment, where cost-effective. A customer should be able to choose energy efficiency services regardless of current or desired fuel, as long as the equipment or upgrade is to efficient equipment and is cost-effective.**

DISCUSSION



PUBLIC COMMENT

