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On Behalf of  
The Ohio Manufacturers Association (OMA)

To the Ohio Senate Public Utilities Committee

Hearing on:  
Review of Ohio Senate Bill 221 and its Energy Efficiency Provisions

April 23, 2013



## SUMMARY

Our research demonstrates that Ohio's energy efficiency resource standard has been and will continue to be economically beneficial to the state. Ohio's utilities are generating energy efficiency savings at a levelized cost considerably lower than the levelized costs of new generation resources. During the first three years of Ohio's energy efficiency standard, the state investor-owned utility (IOU) achieved savings at a cost of \$0.011/kWh, far below the cost of any other generation resource.

Utility energy efficiency programs run by the state's four investor-owned utilities have created significant financial benefits for Ohio electricity consumers over the past five years. These utility energy efficiency programs generate significant benefits in four primary ways:

- (1) They help improve the energy efficiency of customer facilities, thereby directly reducing monthly electricity bills for participants;
- (2) They reduce customer demand, or load, which lowers wholesale *energy* prices for all customers, particularly in the short and medium term;
- (3) In a competitive wholesale capacity market, bidding in energy efficiency resources lowers wholesale *capacity* prices, which benefits all customers; and
- (4) They provide revenue for utilities that bid energy efficiency resources into wholesale capacity auctions, which helps to offset energy efficiency program costs.

Continuing utility commitments to meeting the SB221 energy efficiency standards in coming years could save customers a total of almost \$5.6 billion in avoided energy expenditures. We estimate utility energy efficiency program administration costs to be \$2.7 billion.

Of the savings \$2.2 billion results from price mitigation impacts that reduce wholesale prices, which in turn reduces bills for both participants and non-participants of utility-sponsored energy efficiency programs throughout the entire energy system.

Energy efficiency is the lowest-cost energy resource to meet customer electricity needs in Ohio and can be deployed much more quickly than new capacity can be constructed. While natural gas prices have reached historically low levels and an abundance of shale gas has been discovered in the Marcellus and Utica Formations, neither of these phenomena preclude the need for investments in energy efficiency. The value proposition to businesses and manufacturers, participants and non-participants alike, is unequivocal: energy efficiency reduces customer energy costs, both directly through facility efficiency improvements and through downward pressure on market energy prices. Energy efficiency also reduces risks associated with volatile energy markets and, ultimately, enhances the competitiveness of Ohio's businesses.

## INTRODUCTION

My name is Neal Elliott and I am the Associate Director for Research with the American Council for an Energy-Efficient Economy (ACEEE), a nonprofit organization dedicated to increasing energy efficiency to promote both economic prosperity and environmental protection. ACEEE is a nonpartisan organization formed in 1980 by energy researchers so we will be celebrating our 34<sup>th</sup> anniversary this year. Personally, I have been involved in energy efficiency issues since the late-1970s, primarily focusing on industry and agriculture, and have testified multiple times before various U.S. House and Senate committees on energy efficiency topics.

Today I am testifying on behalf of the Ohio Manufacturers Association (or OMA) about our research into the impacts of the energy efficiency standard established by Senate Bill 221 and the projected benefits of continuing Ohio's utilities' commitments to meeting these standards through 2020. This research was commissioned by OMA and is presented in a report released by OMA on its website today at [http://www.ohiomfg.com/communities/energy/OMA-ACEEE\\_Study\\_Ohio\\_Energy\\_Efficiency\\_Standard.pdf](http://www.ohiomfg.com/communities/energy/OMA-ACEEE_Study_Ohio_Energy_Efficiency_Standard.pdf).

