The Role of Energy Efficiency in a Distributed Energy Future

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American Council for an Energy-Efficient Economy

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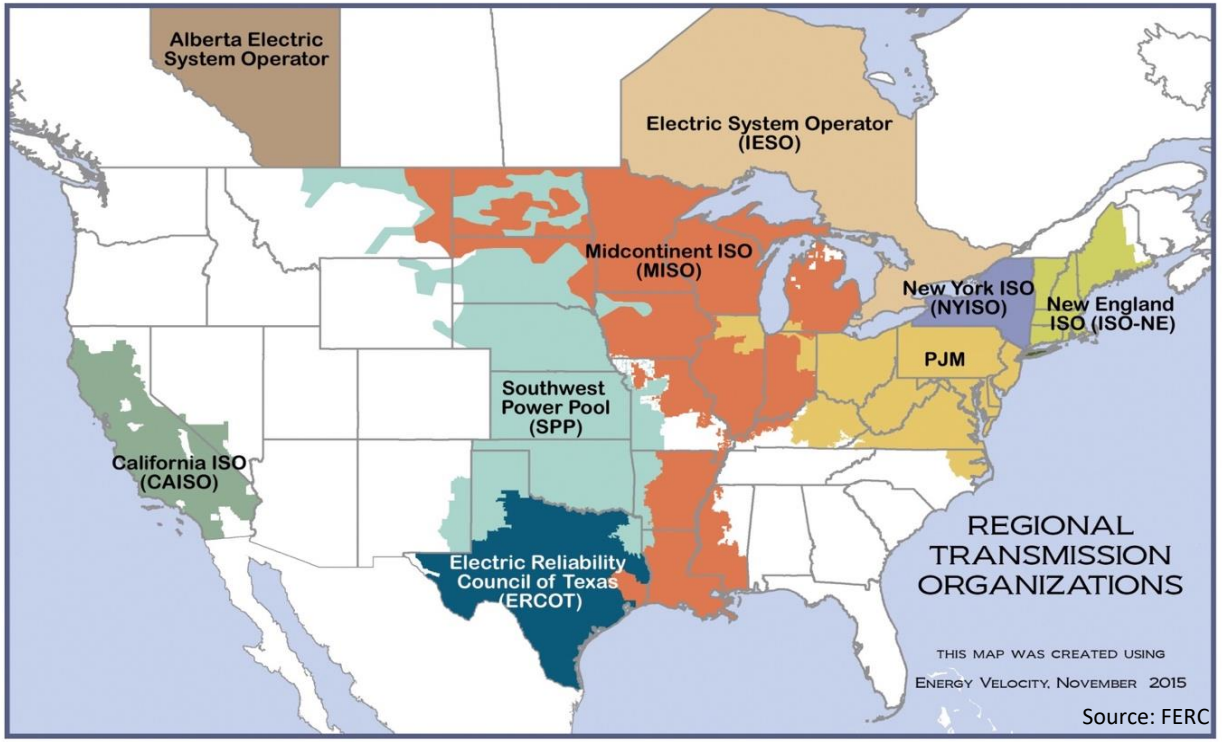
Agenda

- The PJM & ISO-New England capacity auctions
- Auction results and the value of efficiency
- Efficiency in distributed resource planning:
  - **State examples**
- Time and locational value of efficiency
- Geotargeting
- Conclusions and recommendations

Capacity auctions: Overview

- Independent System Operators (ISOs) procure resources for the future
- Some ISOs use capacity auctions to meet reliability requirements

