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**Testimony of the Nuclear Information and Resource Service
Before the Ohio House of Representative – Public Utilities Committee**

**Committee Meeting on Proposed H.B. No. 178
Addressing zero-emissions nuclear resource program**

Thank you for providing the public with an opportunity to be heard on proposed House Bill No. 178, and for accepting the testimony of Nuclear Information & Resource Service (NIRS). NIRS is a national, nonprofit environmental organization, with over 650 members in Ohio. We are headquartered in Takoma Park, Maryland, and were founded in 1978 to provide the public and state and local communities with independent, non-partisan, scientifically and technically accurate information on nuclear power, radioactive waste, and sustainable energy, and it is in that spirit we offer our testimony today.

As NIRS's Executive Director and the preparer of these comments, I have over eighteen years experience monitoring the energy and utility sectors, with a particular focus on the U.S. nuclear industry, merchant nuclear power generation, and utility restructuring. Most recently, over the last three years, I have also monitored a variety of state-level and national proposals to provide subsidies to merchant nuclear power generators. In the last three years, I have authored two reports on the subject, provided testimony to the New York and Connecticut legislatures, and co-authored a white paper on alternatives to subsidizing uneconomical nuclear facilities. In that time, I also prepared analysis for and comments to the U.S. Environmental Protection Agency on the role of nuclear power in the EPA's Clean Power Plan regulations.

NIRS encourages the committee to vote against H.B. 178. The bill would create a costly and counterproductive, long-term bailout for the Davis-Besse and Perry nuclear power plants. The program would charge Ohio utility customers at least to \$282 million in the initial year. However, the total could be as much as \$535 million if FirstEnergy's out-of-state Beaver Valley nuclear power plant were determined to be eligible, per Sec. 4928.754.(C)(2). The price of the subsidy instrument – Zero-Emissions Nuclear Credits (ZENCs) – would be adjusted each year for inflation, leading the cost to rise in absolute dollars over the sixteen-year duration of the ZENC program. In inflation-adjusted terms, the total cost of the program over sixteen years would range from \$4.5 billion to \$8.6 billion, depending on the number of reactors subsidized. In absolute dollars, the cost would range from \$5.3 billion to \$10 billion (at 2% average annual rate of inflation).

The proposed subsidies do not compare favorably, either to nuclear subsidies adopted in other states, nor to available energy alternatives. Nuclear subsidies in Illinois, which are targeted to support three reactors totaling 2,889 megawatts (MW) of generation capacity, are effectively

capped at a price of \$9.90 per megawatt-hour (MWh), nearly 50% lower than the average cost of ZENCs in H.B. 178 over a similar ten-year period (\$18.61/MWh).

Subsidies in New York support four reactors with 3,351 MW of capacity, at an average cost of \$23.32/MWh over twelve years. The average price of ZENCs over the same period (\$19.00/MWh) is comparable, just 19% lower; however, New York's subsidy price includes adjustments if electricity market prices rise, which could decrease the cost of subsidies in future years.

The ZENC subsidy program would be far less cost-effective than investments in renewable energy and energy efficiency programs, which would create far more employment in Ohio. New York's nuclear subsidy program is four times less cost-effective than the state's new renewable energy standard, based on the cost of subsidies and the amount of electricity generation to be developed. By comparison, H.B. 178 would not be no better: over three times more costly than renewable energy alternatives. In addition, energy efficiency investments could reduce statewide energy consumption by more than the amount of electricity generated by the reactors at Davis-Besse and Perry. It is vital to recognize that Davis-Besse and Perry (and Beaver Valley) are aging nuclear power plants, and are likely to reach the end of their technical lives within the 2030 timeframe. Subsidies to old power plants that will close anyway is wasteful, particularly when more cost-effective alternatives are available.

In addition, the proposal to designate out-of-state nuclear reactors as eligible for subsidies from Ohio consumers is unprecedented and unjustified. New York and Illinois programs only provide subsidies to nuclear facilities located in the respective state. Instead, H.B. 178 would potentially benefit a third nuclear power plant, Beaver Valley, owned by FirstEnergy in Pennsylvania, at substantial cost to Ohio consumers. The annual cost of subsidies to Beaver Valley's two reactors would be \$253 million per year, rising with inflation adjustments, and totaling \$4.7 billion over 16 years, a massive transfer of consumer resources from Ohioans to Pennsylvania.

