

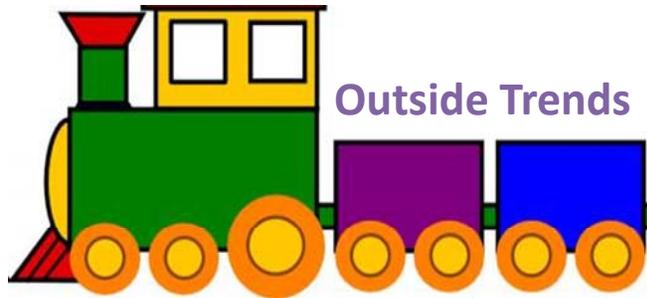
TRENDS IN ELECTRIC ENERGY AND ENERGY EFFICIENCY

Topics of potential interest for the EEAC

► January 20, 2016

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TRENDS THAT MAY DRIVE ENERGY EFFICIENCY CHANGES



- ▶ Trends in healthcare, technology, connectivity
- ▶ Trends impacting the electric grid and how it is used
 - Strategic Electrification to reduce carbon emissions
 - Distributed Energy Resources
 - Demand is increasingly important



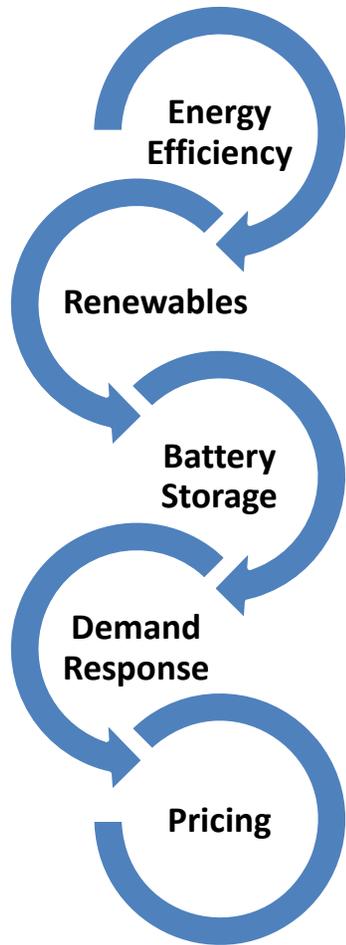
- ▶ Trends in Data, Analysis and their impact on Programs and EM&V
- ▶ Changes to Energy Efficiency Programs
 - Lighting
 - Program outreach and structure

INCREASING OPPORTUNITIES FROM ELECTRIFICATION

- ▶ **MA has an interest in reducing GHG emissions and electrification is important for achieving Clean Energy and Climate Plan goals**
- ▶ **EE programs are already contributing to electrification**
 - Ex. Heat pumps for space heat
- ▶ **Other electrification opportunities can reduce GHGs and benefit efficiency efforts**
 - Ex. Electric car batteries and stationary storage
- ▶ **Additional moves towards electrification should be classified and considered for inclusion in programs**