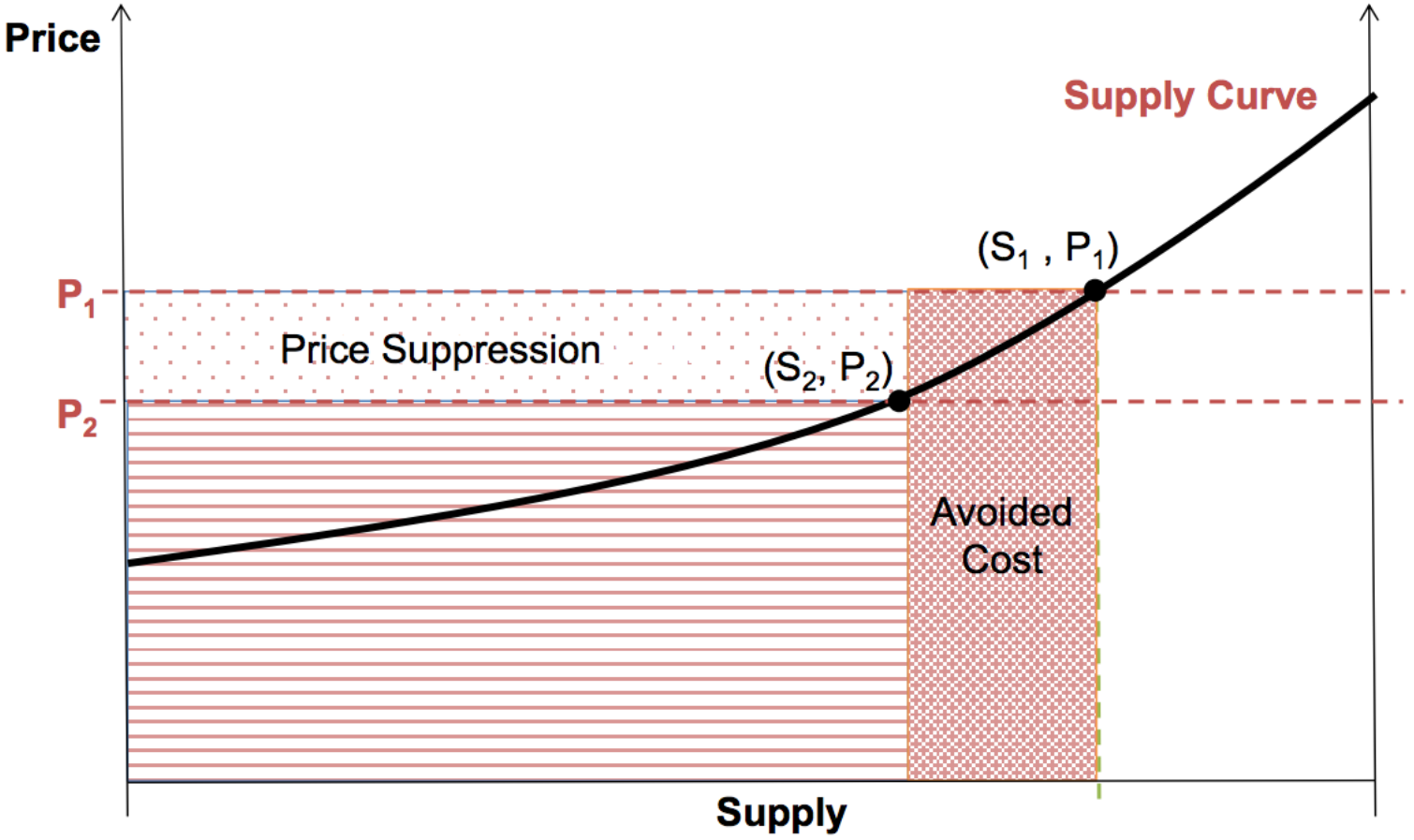


Load Forecasting

- Load forecasts inform reliability requirements
- PJM & ISO-NE have historically over-forecast load
- Efficiency resources that qualify for each auction are added back to the forecast to avoid double counting

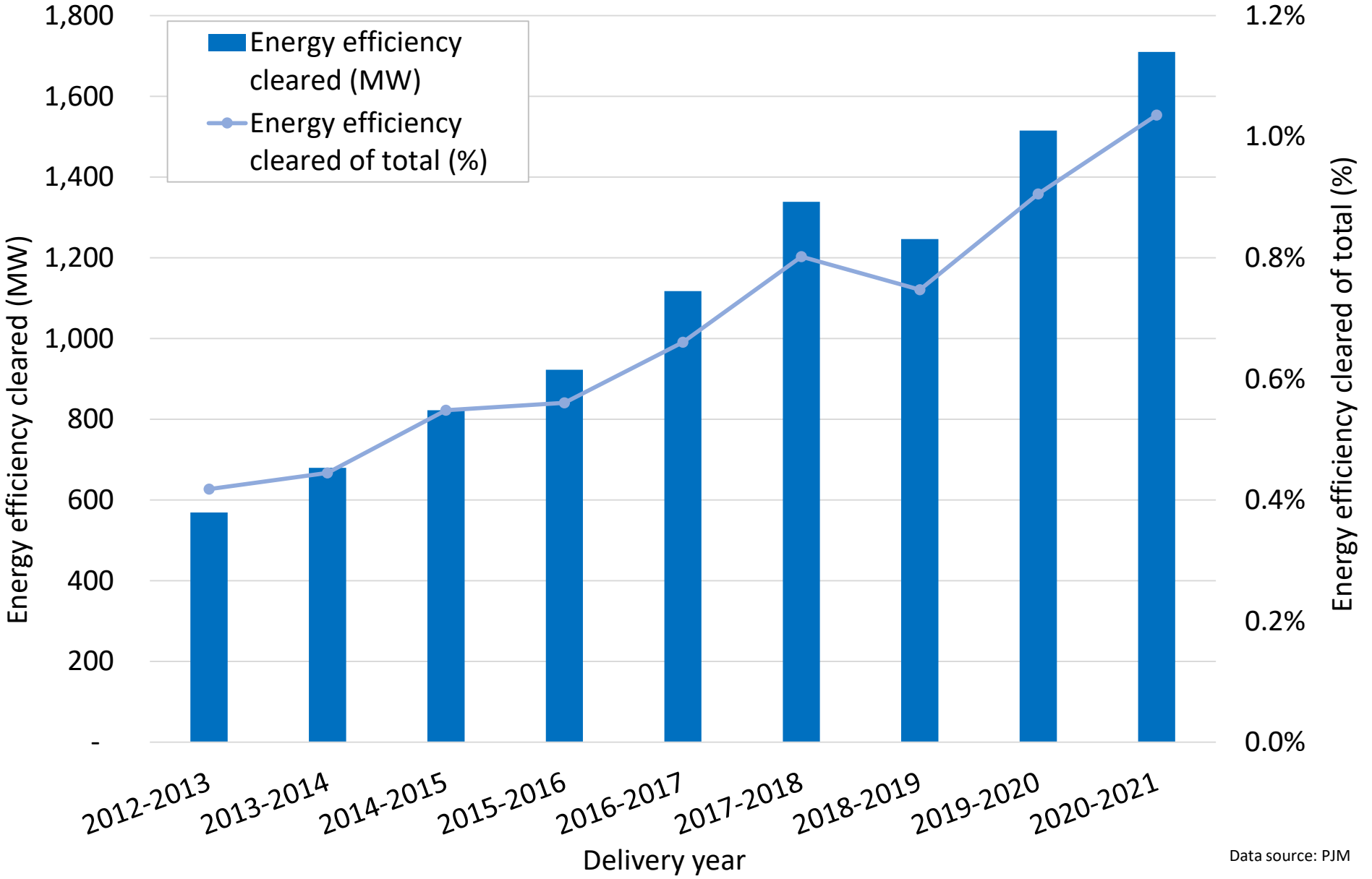
ISO-NE assigns efficiency an availability score of 100%.

