MA ENERGY EFFICIENCY ADVISORY COUNCIL

→ CONSULTANT TEAM

WORKSHOP #1: NEW CONSTRUCTION AND ACTIVE DEMAND

▶ November 5, 2020

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NEW CONSTRUCTION OVERVIEW

- New Construction Programs incentivize construction of new buildings beyond minimum code requirements and/or current standard practice.
- Failing to maximize efficiency at the time it is built represents a "lost opportunity" for energy savings.
- For both residential and C&I new construction, increasingly efficient baselines threaten program cost-effectiveness and performance.
- Opportunities exist to achieve savings, including through all-electric program offerings that integrate with renewables, storage, and active demand.
- Recommendations that follow are designed to increase savings from participating and incorporate new opportunities into program offerings.

RESIDENTIAL NEW HOMES AND RENOVATION INITIATIVE

Low-Rise	• Single Family and low-rise multifamily (three stories and under
High-Rise	• High-Rise (four stories or more), and low-rise multifamily buildings with master metered HVAC systems
Passive House	• Multifamily (5 units or more) meeting Passive House standards
Renovations and Additions	• Partial renovation and/or building an addition to existing home

RESIDENTIAL NEW CONSTRUCTION RECOMMENDATIONS

1. **Continue to grow the pipeline of new multi-family (5+ units) Passive House projects.**
   - Passive House standard provides a step up in savings.

RESIDENTIAL NEW CONSTRUCTION RECOMMENDATIONS

2. **Investigate opportunities for promoting zero-energy modular homes.**
   - These efforts may entail working with DOER's Zero Energy Modular Home Affordable Housing Initiative (ZE-MAHI).

RESIDENTIAL NEW CONSTRUCTION RECOMMENDATIONS

3. **Better characterize the non-energy impacts of fossil-free new construction.**
   - Recent studies have shown significant health impacts from combustion appliances, including the health impacts of gas stoves., Properly quantifying and claiming these benefits would likely improve the cost effectiveness of all-electric new construction and or support.
   - Also relevant to C&I sector

RESIDENTIAL NEW CONSTRUCTION RECOMMENDATIONS

4. **Develop single family and low-rise multifamily all-electric program offers.**
   - The single-family offer would likely entail, at a minimum, a set of stringent prescriptive envelope and HVAC equipment criteria.
   - The MF offer should leverage the current Passive House activities, which should remain largely unchanged.
   - The PAs should provide tools and training to promote the use of variable refrigerant flow (VRF) HVAC systems in MF buildings.

RESIDENTIAL NEW CONSTRUCTION RECOMMENDATIONS

5. **Develop connected home requirements.**
   - May start as requiring smart, Wifi thermostats or possibly over time, requirements for home energy management systems and/or connected equipment such as HVAC and hot water equipment.
   - Efforts should be leveraged by actively recruiting new homeowners to participate in the PAs' active demand response (ADR) efforts.
   - As part of this connected home effort, the PAs should more seamlessly integrate already available storage, EV-charger, and PV incentives into the program.

C&I NEW BUILDINGS AND MAJOR RENOVATIONS

Path 1	• ZNE/ZNER/Passive Buildings
	  • Savings based on post occupancy energy use intensity
	  • Strong technical and financial assistance

Path 2	• High Performance Buildings • Savings based on predicted energy use intensity reduction, strong support
Path 3	• Streamlined Support • Less intensive engagement to move buildings beyond code
Path 4	• Prescriptive • Equipment-based prescriptive incentives

C&I NEW CONSTRUCTION RECOMMENDATIONS

6. **Increase thresholds for participation to ensure significant impacts on building energy use through investments in very high efficiency building envelopes and electrification to avoid more costly future deep energy retrofits.**
   a. Ensure EUI baselines used for Paths 1 and 2 are stringent enough to drive projects towards the highest efficiency achievable with modern construction practices.
   b. Emphasize Path 1 (ZNE ready) as often as possible – including with smaller buildings that are motivated to achieve ZNE status. Include bonus incentives for electrification and reduced thermal loads by focusing on high-performance building envelope.
   c. Address barriers to and find means for consistently shifting new construction to all electric buildings to avoid more costly deep energy retrofits in the future.

C&I NEW CONSTRUCTION RECOMMENDATIONS

7. **Run pilot projects with small or mid-size participants in the less comprehensive new construction Paths 3 & 4 that utilize modern building envelopes and high performance HVAC systems such as Variable Refrigerant Flow or Ground Source Heat Pumps paired with Dedicated Outdoor Air Systems. Include commissioning and operator training, and study project impacts on energy and non-energy benefits including:**
   a. Energy and cost savings
   b. Carbon emissions
   c. Operations and maintenance costs
   d. Indoor air quality and occupant comfort improvements

C&I NEW CONSTRUCTION RECOMMENDATIONS

8. **Develop Connected Buildings offerings for all four C&I new construction paths that build ADR capabilities into the design of new buildings.**
   a. The PAs should leverage controls for end uses like lighting and HVAC in new buildings, which are now required by code in most cases, for active demand reductions (ADR) from early in the design process
   b. Co-market EE and DR for all customers, not just those who express an interest in ADR, to help ensure all new buildings become flexible grid assets.
   c. The U.S. Department of Energy has coined the term “Grid Interactive Efficient Buildings”, which integrates technologies ranging from EE, to DR, to distributed generation and EV charging. The PAs should integrate the themes of this concept into the New Construction programs.