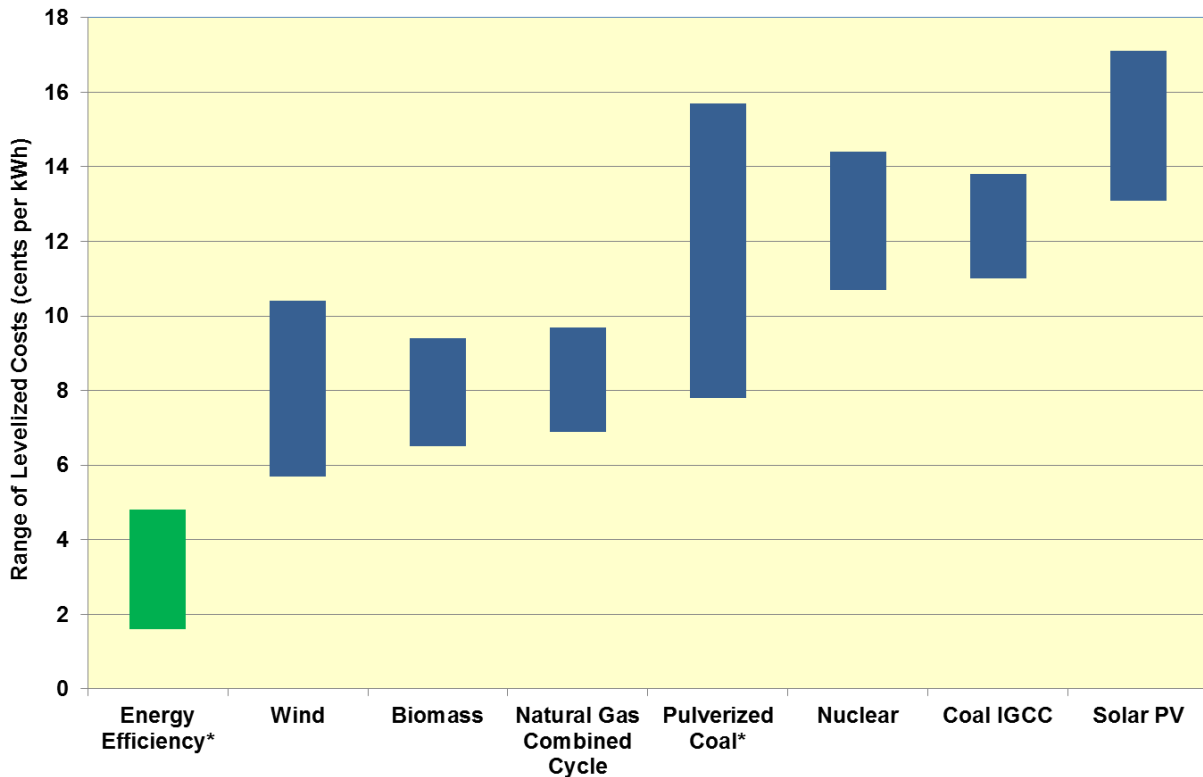
Our research demonstrates that Ohio's energy efficiency resource standard has been and will continue to be economically beneficial to the state. Ohio's utilities are generating energy efficiency savings at a levelized cost considerably lower than the levelized costs of new generation resources. During the first three years of Ohio's energy efficiency standard, the state investor-owned utility (IOU) achieved savings at a cost of \$0.011/kWh (Table 1). This cost compares with the next cheapest national generation resource, wind, at around \$0.06/kWh (Figure 1). Ohio's utilities are generating these savings largely from energy-efficient lighting programs, however, which are relatively inexpensive to administer. In the future, the leveled costs of Ohio's portfolios will likely rise modestly as the portfolios mature and become more comprehensive. Figure 1 shows the average levelized cost of these comprehensive portfolios, which ACEEE estimates to be around \$0.03/kWh.

