



Synapse
Energy Economics, Inc.

Energy Efficiency in Wholesale Markets

Capturing the Multiple Benefits of Energy Efficiency
Roundtable on Energy Provider and Consumer Benefits

16 October 2013

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Energy System modeling, analysis, expert testimony, and stakeholder representation for...

- Consumer Advocates and Public Interest Groups in more than 25 states
 - More than 20 PUCs and Attorneys General
 - Over 40 Environmental Groups and Foundations
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- Wholesale Market Representation for Consumer Advocates, Energy Efficiency, Renewable Generation, and Environmental Advocates

- Impact on transmission planning
- Lower wholesale energy and capacity market prices
- Reduced price volatility and
Can we target wholesale impact?

New England Investment in EE

| Year | Annual EE Budget (\$m) | Approx. FCM Revenue (\$m) | % extra from FCM |
|------|------------------------|---------------------------|------------------|
| 2009 | \$ 353.4 | \$ 26.4 | 7% |
| 2010 | \$ 535.2 | \$ 28.5 | 5% |
| 2011 | \$ 886.3 | \$ 24.6 | 3% |
| 2012 | \$ 1,029.4 | \$ 24.1 | 2% |

Notes:

1. Annual Budget from ACEEE 2011 Scorecard, Table 4.
2. FCM = ISO New England Forward Capacity Market
3. Estimated FCM revenues from public data. Does not account for over/under delivery, pro-rata, or multi-year prices.

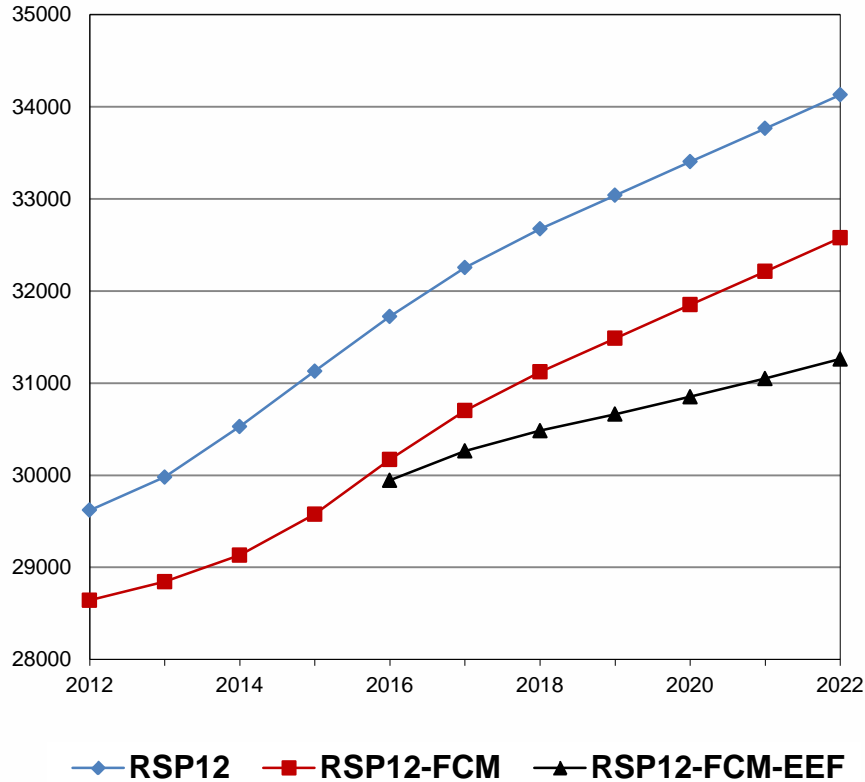
New England Energy Efficiency Forecast

| Year | Forecast of Summer Peak Savings Growth |
|-----------------------|--|
| 2016 | 231 MW |
| 2017 | 218 MW |
| 2018 | 204 MW |
| 2019 | 192 MW |
| 2020 | 180 MW |
| 2021 | 169 MW |
| 2022 | 159 MW |
| Total | 1,353 MW |
| Annual Average Growth | 193 MW |