Demand Reduction Induced Price Effect (DRIPE)



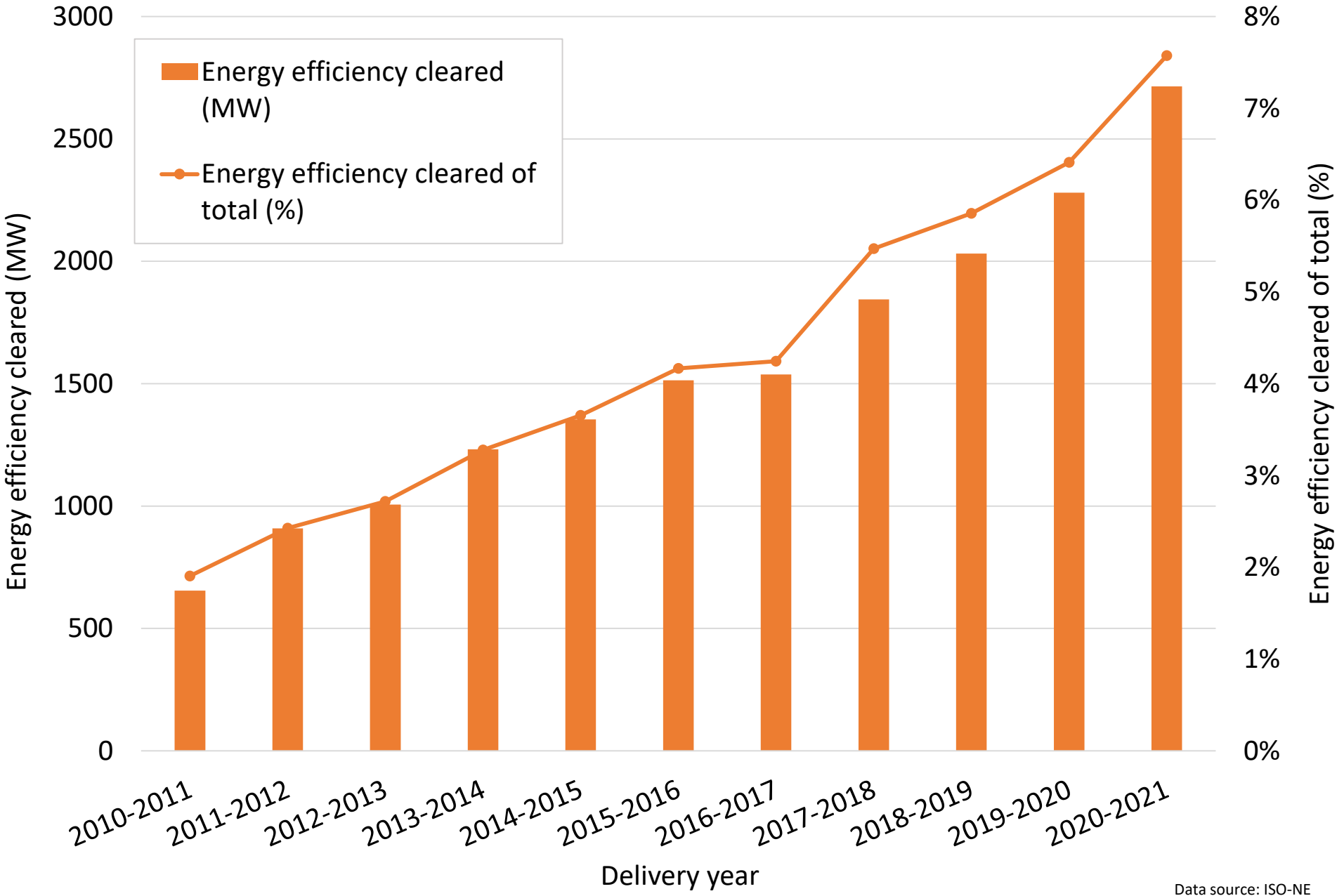
Source: Chernick and Plunkett 2014

Efficiency in PJM's Auction



Data source: PJM

Efficiency in ISO-NE's Auction



Data source: ISO-NE

