Statement of Tom Vinson on behalf of the American Wind Energy Association
Before the Ohio Energy Mandates Study Committee
June 1, 2015

Chairman Balderson, Chairperson Roegner, members of the Committee, thank you for the opportunity to speak with you today. I am here on behalf of the 1,000 member businesses of the American Wind Energy Association, and the nearly 75,000 workers who are employed in this industry in the United States.

In my testimony, I will cover three main topics:

(1) The benefits of wind energy to Ohio today and the potential going forward;
(2) The benefits to Ohio of growing the use of wind energy for Clean Power Plan compliance or otherwise; and
(3) The benefits of retaining the alternative energy portfolio standard.

The benefits of wind energy to Ohio today, and the potential going forward

In Ohio, wind energy is already providing significant economic and environmental benefits for communities, workers and ratepayers. But, Ohio residents can enjoy expanded work opportunities, electric rates lower than they would otherwise be, millions of dollars flowing into communities and improved air quality among other benefits from greater use of wind energy.

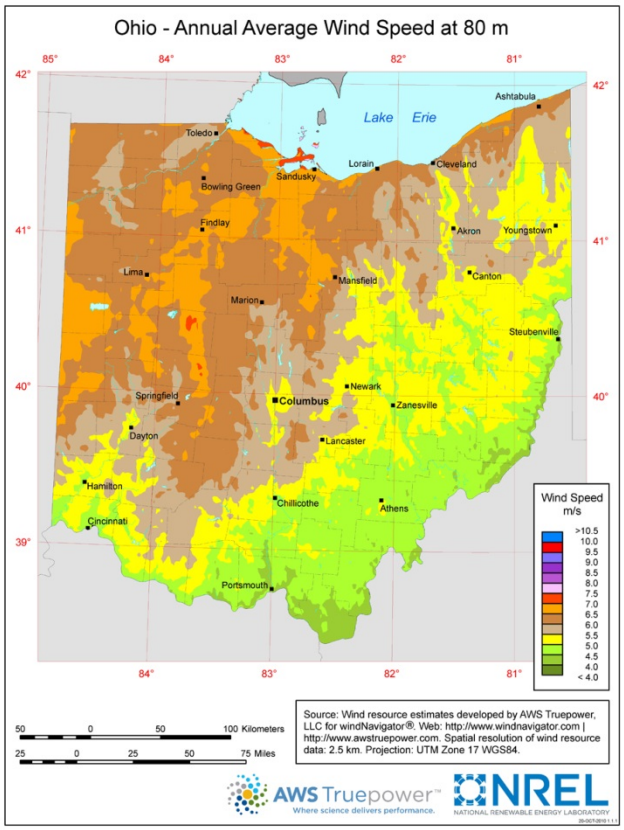
Installed wind energy capacity

There are currently 435 megawatts (MW) of installed capacity in Ohio, approximately 75% of which is sold through long-term contracts to load-serving entities in the state. Blue Creek, the largest wind farm in Ohio, sells its power to American Municipal Power, First Energy Solutions, and The Ohio State University. The second largest wind farm, Timber Road II, sells its power to AEP. The balance of the generation not contracted for in Ohio still benefits Ohio's ratepayers since energy from those wind farms is injected into the regional power grid, thereby displacing other higher cost generators and, therefore, helping reduce wholesale power prices.

Clearly there is strong interest in investing more in Ohio with 11 wind projects certified by the Ohio Power Siting Board[1], but not yet built, totaling an additional 1,400 MW; and four additional projects proposed totaling 452 MW.

The potential for wind energy in Ohio is enormous. The National Renewable Energy Lab 80 meter hub height wind speed map[2] for the state shows this potential, which totals nearly 55,000 MW worth of capacity. In general, areas with an average annual wind speed of 6.5 meters per second and greater at an 80 meter hub height are considered potentially viable:

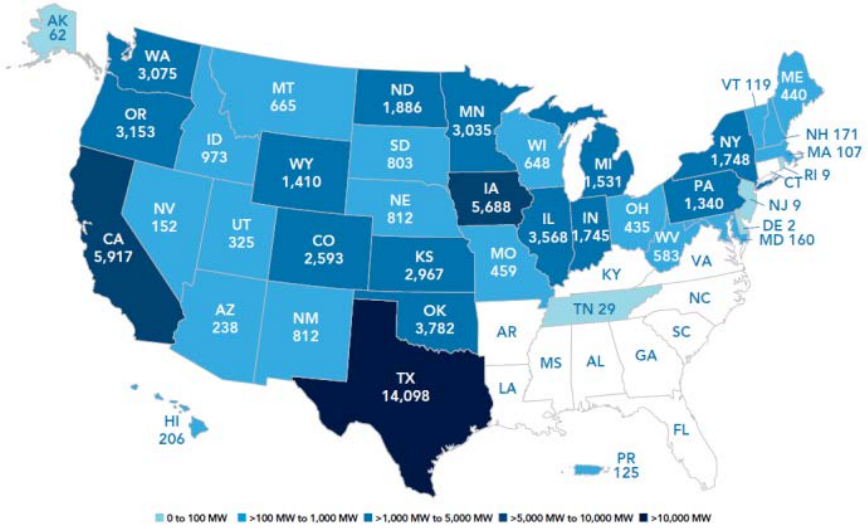
[1] http://www.opsb.ohio.gov/opsb/?LinkServID=895FE98C-C363-FCF9-6BFDC7DF3A3F7AA2
[2] Available at: http://apps2.eere.energy.gov/wind/windexchange/images/windmaps/oh_80m.jpg with additional details available at: http://apps2.eere.energy.gov/wind/windexchange/wind_resource_maps.asp?stateab=oh



