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Demand Resources in CT: Priority Issues and the Future

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Several Demand Resource Strategies

Demand Resource Policies and Strategies

- Demand reductions from EE programs
- *Demand response* to reduce demand (actively) in specific time periods (ISO regional market, state efforts)
- *Demand management*, direct load control, and load shifting, through strategies using controls, analytics, energy management systems, connected technologies
- *Integrated* approaches to the above (e.g., integrated EE and demand response using controls and software)
- Pricing and rate design (time-varying rates, demand charges)

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Demand is important

- Capacity is purchased to meet the forecasted demand
- Demand reduction has multiple objectives
  - Reliability, cost mitigation and pricing, environment and climate, resiliency, customer empowerment
- System peak demand is in the summer
- Winter peak demand and energy prices also important
- Important *where* demand is reduced, for ISO zones and geo-targeting (e.g., Southwest CT in the past)
- Significant overlap with grid modernization and distributed energy resource (DER) efforts

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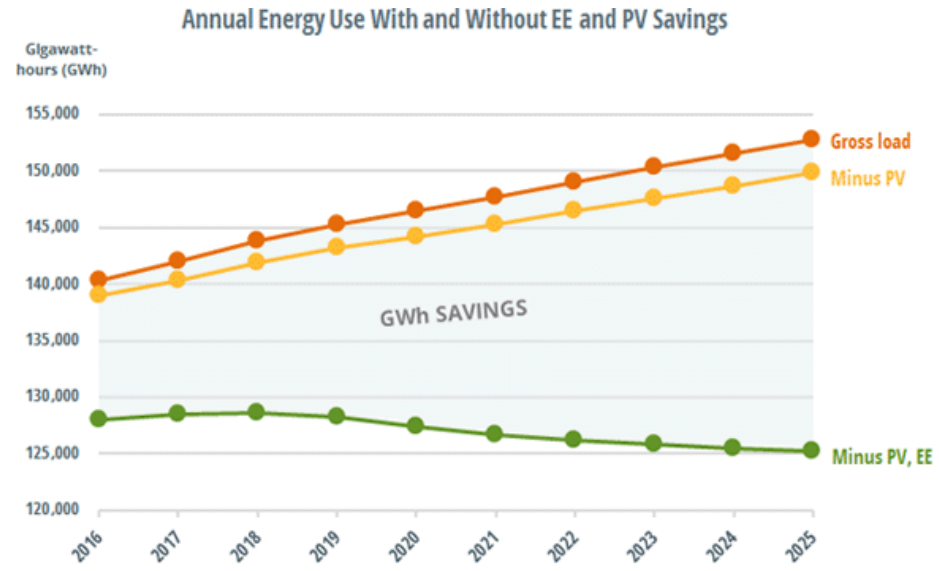
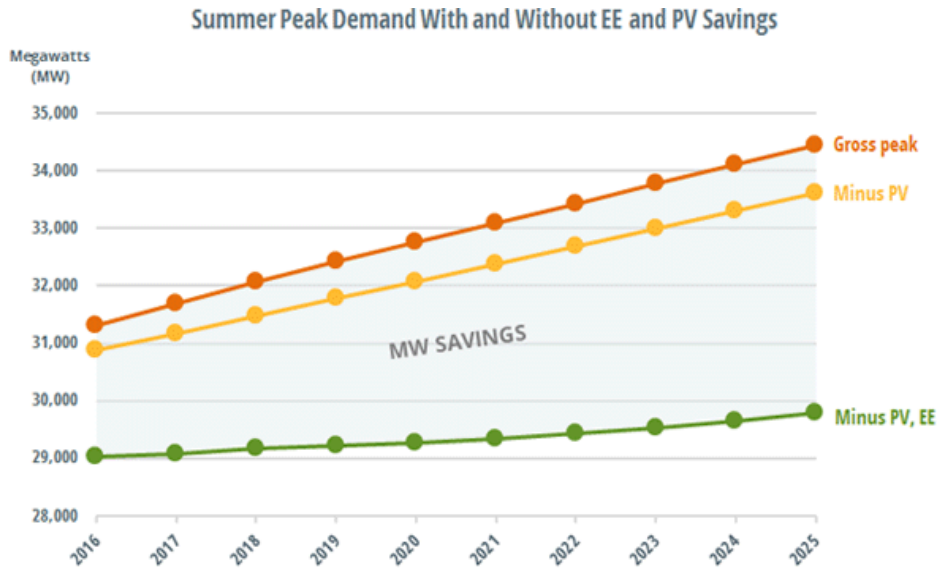
ISO-NE: “Energy use is flat or declining, but peak demand continues to grow”