Value of Demand Resources in Auctions

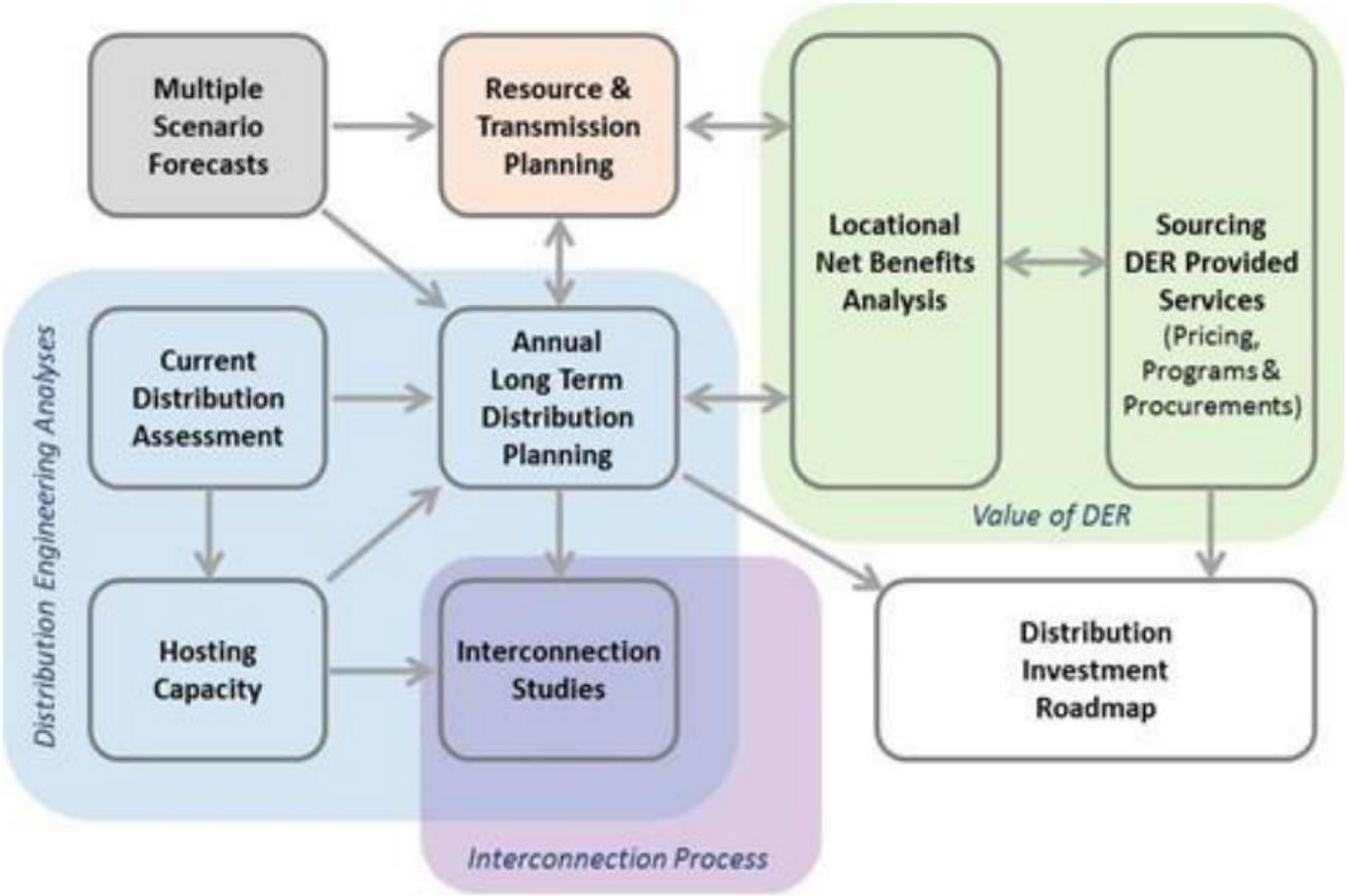
- Auction results are sensitive to the inclusion of demand resources
- Energy efficiency and demand response put downward pressure on bids

