



**Pennsylvania Manufacturers' Association**

Testimony before:  
Pennsylvania House of Representatives  
Environmental Resources & Energy Committee

Public Hearing: House Bill 2277  
David N. Taylor  
President & CEO

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Good morning, Chairman Vitali, Chairman Causer, and members of the committee. I am David N. Taylor, President & CEO of the Pennsylvania Manufacturers' Association, the statewide non-profit trade organization representing the people who make things here in the commonwealth.

In every way that matters, energy is life. The manufacturing sector, which directly employs over a half-million Pennsylvanians and generates \$102 billion in value every year, depends on abundant, reliable, affordable energy. No matter what is being made, manufacturers take raw materials or component parts and undertake a multi-stage process to yield a finished good. At every step of production, large amounts of energy are deployed, which is why our industry requires plentiful, reliable, and affordable energy to be competitive. Energy costs are a large expense for almost all manufacturers, with many firms having energy as their largest expense.

Pennsylvania's energy resources are, can be, and should be a great strength for our industrial economy, which is why PMA supports a pro-production agenda for domestic energy in a competitive marketplace. Pennsylvania generates 6% of America's electricity and is the nation's top exporter. Annual Pennsylvania electricity production is 223,400,000,000,000 watt hours (223.4 TWh).

Our current competitive markets are working. When Governor Ridge and the legislature passed and enacted the Electricity Generation Customer Choice and Competition Act of 1996 he said, "Low-cost electricity is an enormously powerful economic development tool. I have heard it time and time again from some of our largest employers – and I've heard it from some employers who have looked to Pennsylvania as a place to do business." And it worked. Before 1996, Pennsylvania's electricity rates were steadily 20% above the national average. As of the latest EIA report, in March 2024, Pennsylvania's residential rates were less than a half-percent above the national average and were more than a full percent below the national average for commercial and industrial users.<sup>1</sup> According to DEP's own reporting, from 2005-2020, Pennsylvania's electric generation sector has cut greenhouse gas emissions by 44.4%.<sup>2</sup> This is proof competitive markets are working for the consumer and the environment.

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<sup>1</sup> Energy Information Agency, 2024.

[https://www.eia.gov/electricity/monthly/epm\\_table\\_grapher.php?t=epmt\\_5\\_6\\_a](https://www.eia.gov/electricity/monthly/epm_table_grapher.php?t=epmt_5_6_a)

<sup>2</sup>Department of Environmental protection, 2023.

[https://files.dep.state.pa.us/Energy/Office%20of%20Energy%20and%20Technology/OETDPortalFiles/ClimateChange/FINAL\\_2023\\_GHG\\_Inventory\\_Report\\_12.13.23.pdf](https://files.dep.state.pa.us/Energy/Office%20of%20Energy%20and%20Technology/OETDPortalFiles/ClimateChange/FINAL_2023_GHG_Inventory_Report_12.13.23.pdf)

House Bill 2277, commonly referred to as Governor Shapiro's Pennsylvania Reliable Energy Sustainability Standard or PRESS, represents a significant shift away from Pennsylvania's competitive market with more than half of all Pennsylvania electricity generation coming from government mandated sources, and 35% of that from "Tier I" sources such as wind, solar, and other technologies *that do not yet exist*.

The concepts behind House Bill 2277 are the antithesis of our current competitive market structure. When each Tier is fully phased in, 50% of electricity sold or delivered in Pennsylvania must come from a combination of Tier 1 (35%), Tier II (10%) and Tier III (5%). In 2023, 96% of Pennsylvania's electric generation came from natural gas (59%), nuclear (32%), and coal (5%). Under the proposed legislation, a combination of electric generation from existing natural gas, nuclear and coal units would be eligible to meet only 50% of Pennsylvania's electricity demand. Given the existence of the federal nuclear production tax credit, as well as the creation of a new Zero Emission Credit subsidy within HB 2277, it is reasonable to presume that the existing 32% nuclear generation share in PA's electric power generation portfolio will be preserved. Therefore, natural gas generation will effectively be able to compete for only 18% of Pennsylvania's remaining electricity market share. When compared to Pennsylvania's electric generation portfolio for 2023, the 59% share of natural gas electric generation in Pennsylvania's portfolio would be competing for only 18% of PA's electricity demand in 2035. This represents a difference of 69% lower when compared to the existing natural gas electric generation.