The gross load forecast (projected regional energy use)

The gross load forecast minus forecasted “behind the meter” (BTM) solar photovoltaic (PV) resources

The gross load forecast minus forecasted BTM PV, minus energy-efficiency (EE) resources in the Forward Capacity Market (FCM) 2016–2019 and forecasted EE 2020–2025

Note: Summer peak demand is based on the “90/10” forecast, which accounts for the possibility of extreme summer weather, such as an extended heat wave of about 94°F.

Source: Data from *Final ISO New England Energy-Efficiency Forecast 2020–2025* and *Final 2016 Solar PV Forecast Details* (May 2016)

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More effective (and possible) to focus on reducing peak demand rather than prices

Top Ten Highest Hourly LMPs in 2015			Top Ten Highest System Loads in 2015		
Date	Hour	Real Time LMP	Date	Hour	System Load
5/10/15	21	$1041.38	7/20/15	17	24,437
8/15/15	17	$615.48	7/29/15	17	24,437
2/21/15	19	$487.32	7/29/15	18	24,399
1/03/15	18	$425.39	9/08/15	16	24,368
9/07/15	18	$422.92	7/20/15	18	24,365
8/24/15	17	$387.34	7/20/15	16	24,357
8/24/15	16	$377.65	9/08/15	17	24,338
9/08/15	15	$375.40	9/08/15	15	24,291
9/08/15	16	$365.18	7/20/15	15	24,291
12/21/15	18	$350.03	9/09/15	17	24,275

- Highest hourly LMPs (prices) can occur throughout the year
- Highest system loads are consistently in the summer and within consistent (predictable) time frames

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Source: Analysis of MA PAs, presented to MA EEAC on 10/19/16

Some strategy options to obtain value from demand reductions

- System-level (regional system) and state-level options
- ISO market resource (bid into the markets) vs. a state resource or utility resource
- Some options:

Price: Forward Capacity Market (FCM). Bid into the FCM, receive FCM revenues (to fund programs), and put downward pressure on prices as part of FCA auctions

Amount: Installed Capacity Requirement (ICR) and forecast. Reduce the ICR, then states would need to buy less capacity (but note demand resources are reconstituted if bid in)

Cost Allocation: ICAP Tag. Reduce demand in peak hour, thereby reducing the share of capacity costs to the load serving entity and some larger customers (the total system cost doesn't decrease but the share of system costs paid by CT would)

Customer: Reduce customer costs by reducing demand charges and provide other value

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Not your parent's demand response

- Not just:
  - Large customers
  - "Curtailment"
  - Noticed "events"
- Future opportunities
  - All sectors
  - New opportunities and considerations, due in large part to advanced technology and automation
  - Building/process management, not just energy management
  - Demand resources and demand reductions focused on multiple objectives, to provide multiple benefits – and not just focused on one objective or one benefit or one market
- More about *demand management* (within larger context of building and process automation/management) than about customer *response* to a noticed event