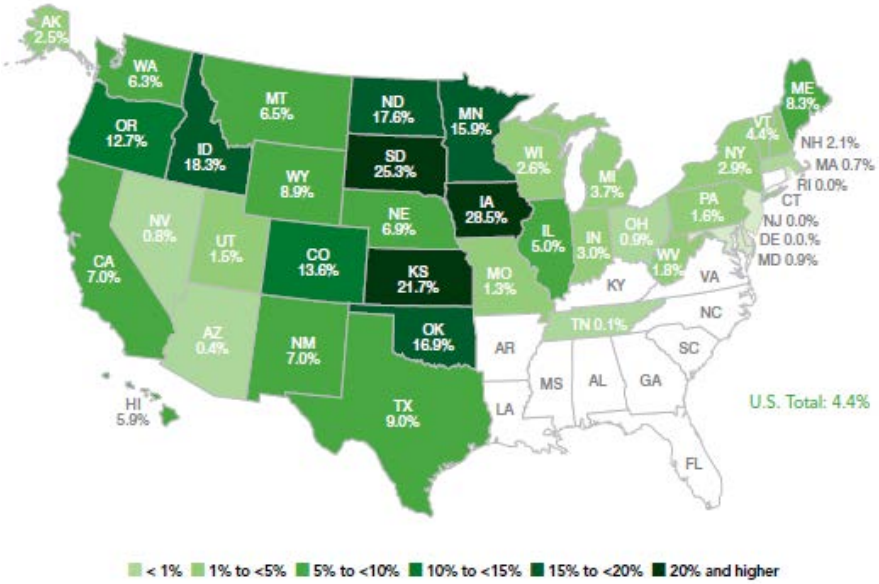
At hub heights greater than 80 meters, which are rapidly growing in popularity in the U.S. with more than 1,200 turbines installed since 2011 with hub heights of 100 meters, the potential for Ohio is even greater, as described in a just-released U.S. Department of Energy (DOE) Report, *Enabling Wind Power Nationwide*.[3] DOE data show that moving to 100 meter hub heights more than doubles Ohio's wind resource potential to over 120,000 MW.[4]

The graphic below shows how Ohio compares to its neighbors in installed wind energy capacity as of the end of 2014.[5] Ohio trails all of its immediate neighbors, with the exception of Kentucky. In most cases Ohio significantly trails its neighbors.

[3] Available at: http://energy.gov/eere/wind/downloads/enabling-wind-power-nationwide
[4] http://apps2.eere.energy.gov/wind/windexchange/docs/wind_potential.xls
[5] AWEA Annual Market Report Year Ending 2014. Available at: http://www.awea.org/AMR2014



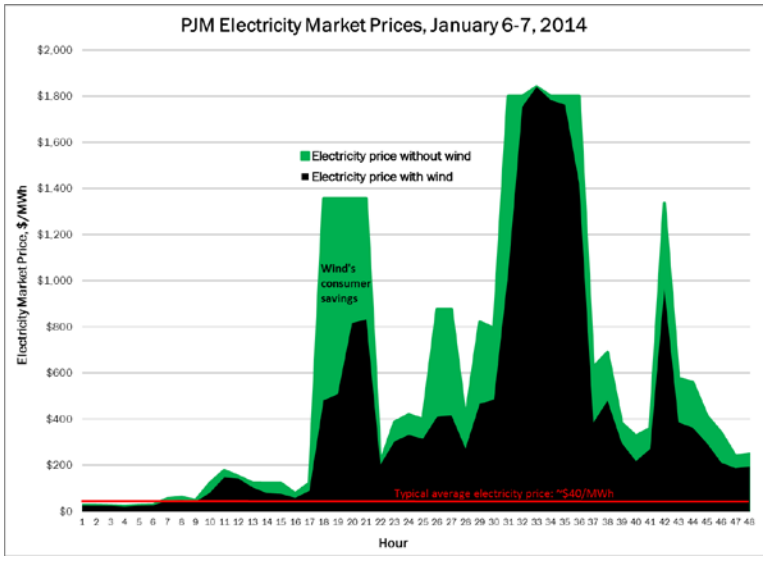
Ohio currently receives just less than 1% of its electric generation from wind energy. As the graphic[6] below shows, several surrounding and nearby states receive significantly higher percentages of electricity from wind energy, including two (Iowa and South Dakota) that on an average annual basis receive more than 25% of their electric generation from wind. Kansas also receives more than 20% of its electric generation from wind, with North Dakota and Minnesota not far behind. States closer to Ohio, including Illinois, Michigan and Indiana currently produce 3-5 times larger shares of their electric generation from wind than Ohio does, with West Virginia at double the penetration rate compared to Ohio.



[6] Ibid.

On the regional interstate power system (PJM) that includes Ohio, wind generation accounted for 2% of total electricity production in 2014. However, PJM's detailed renewable integration study found that wind and solar could reliably increase their share of PJM generation by a factor of 15, as discussed below. Other regions have demonstrated that much higher levels of wind use can be reliably and cost-effectively integrated, with the main Texas power system (ERCOT) reaching 10.6% wind energy in 2014[7] and poised to exceed 15% in the near future. The Southwest Power Pool system reached 12.3% wind in 2014,[8] while the main Colorado power system exceeded 20% renewable energy in 2014.

In addition, wind energy has played a key role in meeting PJM electricity demand at critical times. The value of wind energy was demonstrated during the polar vortex event in January 2014 when wind generation saved PJM consumers at least $1 billion over just two days.[9] Wind farms continued to generate at high levels while many conventional generators went offline due to difficulties in securing fuel or the plants having maintenance problems due to the extreme cold.[10] As shown below, stably-priced wind energy drastically reduced electricity market prices as the price of other fuels skyrocketed.



