Prepared Testimony of

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&
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Good Morning, Chairman Yaw, Chairman Vogel, Chair Comitta, Chair Schwank, and members of both committees. My name is David Althoff, and I am the Director of the Energy Programs Office in the Pennsylvania Department of Environmental Protection (DEP).

I would like to thank you for the opportunity to appear before you today to discuss Senate Bill 284, a bill that would impose new bonding requirements on the research and development, manufacturing, development, and operation of alternative energy projects and their components.

Energy Program's Office's Role

The Energy Programs Office (EPO) at DEP has a mission to support energy policies and implement programs that prevent pollution, protect our environment, improve public health, and ensure access to affordable energy options for all Pennsylvanians. As such, EPO carries out various programs and activities for the Commonwealth and assists DEP in its mission of protecting Pennsylvania's air, land, and water from pollution and providing for the health and safety of its citizens through a cleaner environment.

The Energy Programs Office has been leading efforts through climate planning, energy assurance resiliency planning, solar future planning, developing clean energy workforce reports and assessments, supporting alternative energy transportation projects and the deployment of renewable energy. Together with our partners we support energy efficiency assessments across all sectors in Pennsylvania. All the while, we continuously prioritize and educate Pennsylvanians on the benefits of energy security, resiliency, and the value of energy conservation.

In addition to those duties we also look forward by analyzing and exploring ways for Pennsylvania to benefit from recent and upcoming changes in the energy marketplace; from utilization of new alternative fuels in vehicles, to deployment of new energy efficiency products, and supporting microgrid development via the use of energy storage. Lastly as we move forward, we have an ever-greater focus on fairness and equity as well as the impacts of energy on environmental justice communities. We are keenly aware of the relationship between energy use and its impact on our environment and climate. Because we provide programmatic support in implementing the Pennsylvania Climate Change Act (Act 70 of 2008), we know that over 85 percent of Pennsylvania greenhouse gas emissions comes from the production and use of energy. The continued deployment of alternative energy technologies which emit little or no greenhouse gas emissions are very important opportunities to achieving any greenhouse gas reduction goals.

Alternative Energy Production

One of the important programs that EPO helps to oversee is Pennsylvania's Alternative Energy Portfolio Standards (AEPS) created by the Alternative Energy Portfolio Standards Act (Act 213 of 2004). AEPS is administered by the Public Utility Commission (PUC) in cooperation with DEP and requires that 18 percent of electric power come from alternative and renewable sources.

DEP and the Energy Programs Office play an important role in administering the alternative energy portfolio standard. The Act 213 directs that DEP ensure all qualified alternative energy sources meet all applicable environmental standards. Throughout each reporting year, my office

works with the PUC to ascertain the compliance of qualified alternative energy sources or facilities to ensure they meet environmental standards.

The alternative and renewable energy sources in AEPS are as follows:

1. Solar
2. Wind power
3. Low-impact hydropower
4. Geothermal energy
5. Biologically derived Methane gas (Biogas)
6. Fuel cells
7. Biomass energy
8. Solar thermal
9. Alternative Energy Derived from the byproducts of the Pulp and Paper as well as the wood manufacturing process.
10. Municipal and Co-Op Owned hydropower systems.
11. Waste coal
12. Distributed generation systems
13. Demand-side management –*Includes energy efficiency, demand response and use of industrial by-products and technologies such as waste heat.*
14. Large-scale hydropower
15. Municipal solid waste
16. Generation of electricity outside of Pennsylvania utilizing by-products of the pulping process and wood manufacturing process

The AEPS standard is anticipated to achieve its 18 percent goal this month (May, 2021) and has helped to grow the alternative and renewable energy industry in Pennsylvania by providing support for the deployment of these energy projects, many of which are developed, operated, and supported by Pennsylvania businesses.

Alternative and renewable energy facilities and projects in SB 284

The alternative and renewable energy production projects defined in Senate Bill 284 are in fact the AEPS alternative and renewable energy technologies. Under SB 284, all of the 16 facility types that may deploy a new facility in the future would be required to post a bond if they commence a project after the effective date.

