American Council for an Energy-Efficient Economy

Demonstrating How EE in Ohio Saves Money for All Ratepayers

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ACEEE Energy Efficiency as a Resource Conference

September 24, 2013

Policy and Study Context

- Ohio Energy Efficiency Resource Standard (EERS) requires electric utilities to attain annual target reductions from energy efficiency. (adopted 2008, updated June 2012)
- Annual targets increase from 0.9% in 2013 to 2% by 2020
- Customers either pay for EERS costs through an energy efficiency rider or contribute EE projects to their utility

Policy and Study Context

- Ohio's EERS came under heavy opposition in 2012:
  - "Energy Efficiency is bad for ratepayers, drives up prices."
  - "Large energy users are subsidizing energy efficiency programs for other classes without seeing any benefit to their businesses."
- Raised questions that ACEEE and Synapse sought to address:
  - Have utilities been successful in meeting their EERS targets?
  - Will Ohio ratepayers and the state economy continue to benefit from investing in energy efficiency?
  - In what form will those benefits accrue to participants in energy efficiency programs and to non-participants?

Policy and Study Context

- Capacity shortage in northern Ohio (ATSI zone) led to high prices for wholesale electric capacity ($/kW) in May 2012 PJM Base Residual Auction (BRA) for the 2015/2016 delivery year
- Could reductions from EE provide benefits to all OH ratepayers in the form of lower capacity and energy prices?

Source: FERC

Study Results

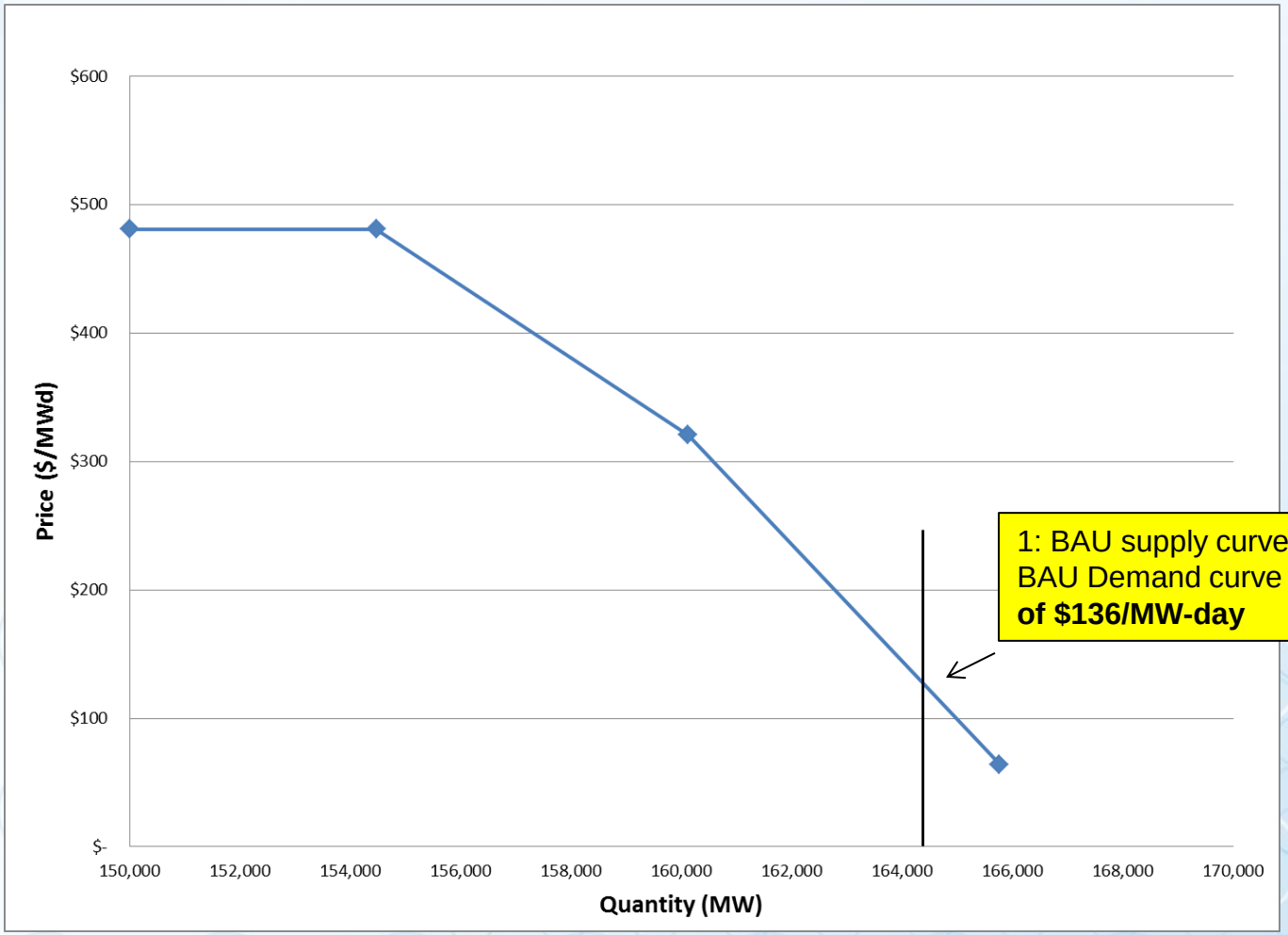
	Savings 2010-2020 (Million $2012)
Program participants – savings from lower energy use	$3,370
All OH ratepayers – savings from lower prices for wholesale capacity and energy (Price Mitigation)	**$ 2,200**
Gross Savings	$5,570
Utility Program Administration Costs	($2,800)
Net Savings	$2,770