Economic impact in Ohio

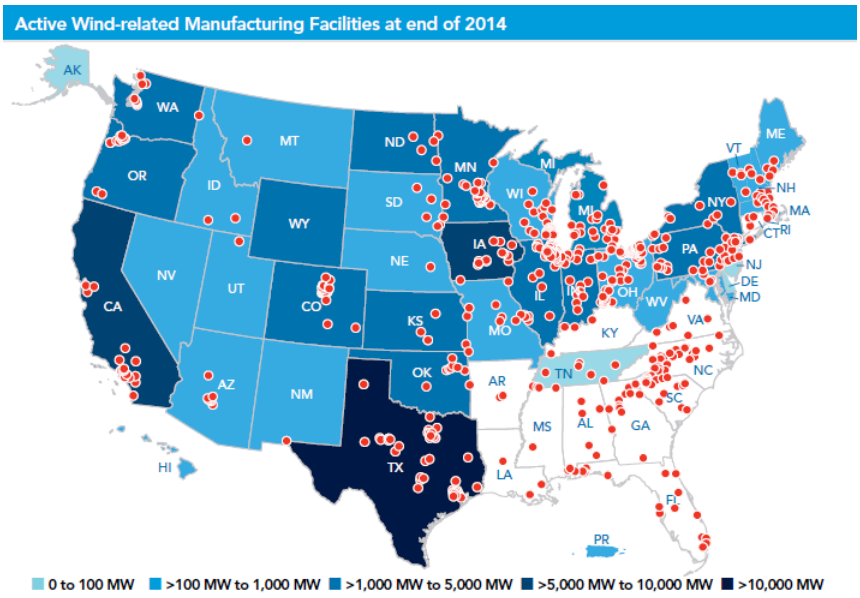
The cumulative capital investment from the operating projects in Ohio is $890 million. By contrast, based on AWEA's numbers[11], most of Ohio's neighbors have enjoyed significantly higher levels of investment, including Iowa ($10 billion), Illinois ($7.2 billion), Minnesota ($5.7

[7] http://ercot.com/news/press_releases/show/51654
[8] http://www.spp.org/GenerationMix/
[9] Details available in an AWEA report available at: http://awea.files.cms-plus.com/AWEA%20Cold%20Snap%20Report%20Final%20-%20January%202015.pdf
[10] Additional details on the problems experienced by conventional generators during the polar vortex are available in the North American Electric Reliability Corporation (NERC) report available at: http://www.nerc.com/pa/rrm/January%202014%20Polar%20Vortex%20Review/Polar_Vortex_Review_29_Sept_2014_Final.pdf
[11] Ibid.

billion), Indiana ($3.7 billion), Michigan ($2.9 billion), Pennsylvania ($2.7 billion), Wisconsin ($1.3 billion), and Missouri ($960 million).

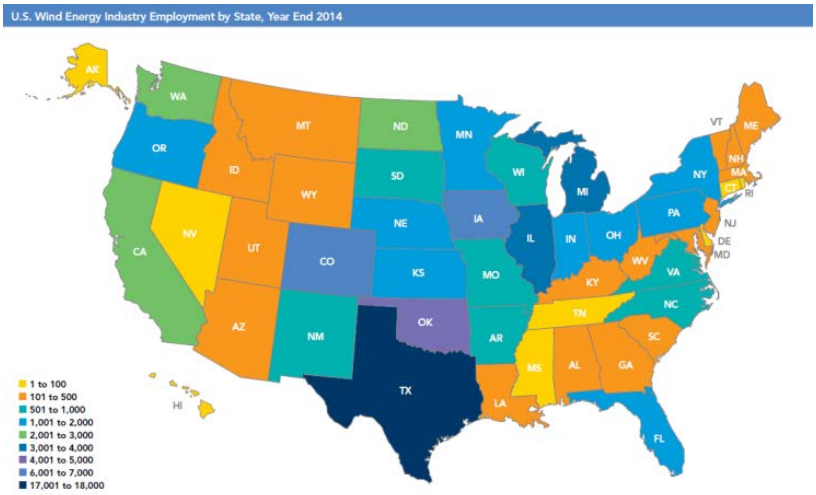
If the 1,400 MW of certified projects are all built they would provide another $2.8 billion investment in the state, and if the proposed projects are also built, the investment will rise to $3.6 billion.

Manufacturing is another way Ohio benefits from wind energy. There are 61 wind-related manufacturing facilities in Ohio, the most of any state in the country. The graphic below[12] shows where wind-related manufacturing is located.



Between 1,000 and 2,000 Ohioans are employed by the wind energy industry. The graphic to follow[13] shows the distribution of wind-supported jobs across the country.

[12] Ibid.
[13] Ibid.



Ohio landowners benefit from annual land lease payments totaling $3 million, plus local communities in the State benefit through annual local tax revenue totaling $3.7 million.

Environmental benefits in Ohio from existing wind generation

Wind energy:

- Saves 248 million gallons of water per year, or 2.6 billion bottles of water.
- Reduces Ohio's carbon emissions by 2%.
- Reduces the dangerous pollutants sulfur dioxide[14] by 16 million pounds and nitrogen oxide[15] by 4 million pounds.

<u>The benefits of growing wind energy use in Ohio</u>

There are a variety of benefits from growing the use of wind energy in Ohio.