This significant shift would surely prematurely shutter many of the existing coal and natural gas fleets that are currently operating in compliance of all federal and state standards. These premature closures threaten our already fragile grid reliability here in Pennsylvania and throughout the entire Northeast and Mid-Atlantic United States.

Besides this obvious shortfall, there are many fundamental questions about this plan that the bill sponsors must answer before the legislature can even begin considering it. Such as:

- Which energy sources will provide how much electricity by what date?

Boasting of the new sources included in the PRESS plan, Governor Shapiro said: "So not only will it be wind and solar anymore, but it's also going to be methane digesters, new fusion technology, [and] small modular nuclear reactors."

Unfortunately, two of Shapiro's Tier I energy sources — small modular nuclear reactors and fusion reactors — are years if not decades from coming online, if they ever become viable

at all. The likelihood of those sources contributing to Pennsylvania's energy production by 2035 is near zero. In a recent report examining the feasibility, or a lack thereof, it was written, "Utah Associated Municipal Power Systems (UAMPS), a coalition of community-owned power systems in seven western states, withdrew from a deal to build the plant, designed by NuScale Power, because too few members agreed to buy into it. The project, subsidized by the U.S. Department of Energy (DOE), sought to revive the moribund U.S. nuclear industry, but its cost had more than doubled to \$9.3 billion."<sup>3</sup>

The report went on to say that "to some observers, the plan's collapse also raises questions about the feasibility of other planned advanced reactors, meant to provide clean energy with fewer drawbacks than existing reactors."

The fuels needed for such a project as this are not commercially available or viable. Originally, projects to bring small nuclear reactors online were ambitiously aimed at 2030, but this most recent failure will ensure that will not happen, and to think it will be ready to scale by 2035 is far from realistic.

The other cited source is fusion technology, however, that is even less of a reality than small modular nuclear. In reports published in January of 2024 it was stated, "Fusion power has been one of those things that's been 'only 20 years away' for about 50 years now."

In the absence of new electricity from fusion and small modular nuclear reactors, only solar power will be minimally viable to generate the 35% Tier I mandate.

- How many acres of land will be consumed by solar panels and where will they be located?
- What remediation plans will be enacted to address water runoff, soil erosion, and loss of habitat to wildlife caused by building solar arrays and windmills?
- What remediation plans will be enacted to protect birds and bats that will be endangered by incineration by solar arrays and bludgeoning deaths by windmills?

On these questions, a state mandate essentially requiring 35% of all electricity be produced by solar panels would be an environmental disaster because the low yield, intermittency, and fragility of that technology would require an impossibly large footprint that would destroy natural habitat, threaten groundwater with excessive runoff, and cause an environmental crisis. In 2022, Pennsylvanians used 245,935,000 MWH (megawatt

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<sup>3</sup> Adrian Cho, Science Insider. November 10, 2023. <https://www.science.org/content/article/deal-build-pint-size-nuclear-reactors-canceled>

hours) of electricity, 30% of which would be 86,077,250 MWH or 86,077 GWH (gigawatt hours). According to Freeing Energy, it takes 2.97 acres to host enough solar panels to generate 1 GWH of electricity.<sup>4</sup> Therefore Governor Shapiro's PRESS plan would necessitate building 255,648 acres of solar panels. However, solar has a capacity generation factor of, at best, 25%<sup>5</sup>, meaning that you must build four times as many solar arrays, totaling 1,022,594 acres, to actually generate 35% solar. Converting acres to square miles, 1,022,594 acres equals 1,597 square miles covered in solar panels necessary to meet a 35% solar.

Chester County is 759 square miles; Montgomery, 483; Lehigh, 345. These three counties combined totals 1,587 square miles. We would need to clear cut and put a solar panel on every inch of all three counties and still be 10 square miles short. Pennsylvania has approximately 6,960 square miles of state forest land. To meet this mandate, it would be the equivalent of clear cutting and installing solar panels on almost a quarter of all our state forests.