Impact of Energy Efficiency on Generation Capacity & Energy Costs

- At utilities who own/acquire generating capacity and energy resources at the cost of each resource, EE has some downward impact on retail rates by delaying cost of **marginal** capacity resource and avoiding cost from **marginal** energy resource.
- At utilities who acquire generating capacity and energy at wholesale market prices, EE has a much larger downward impact on retail rates:
  1. EE reduces market clearing prices which apply to capacity from **all** resources and to energy from **all** resources;
  2. A small quantity of EE can have a large impact on prices depending on the shape of the supply and demand curves.

Wholesale Capacity Price Mitigation (annual)

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

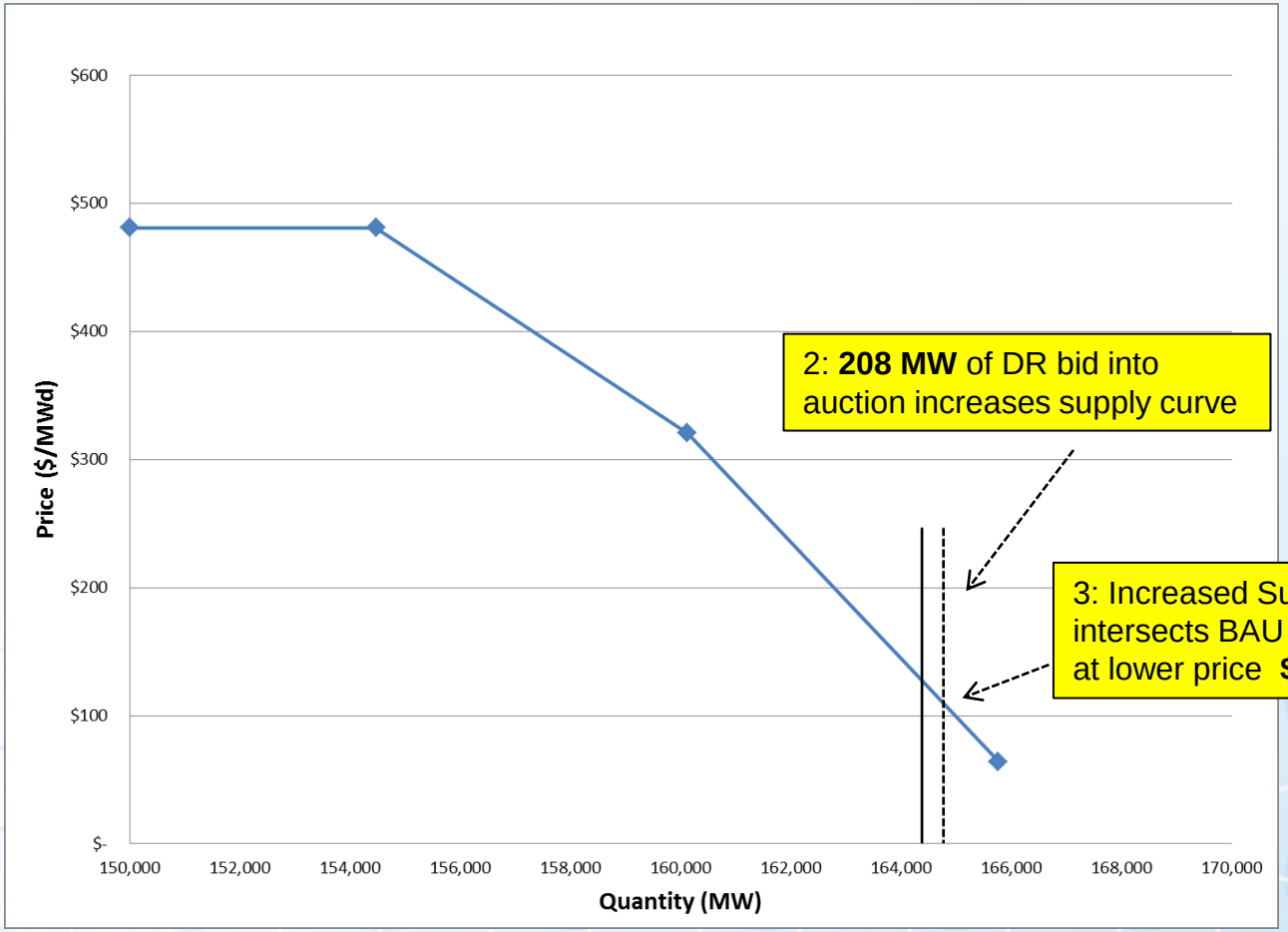


BAU Supply Curve

BAU Demand Curve ("VRR Curve"

Wholesale Capacity Price Mitigation (annual)

Step 2 – BAU Demand; Increased supply; Lower Price



BAU Supply Curve

BAU Demand Curve ("VRR Curve"

Wholesale Capacity Price Mitigation (annual)