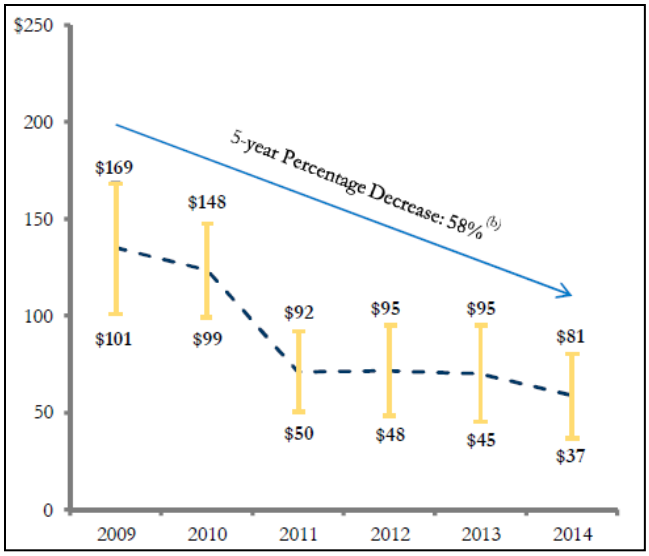
(1) Wind energy is affordable

The cost of wind energy has been declining rapidly, 58% since 2009 alone[16]. The graphic below shows the unsubsidized (i.e. without the federal production tax credit) levelized cost of wind energy in the blue dotted line with the ranges in the yellow bars.

[14] "Short-term exposure to high levels of sulfur dioxide in the air can be life-threatening by causing breathing difficulties and obstructing airways, especially for people with lung disease. Long-term exposure to persistent levels of sulfur dioxide can cause chronic bronchitis, emphysema, and respiratory illness. It can also aggravate existing heart disease." Source: U.S. National Institutes of Health, available at: http://toxtown.nlm.nih.gov/text_version/chemicals.php?id=29

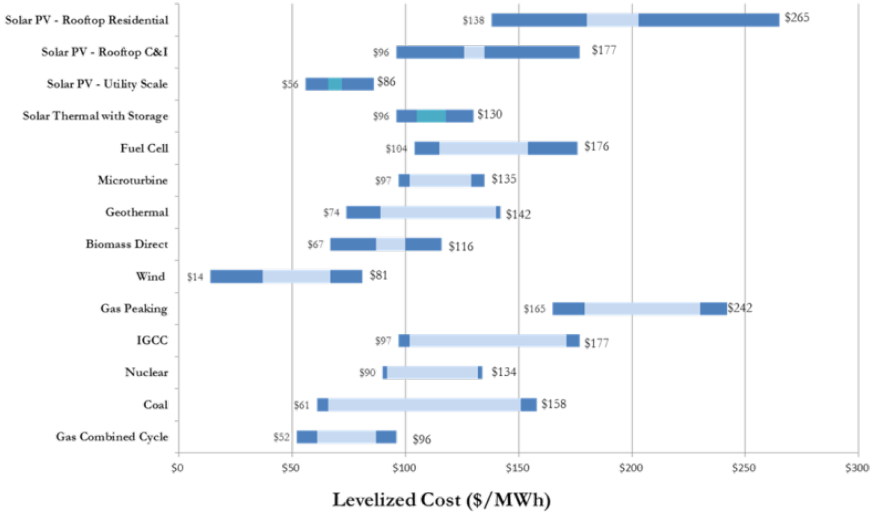
[15] "Long-term exposure to nitrogen oxides in smog can trigger serious respiratory problems, including damage to lung tissue and reduction in lung function. Exposure to low levels of nitrogen oxides in smog can irritate the eyes, nose, throat, and lungs. It can cause coughing, shortness of breath, fatigue, and nausea." Source: U.S. National Institutes of Health, available at: http://toxtown.nlm.nih.gov/text_version/chemicals.php?id=19

[16] Lazard Levelized Cost of Energy Analysis Version 8.0. Available at: http://www.lazard.com/PDF/Levelized%20Cost%20of%20Energy%20-%20Version%208.0.pdf



Lazard, a private asset management firm,[17] and the U.S. Energy Information Administration[18] have both found wind energy is already one of the most affordable options for new electric generation.

The chart below shows data from Lazard comparing the range of renewable energy costs with and without federal tax incentives compared to generating technologies that have fuel price risk.[19] Again, wind energy competes extremely well with other generating technologies; with the middle to lower end of the range in the graphic below demonstrating wind energy is often the cheapest option available.



[17] Ibid.
[18] Available at: http://www.eia.gov/forecasts/aeo/electricity_generation.cfm
[19] AWEA combination of data from multiple charts in Lazard's Levelized Cost of Energy Analysis – Version 8.0, available at: http://www.lazard.com/pdf/levelized%20cost%20of%20energy%20-%20version%208.0.pdf

The AEPS itself has been affordable. The Public Utilities Commission of Ohio (PUCO) reported last year[20] that the average REC price for non-solar RECs (i.e. wind, biomass) were as follows based on 2012 data, so they would not reflect the most recent cost declines in wind energy:

	Ohio Electric Distribution Utilities	**Ohio Competitive Retail Electric Service Providers**
Category	**Avg. $/REC**	**Avg. $/REC**
Ohio Non-Solar	$33.51	$13.08
Other Non-Solar	$24.93	$2.04