INCREASING INTEREST IN INTEGRATING OTHER SMALL SCALE DISTRIBUTED ENERGY RESOURCES WITH EE

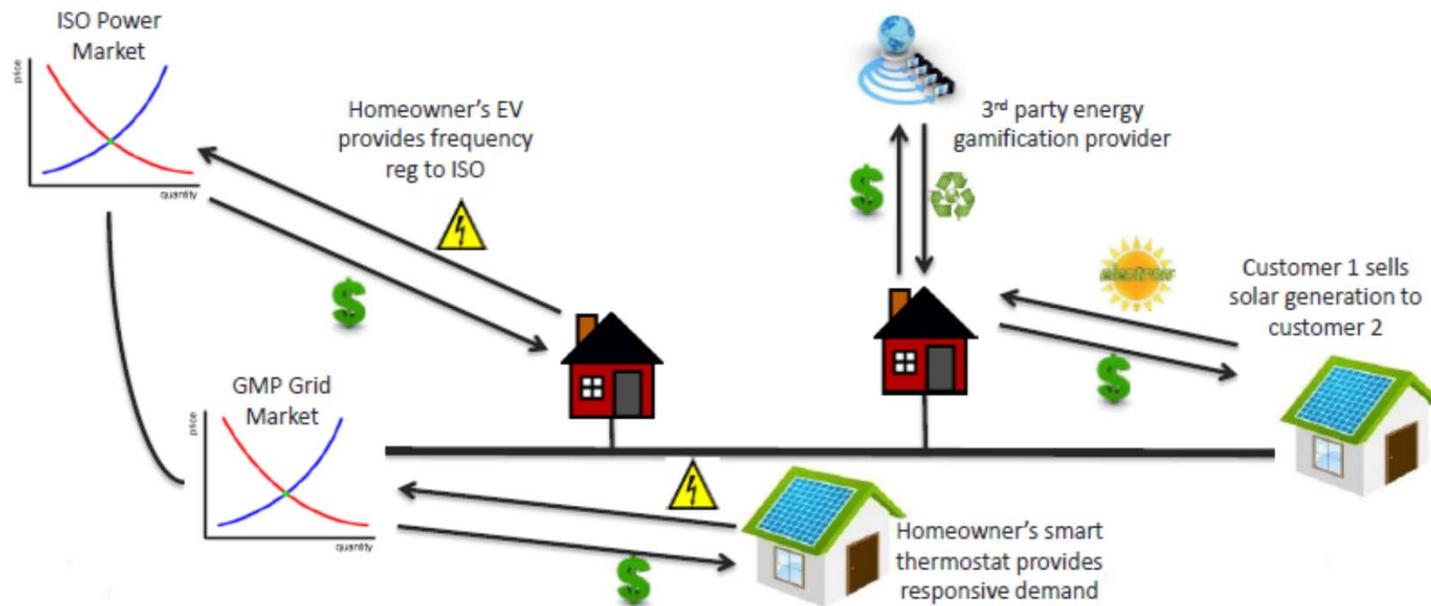


- ▶ **Policy is calling for efforts to break down silos between energy resources and will impact efficiency**
 - Ex. Grid modernization
- ▶ **Technologies are also driving integration**
 - Ex. Two-way communicating thermostats that can enable DR also can manage energy use year-round
- ▶ **Opportunities exist for program delivery integration**
- ▶ **Integration can meet customer needs with a broader range of services**

THE FUTURE?

Grid Future State: Grid Market Platform Examples

Directed technology interacts with market and third party providers on behalf of the customer!



DEMAND IS INCREASINGLY IMPORTANT, BUT MULTIPLE ASPECTS; CAN BE CONFUSING

▶ Multiple objectives

- Reliability, cost mitigation and pricing, environment and climate, customer empowerment

▶ Winter peak demand also important

- Also analyzing time periods

▶ Increasing important to pay attention to *where* demand is reduced, for ISO zones and geotargeting

▶ Significant overlap with grid modernization efforts

▶ Demand Savings Group is an important forum for clarifying the issues and developing solutions

Demand Reduction Policies and Strategies

Demand reductions from EE programs

Demand response (regional markets, regional efforts, state efforts)

Load control/management/shifting, through controls & connected technologies

Pricing and rate design (time-varying rates/TOU, demand charges)



TRENDS IN ENERGY EFFICIENCY

TECHNOLOGICAL ADVANCES ARE IMPACTING HOW DATA IS COLLECTED AND ANALYZED

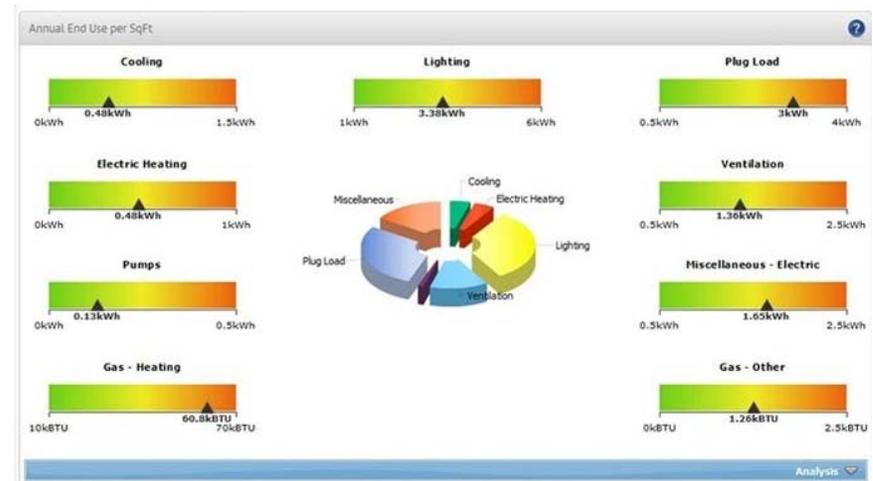
► Technological advances include:

- Improved tools (smart meters, smart thermostats, non-intrusive load monitoring)
- Advanced data analytics (cloud computing, algorithms to disaggregate usage, real-time feedback)

► These advances affect a wide range of functions, including program planning, targeting, and EM&V