FirstEnergy's statements that it intends to divest or close its nuclear power plants, with or without subsidies, means that H.B. 178 will not benefit Ohio consumers, but rather FirstEnergy itself. By providing a sixteen-year, multi-billion dollar subsidy, FirstEnergy is more likely to find a willing purchaser of the reactors—likely, a corporation headquartered in another state. This would benefit FirstEnergy by taking the ultimate liability for decommissioning and cleaning up nuclear reactor sites off of its balance sheet, and transferring them to another company. Rather than advancing the interests of consumers and Ohio's energy economy and environmental goals, H.B. 178 would create a massive bailout for FirstEnergy's shareholders.

Thank you for accepting our testimony.

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Background: Economic Conditions in the Nuclear Power Industry

The very problems that have led FirstEnergy and other merchant nuclear power corporations to seek assistance from legislatures and regulators mean that nuclear has no significant role to play in addressing energy and emissions reduction needs. Nuclear power plants are becoming increasingly uneconomical to continue operating, and it is in states' best interests to plan for their closure and replacement, rather than put themselves on the hook to pay hundreds of millions to billions of dollars in above-market energy costs to support aging power plants that are likely to close within the next decade anyway.

The nuclear power plant fleet in the United States is among the oldest in the world, and, as such, the cost of operating them has grown precipitously over the last 10-15 years. While reactors are originally licensed to operate for forty years, over 40% of the reactor fleet is now older than that and the average age is 36 years in the United States. According to biennial reports by the Nuclear Energy Institute, the average operating cost of reactors in the U.S. rose by nearly 60% from 2002-2012, in inflation-adjusted dollars. Increasing capital costs have driven this trend, growing over 340% while fuel and operating costs increased only 30% in real dollars. The most uneconomical nuclear plants--typically, older, smaller, single-reactor facilities--require the most maintenance and generate the least power.

Over the last decade, electricity demand has leveled off or even decreased, while less expensive sources of electricity and energy efficiency have contributed to lower market power prices—a needed relief for power consumers in Ohio, who have typically be burdened with some of the highest electricity prices in the country. In short, while the cost of operating nuclear reactors is going up, the cost of power from other sources has been going down. This picture is not likely to change for aging nuclear power stations, and the proper question is how best to plan for their eventual closure.

From a climate standpoint, the good news is that carbon-free energy solutions are increasingly becoming the least expensive resources available: already, energy efficiency, wind, and solar power are cheaper than all but the cheapest natural gas plants; and the costs of energy storage to complement renewables are declining similarly, making it possible to envision a transition to a new, modern, flexible clean energy system taking off within the next five years. Some states are taking steps to facilitate this transition by proactively restructuring the utility business to integrate renewable energy, efficiency, and flexible demand management systems, and to animate competitive markets for such energy products and services. California, Massachusetts, Maryland, New York, Hawaii, and Minnesota are among these states, and Ohio should follow suit.

Status of State Nuclear Subsidy Proposals

We encourage the committee to take a broad view of state energy planning and policy. H.B. 178 would put Ohio's eggs in the wrong energy basket. The state's economic and environmental goals are far more important than the fate of FirstEnergy's nuclear power plants, which are aging and increasingly uncompetitive and uneconomical to operate. Ohio is not the only state considering financial supports for aging nuclear reactors. At least three other states have considered such proposals since 2014, with widely varying results:

- In Ohio, FirstEnergy's proposal to provide subsidized power contracts for the Davis-Besse reactor and three coal-fired power plants was struck down by the Federal Energy Regulatory Commission (FERC) in 2016, due to their impact on wholesale power markets.
- In New York, a temporary subsidy for the Ginna Nuclear Power Plant, authorized by the state Public Service Commission in 2014, was shortened from 3.5 years to two years, in favor of more affordable transmission system upgrades. A long-term, expensive nuclear subsidy program for Ginna and three other reactors was later adopted in August 2016, to be implemented beginning in April 2017. New York consumers are to begin paying the subsidies in their utility bills this month.
- In Illinois, legislation to subsidize unprofitable reactors failed through two legislative sessions, before a compromise bill was enacted late last year; the latter included a subsidy for two nuclear power plants, based on the structure of the New York program, but with greater cost controls. Consumers will begin paying subsidies of \$235 million per year to three reactors in June 2017.
- In Connecticut, the State Senate has introduced a bill (S.B. 106) requiring the state's investor-owned utilities to purchase up to 950 megawatts of power generated by the Millstone Nuclear Power Station for five years, as well as much smaller amounts of power from renewable energy and other non-fossil fuel-fired power plants. The contract could be extended for subsequent five-year terms. A similar bill was introduced in 2016, but failed to pass both chambers of the General Assembly.

Neither the New York nor Illinois subsidies have been fully implemented to date, and both are subject to legal and regulatory challenges that will not be resolved for several months. In addition, legislators in Pennsylvania and New Jersey are considering introducing bills to subsidize reactors, but so far no legislation has come forward.