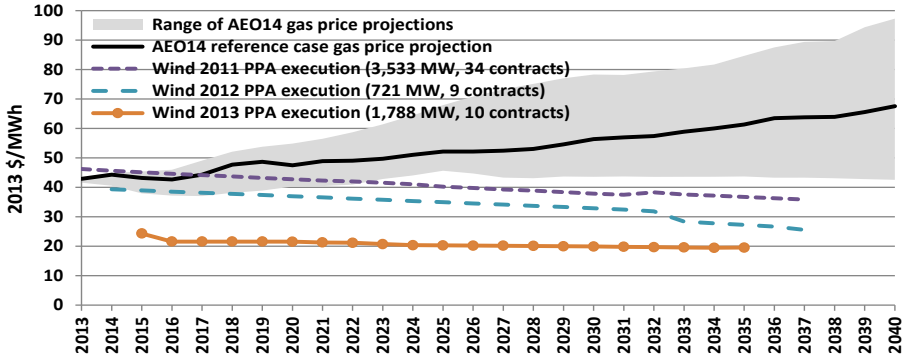
The US DOE's Lawrence Berkeley National Laboratory (LBNL) reported in 2014[21] on the cost and benefits of state RPS laws. LBNL reported that the average monthly charge to Ohio consumers in 2012 from the AEPS varied by utility, but on average were less than 1% of retail rates:

- Cleveland Electric Illuminating (FirstEnergy): $3.25
- Dayton Power & Light: $0.59
- Ohio Edison (FirstEnergy): $2.49
- Toledo Edison (FirstEnergy): $3.02

A May 2013 study[22] by Synapse Energy Economics found that wind energy benefits consumers going forward as well. Synapse found that doubling the use of wind energy in PJM beyond existing RPS requirements, including in Ohio, would save consumers $6.9 billion per year on net, even after accounting for all wind and transmission investment costs.

(2) Wind energy provides long-term price certainty, providing a valuable hedge

Just as a fixed-rate 30-year mortgage provides homeowners with a hedge against interest rate increases, utilities and other buyers can lock-in wind energy prices today for 15 to 25 years, providing a valuable hedge against traditionally volatile fossil fuel prices. As shown in the graph below from the Lawrence Berkeley National Laboratory[23], wind energy contract prices in recent years have been below the U.S. Energy Information Administration projected range for gas prices.



[20] Available at: http://dis.puc.state.oh.us/TiffToPDf/A1001001A14A14B02242C15874.pdf
[21] Available at: http://emp.lbl.gov/sites/all/files/lbnl-6589e.pdf
[22] Available at: http://www.synapse-energy.com/sites/default/files/SynapseReport.2013-05.EFC_.Increased-Wind-Power-in-PJM.12-062.pdf
[23] U.S. Department of Energy 2013 Wind Technologies Market Report, available at: http://emp.lbl.gov/sites/all/files/2013_Wind_Technologies_Market_Report_Final3.pdf

LBNL also reported in 2013[24] that the hedge value of wind energy benefits consumers, even in the current era of lower natural gas prices:

> "On average and in real dollar terms, the buyers of the wind energy in the PPA sample will pay no more per MWh twenty years from now as they do today. In contrast, natural gas prices are difficult to lock in for any significant duration, making it hard to capitalize on today's low prices. Although short-term gas price risk can be effectively hedged using conventional hedging instruments (like futures options, and bilateral physical supply contracts), these instruments come up short when one tries to lock in prices over longer terms – e.g., greater than five or ten years. It is over these longer durations where inherently stable-priced generation sources like wind power hold a rather unique competitive advantage."

Utilities and large energy consuming businesses have recognized the value wind energy provides. To follow is a small sampling of illustrative quotes:

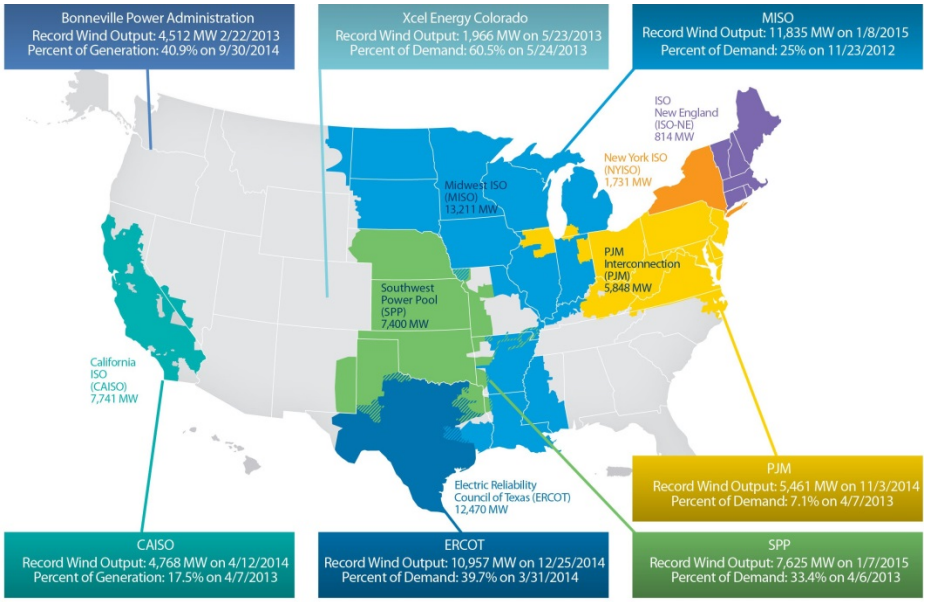
- "Wind prices are extremely competitive right now, offering lower costs than other possible resources, like natural gas plants. These projects offer a great hedge against rising and often volatile fuel prices." David Sparby, president & CEO of Xcel Energy's Northern States Power.
- John Kelley, Alabama Power's Director of Forecasting and Resource Planning stated: "These agreements [referring to contracts to purchase wind power] are good for our customers for one very basic reason, and that is, they save our customers money."
- An AEP subsidiary in Oklahoma tripled the amount of wind energy it planned to buy because "extraordinary pricing opportunities that will lower costs for PSO customers by an estimated $53 million in the first year of the contracts…annual savings are expected to grow each year over the lives of the contracts."
- Gulf Power, the Southern Company-owned Florida utility that is heavily reliant on coal, asked regulators to approve its first-ever wind PPA, stating that "wind power helps diversify the power supply and Kingfisher Wind is projected to provide lower overall energy costs."