Additionally, SB 284 imposes bonding requirements on certain activities connected with these alternative and renewable energy production projects. The bill references facilities that manufacture products or component parts, including those that "provide alternative energy or alternative fuels" or "improve energy efficiency or conserve energy". This expansive definition could include efficiency products that conserve energy such as thermostats, lightbulbs, water heaters, high-efficiency HVAC systems, high-efficiency LED lighting, energy efficient windows and doors, and insulation. It also imposes bonding requirements on facilities or projects that make and/or deliver alternative fuels across all sectors, including the rail sector. Lastly, the bill imposes bonding requirements on facilities used for the research and development of alternative and renewable energy sources, which seems to include not just private, for-profit entities but also our public research universities.

The bill requires bonding of sufficient funds to implement a reclamation plan, decommissioning, addressing hazardous liabilities and recycling or disposal of the projects. This includes the component parts of the facilities and projects in contrast to just any wastes created by the project.

Pennsylvania has long been a leader in the manufacturing sector and there are many facilities in the Commonwealth that produce components for alternative energy projects or that otherwise improve energy efficiency or conserve energy. For instance, there are at least 29 facilities in Pennsylvania that manufacture components that are used in wind turbines. Pennsylvania was home to the first paper mill in North America and the forest products industry remains an important part of the Commonwealth's economy, including generating coproducts that would otherwise be waste but are instead used as alternative fuels to generate electricity. SB 284 would have far reaching effects across the manufacturing sector here.

Certain alternative energy technologies do emit wastes. Some of these wastes themselves are beneficially reused as coproducts. For instance, in the case of waste coal, wastes are used to remediate mine lands. When these emitted wastes exceed certain thresholds, they are managed via traditional environmental permits. When appropriate, a facility may be required to bond their waste, air, and water pollution controls systems. This is a safeguard in case the permitted facility fails in its obligation to appropriately manage the waste(s) properly and the public has to remove the waste the facility operators were required to manage via permit. Other facilities, such as a solar array or a wind farm may have permits for construction activities much like any other building project, but they do not have permits to manage wastes as there are few, if any, wastes that would meet a threshold to require a permit. SB 284 goes beyond addressing wastes and appears to attempt to address the final disposition of component parts of the facility and any hazardous liabilities.

Solar in Pennsylvania

To this point, I have discussed how SB 284 impacts all types of newly constructed alternative energy projects and facilities making products, components, and fuels. In looking at the energy generation projects currently being planned and evaluated, it appears that SB 284's biggest impact would be on grid-scale solar in Pennsylvania.

I will take a moment to summarize the current scope and scale of grid-scale solar development in Pennsylvania.[1]

- There is currently approximately 100 megawatts (MW) installed capacity from seven operating projects.
- There is approximately 12,100 MW of capacity in development from roughly 370 projects that are currently seeking approval from the transmission operator, PJM, to connect to the grid.

[1] Please note that "Grid-Scale Solar" does not include residences or businesses in the Commonwealth that generate alternative energy for onsite consumption as these systems are not subject to the bonding requirements contemplated by SB 284.

- These 370 projects in development represent over $12 billion[2] in investment potential (to build and operate) and an estimated 40,000 jobs over 10 years.[3]

Impact of Alternative Energy Projects

We recognize that even though renewable energy projects such as solar, wind, and hydro are termed "zero emissions", that does not mean zero emission projects have zero environmental impact. You would be hard-pressed to identify any project or human activity whatsoever that has no impact on land and resources.

Recognizing and incentivizing proper reclamation and decommissioning of any project or site to restore it and recycle, reclaim, or refurbish the equipment and materials used is an effort we should apply across the board. In addition, we should be designing facilities with the environment in mind, using products that take less energy to make and are designed to be able to be reused or easily recycled.