**Table 1. Utility Program Costs, Savings, and Levelized Cost of Saved Energy, 2009-2011**

Utility	Program Year	Program Savings (MWh)	Program Costs (Ths \$)	Levelized CSE (\$/kWh)
AEP		250,600	\$ 14,837	\$ 0.008
Duke		86,353	\$ 9,205	\$ 0.014
DP&L	2009	114,288	\$ 7,648	\$ 0.009
FirstEnergy*		22,614	\$ 31,174	\$ 0.179
<b>Total</b>		<b>473,855</b>	<b>\$ 62,865</b>	<b>\$ 0.017</b>
AEP		364,000	\$ 34,781	\$ 0.012
Duke		310,553	\$ 19,797	\$ 0.008
DP&L	2010	179,206	\$ 12,157	\$ 0.009
FirstEnergy*		534,486	\$ 25,257	\$ 0.006
<b>Total</b>		<b>1,388,245</b>	<b>\$ 91,992</b>	<b>\$ 0.009</b>
AEP		502,000	\$ 51,456	\$ 0.013
Duke		215,699	\$ 21,412	\$ 0.013
DP&L	2011	179,586	\$ 13,980	\$ 0.010
FirstEnergy*		461,158	\$ 23,283	\$ 0.007
<b>Total</b>		<b>1,358,443</b>	<b>\$ 110,131</b>	<b>\$ 0.010</b>
<b>Grand Total</b>		<b>3,220,543</b>	<b>\$ 264,988</b>	<b>\$ 0.011</b>

\* Program costs for FirstEnergy are budgets, taken from their 2009 DSM Plan (FirstEnergy 2009)  
 Sources: AEP 2010, 2011, 2012; Duke 2010, 2011, 2012; DP&L 2010, 2011, 2012;  
 FirstEnergy 2009, 2010, 2011, 2012a

Figure 1. Levelized Utility Cost of New Energy Resources



\*Notes: Energy efficiency average program portfolio data from Molina 2013 (ACEEE); All other data from Lazard 2012. High-end range of advanced pulverized coal includes 90% carbon capture and compression.

### IMPACT OF ENERGY EFFICIENCY ON OHIO'S ELECTRICITY MARKETS

Utility energy efficiency programs run by the state's four investor-owned utilities have created significant financial benefits for Ohio electricity consumers over the past five years. These utility energy efficiency programs generate significant benefits in four primary ways:

- (5) They help improve the energy efficiency of customer facilities, thereby directly reducing monthly electricity bills for participants;
- (6) They reduce customer demand, or load, which lowers wholesale *energy* prices for all customers, particularly in the short and medium term;
- (7) In a competitive wholesale capacity market, bidding in energy efficiency resources lowers wholesale *capacity* prices, which benefits all customers; and
- (8) They provide revenue for utilities that bid energy efficiency resources into wholesale capacity auctions, which helps to offset energy efficiency program costs.

The price mitigation impacts of energy efficiency reduce energy prices, which in turn reduces bills for both participants and non-participants of utility-sponsored energy efficiency programs throughout the entire energy system.

In our analysis, we quantify the first three of these four benefits that would accrue through the full implementation of the energy efficiency resource standard (or EERS) in Ohio through 2020 (Table 2).

**Table 2. Summary of Wholesale Energy Cost Savings and Wholesale Energy and Capacity Price Mitigation Impacts from Ohio's EERS Through 2020**

	<b>Economic Savings (Million \$2012)</b>
<b>Wholesale Energy Cost Savings</b>	<b>\$3,370</b>
<b>Wholesale Energy Price Mitigation Savings</b>	<b>\$880</b>
<b>Wholesale Capacity Price Mitigation Savings (Estimated, 2017-2020)</b>	<b>\$1,320*</b>
<b>Total Savings</b>	<b>\$5,570</b>
<b>Wholesale Capacity Price Mitigation Savings (Forgone, 2015/2016)</b>	<b>\$500</b>
<b>Utility Program Administration Costs**</b>	<b>\$2,700</b>

\* Assumes that savings from the 2017/2018 through 2020/2021 auctions are equal. Does not include savings from 2016/2017 auction, which transpires in May 2013 and, hence, the potential savings have already been lost.

\*\* Utility program investments will accrue savings over the life of the measures installed in each program year and, therefore, they will deliver savings beyond 2020. However, we only count program savings through 2020.

There is clearly an inextricable link between Ohio's energy policy and its economic health. Continuing utility commitments to meeting the SB221 energy efficiency standards in coming years could save customers a total of almost \$5.6 billion in avoided energy expenditures and reduced wholesale energy and capacity prices by 2020: \$3.37 billion from reduced customer expenditures on electricity; \$880 million from wholesale energy price mitigation impacts; and \$1.3 billion from wholesale capacity price mitigation impacts from the 2017/2018 through 2020/2021 PJM Energy Market<sup>1</sup> capacity auctions.