This massive amount of land mass would cause major disruptions to wildlife of all kinds. Adding wind power to the mix not only required a large amount of landmass, but also would impact aerial species such as birds and bats. In a 2020 study it was published that, "Wind energy offers substantial environmental benefits, but wind facilities can negatively impact wildlife, including birds and bats...Forty-four wind facilities reported 2,039 bird fatalities spanning 128 species and 22 facilities reported 418 bat fatalities spanning five species."<sup>6</sup>

Often, environmental extremists have forcefully opposed pipeline and transmission line construction. Given the environmental challenges this proposal faces, and the massive land and air use this proposal would have it begs the question: will activists oppose these projects in the same way?

- What battery technology will be used for power storage and backup, how much will we need, and where will they be located?

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<sup>4</sup> Freeing Energy, "How much land does solar need to generate a megawatt hour?" 2020. <https://www.freeingenergy.com/math/solar-pv-land-acres-hectares-miles-m118/>

<sup>5</sup> U.S. Energy Information Administration, "Southwestern states have better solar resources and higher solar PV capacity factors," June 12, 2019. <https://www.eia.gov/todayinenergy/detail.php?id=39832#:~:text=On%20average%2C%20utility%2Dscale%20solar,values%20from%202014%20through%202017>

<sup>6</sup> Choi DY, Wittig TW, Kluever BM. 2020. An evaluation of bird and bat mortality at wind turbines in the Northeastern United States. PLoS ONE 15(8): e0238034. <https://doi.org/10.1371/journal.pone.0238034>

Because of the intermittent nature of renewable energy, a massive number of batteries will be needed to sustain any kind of baseload capacity needed for grid stability. Even the left-leaning publication Vox has published articles stating, “few expect it to be by 2030,”<sup>7</sup> when it comes to affordable battery technologies that can provide any kind of baseload capacity. But examining this even further, what is in an “affordable” battery. Components of batteries include refined minerals such as lithium, nickel, cobalt, graphite, magnesium, vanadium, and others.

China dominates the global supply chain for batteries and component minerals. Any policy mandating or incentivizing the need for these batteries jeopardizes U.S. energy security to China’s advantage. Moreover, solar panels and wind turbines require strategic minerals that the U.S. does not mine in sufficient quantities and for which we have almost no refining capacity. All of the supply chains for solar panels are dominated by the dictatorship in Beijing as the national policy of that government. Handing control of our energy production to a hostile foreign power is foolhardy in the extreme.

For all of the differences between Democrats and Republicans, liberals and conservatives, labor and business, I hope we could agree on this much: No American worker should ever have to compete with slave labor and no American consumer should ever be exposed to slave-made goods in the U.S. marketplace.

At this moment, in occupied East Turkestan (which the Chinese Communist Party calls “Xinjiang”), more than two million prisoners of the Uigur ethnic group are being held in concentration camps where they are subjected to forced labor. Beijing holds prisoners of conscience and executes them to harvest their internal organs for transplant.<sup>8</sup> Anyone who is paying attention has seen how Hong Kong’s civil society has been systematically dismantled by Beijing. The same fate awaits us if we give them the chance.

According to Jenny Chase, head of solar analysis at Bloomberg New Energy Finance, “Nearly every silicon-based solar module—at least 95% of the market—is likely to have some Xinjiang silicon in it.”<sup>9</sup>

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<sup>7</sup> David Roberts. VOX. September 20, 2019. <https://www.vox.com/energy-and-environment/2019/8/9/20767886/renewable-energy-storage-cost-electricity>

<sup>8</sup> Ali Iqbal, Aliya Khan, “Analysis: Killing prisoners for transplants: Forced organ harvesting in China,” McMaster University, 2022. <https://brighterworld.mcmaster.ca/articles/analysis-killing-prisoners-for-transplants-forced-organ-harvesting-in-china/>

<sup>9</sup> Jenny Chase, “Fears over China’s Muslim forced labor loom over EU solar power,” PoliticoPro, February 10, 2021. <https://www.politico.eu/article/xinjiang-china-polysilicon-solar-energy-europe/>

Moreover, it's been reported, "In a survey, *World Vision* also found that 19 per cent of miners have witnessed a child die at a mining site, 67% reported frequent or persistent coughing, and several girls had genital infections after working waist-deep in acidic water. In addition, up to 2,000 people die from cobalt mining accidents in the DRC every year. Miners also face sexual assault and forced evictions."<sup>10</sup>

The supply chains for solar panels, batteries, and their inputs are contaminated by slave labor and related human rights atrocities. Common decency requires us to not abet or reward these practices.