The inclusion of demand resources in PJM's auction reduced payments to suppliers by $9 billion (124%) in the 2017/2018 delivery year.

Efficiency as a distributed resource

- Distributed energy resources (DERs):
  - **No common definition**
  - **Most, but not all, definitions include energy efficiency**
- Distributed resource planning (DRP):
  - **The planning processes undertaken by utilities and regulators to plan for and integrate DERs into various utility systems**
  - **Focuses on distribution system**

Integrated planning process

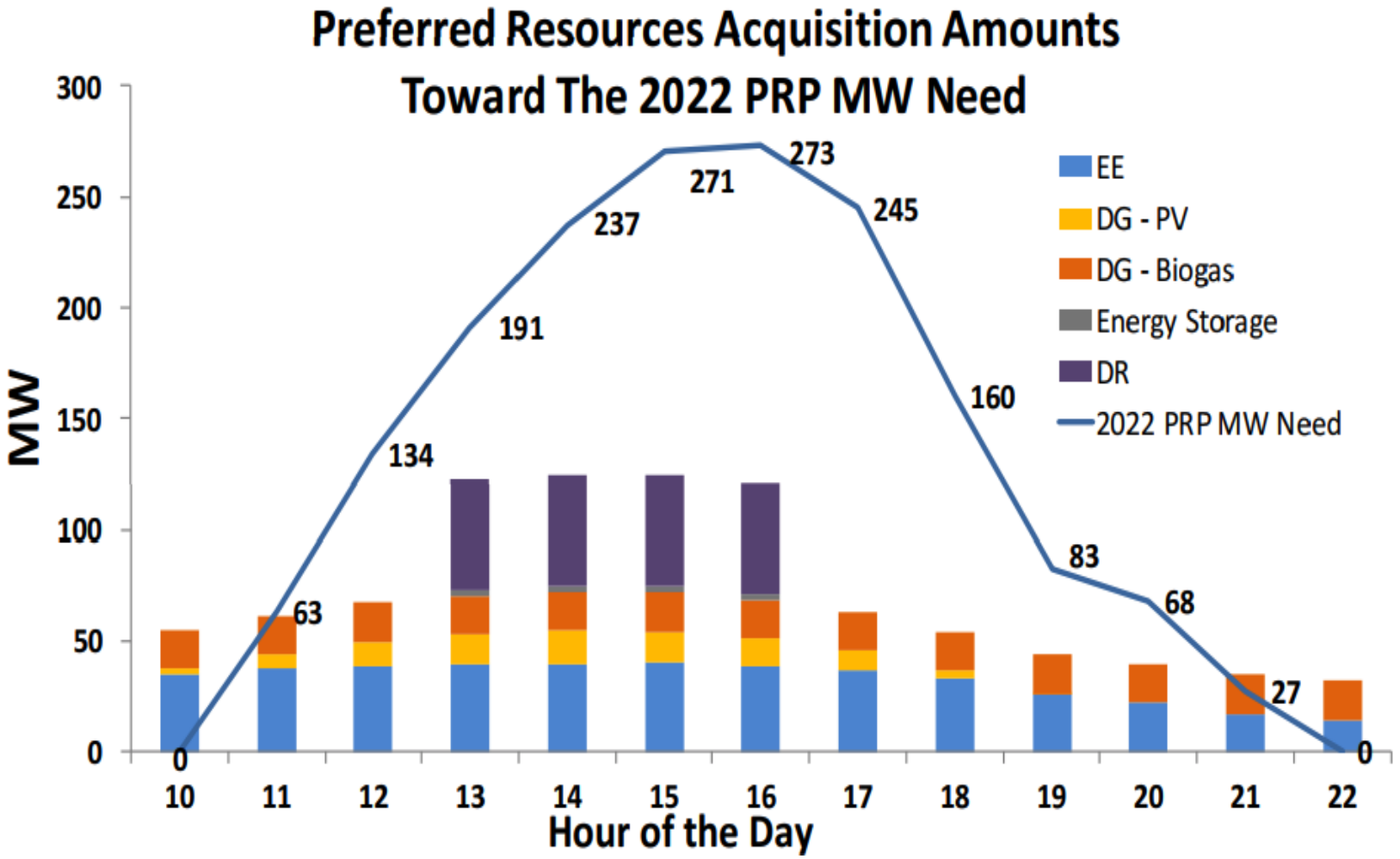


Source: ICF

Efficiency in DRP: California

- Utilities required to submit DER plans
- Must evaluate location benefits of DERs at the distribution level
- Must consider how to coordinate programs to maximize location benefits and minimize costs
- Must consider non-utility owned DERs as alternatives to distribution system investments