Table 2 also presents utility energy efficiency program administration costs, which we estimate at \$2.8 billion. These program expenditures would be partially offset, however, by revenues awarded to utilities through selling energy efficiency resources into the PJM auctions, which we estimate could total around \$100 million in revenues from the same four PJM auctions, for a net effect of \$2.7 billion.

Our estimates of the wholesale capacity price mitigation savings are conservative: they only include the potential effects of energy efficiency for four capacity auctions: the 2017/2018 through 2020/2021 auctions.<sup>2</sup> The approximately \$330 million potential price mitigation savings during the 2020/2021 auction assumes that utilities only save as much energy as required by the mandated targets and no more. If utilities continue to surpass their annual targets, price reduction impacts would be even greater. Therefore, it is safe to say that the potential savings

<sup>1</sup> PJM Energy Market is the independent system operator that coordinates the wholesale energy market and runs the auctions which Ohio is joining.

<sup>2</sup> Another important benefit to the electric system from investments in energy efficiency is transmission and distribution infrastructure savings. We did not attempt to quantify these benefits.

from the other three auctions will generate economic savings to customers of a similar to those from the 2020/2021 auction.

In the 2015/2016 auction, some utilities did not bid all the savings generated by energy efficiency programs into the wholesale power auction. Table 3 shows the savings that could have accrued had utilities bid all available energy efficiency resources into that auction, which we estimate to be almost \$500 million, 90% of which would have come from energy efficiency resources bid from the American Transmission System, Inc. (ATSI) zone in northern Ohio.

**Table 3. Potential Wholesale Capacity Cost Savings Had Maximum Available Energy Efficiency Resources Been Bid into the 2015/2016 BRA**

Zone	Actual Auction Capacity Costs (M\$)	Capacity Costs with Additional EE (M\$)	Capacity Cost Savings (M\$)	Capacity Cost Savings (M2012\$)
ATSI	\$1,368	\$883	\$484	\$452
All Others	\$717	\$666	\$51	\$47
<b>Ohio Total</b>	<b>\$2,084</b>	<b>\$1,549</b>	<b>\$535</b>	<b>\$500</b>

**ENERGY EFFICIENCY BENEFITS UTILITIES AND CUSTOMERS ALIKE**

Energy efficiency has both direct and indirect benefits to utilities and customers:

- **Energy efficiency is the lowest-cost resource for utilities to meet the demand for electricity, even during a period of abundant shale gas and low natural gas prices.** Figure 1 indicates the range of the levelized cost<sup>3</sup> of new supply resources (Lazard 2012). The size of each bar in Figure 1 represents the likely potential range in the cost to the utility of each resource, while the midpoint of each bar represents the best single estimate. The best estimate for energy efficiency is an average cost to the utility of less than 3¢/kWh. That is about one-third the cost of the next-cheapest set of electric resources and less than one-fourth the cost of the remaining conventional electricity generation options.
- **Investments in energy efficiency allow utilities to defer costly investments in new generation resources and transmission and distribution infrastructure.** These deferred capital investments help to keep electricity rates low for all utility customers, whether they participate in energy efficiency programs or not.
- **Energy efficiency contributes to the optimal functioning of the wholesale capacity markets, putting downward pressure on the cost of electricity for all customers.** Capacity costs – which impact the cost of electricity – are set to dramatically increase in 2015 in the ATSI zone in northern Ohio.<sup>4</sup> As a utility system resource, energy efficiency

<sup>3</sup> “Levelized cost” refers to the cost per kilowatt-hour for electricity over the life of a generating resource, and includes capital, operations and maintenance, and fuel costs (or, in the case of energy efficiency, analogous program costs).

<sup>4</sup> FirstEnergy’s service territory is in the ATSI zone, which represents 40% of the total energy load in Ohio.



can reduce the risk of unexpected capacity constraints and thereby suppress capacity prices should there be a delay in planned new generation or transmission projects.

