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Testimony of

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Before the

Public Hearing on Offshore Wind Energy in Lake Erie

My name is Jan Jarrett and I am the President and CEO of Citizens for Pennsylvania's Future. I would like to thank Senator Jane Earll and Senator Mary Jo White for the opportunity to express our support of legislation similar to House Bill 2342 from last session and the many benefits that responsible development of Lake Erie's wind resources will bring to Pennsylvania. Since its inception in 1998, PennFuture has worked to create a just future where nature, communities, and the economy thrive.

PennFuture strongly supports the development of renewable energy sources in Pennsylvania. Since our founding, we have advocated for the passage of legislation that promotes the expansion of clean energy technologies within the Commonwealth. PennFuture helped drive the passage of the Alternative Energy Portfolio Standards (AEPS) in 2004. By requiring that growing amounts of electricity production be derived from renewable sources, this legislation initiated rapid growth of Pennsylvania's renewable energy industries that are currently providing enormous benefit to the Commonwealth. Since the passage of the AEPS, Pennsylvania's wind energy production capacity increased by nearly six times, and now generates enough electricity to meet the demand of over 218,416 homes. There are currently sixteen commercial wind farms operating in the Commonwealth, the second highest number of any state on the east coast. This impressive development of our state's wind industry has created jobs, attracted investment and improved the health of both our environment and our citizens.

PennFuture has been highly involved in the growth of Pennsylvania's wind industry. As the AEPS created tremendous opportunities for wind companies, we worked to facilitate growth that also ensured responsible development of Pennsylvania's resources. Since 2006, PennFuture has actively promoted responsible wind energy development by facilitating Pennsylvania's Wind and Wildlife Collaborative. We also facilitated the drafting of Pennsylvania's Model Wind Ordinance, which has been widely adopted by municipalities throughout the Commonwealth, helping local governments and communities foster responsible development of their wind resources.

PennFuture is proud to join the American Wind Energy Institute (AWEA), as well as a long list of other noteworthy supporters, in giving our strong endorsement of legislation similar to House Bill 2342. Lake Erie's wind resources offer tremendous potential for Pennsylvania. The winds off the coast of Erie County are estimated to possess approximately 9,620 megawatts (MW) of energy potential, enough to power 2,809,040 homes each year of energy potential, which is nearly thirteen times the amount of land-based wind capacity currently installed in the state.<sup>1</sup> Allowing leasing of the land under Lake Erie will provide the necessary first step towards capitalizing on this opportunity. I would like to focus my testimony today on highlighting those benefits, as well as to make a few suggestions on how to best achieve them.

#### Economic Development

The proposed development of Lake Erie's wind resources would generate significant economic development within the Commonwealth. Pennsylvania's experience with land-based wind development since the passage of the AEPS in 2004 illustrates the potentially significant economic benefits to come

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<sup>1</sup> *Offshore Wind Resource by State and Wind Speed Interval Within 50nm of Shore*, Wind Powering America, at [http://www.windpoweringamerica.gov/pdfs/offshore/offshore\\_wind\\_potential\\_table.pdf](http://www.windpoweringamerica.gov/pdfs/offshore/offshore_wind_potential_table.pdf).

from development in Lake Erie. At the time of its passage, the AEPS set some of the most aggressive targets of any state. This firm commitment to wind energy persuaded wind companies to locate their operations in Pennsylvania. The result is that today there are currently eighteen wind component manufacturing facilities located within the Commonwealth. These manufacturing facilities employed between 4,000 and 5,000 workers in 2009. Annual property tax payments from wind project owners in Pennsylvania now total \$1.3 million a year, and annual land lease payments total nearly \$2.2 million.<sup>2</sup> These numbers reveal a significant economic impact from an industry that is still very young in Pennsylvania. Pennsylvania's wind energy generation currently provides approximately 0.3 percent of our electricity production, while the National Renewable Energy Lab (NREL) predicts that Pennsylvania could generate up to 6.4 percent of its electricity with wind.<sup>3</sup> Pennsylvania's wind resources hold tremendous potential for growth, offering diverse and enduring economic benefits. Facilitating the development of the waters off Erie County will help place the Commonwealth on the road to capitalizing on these currently unexploited opportunities.