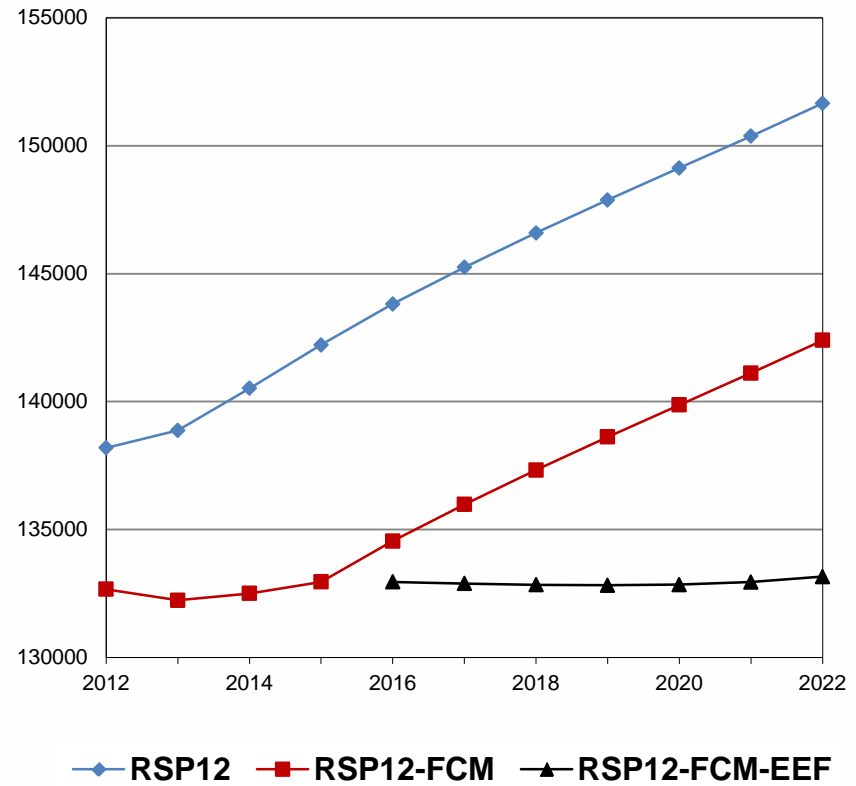
Source: ISO New England Energy Efficiency Forecast Working Group. 2013 Energy Efficiency Forecast.

Effect of EE on Transmission Planning

New England: Summer 90/10 Peak (MW)



New England: Annual Energy (GWh)