Ohio fraction of PJM RTO excluding ATSI

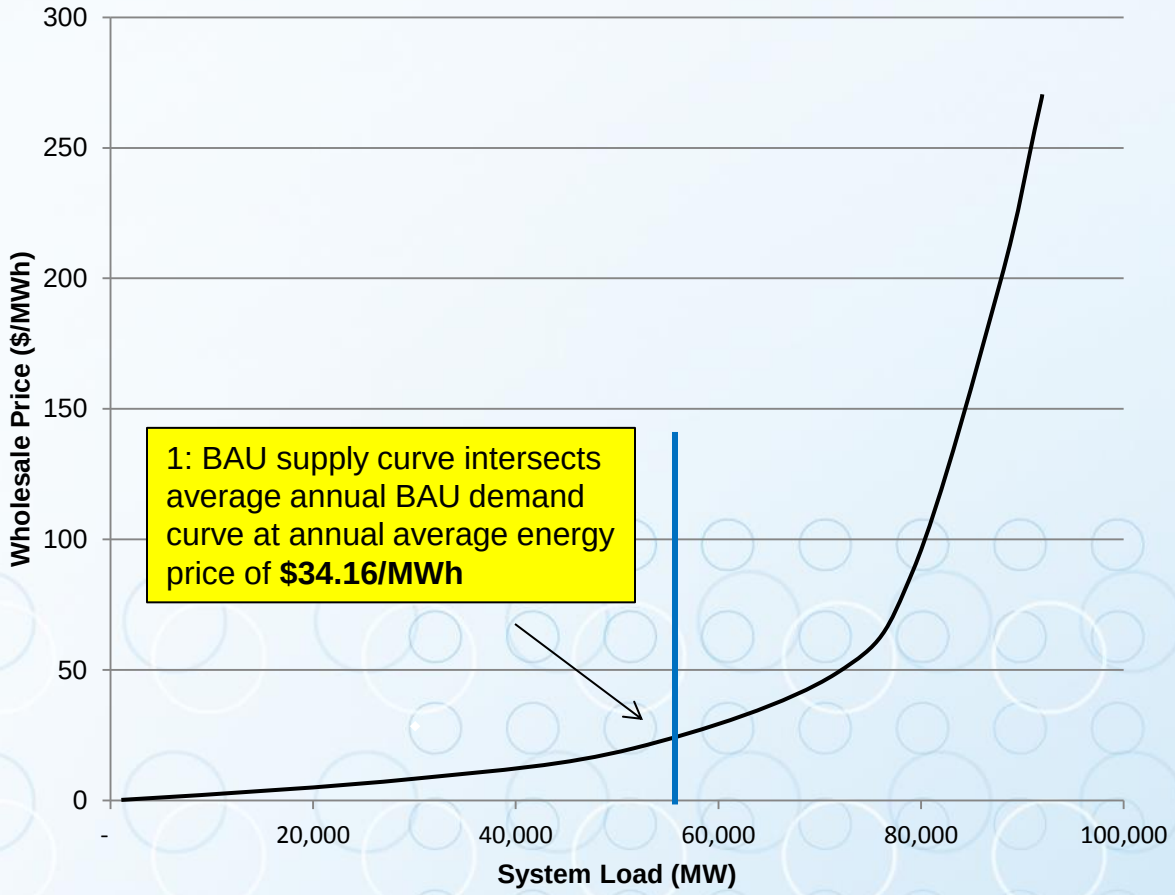
Scenario	Capacity (MW)	Price ($/MW-day)	Cost (million $)
BAU	14,439	$136	$716.7
BAU + EE	14,459	$126.2	$ 666
Change	20 **	(9.8)	($ 50.7)
	0.14 %	**(7.2%)**	**(7.1)%**

0.14% increase in supply reduces price by 7.2%

**20 MW is Ohio fraction of 208 MW bid into PJM RTO

Wholesale Energy Price Mitigation (annual)