The proposed development of Lake Erie's wind resources holds even greater potential for economic benefit than those already enjoyed in Pennsylvania from our onshore development. The Lake Erie Economic Development Corporation (LEEDCo) funded a study to determine the impacts of Lake Erie wind development on Ohio's economy. Released in July of 2010, the study reveals that approximately 8,000 jobs would be created and maintained if 5,000 MW of offshore wind development occurred by the year 2030. This development would also generate \$7.8 billion in wages and salaries, \$22.6 billion in sales, and \$586.5 million in public revenues. In the case of more moderate growth, the study estimates that approximately 3,000 jobs would be created and maintained in Ohio if 1,500 MW of offshore wind development occurred by the year 2030. This level of development activity would induce an estimated \$2.2 billion of wages, \$6.5 billion in sales, and produce \$171.5 million of both state and local tax revenue. The study predicts that even greater economic benefits could be derived if efforts were made to develop local capacity in manufacturing wind turbines, towers, and blades.<sup>4</sup>

Developing Lake Erie's offshore wind capacity would provide growth in a wide spectrum of occupations. The LEEDCo study finds that primary occupations employed in offshore wind development would include: construction, machinery, manufacturing, fabricated metal manufacturing, water transportation, professional and technical services, electrical equipment manufacturing, plastic products manufacturing, and primary metals manufacturing.<sup>5</sup> The offshore areas within Pennsylvania's territory are more than capable of producing 1,500 MW of wind energy capacity, which serves as the LEEDCo study's baseline. It can therefore be assumed that the Ohio estimates provided by this study are generally applicable to northwestern Pennsylvania, making these estimates valuable insight into the significant economic growth potential that would result from offshore wind development in Erie County.

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<sup>2</sup> *Wind Energy Facts: Pennsylvania*, AWEA (October, 2010).

<sup>3</sup> *Id.*, at 2.

<sup>4</sup> Jack Kleinhenz and Russ Smith, *The Potential Economic Impacts in Ohio Associated With the Emergence of a Lake Erie Offshore Wind Industry*, Kleinhenz & Associates Inc. (July, 2010), at 1.

<sup>5</sup> *Id.*, at 2.

States around the country are similarly recognizing the economic development and clean energy opportunities in offshore wind development, and are also beginning to formulate public policies to facilitate the growth of this industry. It is vital that Pennsylvania initiates this process without unnecessary delay in order to assure that the future jobs in the offshore wind industry are located within the Commonwealth. Passing legislation like House Bill 2342 will be an invaluable first step towards ensuring that Pennsylvania maximizes the benefits of this development and quickly becomes a competitive leader in the offshore wind industry.

## Environment

Development of Lake Erie's wind resources would provide enormous environmental benefit to Pennsylvania. Today, approximately half of Pennsylvania's electricity is generated by coal fired power plants. This form of energy generation is harmful to both our environment and our health. The Pittsburgh Post-Gazette recently completed a study, estimating that well over 14,000 Pennsylvanians died in the Pittsburgh region between 2000 and 2008 as a direct result of air pollution from coal-fired power plants.<sup>6</sup> Furthermore, Pennsylvania has the highest number of estimated deaths caused by coal plant air pollution of any state in the nation.<sup>7</sup> Wind energy has no air pollution and is a carbon-free source of energy. By utilizing the high wind energy capacity available in Lake Erie, our state would be able to displace generation that is now being met with coal and other fossil fuel sources. Lake Erie's winds provide a unique opportunity to significantly improve Pennsylvania's air quality as well as our carbon footprint.

Apex Wind, a leading wind energy developer pursuing projects in Lake Erie, estimates that between 1,000 and 2,000 MW of wind energy capacity could feasibly be constructed within Pennsylvania's offshore areas in Lake Erie. Apex Wind believes that 1,000 MW is an accurate estimate for a potential first stage of development in this zone, and that this level of capacity would yield approximately 3,000,000 megawatt hours (MWh) of electricity annually.<sup>8</sup> Using this number as a baseline and assuming that generation from wind energy would displace generation from fossil fuel power plants, approximate levels of avoided environmental impacts can be estimated.

The power production from Lake Erie's wind energy would significantly decrease Pennsylvania's contribution to climate change. Pennsylvania is the third leading emitter of carbon pollution of any state. Developing 1,000 MW of wind energy capacity in Lake Erie would avoid over two million metric tons of carbon dioxide emissions.<sup>9</sup> This quantity of carbon dioxide reductions is equivalent to the

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<sup>6</sup> Don Hopey and David Templeton, *Region at risk: Can higher rates of death be linked to air pollution?*, PITTSBURGH POST GAZETTE (December 12, 2010), at <http://www.post-gazette.com/pg/10346/1109168-114.stm>.

<sup>7</sup> Conrad Schneider and Jonathan Banks, *The Toll from Coal*, CLEAN AIR TASK FORCE (September, 2010), at [http://www.catf.us/resources/publications/files/The\\_Toll\\_from\\_Coal.pdf](http://www.catf.us/resources/publications/files/The_Toll_from_Coal.pdf).

<sup>8</sup> Assuming a net capacity factor of 35%, constant operation, and 1,000 MW of generation capacity - annual MWh of production = 3,066,000 (.35%\*1,000 MW\*8760 hours = 3,066,000).