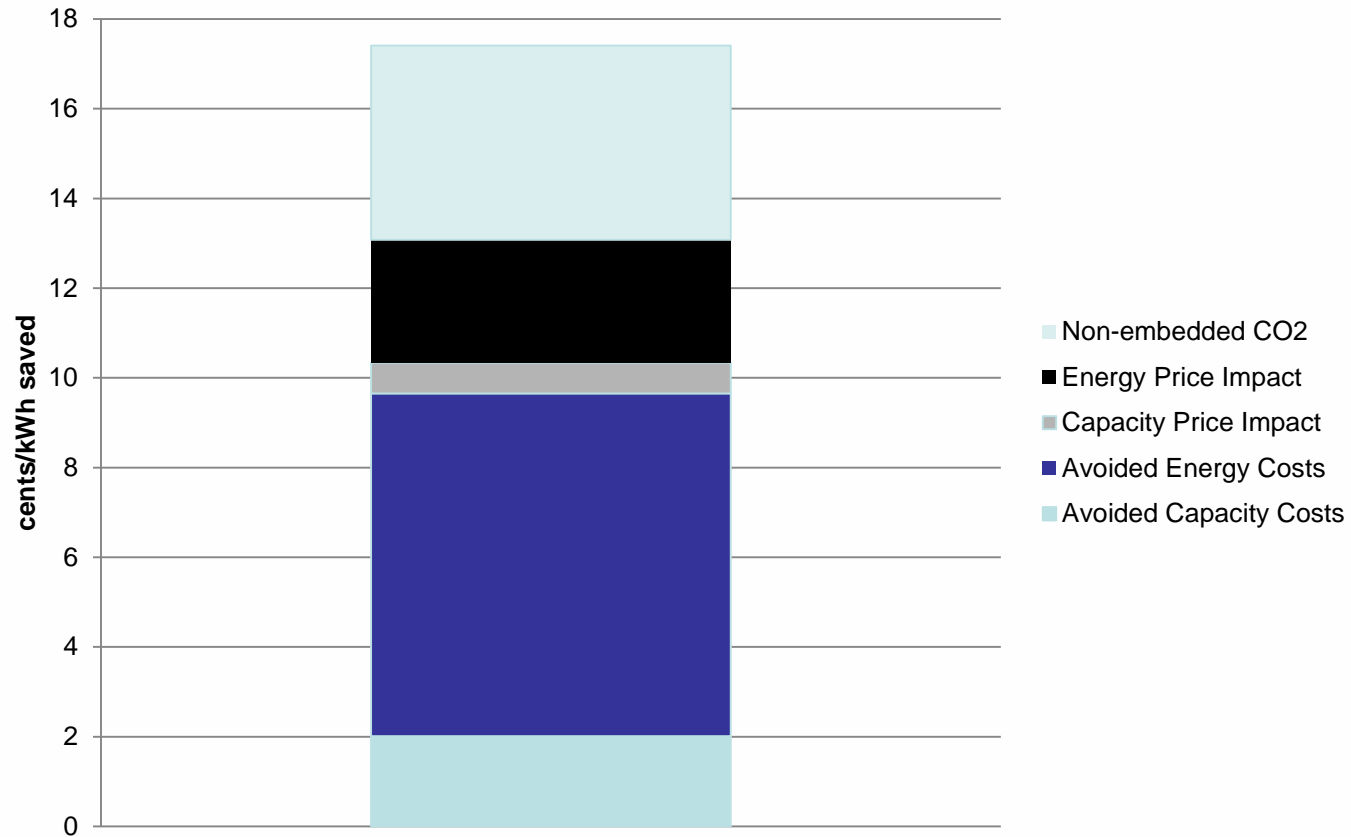


Any savings from deferred or cancelled transmission projects accrue to ALL ratepayers!

Source: ISO New England Energy Efficiency Forecast Working Group. 2013 Energy Efficiency Forecast.