(3) Wind energy is reliable

Wind energy is already being reliability integrated in significant amounts every day in many states, with three states now achieving 20% of their electric generation from wind energy alone on an average annual basis, nine states receiving 10% or more of their generation from wind energy, and 17 states at more than 5%.

On other power systems, wind energy has at times provided more than 60% of the electricity, with a record in PJM of 7%, all without raising reliability issues. See the graphic below created by AWEA that details the record penetration levels by grid operator:

[24] Available at: http://emp.lbl.gov/sites/all/files/lbnl-6103e.pdf



How is this possible? Grid operators deal with variability every day, all day. Variability in demand as businesses and factories open up, as workers come home and turn on the television and throw in laundry. And variability in generation levels, as the wind picks up or ebbs, or clouds roll in reducing solar generation, as a conventional power plant trips offline due to a mechanical problem or inability to secure fuel, or as a nuclear plant is offline for re-fueling, or when market prices are at a level that it doesn't make sense to run a particular plant etc. In essence, all power plants on the grid back up each other.

The three main services the grid needs to operate reliably are energy (electricity), capacity (the ability to generate electricity at a given point in time) and flexibility (the ability to turn generation up or down as needed). Cost effectively obtaining all three services requires a division of labor among the various generating technologies in order to keep supply and demand in balance instantaneously at all times, as no resource excels at providing all three. For example, baseload resources like nuclear power and coal plans generally do not provide flexibility, and there can be lower cost ways of obtaining energy and capacity than what is provided by baseload facilities.

Wind energy primarily provides value as a low-cost, non-polluting source of energy, though wind does provide some capacity value and can provide flexibility, including the ability to reduce output on command, when it is economic to do so.

In addition, wind can be integrated reliably because, as NERC itself has acknowledged, wind turbines can and do provide essential reliability services to the grid, including frequency response, inertial response, active power control, voltage and frequency ride-through, and voltage and reactive power control.[25]

[25] For more details, see this AWEA report: http://awea.files.cms-plus.com/AWEA%20Reliability%20White%20Paper%20-%202-12-15.pdf

Improved wind energy forecasting also means that while wind energy is variable, it is generally predictable as well, which means grid operators have a good understanding of when they'll need to ramp up or down other generation.

In a March 2014 report[26], PJM found that significantly higher levels of wind and solar energy, 20%-30% penetration levels, can be reliably integrated. The report found "no insurmountable operating issues were uncovered over the many simulated scenarios of system-wide hourly operations and this was supported by hundreds of hours of sub-hourly operation using actual PJM ramping capability." Further, it noted that "every scenario resulted in lower PJM fuel and variable operations and maintenance costs as well as lower average locational marginal prices." In other words, consumers will benefit.

While increased wind and solar penetration require some modest increase in reserve capacity, according to the PJM analysis, the addition of 100,000 MW of renewable capacity required only 1,000-1,500 MW of additional reserves, which is comparable to the 1,200 MW of reserves modeled for load alone (the variability of load in PJM is ten times larger than the variability of renewable generation), and is far less than the 3,350 MW of fast-acting contingency reserves PJM holds to deal with unexpected problems with conventional generators. MISO, the neighboring grid operator to Ohio's west, has found the need for increased reserves to accommodate the 10,000 MW of wind on their system has been "little to none" while ERCOT, the grid operator over much of Texas, also reports that they have accommodated 10,000 MW of wind with only 50 MW of additional fast-acting reserves and a "minimal increase" in operating reserves. In fact, ERCOT data indicate that the cost of holding contingency reserves to accommodate the unexpected failures of conventional power plants are 17 times larger than the cost of reserves to integrate wind, even with more than 10,000 MW of wind on the ERCOT system.[27]

(4) Wind energy is an effective tool for reducing emissions

In 2013, nationwide, wind generation reduced power sector emissions by more than 5%. Eleven states achieved a 10% or greater reduction in emissions due to wind energy alone; with three additional states just under 10%.

Further, the emissions reductions from wind energy hold up even when taking into account any change in the cycling of fossil power plants. A peer-reviewed analysis[28] by a Department of Energy lab found that wind energy produces 99.8 percent of the carbon emissions savings expected of a zero-emissions resource. The study found that for a scenario with wind and solar providing 33 percent of electricity on the Western U.S. power system, one MWh of wind energy saves more than 1,190 pounds of carbon pollution on average, with those savings reduced by only 0.2 percent, or 2.4 pounds, as a result of increased cycling of fossil-fired power plants. These findings were confirmed for this region in the previously mentioned March 2014 PJM renewable integration study.

In the Lazard analysis mentioned earlier, they also found wind is one of the most cost effective options for carbon abatement,[29] which is consistent with the just released results from the U.S. Energy Information Administration, which I describe in more detail below.