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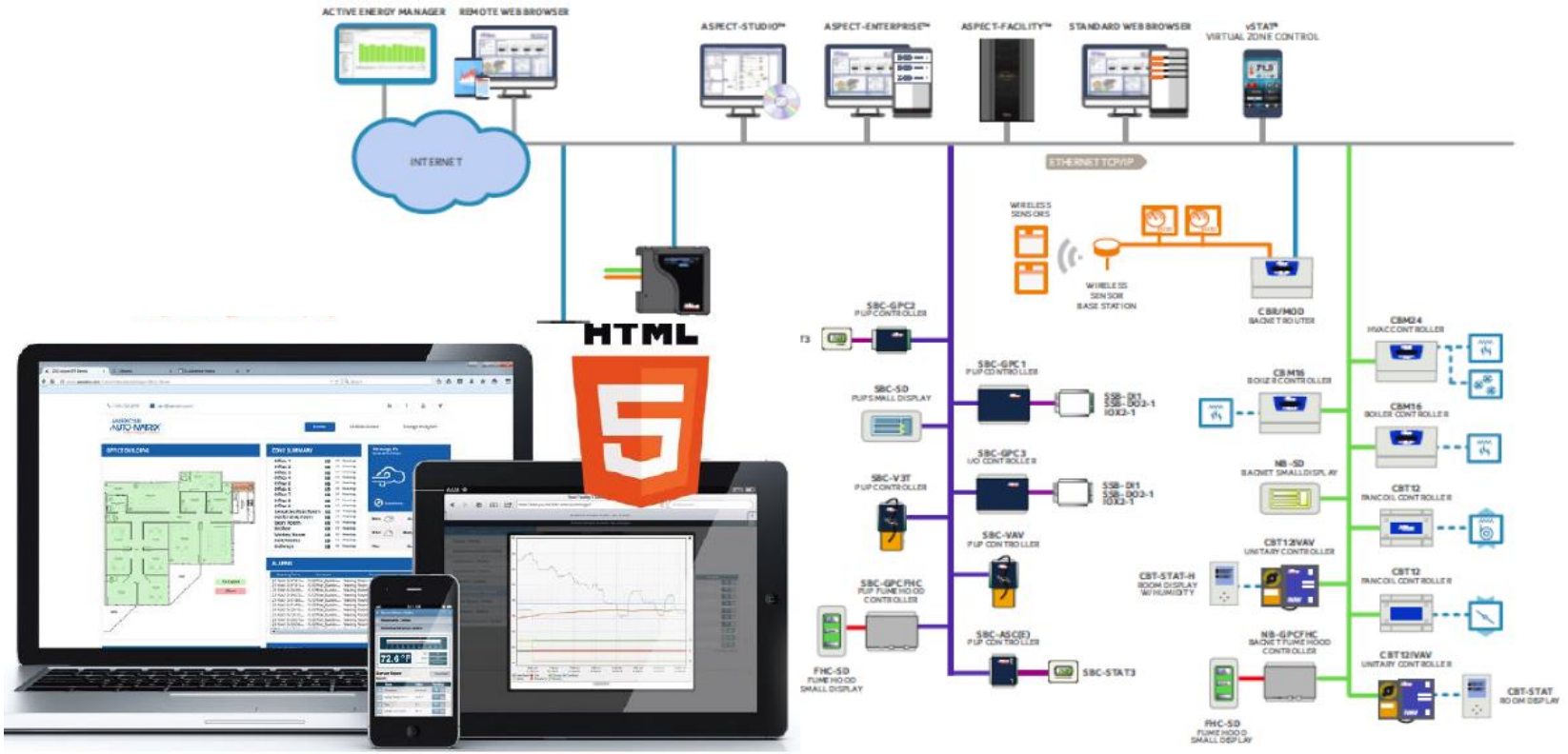
Building automation, energy management – software, controls, and automation