Operating a project and then being able to use the land in a manner equal to pre-project conditions is actually a key element of what makes renewable energy projects, particularly solar, superior to other types of development that sometimes forever irrevocably change the nature or use of the land. Unlike most large, grid-scale energy projects, solar installations can be removed entirely, and the land can be used for the same purpose as prior to the project.

In the case of solar, there are a number of mechanisms to achieve assurance that projects are decommissioned, the land is restored, and retired solar panels are handled properly. Bonding is already part of the current best practices for ensuring proper decommissioning and land restoration at the end of a solar project. Bonding and details regarding end-of-life restoration are considerations in the land lease between the property owner and developer such that the conditions, payments, and timeframes be suitable to both. This requirement can also be further strengthened at the local government level by including provisions in ordinances where oversight of a local project is customary. These bonding requirements bound by ordinance can and are included in the land lease before a construction permit is issued.

For example, a model ordinance being used today by many local governments includes decommissioning and restoration provisions, and it even includes wording on bonding requirements to assure those plans are implemented at project closure or abandonment. Often due to the nature of the lease term, the number of term extensions and the potential over time for refurbishment of panels or costs for recycling or disposal, the bonding amount and agreements may have to be reviewed and updated.

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[2] NREL: $1.13 per Wdc for 50 MW Fixe-tilt (Non-Union Labor, US Weighted Average, 2016) Source: U.S. Solar Photovoltaic System Cost Benchmark Q1 2018, Figure 28 https://data.nrel.gov/submissions/103

[3] Solar Foundation: 3.3 Installation and Project Development Jobs per MW Installed (Utility-scale) Source: 2018 Solar Census, Table 9, Page 30 https://www.thesolarfoundation.org/wp-content/uploads/2020/02/Solar-Jobs-Census-2018-1-1.pdf

With this in mind, SB 284 may create an additional, duplicative layer of state bureaucracy in that it would establish a new state-level bonding requirement and add new bonding requirements for items that were not normally part of the standard practice lease agreement bond. This would involve the Commonwealth becoming a party to the bonding process of hundreds of projects, all with differing timeframes and potential for periodic updates. This would very likely increase the cost of these projects being developed, making Pennsylvania less attractive for investment, with questionable benefit.

Considering that the Commonwealth is not engaged in permitting these facilities outside of environmental permits related to construction, using earth disturbance and storm water controls, this bonding requirement would then engage the DEP in the project throughout its entire life and through completion of the decommissioning plan. This is not typically something that is done for other construction projects by DEP and would represent an expansion of DEP's traditional role.

Recycling

Senate Bill 284 also emphasizes recycling and removal of hazardous liabilities. It is our hope that refurbishment or recycling is the primary consideration prior to disposal. The Pennsylvania Recycling Markets Development Center has previously said that dismantling solar panels for recycling will likely require proper management of both hazardous and non-hazardous materials, not unlike flat screen televisions and other consumer electronics, which in both electronics recycling and other forms of materials management is very common across the United States and around the world.

Furthermore, solar panels that may contain some hazardous chemicals are not any different than other power electronics that are present throughout our society. In fact, solar panels are solid state and sealed from the elements – they are explicitly designed to be impervious so that rainwater, wind, etc. do not interact with the inner chemistry of the system.

There is more than a single type of solar panel/photovoltaic (PV) technology, and differing types have different chemistry. In previous hearings, some legislators have highlighted thin film PV technologies that contain Cadmium Telluride (CdTe), which is a compound that is typically hazardous, but it is rarely in use in Pennsylvania and makes up less than five percent of the world market[4]. Additionally, CdTe was the subject of research from Brookhaven National Laboratory[5] concluding that "CdTe PV modules do not present any risks to health and the environment during their use, and recycling the modules at the end of their useful life completely resolves any environmental issues." Silicon (monocrystalline and polycrystalline) solar cells – which do not contain CdTe – make up over 90 percent of the solar cells made and almost all solar cells in deployment in Pennsylvania. To my knowledge these silicon modules do not fail a hazardous waste determination upon their disposal, meaning they are not hazardous waste. Additionally, by weight, approximately 80 percent of a solar panel is glass and aluminum – two commodities that are recycled in significant volumes today.