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[26] Available at: http://www.pjm.com/committees-and-groups/subcommittees/irs/pris.aspx
[27] See ERCOT data presented here: http://www.aweablog.org/fact-check-winds-integration-costs-are-lower-than-those-for-other-energy-sources/
[28] Available at: http://www.nrel.gov/electricity/transmission/western_wind.html
[29] See the chart on page 6 of this Lazard analysis: http://www.lazard.com/PDF/Levelized%20Cost%20of%20Energy%20-%20Version%208.0.pdf

(5) Generation and emissions reductions from wind energy readily quantifiable, verifiable

All utility-scale wind projects have revenue-grade metering equipment that measures the amount of wind energy production. Among other reasons, such equipment and verification is necessary to ensure compliance with power purchase contract generation requirements and for purposes of claiming the federal production tax credit (PTC), which is based on electricity actually generated, on tax returns.

Additional details on the tracking and verification of renewable generation in Ohio is described later in my testimony.

(6) Wind energy is fast to build and rapidly scalable

Since the end of 2005, the U.S. wind energy industry has doubled its installed capacity, on average, every 36 months. The 5 year average annual growth rate is nearly 20%, with 13,000 MW installed in 2012 alone. There are currently more projects (over 14,000 MW) under construction in the U.S. than at any time in history.

Wind energy and the AEPS as a valuable tool for compliance with the Clean Power Plan

The U.S. Environmental Protection Agency (EPA) is scheduled to finalize the Clean Power Plan this summer, a rule to require carbon reductions from existing power plants. Wind energy is well-positioned to help Ohio comply with the CPP requirements, and the AEPS is a proven and readily available tool.

The draft rule requires Ohio to reduce its CO_2 emissions rate (i.e. lbs/MWh) by 27.67%, from 1,850 lbs/MWh down to 1,338 lbs/MWh by 2030 with an interim target on a 10 year average basis of 1,432 lbs/MWh between 2020-2029. These targets may change in the final rule.

The targets are driven by EPA estimates ("building blocks") on what levels of efficiency at coal plants, increased utilization of existing natural gas plants, deployment of renewable energy and nuclear energy, and demand side efficiency can be achieved in each state. EPA's calculation assumed renewables would increase their share of Ohio's electricity mix from 1% in 2012 to a 6% average for the years 2020-2029 and 11% by 2030.

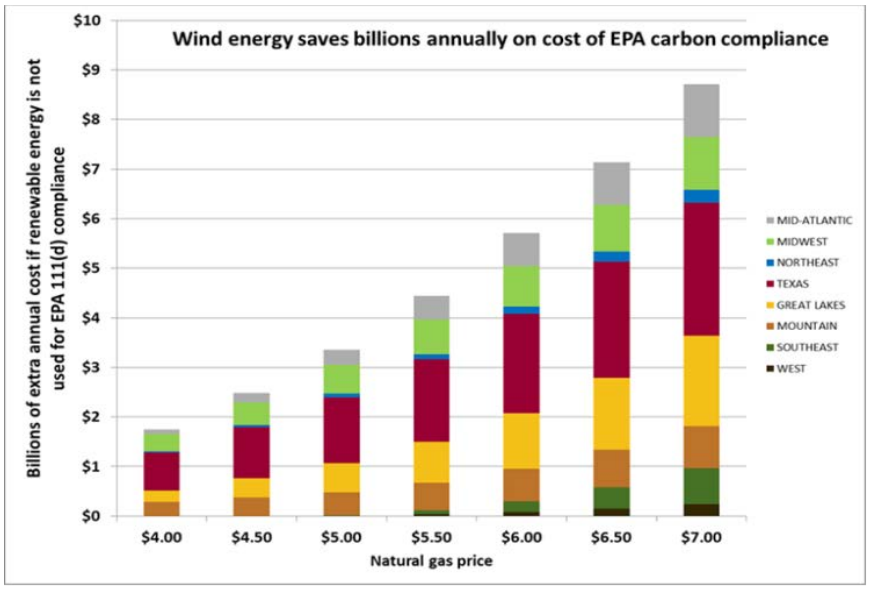
Ohio doesn't have to deploy the measures identified by the EPA, or deploy them at the same levels the EPA calculated is achievable, but if Ohio chooses to do less renewables, it will have to make it up with other, likely more expensive, actions.

In May 2015, the U.S. Energy Information Administration released its economic analysis of the CPP,[30] which found wind energy to be the most cost effective option for compliance across a wide range of different scenarios, particularly in the region that includes Ohio. EIA's analysis found that wind energy would provide more than half of the economically optimal compliance mix nationwide.[31] EIA's analysis also reinforces that adding a zero emissions resource like wind

[30] Available at: http://www.eia.gov/analysis/requests/powerplants/cleanplan/
[31] See summary of EIA's analysis available at: http://www.aweablog.org/eia-finds-wind-energy-will-have-largest-role-in-cost-effectively-meeting-clean-power-plan/

provides states flexibility to make fewer changes in the rest of their system, such as retiring fewer coal facilities.

AWEA has calculated that at current natural gas costs, not using renewable energy to comply, and instead using primarily natural gas, would increase Ohio's compliance cost by $80 million per year. If natural gas prices returned to $7/MMBtu, driving up the cost of natural gas as a compliance option, using renewable energy would reduce Ohio's compliance cost by around $360 million per year. PJM-wide, using wind would save $130 million annually ($4 gas) to $1.4 billion ($7 gas) depending on gas prices. The graphic below based on AWEA's analysis shows the cost savings to consumers from using wind energy for compliance at different gas prices, with Ohio's savings included in the total listed for the Mid-Atlantic region.