Building Automation and Energy Management



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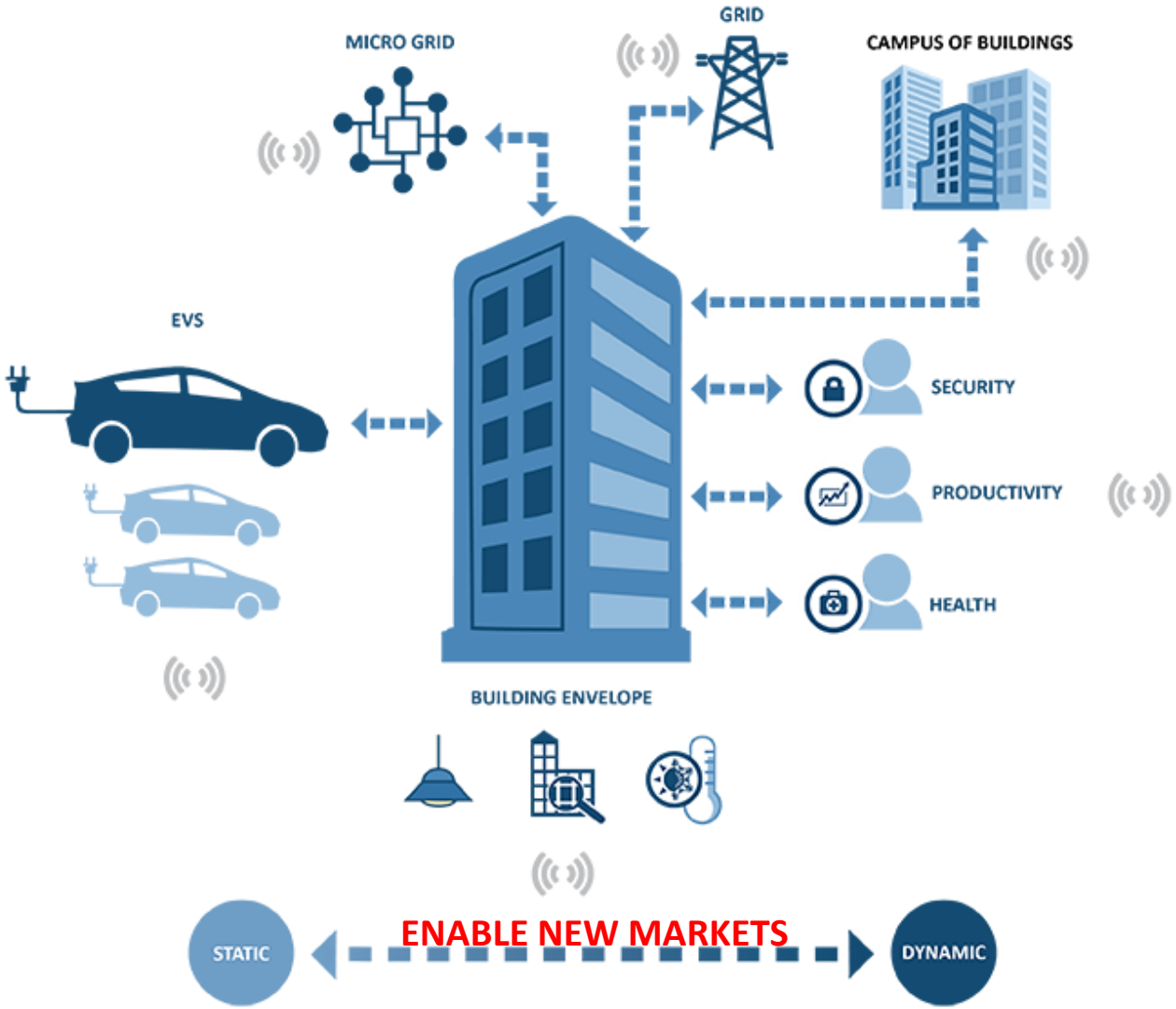
Integration of demand management and EE

- Many new opportunities can be leveraged by or layered on top of EE efforts – especially with advanced technology and automation.
- Not siloed into EE vs DR
- Examples:
  - Energy management systems, controls, and automation to manage lighting, HVAC, and process loads
  - Lighting and HVAC controls in commercial facilities
  - Process automation
  - Wifi thermostats to reduce energy use and manage peak demand (summer and winter opportunities)
  - Smart systems, smart controls and smart equipment

The Future - Dynamic Communication and Aggregation



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Key information needs – why pilots?

- Technology and automation – what are the opportunities, how well will it work, will it perform as expected?
- Customer interaction and acceptance – how will customers interact with new technology and automated systems, and what will be the nature and degree of customers allowing others to manage their demand?
- Integration – what are the best opportunities to integrate active demand management and energy efficiency?
- Strategies – which strategies are most effective at delivering value, for the system and for customers?
- *Pilots over next 1-2 years are crucial to address these key information needs and research questions*

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EE Board comments on the pilots

- The Companies should ensure that an adequate number of pilot sites across the key targeted customer segments covering the demand reduction strategies to be tested are installed and fully operational before the summer of 2017, considering the importance of the demand reduction pilots as a crucial step in addressing peak demand issues in Connecticut. The Board understands there is limited budget available for the pilots in 2017 and the Board is not recommending an increase in the pilot budgets. As one approach for stretching the available funding, the Board recommends that the Companies enroll additional customers that have existing infrastructure (i.e., controls, software, etc.) compatible with the design and focus of each pilot so that more customers can participate in the pilots and more results from the pilots are available. The Board also encourages the Companies to identify and pursue other opportunities for expanding the number of sites in the pilots, including through adding some recent participants in the energy efficiency programs to the pilots, where appropriate. All of the pilot sites focusing on summer peak demand should be fully installed in the field by mid-May 2017, in time for testing during the summer of 2017. This timing is critical, so that the Companies, the Board, DEEP, and others can review the results of the summer 2017 pilots in September-October 2017, and then the Companies and Board can complete the planning for demand reduction activities for 2018 as part of the 2018 Plan Update process.