<sup>9</sup> *Green-E Climate Protocol for Renewable Energy*, Center for Resource Solution (May 25, 2010), See page 9: at <http://www.green-e.org/docs/climate/Green-eClimateProtocolforRenewableEnergy.pdf>.

approximate annual emissions of 380,000 passenger vehicles.<sup>10</sup> This level of mitigation would be a major reduction in the Commonwealth's carbon footprint, making wind energy development in Lake Erie a cornerstone of our efforts to mitigate climate change.

Offshore wind development in Lake Erie would result in significant reductions in emissions of both sulfur dioxide and nitrogen oxides. These pollutants are the primary cause of ground-level ozone and acid rain, which cause significant environmental degradation both within our Commonwealth and across the Mid-Atlantic region. These pollutants also cause respiratory illnesses that lead to increased hospitalization and death. A first stage development of 1,000 MW of wind energy in Lake Erie would avoid annual emissions of approximately 564,000 pounds of nitrous oxides, and nearly 3,000,000 pounds of sulfur dioxide.<sup>11</sup>

Developing the wind resources in Lake Erie would avoid significant quantities of mercury pollution. Today, one in six women possess heightened levels of mercury in their body, which poses the risk of causing brain damage to developing babies and young children.<sup>12</sup> The Pennsylvania Department of Conservation and Natural Resource predicts that mercury emissions also cause \$800 million in annual economic losses to the Commonwealth's fishing industry each year.<sup>13</sup> One thousand MW of wind development in Lake Erie would avoid annual emissions of approximately 150 pounds of mercury.<sup>14</sup>

Wind energy capacity in Lake Erie would furthermore help to reduce the tremendous consumption of water required by traditional forms of energy production. In a national ranking, Pennsylvania's energy production currently consumes the second highest level of water per unit of energy generated.<sup>15</sup> A first stage development of 1,000 MW in Lake Erie would help avoid nearly 16 million gallons of annual water consumption.<sup>16</sup> Avoiding these high levels of water consumption would help preserve this invaluable resource for other uses such as human consumption and agriculture, and reduce the impact of these withdrawals on river ecosystems.

Development of Lake Erie's wind resources would generate numerous and long-term environmental benefit for Pennsylvania. Harnessing the abundant, clean, and renewable energy present over the waters of Lake Erie would help avoid significant levels of pollution for many years to come.

## Cost

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<sup>10</sup> *Emission Facts: Greenhouse Gas Emissions from a Typical Passenger Vehicle*, EPA, at <http://www.epa.gov/oms/climate/420f05004.htm>.

<sup>11</sup> EPA E-Grid data for 2004 power plant emissions in Pennsylvania.

<sup>12</sup> Mahaffey, K.R., R. P. Clickner and C.C. Budurow, *Blood organic mercury and dietary mercury intake: National Health and Nutrition Examination Survey, 1999 and 2000*, Environmental Health Perspectives, Volume 112, No. 5, April 2004 (Exhibit 2); Mahaffey, Kathryn R., *Methylmercury: Epidemiology Update* (presentation, 2004), at <http://www.epa.gov/waterscience/fish/forum/2004/presentations/monday/mahaffey.pdf>.

<sup>13</sup> Department of Conservation and Natural Resources, *Pennsylvania's Wildlife and Wild Places: Our Outdoor Heritage in Peril*, August 2003, p. 7 (Except, Exhibit 10).

<sup>14</sup> EPA E-Grid data for 2004 power plant emissions in Pennsylvania.

<sup>15</sup> P. Torcellini, N. Long, and R. Judkoff, *Consumptive Water Use for U.S. Power Production*, NREL (December, 2003), at <http://www.nrel.gov/docs/fy04osti/33905.pdf>.

<sup>16</sup> *Consumptive Water Use for PA Power Production*, National Renewable Energy Laboratory, P. 9.

While offshore wind, as a new technology, does currently cost more than traditional fossil fuel based generation, the addition of more renewable resources to our regional electric grid has many economic advantages. Development of Lake Erie's wind resource actually offers an opportunity to help lower the cost of wholesale electricity, thereby lowering the cost of electricity for all Pennsylvania ratepayers. Due to wind power's ability to generate electricity without using fuel, wind energy producers are able to bid their product into the electric market at a cost of \$0. Through the competitive bidding process whereby electric generation supplies are selected, wind energy is consistently chosen over higher bidding fossil fuel plants that need to recoup their fuel expenditures. By selecting this lower priced form of generation and excluding higher priced generation facilities, the clearing price for all electricity bidding in the market decreases. The end result is that adding wind capacity to the electric grid suppresses the overall price of electricity for all consumers. A recent study illustrated this price suppression effect, revealing that development of wind resources in Texas resulted in a reduction in the marginal price of power by approximately \$10/MWh.<sup>17</sup> Large-scale development of wind systems in Lake Erie would therefore provide the opportunity for Pennsylvanians to lower their cost of energy.