Other analyses have demonstrated the value of using renewable energy as a key component of state compliance plans while maintaining a diverse generation portfolio. For example, interestingly, anti-CPP analysis prepared for the American Coalition for Clean Coal Electricity and other pro-coal groups by NERA Economic Consulting demonstrates that a compliance scenario that includes renewable energy results in lower natural gas prices and consumer impacts, as well as fewer coal retirements. The analysis finds that compliance using a diverse portfolio of options via the flexibility that is available to states drafting their own plans is cheaper and less impactful than reliance solely on heat rate improvements at coal plants and reliance on natural gas.

Analysis[32] done by 5 Lakes Consulting based on a modeling tool created for the State of Michigan also found that compliance using a zero emissions resource like wind energy reduces the magnitude of other changes that are necessary in the electric sector. Among the key conclusions of the Michigan analysis that hold for Ohio as well:

- "Complying with the Clean Power Plan by replacing coal generation with natural gas leads to the retirement of far more coal generation than does replacing coal generation with renewable generation."

[32] Available at: http://5lakesenergy.com/wp-content/uploads/2015/02/5LE_ClarifyingTheChoices_022515.pdf

- "This occurs because replacing a megawatt-hour of coal generation with renewable generation eliminates all of the carbon emissions associated with coal generation, while replacing a megawatt hour of coal generation with natural gas generation only eliminates a fraction of the carbon emissions associated with coal generation."
- "The scenarios presented above suggest that if we choose the renewables path and natural gas prices remain low, we may regret that we are not using cheap natural gas. However, in that scenario, we will have significant remaining coal capacity that can be replaced with natural gas generation to take advantage of the continuing low natural gas prices. If we choose the natural gas path and natural gas price risk, we may regret that we are stuck using expensive natural gas when we could have had free wind or solar 'fuel.' Of course we can then start building renewable generation to reduce our use of natural gas, but will still need to pay for the natural gas generation capacity."

Finally, PJM's economic analysis of the CPP[33], including the accompanying state specific detailed analysis[34], also finds that scenarios with higher levels of zero emissions options like renewable generation result in lower compliance costs and a more diverse generation portfolio through reduced fossil plant retirements. Specifically, PJM reported: "Adding energy efficiency and renewable generation and retaining more nuclear generation would likely lead to lower CO2 prices; this could result in fewer megawatts of fossil steam resources at risk of retirement because lower CO2 prices may reduce the financial stress on fossil steam resources under this scenario."

For Ohio specifically, PJM finds that even through 2029, wholesale energy prices under the CPP are below the 2014 transmission planning case (i.e. the previously expected future), due to the higher levels of renewable energy and energy efficiency deployed under the CPP than in the planning scenario. PJM's analysis also reveals that under the scenarios with higher levels of renewable deployment, locational marginal prices in Ohio and PJM-wide, as well as the load energy cost, are lower than under other compliance scenarios.

The Ohio AEPS is valuable as a compliance tool for the CPP or to otherwise secure the benefits for Ohio of increased wind energy.

The U.S. EPA requires that emissions reductions be quantifiable, non-duplicative, permanent, verifiable, and enforceable. That makes a policy like the AEPS ideal as a compliance tool because it already has mechanisms for quantifying and verifying reductions and it is legally enforceable. Not to mention that it has proven effective at deploying renewable energy.

Under the AEPS, the Ohio PUC certifies[35] renewable energy facilities as eligible for compliance. Renewable generation is tracked using one of two tracking systems recognized by the PUC: the PJM EIS Generation Attribute Tracking System (GATS) or the Midwest Renewable Energy Tracking System (M-RETS). During the 2012 compliance year, which is covered in last year's PUC report to the Ohio legislature, all utilities used RECs tracked in GATS. The PUC retains an ability to review the REC data in GATS to monitor compliance efforts, with individual compliance reports available on the PUC website.[36]

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[33] Available at: http://pjm.com/~/media/4CDA71CBEC864593BC11E7F81241E019.ashx
[34] Available at: http://pjm.com/~/media/3C832213F02B4E5D9CE0D5FB08AA92E3.ashx
[35] Additional details available in the annual PUC reports to the Ohio legislature, the most recent of which is available at: http://dis.puc.state.oh.us/TiffToPDf/A1001001A14A14B02242C15874.pdf
[36] Available at: http://www.puco.ohio.gov/puco/index.cfm/industry-information/industry-topics/ohioe28099s-renewable-and-advanced-energy-portfolio-standard/#sthash.nQGYzXba.dpbs

Finally, the Committee requested comment on what programs the wind energy industry sees as helpful in facilitating AEPS compliance. Here are three recommendations:

(1) Long-Term Contracts: a program which enables long-term contracts with load serving entities can ensure cost-effective compliance with the Ohio RPS. Long-term contracts reduce a project's cost of capital, which reduces its required return, thereby reducing its levelized cost of energy. Competitive solicitations for long-term contracts ensure that those cost savings are passed on to consumers. Ohio State's long-term contract with the Blue Creek wind farm is one example of the benefits of long-term contracts as Ohio State reports saving $4 million compared to the "market" cost of energy.

(2) Siting: Wind energy is generally the least cost resource for RPS compliance. Ohio's current siting laws make it exceedingly difficult to site wind farms. This will raise the cost of RPS compliance by reducing the potential supply of resources available to meet Ohio's RPS requirements. Changes to Ohio's burdensome setback requirements are important for cost-effective RPS compliance.

(3) Competitive Property Taxes: Ohio's property taxes for electricity generators, including independent power producers like wind farms, are significantly higher than other states, even the PILOT rate passed in SB 232 is higher than many other states (as the referenced charts demonstrates). A long-term extension of SB 232's PILOT rate will ensure significant tax revenues from wind farms at a rate competitive enough for wind farm development in Ohio to succeed.

Thank you again for the opportunity to testify. I am happy to answer any questions the Committee may have.