ACTIVE DEMAND OVERVIEW

- **In the 2019-2021 Plan, the PAs included new Active Demand Management (ADM) offerings to reduce summer and winter peak demand.**
  - Residential direct load control, C&I interruptible load curtailment, and C&I targeted dispatch.
- **In addition to expanding and enhancing existing offerings, additional opportunities exist for electric vehicles gas active demand management, and winter active demand management**
- **Looking ahead, the key question is how much and which types of ADM does the Commonwealth need to meet future needs, particularly for the 2022-2024 Plan period?**

2020 ACTIVE DEMAND REDUCTIONS PERFORMANCE

► **Preliminary numbers reported by PAs**

PA	Sector	Dispatch Type	Technology	Season	Participants	2020 Planned (MW)	2020 Enrolled (MW)	2020 Performed (MW)	2020 Evaluated (MW)	Notes
National Grid	Resi	DLC	Thermostats	Summer	14,155	6.78	7.1	7.1		Incomplete results
National Grid	Resi	DLC	Storage	Summer	217	1.76	1.2	1.0		Incomplete results
National Grid	C&I	Targeted	Agnostic	Summer	440	72.0	90.9	69.1		Incomplete results
National Grid	C&I	Daily	Agnostic	Summer	5	5.0	9.0	4.4		Incomplete results
National Grid	C&I	Targeted	Agnostic	Winter	116	13.0	42.1	25.5		Represents last winter
Eversource	Resi	DLC	Thermostats	Summer	16,529	3.0	8.3	6.6*		98% reported
Eversource	Resi	DLC	Storage	Summer	24	0.15	0.42	0.093		100% reported
Eversource	Resi	DLC	EVSE	Winter	184			0.025*		98% reported
Eversource	C&I	Targeted	Agnostic	Summer	311	55.0	88.0	26*		58% reported
Eversource	C&I	Daily	Storage	Summer	8	5	4.8	0*		0% reported
Eversource	C&I	Targeted	Agnostic	Winter	60	9.2	12.24	14.69		Represents last winter
Unitil	Resi	DLC	Thermostats	Summer	170	0.112	0.056	0.06		Preliminary numbers
Unitil	C&I	Targeted	Agnostic	Summer	3	0.4	0.8	1.00		Preliminary numbers
CLC	Resi	DLC	Thermostats	Summer	876	1.34	0.438	N/A	N/A	
CLC	Resi	DLC	Storage	Summer	0	0.12	0	N/A	N/A	
CLC	C&I	Targeted	Agnostic	Summer	23	12.5	1.18			
CLC	C&I	Targeted	Storage	Summer	1	2	0.28			

*Winter values represent 2019/2020 season

ACTIVE DEMAND RECOMMENDATIONS

1. **Direct Load Control (DLC)**: Increase participation in existing DLC offerings, incorporate new end uses, and expand DLC offerings to low income customers.
   a. Increase wifi thermostat DLC penetration through tactics including bundling wifi thermostats and DLC with heating and cooling system installations including heat pumps, and co-marketing and delivery coordination of DLC with in-home audits and wifi thermostat rebates. Increase enrollment and penetration of wifi thermostats in DLC, e.g. from 3% of wifi thermostats to 15% (residential and small business).
   b. Incorporate new end uses by expanding or adding EV charging and pool pumps and revisit the cost-effectiveness and potential addition of appliance DLC opportunities such as water heaters and dehumidifiers.
   c. Expand DLC offerings to low income customers.

ACTIVE DEMAND RECOMMENDATIONS

2. **C&I Load Curtailment**: Grow the C&I load curtailment resource through integration with normal program and market sales channels and with the new construction program. Before 2022, assess the eligibility for new CHP/generators to participate in C&I load curtailment for the 2022-2024 Plan, and consider phasing out existing CHP/generators that are currently enrolled during the 2022-2024 period.

ACTIVE DEMAND RECOMMENDATIONS

3. **Storage**: Significantly expand the program behind-the-meter (BTM) storage targets to contribute to the Commonwealth's overall storage goal of 1,000 MWh by 2025 (or 500 MW with storage duration of 2 hours), Revise the program outreach and integration processes to enable increased and broader participation of customers and storage/inverter providers, and help integrate the storage program offerings into a statewide framework that leverages SMART and the Clean Peak Standard.

ACTIVE DEMAND RECOMMENDATIONS

4. Electric Vehicles (EV) Charging and Mobility

a. Increase enrollment and participation of EV chargers in the bring-your-own-device (BYOD) program offering

b. Consider targeted incentives for wifi-enabled EV chargers and/or vehicle-controlled chargers for new or used EVs,

c. Consider co-marketing and targeted incentives for EV chargers for some customers to provide equitable opportunities to benefit from transportation electrification

d. Explore/investigate co-delivery and integration with other state EV and charger programs including potential co-funding sources

e. Explore possible program support for other mobility solutions beyond individual automobile approaches

ACTIVE DEMAND RECOMMENDATIONS

5. **Winter Demand Management**: Revisit the performance and cost-effectiveness of winter ADM by mid-2021 after the AESC 2021 study is complete, and consider combining summer and winter efforts into an annual ADM offering. Continue winter ADM efforts in the interim in 2020-2021 by leveraging investments in summer ADM to increase utilization in winter.

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THANK YOU

Questions?

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