Avoided Energy Supply Costs from EE

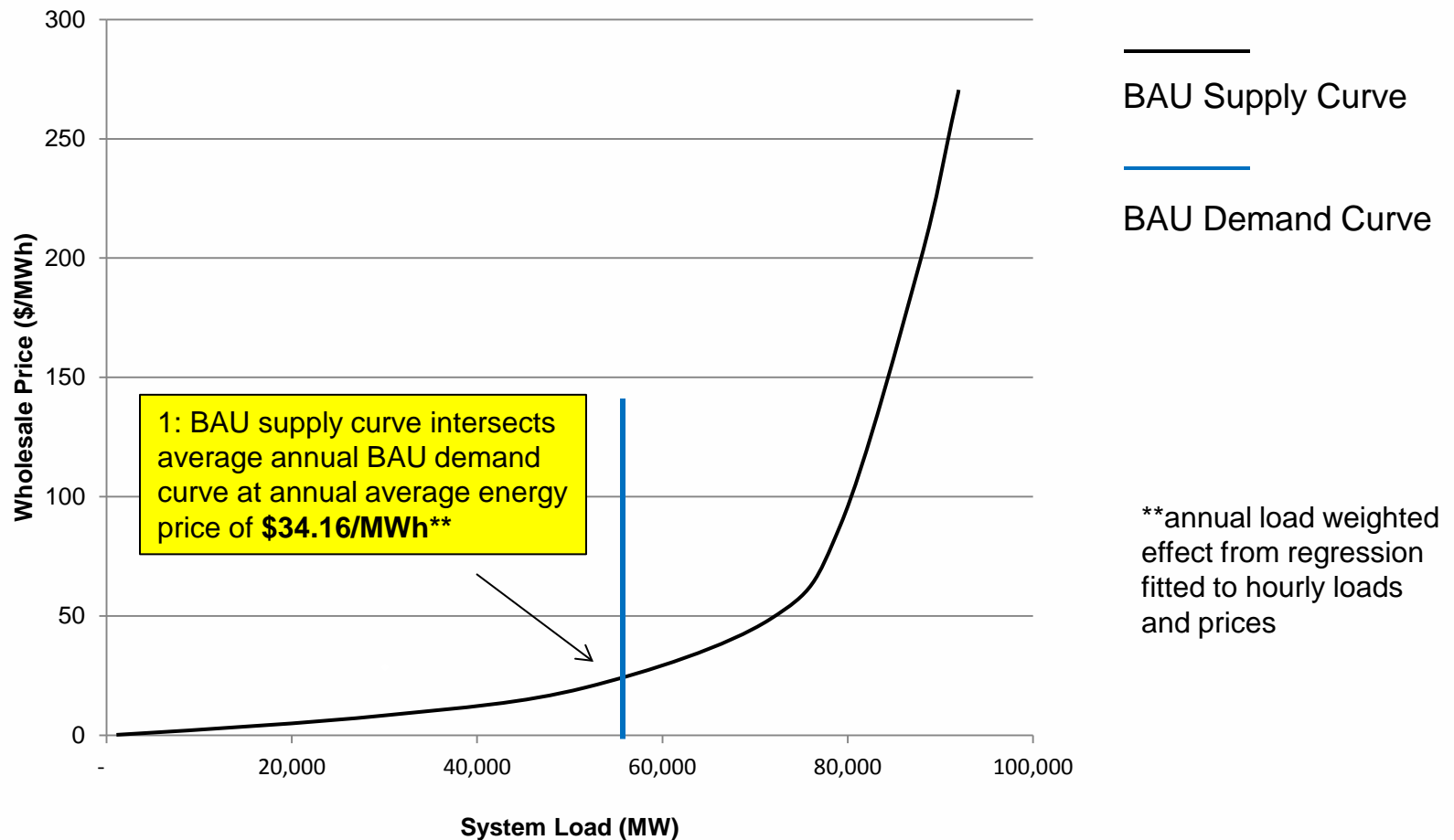
Components of Avoided Cost



Source: *Avoided Energy Supply Costs in New England: 2013 Report*. July 2013.

Impact of EE on Wholesale Energy Market Price

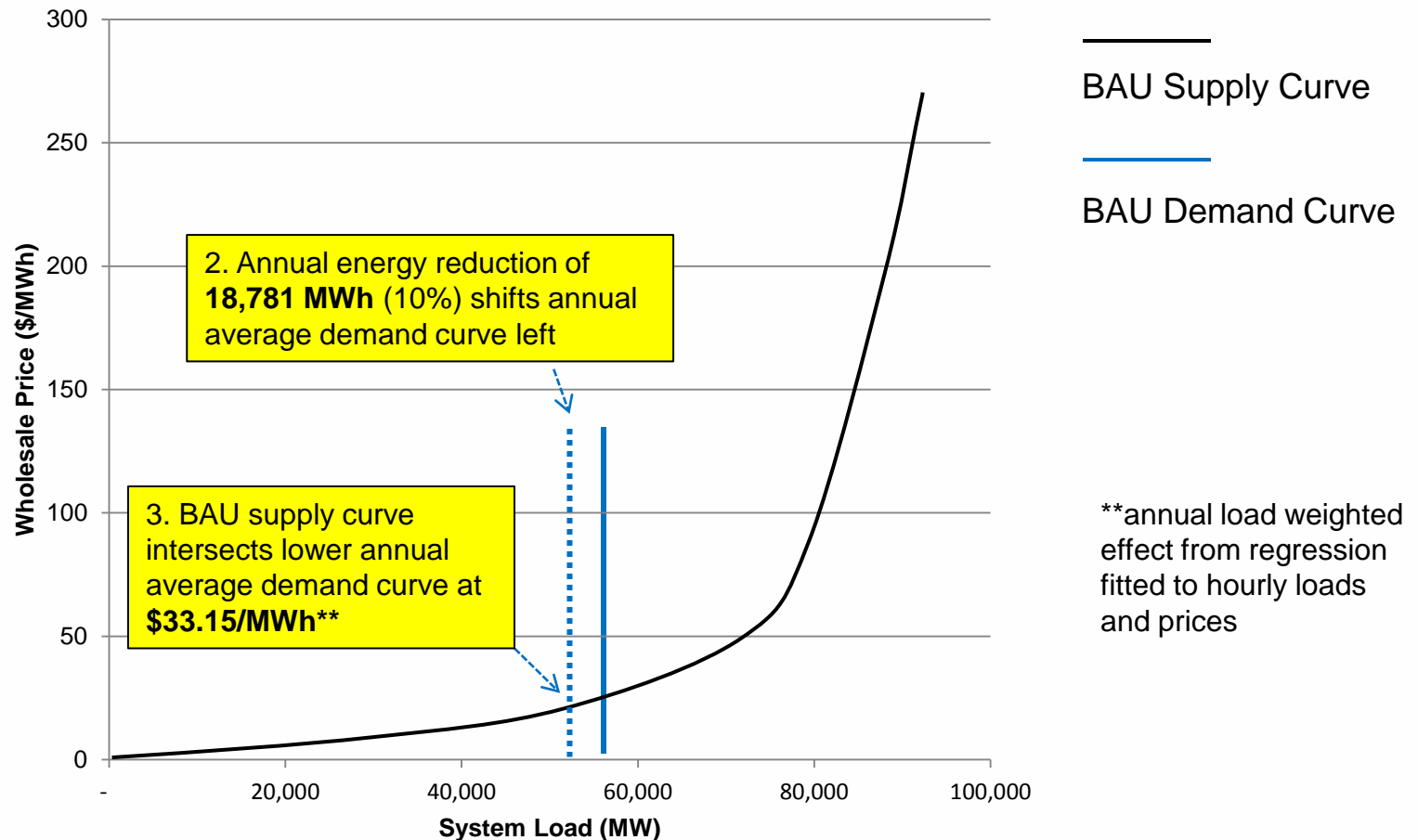
Step 1 – Business as Usual (BAU) Energy; BAU Supply, BAU Price