- **Energy efficiency reduces financial risk to utilities, investors, and customers by diversifying the utility's portfolio of energy resources.** From a utility planning perspective, energy efficiency is the lowest-risk resource option (Binz et al. 2012): it is not capital intensive, can be deployed quickly, and generates savings perpetually over the life of the installed measures. Supply-side resources, on the other hand, are capital intensive, cannot be deployed as quickly and do not generate electricity 100% of their operating lives, all of which increase the financial risk to utilities and customers.
- **For a given level of investment, energy efficiency creates more jobs than new generation.** A recent ACEEE study found that investments in energy efficiency create jobs in labor-intensive industries, such as manufacturing and construction, where a \$1 million investment supports, on average, 14 and 20 jobs, respectively (Bell 2012). In the energy generation industry, the study found that a \$1 million investment supports about 10 jobs. Energy savings from energy efficiency will be reinvested in the economy, supporting jobs in other industries.

Ohio's manufacturers will also reap these benefits, along with others, such as:

- A potential income source from selling energy efficiency to utilities to help utilities meet their energy savings goals.
- Co-benefits that are equivalent to 3-5 times the direct energy savings, such as improved worker safety, improved plant reliability, improved product quality, and reduced maintenance costs (Worrell et al. 2003).
- Burgeoning demand for Ohio-manufactured products that are energy efficient, such as insulation, heating and cooling equipment, and variable speed drives (because a greater portion of dollars invested in energy efficiency, as opposed to dollars invested in generation capacity, will remain in Ohio).
- Energy efficiency increases the availability of existing natural gas leading to a lower market price and providing manufacturers with expanded access to an affordable and plentiful supply of natural gas to use as a feedstock, such as in combined heat and power applications, which are qualified resources for meeting the mandated savings targets.

## OTHER ISSUES

In the past Committee hearings a number of issues have come up that I would like to address.

**(1) Should energy efficiency charges be by-passable?** In my expert opinion, I do not feel that these charges should be by-passable because:

- All utility customers benefit from energy efficiency whether they choose to participate in energy efficiency programs or not. Our research, presented above, clearly makes the case for all customers to contribute to energy efficiency.

- The energy efficiency standard applies to the distribution utility, not the generator, so all electricity delivered should be covered under the standard.
- (2) **What is the role of combined heat and power (CHP) in meeting the targets?** While the original standard established by SB221 did not include CHP among the allowable energy efficiency measures, last year's SB315 legislation extended allowable energy efficiency measures to include CHP. The Public Utilities Commission of Ohio is currently considering the guidelines under which CHP can participate in meeting targets. Once these guidelines are in place, I anticipate that CHP will become an important element of the utilities' energy efficiency portfolio, creating new value for utilities and customers alike.
- (3) **What are acceptable target levels for energy efficiency in the out-years of the standard?** Utilities such as AEP have shown significant innovation in the programs that have allowed them to more than meet current targets set by SB221. AEP has been achieving a significant portion of their savings from Ohio manufacturers in their service territory. By building relationships with their customers and then building capacity for greater energy efficiency within their organization, AEP's programs are helping their industrial customers implement energy efficiency management plans for their facilities and organize energy teams that can deliver increasing levels of energy efficiency at low costs. With the inclusion of CHP among the eligible measures, there will be significant opportunities to meet higher levels of energy efficiency. It will be important, however, for the PUCO to review targets as these programs mature to ensure that the targets are reasonable and achievable.

## CONCLUSION

Energy efficiency is still the lowest-cost energy resource to meet customer demand and can be deployed much more quickly than new capacity can be constructed. While natural gas prices have reached historically low levels and an abundance of shale gas has been discovered in the Marcellus and Utica Formations, neither of these phenomena preclude the need for investments in energy efficiency. The value proposition to businesses and manufacturers, participants and non-participants alike, is unequivocal: energy efficiency reduces customer energy costs, both directly through facility efficiency improvements and through downward pressure on market energy prices. Energy efficiency also reduces risks associated with volatile energy markets and, ultimately, enhances the competitiveness of Ohio's businesses.

ACEEE stands ready to assist the Committee by addressing any further questions related to the impacts of the energy efficiency standard on electricity markets in the state.

This concludes my testimony. Thank you for the opportunity to present these views.

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