SCE's Preferred Resources Pilot



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Source: SCE

Efficiency in DRP: New York

- Reforming the Energy Vision (REV):
  - **Reduce environmental impact**
  - **Adapt to the changing energy landscape**
- Reshapes the utility business model:
  - **Distribution System Implementation Plans integrate DERs into full system planning**
  - **Utilities as "Distribution System Platforms"**
  - **Utilities can earn shareholder incentives for efficiency**

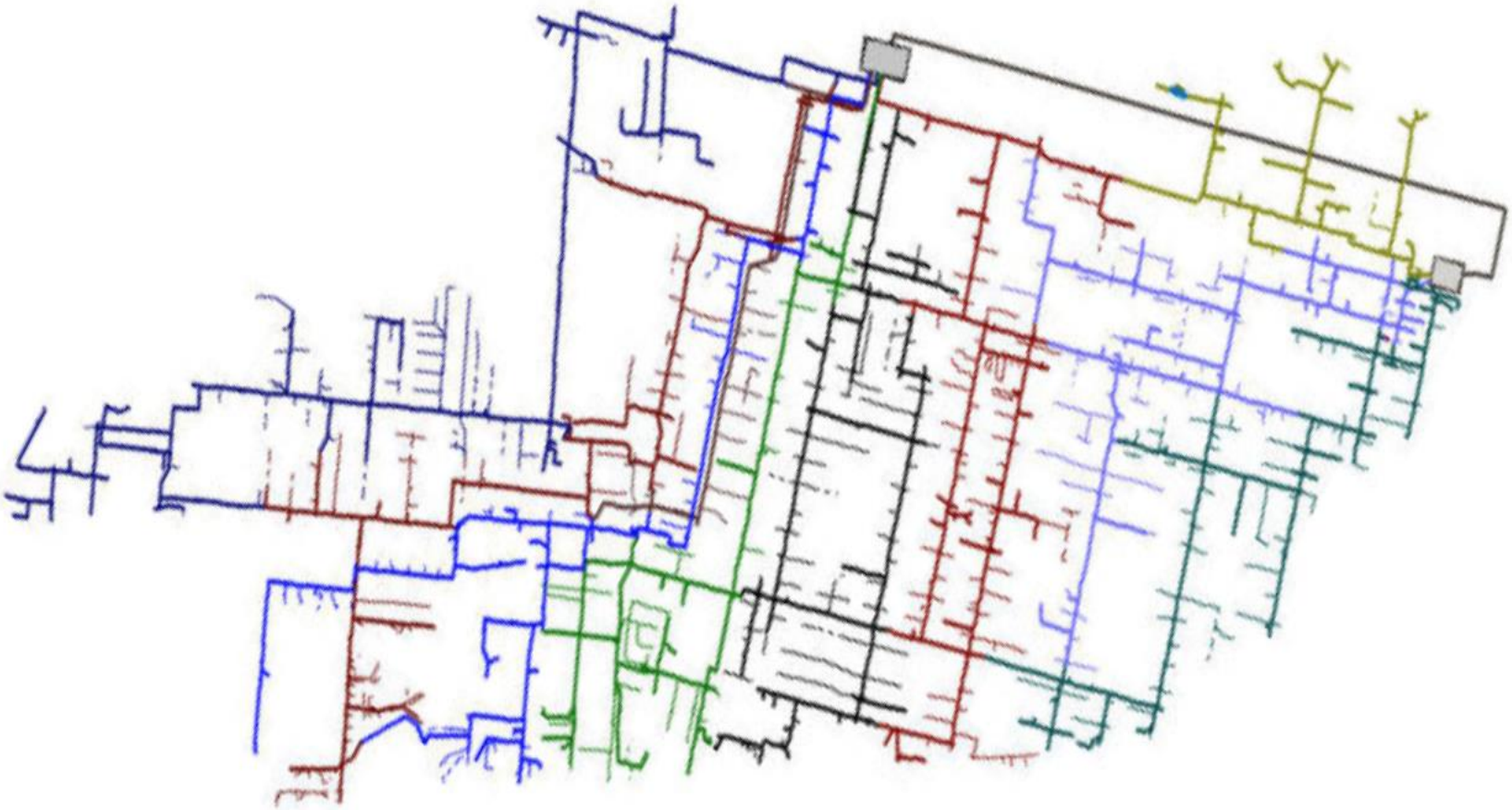
Other state examples:

- Connecticut:
  - **Distribution planning team identifies overloaded feeders**
  - **Evaluate efficiency resources on each feeder on a monthly basis**
- Washington State:
  - **Increased transparency in resource planning processes**
  - **Tacoma Power is geotargeting voltage optimization**
- Oregon:
  - **Pilot program aims to determine if DERs can improve operation during specific locational peak hours**

Time and locational value of efficiency

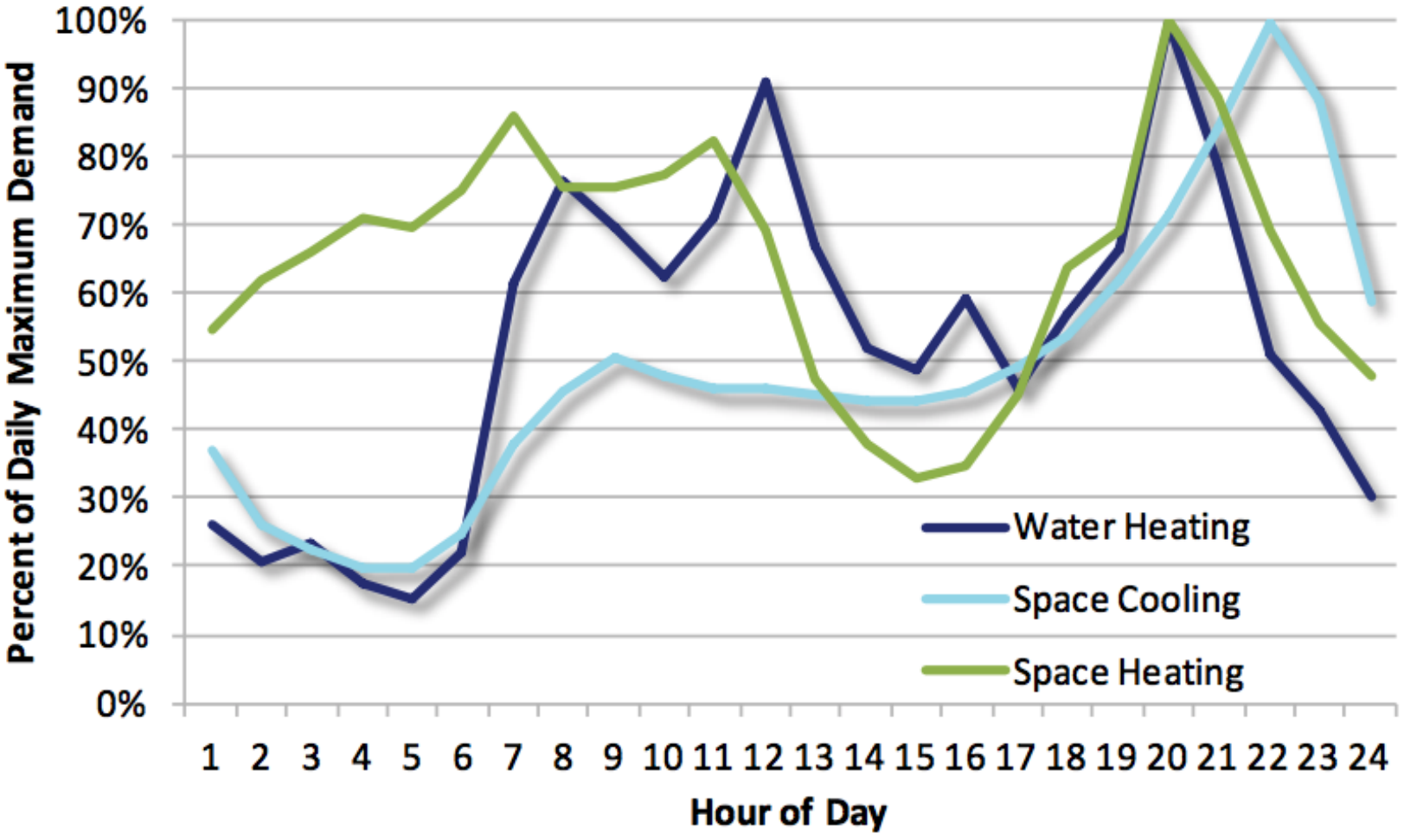
- Value of efficiency varies by time and location
- Cost effectiveness testing may capture system benefits of avoided:
  - **Energy production**
  - **Generation capacity**
  - **Transmission & distribution**
- Data are typically averaged across the system, not granular