Source: *Ohio's Energy Efficiency Resource Standard: Impacts on the Ohio Wholesale Electricity Market and Benefits to the State*. ACEEE and Synapse. April 2013.

Impact of EE on Wholesale Energy Market Price

Step 2 – Lower Energy; BAU Supply; Lower Price



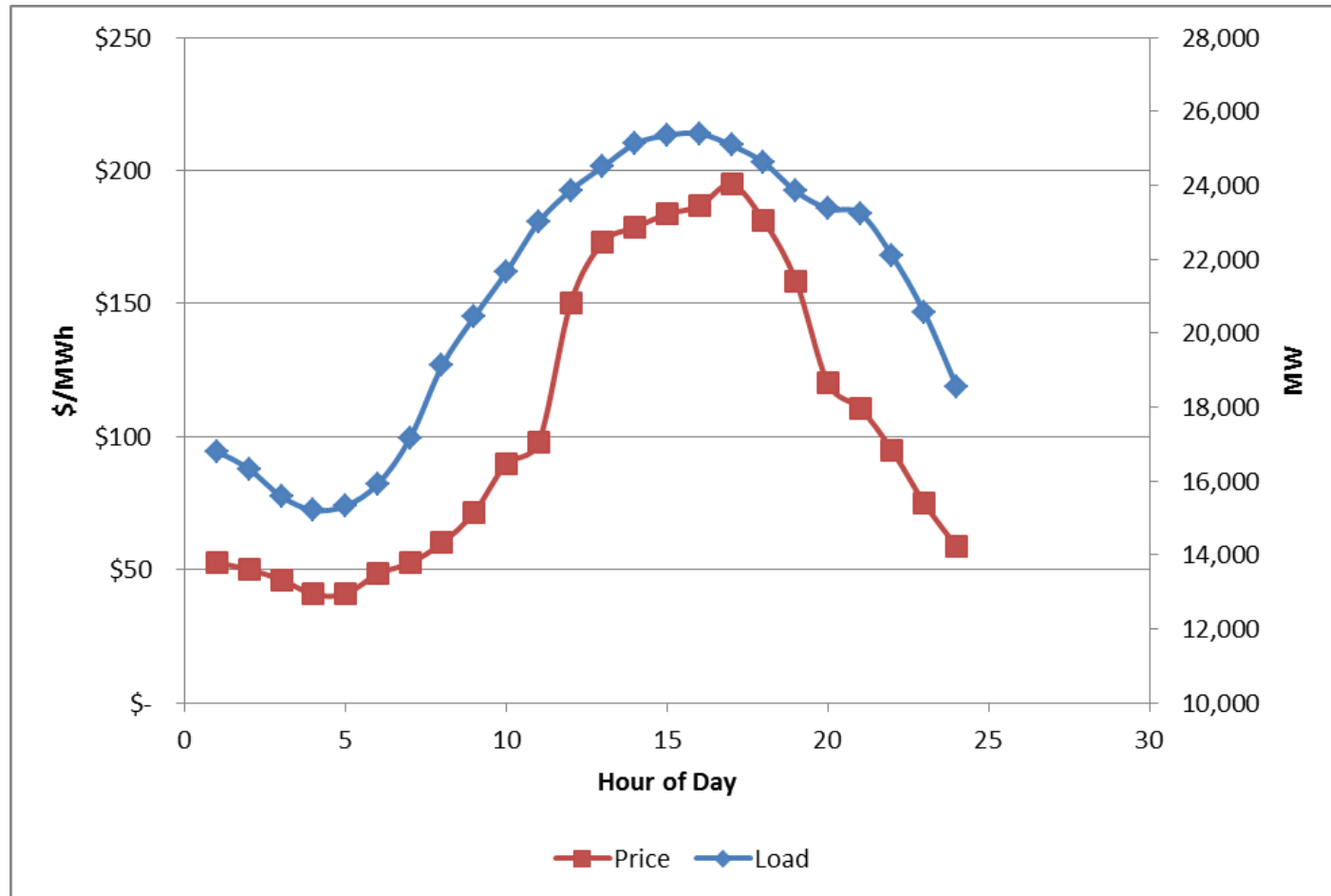
Source: Ohio's Energy Efficiency Resource Standard: Impacts on the Ohio Wholesale Electricity Market and Benefits to the State. ACEEE and Synapse. April 2013.