The New York Subsidy Model

It appears that H.B. 178 is modeled after the subsidy program adopted. The New York PSC started a proceeding in January 2016 to create a nuclear subsidy program as part of New York's Clean Energy Standard last year, which also included a renewable energy standard of 50% by 2030. Like H.B. 178, the pricing of nuclear subsidies in New York (Zero Emissions Credits, or ZECs), is based on the U.S. Environmental Protection Agency's Social Cost of Carbon (SCC), starting at \$17.48 per megawatt-hour (MWh).

Under the program, New York has entered into a twelve-year contract to purchase ZECs from four reactors designated by the PSC as publicly necessary. The ZECs will be priced through a non-competitive formula, based on the U.S. Environmental Protection Agency's Social Cost of Carbon (SCC). The SCC is a metric used to estimate the global impact of carbon dioxide emissions, not the cost of subsidies to reduce those emissions. The SCC increases substantially over time, and because of that, the cost of New York's nuclear subsidies will increase by over 50% over the course of the program, through biennial price adjustments. The New York PSC projects the cost of subsidies will be \$482 million per year for the first two years, which will increase to over \$800 million per year in the final two years (2027-2029).

Financial supports to nuclear power in New York are likely to total \$7.6 billion over the next twelve years. In comparison to the renewable energy standard, the nuclear subsidies will be

four times less cost-effective in relation to the state's energy and climate objectives than the expansion of renewable energy to 50% of the state's electricity supply by 2030. The cost of renewable energy credits (RECs) for new sources needed to reach 50% is projected to cost \$2.44 billion, less than one-third the cost of nuclear subsidies, while generating 25% more power by 2030. In addition, according to a 2016 report by Synapse Energy Economics, the nuclear subsidies are likely to have a net cost over \$10.5 billion greater than that of an energy efficiency program that would reduce statewide electricity consumption by the same amount as the subsidized reactors generate. However, the PSC did not consider any such alternatives to subsidizing the continued operation of nuclear power plants.

Comparison of H.B. 178 Similar Subsidy Proposals

Nuclear subsidies in New York and Illinois are so far the only such long-term financial support programs for existing reactors in the country. While still controversial, they were adopted as a part of broader energy policies that include significant increases in renewable energy and, in the case of Illinois, energy efficiency, consumer protections, and environmental justice. H.B. 178 does not compare favorably to either. It does not include any measures to advance or modernize Ohio's energy economy, but simply locks in aging reactors that are nearing the end of their economic usefulness – and for far longer than New York's and Illinois' already long-term subsidies.

Recently, I prepared a comparison of key features of the New York and Illinois nuclear subsidy policies, illustrating that Illinois' program is 55% more cost-effective than New York's, toward producing the same objectives. That is despite the fact that the basic structure of the subsidies is the same: energy credits based on the SCC, with adjustments for annual increases to the SCC and future market prices of electricity. Legislators in Illinois incorporated lower estimates of the SCC and more stringent market price adjustments, as well as a hard cap on total costs of the subsidy program. For a similar amount of nuclear generation (2,889 MW in Illinois and 3,351 MW in New York), for similar periods of time (10 years in Illinois and 12 years in New York), the end cost to consumers is 55% less in Illinois compared to New York.

Implications for Ohio and H.B. 178

New York's decision to provide subsidies and incentives to delay the closure of four reactors should therefore be a cautionary tale for Ohio. Because the New York program is being promoted in other states, NIRS published a report in November, "Too Big to Bail Out: The Economic Costs of a National Nuclear Power Subsidy."¹ In this report, we estimated the state and national cost of subsidies to nuclear power plants based on New York's program. Should Ohio adopt a similar measure to support FirstEnergy's reactors, the cost to consumers would be proportionally greater than in New York. The costs of subsidies to Davis-Besse and Perry would be approximately \$5.3 billion over twelve years, or over \$440 million per year; if Beaver Valley were to become eligible, it would cost an additional \$4.7 billion. However, those costs would be distributed across a smaller customer base in Ohio than in the Empire State. Whereas the subsidized New York reactors represent only 15% of statewide electricity

¹ Judson, Tim. "Too Big to Bail Out: The Economic Costs of a National Nuclear Power Subsidy." Nuclear Information and Resource Service. November, 2016.

<https://www.nirs.org/big-bailout-economic-costs-national-nuclear-power-subsidy/>

demand in 2017, Davis-Besse and Perry generate close to 12% of the amount of electricity consumed in Ohio, but with a population less than two-thirds the size.