[4] Cadmium Telluride | Department of Energy

[5] Could CdTe PV Modules Pollute the Environment (bnl.gov)

As this bill contemplates bonding for reclamation of facilities at the end of life, a new PV facility today could have a lifespan of 25 years or more. These solar panels in this forward-looking timeframe could likely be refurbished or the materials contained in them have such value that deconstructing these panels may result in zero waste. Development of supply chain incentives, including design for recyclability, and focusing on reuse of reclaimed materials may make the purpose of a bond to ensure reclamation or remediation moot.

Other Bonding Requirements

There are bonding requirements in certain areas of DEP's jurisdiction, including waste management, oil and gas development, and mining. While there are some full-cost bonding requirements for mining and waste management, oil and gas bonds are well below actual costs. Generally speaking, DEP does not require bonding for the construction, decommissioning, or reclamation of power generation units or facilities.

Conventional Oil and Gas Wells

Wells drilled prior to 1985 do not require any bond. For conventional wells drilled after 1985, the bond is $2,500 per well with a maximum bond of $25,000, well under the actual cost to plug a well. A $25,000 bond could cover dozens or hundreds of wells that a company owns. It costs on average $33,000 for DEP to plug a conventional well, which is only the actual well plugging itself and potentially site stabilization if necessary, but it does not include restoration or reclamation of the site.

Unconventional Oil and Gas Wells

Bonding requirements depend on the bore length and the number of wells owned by the operator. Bonds begin at $4,000 per well and go up to $10,000 per well, and bonding limits vary from $35,000 for operators with fewer than 50 wells to a maximum of $600,000 for operators with over 150 wells. Again, this is far below the actual cost of plugging a well.

Waste Management

Generally speaking, individual permits for waste processing or disposal facilities require bonding. In addition, many general permits also require bonding. The general permits where bonding is applied are typically for situations where there is processing of large quantities for beneficial use, complicating processing techniques, or other instances where there exists a substantive threat to public health or the environment. Such bonds would cover the cost to clean up and dispose of all the waste materials authorized to be stored, processed, or disposed on site.

Mining

While DEP is not involved in the bonding of coal-fired power plants, the bonding program for mining operations is based on the full cost of reclamation of a site. DEP is able to recalculate bonding amounts annually, which are developed based on actual costs for, among other sources, reclamation of abandoned mine lands and forfeited mine sites. Reclamation plans include information on approved future land use after the reclamation. Such bonds would cover the cost of reclaiming the site and may include additional bonding requirements to cover the cost of, for instance, long-term operation and maintenance of treatment of discharges to nearby waterways.

Conclusion

In closing, the alternative energy sector and associated support businesses, including manufacturers of products and component parts used in alternative energy facilities, is large and quickly growing. These bonding requirements are potentially duplicative and highly onerous and there are serious questions about what benefits they would provide over existing requirements. Renewable and alternative energy projects in development represent economic opportunities for the Commonwealth, and solar deployment in particular could result in over $12 billion of investment potential in Pennsylvania in the near future. Beyond the environmental benefits, these facilities will provide local economic opportunities and tax revenues as well as many jobs to build, maintain, and eventually decommission these projects.

While we are encouraging this kind of smart, low-impact development, the effects of this bill could create a financial disincentive and lead to a substantial loss of investment potential in the alternative energy and manufacturing sectors. Again, in the case of solar, the best practice in play is to reduce, refurbish, and recycle. It is possible that SB 284 may unintentionally stifle research and development and be a deterrent to those manufacturers seeking to locate or expand in Pennsylvania.

Thank you again for the invitation to testify today. I appreciate your consideration of all I have said on this important topic. We look forward to working with you and all interested stakeholders on this topic as we seek to both conserve and improve our environment.