Notes on Price Impact

- Price impact savings accrue to ALL ratepayers, not just those who participate by installing measures at their own home or business.
- Impact can be very sensitive to market rules. This is especially true for capacity price impact.
- Important to analyze timing of EE install and other expected market need, entry, and retirement.
- Estimating the persistence of these reductions requires analyses of how wholesale markets will respond to lower prices over time
- Estimating the resulting impact on retail rates requires analyses of how wholesale capacity and energy costs flow into retail rates

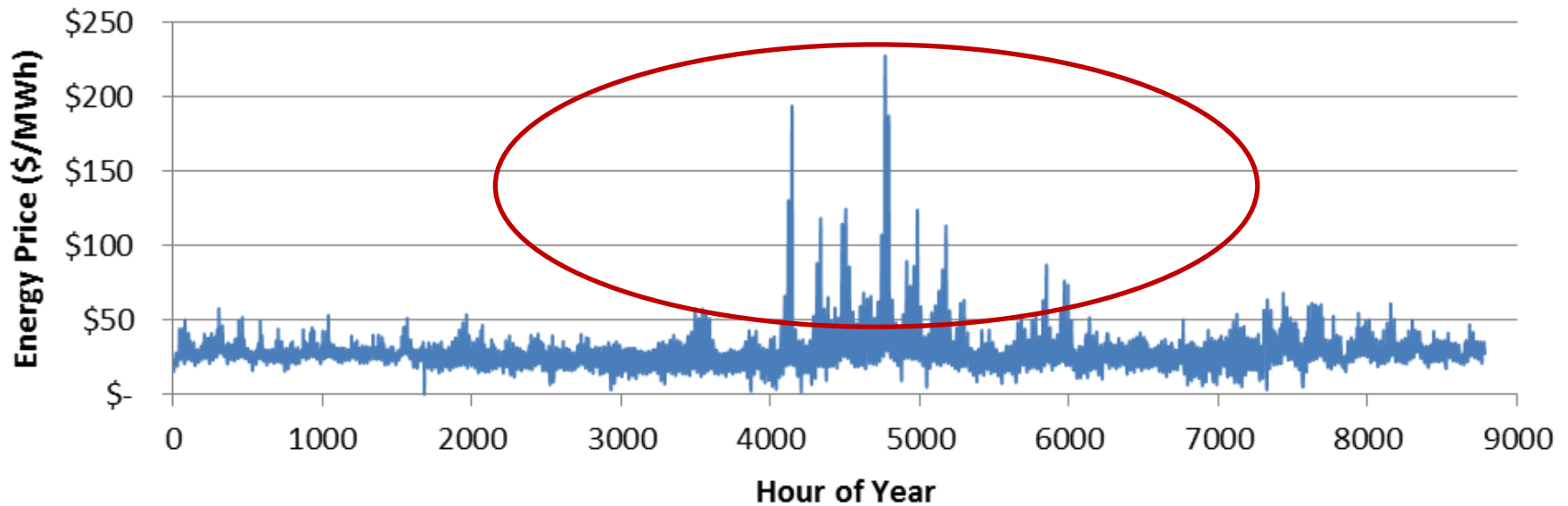
Effect on Hourly Price

Hourly Price and Load in New England. 18 July 2013.