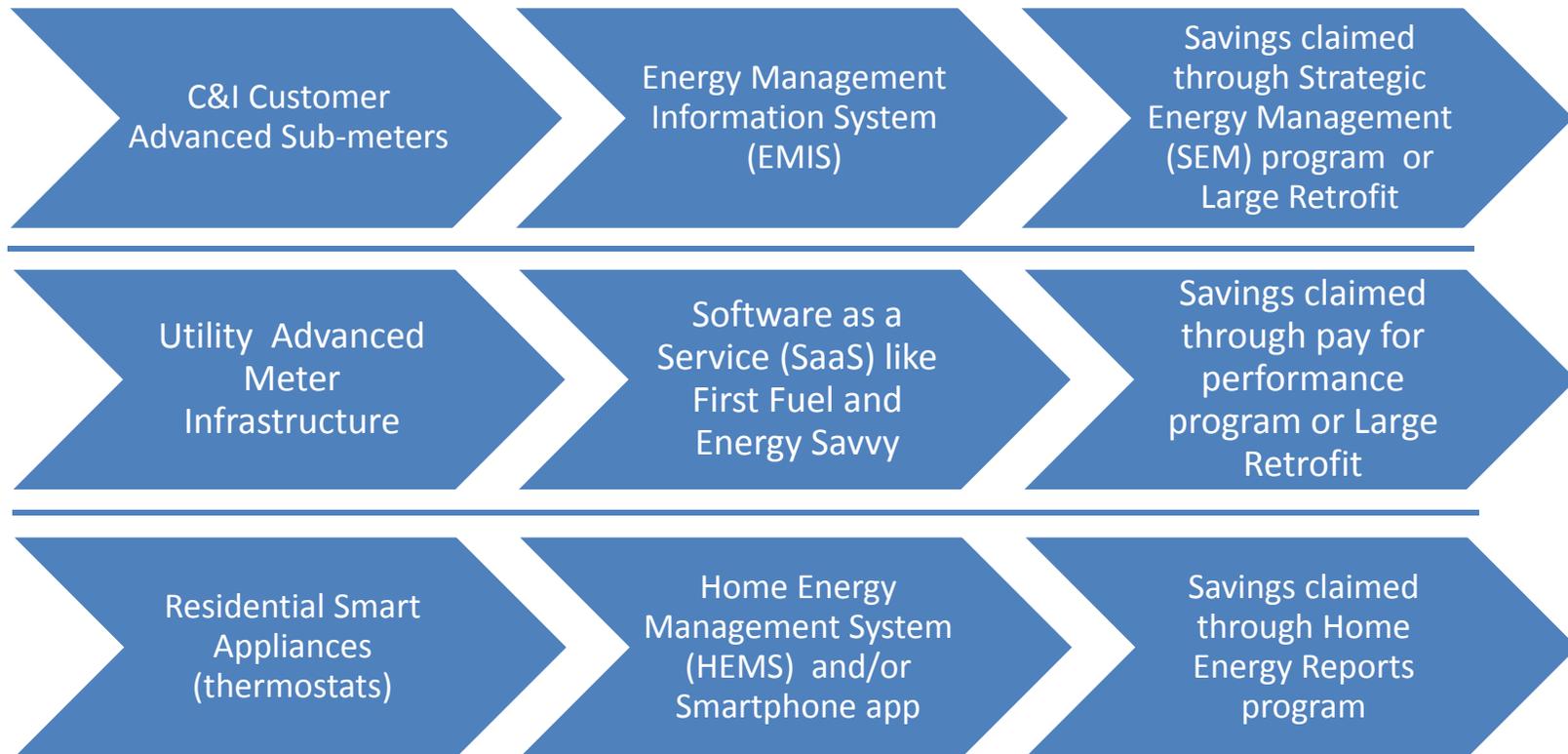
► Use of the same data/software technologies to support multiple functions is called *convergence*

- One tool may be used to identify savings opportunities, provide real time feedback, monitoring and alarms, and measure savings



BIG DATA AND ANALYTICS ARE BECOMING MORE IMPORTANT IN IMPLEMENTATION

- ▶ **Because data is getting cheaper, and there are more software analytic options to provide context**



DATA AND ANALYTICS ALSO HOLD POTENTIAL FOR EM&V

- ▶ **Some data and software for EM&V overlap with program apps**
 - AMI, smart thermostats, cloud computing, automated data cleaning
- ▶ **The use of these technologies is sometimes seen as the future of evaluation, “EM&V 2.0”, but this is premature**
 - While very useful for program implementation/tracking, new technologies are more likely to enhance rather than replace current EM&V approaches
- ▶ **Technologies are advancing rapidly, but few have yet reached the stage of mainstream EM&V application**
 - EM&V has high evidentiary standards
 - Mostly applicable to retrofit, not new construction
 - Proprietary data issues

LEDS ARE RAPIDLY TRANSFORMING THE LIGHTING MARKET

- ▶ **Lighting is a big part of savings in MA**
 - 64% Net Annual and 60% of Net Lifetime in 2016
- ▶ **LED prices are declining and market share is growing in all markets**
- ▶ **Standards and/or saturation will reduce or stop savings at some point in all markets**
- ▶ **These trends lead to uncertainty and risk from 2018 onward, so the time to plan is now**



PAY FOR PERFORMANCE DEFINED



- ▶ **Incentives are paid for outcomes, not expectations**
- ▶ **Most programs pay incentives for deemed or calculated savings**
 - Prescriptive and upstream measures are deemed
 - Custom projects are calculated
- ▶ **Pay for performance pays for measured savings**
 - Most applicable to retrofit programs
 - Examples include Strategic Energy Management (SEM), Retro-commissioning, and behavior/operations programs

CONCLUSION



- ▶ **Trends are overlapping and will increasingly impact EE programs**
 - Strategic electrification is driving changes
 - Grid modernization seeks to integrate energy resources
 - Peak demand reduction is increasingly important
 - Technology and markets are evolving quickly, and some key technologies are nearing market saturation
- ▶ **So, programs need to adapt to keep up with changes to mitigate risk**

THANK YOU

Questions?

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