Time and locational value of efficiency



Source: Eaton

Time and locational value of efficiency



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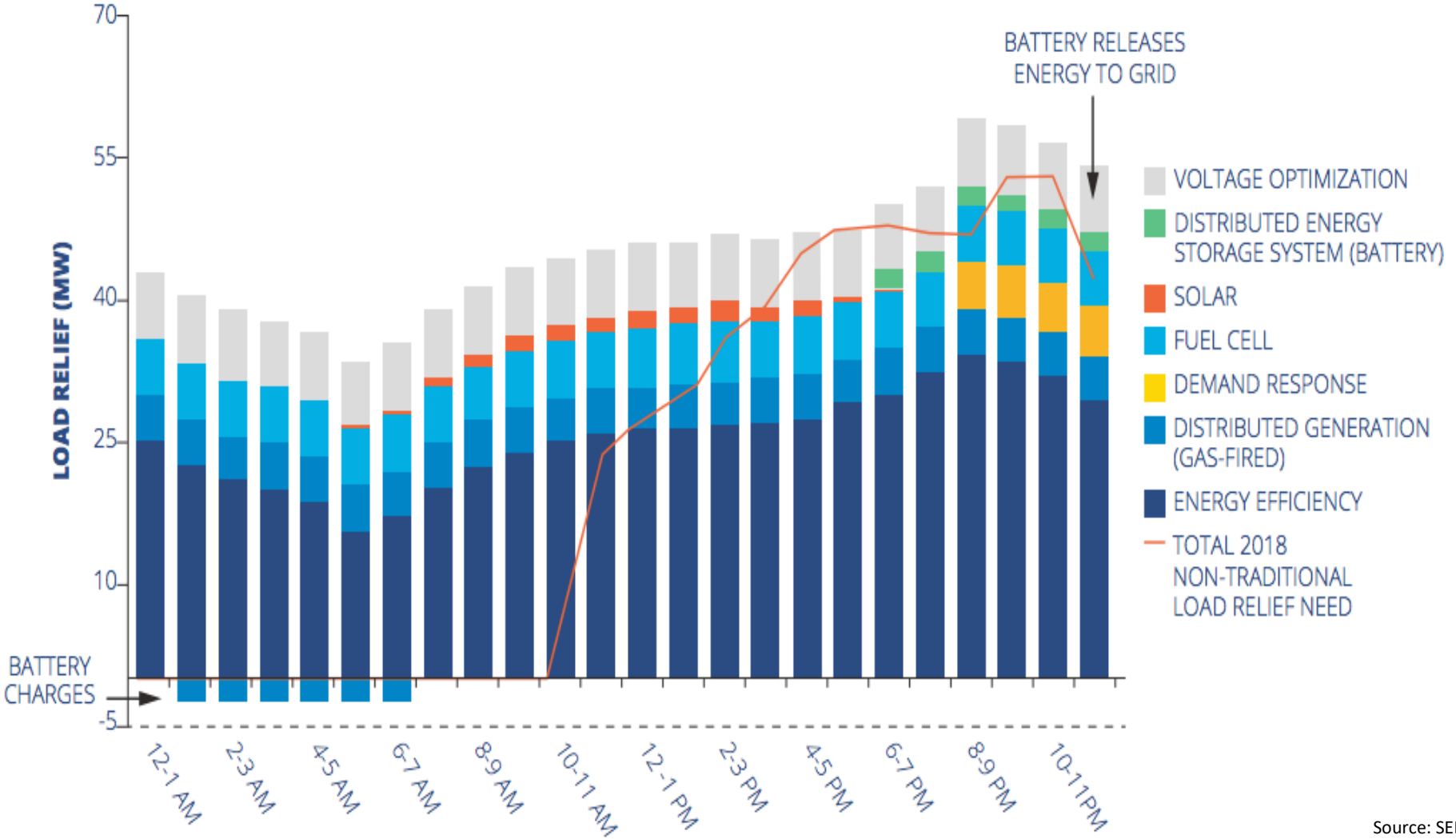
Source: NWPCC

NY's Proposed Benefit/Cost Framework

Selected Benefit	Description
Avoided generation capacity	Zone-specific spot capacity auction market prices.
Avoided energy	Location-specific energy market prices. Utilities encouraged to calculate this benefit down to the substation, feeder, transformer, or customer level.
Avoided transmission infrastructure	Additional benefits from avoided transmission capacity and O&M.
Avoided distribution infrastructure	Evaluates the need for additional infrastructure based on the specific load and the equipment that serves it.

Geotargeting: ConEd's Brooklyn Queens Demand Management Project



Source: SEPA

Geotargeting: BPA's I5 Transmission Line

Conclusions and recommendations

- Efficiency provides value at all levels of the electric system.
- Valuation methods should continue to be enhanced and improved to capture the full value of energy efficiency.
- Planning processes should be coordinated to improve outcomes.
- Geotargeted efficiency should be used as a complement to broad-scale or system wide efficiency, not as a replacement.

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