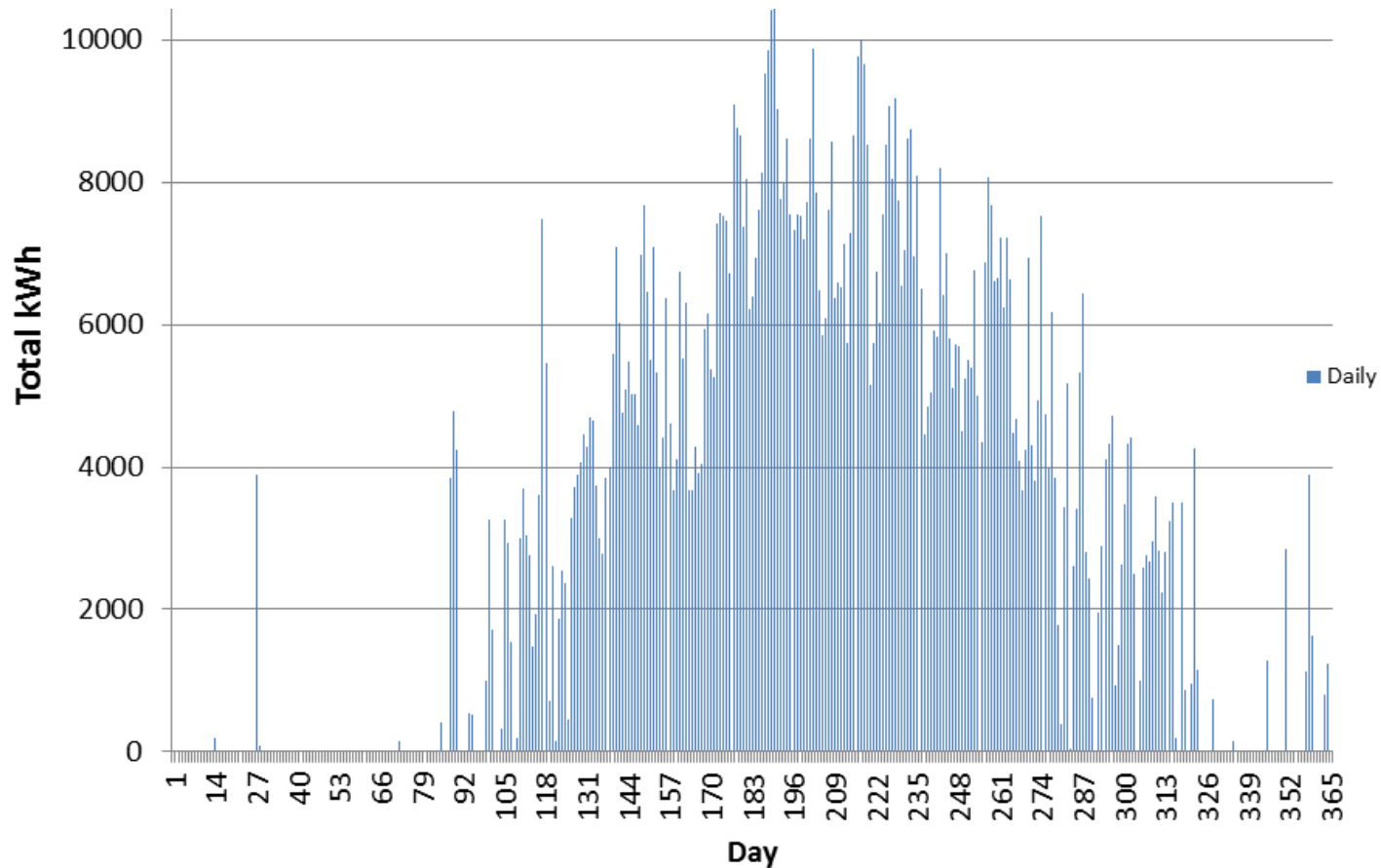
Reducing Price Volatility

ComEd Day-Ahead Energy Price Calendar Year 2012



Northeast Energy Efficiency Partnerships EM&V Forum / KEMA C&I HVAC Savings Tool

1 MW of Connected Load Reduction in Eastern Mass



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