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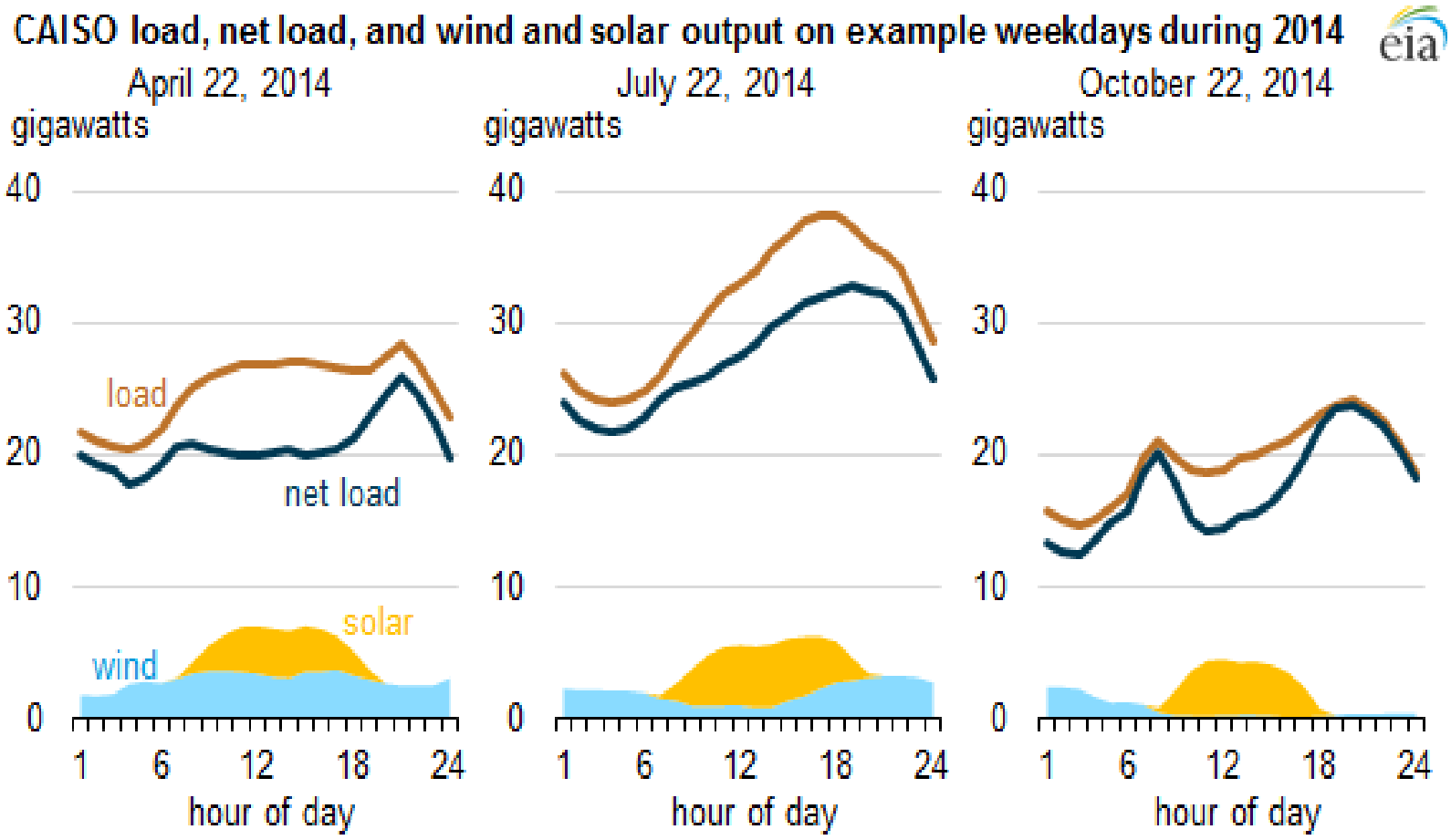
Need for Electric Supply Changing with More Renewables



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Thank You

Questions?