- What remediation plans will be enacted to dispose of untold millions of tons of dead solar panels and windmill blades in the 2040s and 50s?

The useful life of solar panels is roughly 20-30 years<sup>11</sup>, after which they become toxic garbage. Currently, about 90% of end-of-life or defective solar panels also end up in landfills, largely because it costs far less to dump them than to recycle them.<sup>12</sup> According to a study in the journal *Renewable Energy*, "Between 2030 and 2060, roughly 9.8 million metric tons of solar panel waste are expected to accumulate."<sup>13</sup> Wind turbines often see the same fate, and experts have calculated that the waste total will amass to 2.2 million metric tons in our landfills by 2050.<sup>14</sup>

The Institute for Energy Research published a study stating, "Solar panels contain lead, cadmium, and other toxic chemicals that cannot be removed without breaking apart the entire panel. While disposal of solar panels has taken place in regular landfills, it is not

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<sup>10</sup> Victoria Audu. The Republic. November 2023. <https://republic.com.ng/october-november-2023/congo-cobalt-genocide/#:~:text=In%20addition%2C%20up%20to%20%2C000,are%20spread%20across%20various%20groups>.

<sup>11</sup> Emily Glover, Corinne Tynan. June 6, 2024. Forbes. <https://www.forbes.com/home-improvement/solar/how-long-do-solar-panels-last/#:~:text=When%20you're%20doing%20your,for%2025%20years%20or%20more>.

<sup>12</sup> Bob Woods. CNBC. May 13, 2023. <https://www.cnbc.com/2023/05/13/recycling-end-of-life-solar-panel-wind-turbine-is-big-waste-business.html>

<sup>13</sup> Adriana Dominguez, Roland Geyer. *Renewable Energy*. April 2019. <https://www.sciencedirect.com/science/article/abs/pii/S0960148118310139?via%3Dihub>

<sup>14</sup> Bob Woods. CNBC. May 13, 2023. <https://www.cnbc.com/2023/05/13/recycling-end-of-life-solar-panel-wind-turbine-is-big-waste-business.html>

recommended because the modules can break and toxic materials can leach into the soil, causing problems with drinking water.”<sup>15</sup>

This is an issue that state and international governments are facing and so far there have not been viable, cost-effective options. Government mandates and incentives will make this mounting problem even worse.

In conclusion, Pennsylvania is America’s number one exporter of electricity, second largest producer of natural gas, and third largest producer of coal. These are domestic energy sources produced by Pennsylvania workers under DEP, OSHA, L&I, and USDOL rules. Upending competitive markets on Pennsylvania-generated electricity is an insult to consumers and a death wish for our economy. AEPS mandates cost ratepayers, through the purchasing of credits, \$528 million in the reporting year of 2022-23, but generated less than 1.5% of Pennsylvania’s electricity. This is not just disastrous energy policy, it’s expensively disastrous energy policy – and it’s every single consumer in Pennsylvania who is fronting the bill. The cost burden under the proposed PRESS mandate could increase the Tier I ratepayer costs to as much as \$6 billion over 5 years when fully implemented.

For these reasons and more we, the Pennsylvania Manufacturers’ Association, oppose any expansions to the Alternative Energy Portfolio Standards Act, including House Bill 2277, seeking to implement Governor Shapiro’s PRESS plan.

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<sup>15</sup> Institute for Energy Research. The Mounting Solar Panel Waste Problem. September 12, 2018. <https://www.instituteforenergyresearch.org/renewable/solar/the-mounting-solar-panel-waste-problem/>