Wind energy's fuel free operation also offers the benefit of providing a fixed price of production over the lifetime of the system. With a predicted lifetime of 25 years, wind systems provide a valuable hedge against increases in the costs of other forms of electric generation that rely on the variable, and many times volatile, prices of fossil fuels. Future large-scale wind energy generation on Lake Erie would therefore ensure more consistency in Pennsylvanians' electricity prices.

Furthermore, the costs of wind energy systems have decreased dramatically over recent years. Costs fell by approximately half over the past decade, and continue to follow a strong, downward trend.<sup>18</sup> In many cases, wind energy has met cost parity with other forms of electricity production. A worldwide effort to encourage wind development has driven down the cost of wind energy.

## Reliability

Developing Lake Erie's wind resources will provide Pennsylvanians with a more reliable electric system. Wind power provides a valuable hedge against forced outages of other sources of electricity production. The recent rolling blackouts in Texas provide an example of the increased reliability provided by wind power. On February 2, fossil fuel plants in Texas were unable to meet power demand, leaving homes across the state without electricity in minus twenty degree weather. However, wind farms across western Texas helped lessen the duration of the blackouts by providing more than their expected share of electricity that day. The CEO of the Electric Reliability Council of Texas that manages most of the state's grid said, "I would highlight that we put out a special word of thanks to the wind community because they did contribute significantly through this time frame. Wind was blowing, and we had often 3,500 megawatts of wind generation during that morning peak, which certainly helped us

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<sup>17</sup> Brandon Blossman, Becca Followhill, and Jessica Chipman, *Texas Wind Generation*, Tudor Pickering Holt and Company (August, 2009), at <http://www.tudorpickering.com/pdfs/TPH.Texas.Wind.Generation.Report.August.2009.pdf>.

<sup>18</sup> *Guide to Tribal Energy Development: Costs of Wind Energy*, U.S. Department of Energy at [http://www1.eere.energy.gov/tribalenergy/guide/costs\\_wind\\_turbines.html](http://www1.eere.energy.gov/tribalenergy/guide/costs_wind_turbines.html).

in this situation”.<sup>19</sup> Developing the impressive amount of wind energy potential over the waters of Lake Erie would increase our grid’s reliability and provide the Commonwealth with a similar hedge in the case of future blackouts.

## Wildlife

PennFuture recommends that any initiative to facilitate the development of Lake Erie’s wind resource be accompanied by a thorough process of evaluating the environmental impacts of such development. We believe that all wind energy must be developed responsibly. For this reason PennFuture has facilitated Pennsylvania’s Wind and Wildlife Collaborative since its establishment in 2006. The mission of the Pennsylvania Wind and Wildlife Collaborative is to engage federal and state environmental agencies, nongovernmental conservation organizations, and the wind industry in a collaborative, consensus-based process to collect, share, review, and use the best available science, data, and professional expertise to address how best to assist in the development of wind energy in Pennsylvania in an environmentally responsible manner.<sup>20</sup> Over the last five years, the Wind and Wildlife Collaborative has proven instrumental in ensuring responsible wind development within the Commonwealth. A major success of this effort was the Pennsylvania Game Commission’s Wind Energy Voluntary Cooperative Agreement, signed by twenty-eight companies, and binding the cooperators to the development guidelines produced by the collaborative. The collaborative has also developed and approved best management practices for the wind industry, as well as two reports specific to wind development’s impacts on Pennsylvania’s wildlife. These reports have both highlighted important areas of concern while also asserting the overall benefit of wind energy by disproving overstated claims of wind development’s environmental impacts. As a unique collaboration between stakeholders, the collaborative has successfully fostered responsible wind energy development and become a nationally recognized model for such work.

PennFuture recommends that all developers seeking to construct wind energy systems in Lake Erie should be required to sign the Pennsylvania Game Commission’s Wind Energy Voluntary Cooperative Agreement. In this way Pennsylvanians can be assured that the benefits of future development are attained while simultaneously protecting the region’s environmental integrity. It should be noted that Apex Wind, a leading potential offshore wind developer in Lake Erie, is a signee of the Pennsylvania Game Commission’s agreement.

## Conclusion

PennFuture strongly supports the passage of legislation similar to House Bill 2342. This legislation will enable Pennsylvania to take a vital, initial step towards realizing the wide range of benefits that will surely accrue as a result of responsible development of offshore wind resources in Lake Erie. Thank you again for allowing PennFuture to testify today.

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<sup>19</sup> Kate Galbraith, *An Interview With the CEO of the Texas Grid*, The Texas Tribune (February 4, 2011), at <http://www.texastribune.org/texas-energy/energy/an-interview-with-the-ceo-of-the-texas-grid/>.

<sup>20</sup> PA Wind and Wildlife Collaborative, at <http://www.dcnr.state.pa.us/wind/index.aspx>.