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

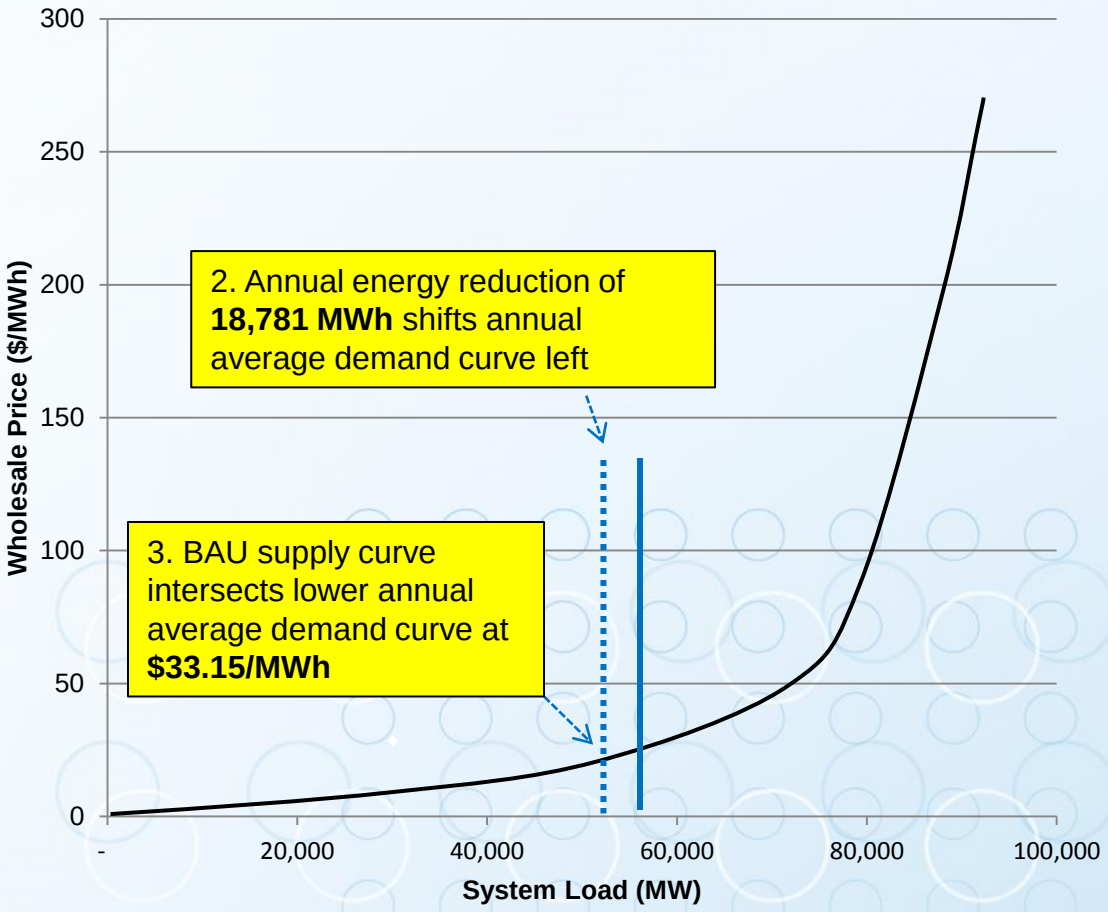


BAU Supply Curve

BAU Demand Curve ("VRR Curve")

Wholesale Energy Price Mitigation (annual)

Step 2 – Lower energy use; BAU supply; Lower Price



Wholesale Energy Price Mitigation (annual)

Scenario	Load (GWh)	Price ($/MWh)	Cost (million$)
BAU	181,904	34.16	6,214
BAU + EE	163,124	33.15	5,408
Change	(18,781)	1.006	806
	(10%)	(3%)	(13%)
Lower Energy Use Savings	18,781 * $34.16 /1,000		642
Price Mitigation Savings	163,124 * $1.006 /1,000		164

Price Mitigation Impact of Energy Efficiency on Retail Rates

- Estimating the downward impact of EE on wholesale market clearing prices for capacity and for energy requires analyses of:
  - the BAU operation of those markets
  - when, and for how long, those markets see reductions from EE
- Estimating the resulting impact on retail rates requires analyses of how wholesale capacity and energy costs flow into retail rates
- Estimating the persistence of these reductions requires analyses of how wholesale markets will respond to lower prices over time

Price Mitigation Impact of Energy Efficiency on Retail Rates

Further Reading

- **Neubauer, Max et al., *Ohio's Energy Efficiency Resource Standard: Impacts on the Ohio Wholesale Electricity Market and Benefits to the State.* ACEEE, April 2013.**
- **Hornby, Rick et al. *Avoided Energy Supply Costs in New England: 2013 Report.* Synapse Energy Economics, July 12, 2013. Chapter 7.**

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ACEEE American Council for an Energy-Efficient Economy

Synapse Energy Economics, Inc.

The American Council for an Energy-Efficient Economy (ACEEE)

- nonprofit 501(c)(3) that acts as a catalyst to advance energy efficiency policies, programs, technologies, investments & behaviors.
- Nearly 50 staff based in Washington, D.C.
- Focus on end-use efficiency in industry, buildings, utilities & transportation
- Other research in economic analysis; behavior; national, state & local policy.
- Funding:
  - Foundation Grants (52%)
  - Contract Work & Gov. Grants (20%)
  - Conferences and Publications (20%)
  - Contributions and Other (8%)

Synapse Energy Economics

- Analyzes economic and environmental issues in the electric and natural gas industries
- Founded in 1996
- Staff of 30 engineers, scientists, economists and policy experts in Cambridge, MA
- Focuses on electric industry resource planning and ratemaking. Emphasis on environmental compliance costs, role of efficiency and renewables, design and operation of wholesale electricity markets. Experts in computer simulation modeling of long-term demand, supply and prices.
- Provides reports, testimony, litigation and regulatory support
- Clients include energy offices, utility regulators, consumer advocates, environmental organizations and Federal agencies