



Prepared Comments of

**Sharon Pillar, Executive Director for the Pennsylvania Solar Center, and
Matt Mahoney, Director of Government Affairs for the Pennsylvania Solar
Center**

Before the

House Environmental Resources & Energy Committee

Public Hearing on Solar Energy and Economic Development

March 18, 2024

March 18, 2024

Honorable Greg Vitali, Chair
Honorable Martin T. Causer, Republican Chair
House Environmental Resources & Energy Committee
Hearing Room G-50, Irvis Office Building
Harrisburg, PA 17120

Re: Public hearing on Solar Energy and Economic Development

Dear Representative Vitali, Representative Causer, and members of the Committee:

Please accept the enclosed comments assembled for the House Environmental Resources & Energy Committee's (Committee) public hearing on Solar Energy and Economic Development scheduled for Monday, March 18, 2024. These comments are being submitted on behalf of the Pennsylvania Solar Center, a nonprofit, nonpartisan organization that envisions a world powered by energy that is reliable, affordable, and sustainable for all. Our mission is to provide trusted guidance to usher all Pennsylvanians into the clean energy economy, building a bridge to a sustainable and resilient tomorrow. We do this through our GET Solar technical assistance program, our education and outreach work as well as our policy advocacy. Our GET Solar program is currently assisting more than 200 nonprofits, businesses, schools, and municipalities to assess their solar potential. We help them through the solar procurement process to realize thousands of dollars of savings on their electricity bills, so we see firsthand the difference solar is making in communities. We also co-lead a coalition along with the Pennsylvania Solar & Storage Industries Association (PASSIA) of more than 70 renewable energy businesses including small residential installers, commercial developers, community solar and utility-scale renewable developers, as well as energy storage companies.

We commend the Committee for exploring the economic development opportunities enabled by solar energy in the Commonwealth. Increasing the amount of solar energy generation in Pennsylvania presents a number of accessible, innovative economic opportunities given the dynamic characteristics of solar energy and the characteristics of the technology.

Solar photovoltaic (PV) panels are a modular energy generation technology that has enabled the proliferation of distinctive markets within the solar industry. The three most commonly recognized markets in the solar industry currently include utility-scale solar, community solar, and distributed solar. Each of these unique markets provides economic benefits to Pennsylvanians and experiences different market dynamics.

- 1) Distributed solar, otherwise referred to as rooftop solar, allows homeowners, nonprofits, businesses, municipalities, schools, farmers, manufacturers, warehouses, and many others generate electricity onsite to directly reduce their electricity bills. As of February 2024, there are over 53,000 individual distributed solar systems installed across Pennsylvania.¹ Once installed, distributed solar systems produce energy for 30 years or more, providing electricity prices that are stable and predictable. Distributed solar also benefits other electricity users by reducing distribution congestion and line loss because solar energy directly serves local electricity needs. Distributed solar also creates a stronger grid that protects communities from the breakdowns that can occur from over reliance on centralized generation systems. Distributed solar also has the largest opportunity to grow jobs. Distributed solar is also crucial

¹ Pennsylvania Public Utility Commission. (Accessed March 14, 2024). *Pennsylvania Alternative Energy Credit Program*. PA Public Utility Commission. <https://pennaeps.com/reports/>

for building the grid of the future so that utilities can manage solar output along with storage, demand response, electric vehicles to effectively regulate power availability. These types of demand response will be necessary for virtual power plants (VPPs) that will replace the traditional base-load power of the past.

- 2) Utility-scale solar generates relatively large amounts of electricity that is sold on the wholesale markets, not directly to end-use consumers. Utility-scale solar offers the largest opportunity to reduce electricity prices because it can provide fixed-price electricity during peak demand when electricity prices are subjected to fluctuating energy resource prices. Increasing the amount of utility-scale solar onto the transmission grid suppresses electricity prices for all customers. Utility-scale systems operate within the wholesale electricity markets overseen by PJM Interconnection, the region's regional transmission operator. Currently in the PJM queue for Pennsylvania, there are 502 applications totaling 23.1 GW of capacity, of which 14 projects totaling 577 MW are currently under construction with some in partial service.²
- 3) Community solar is a business model that expands access to solar, particularly for those who cannot install solar on their own property. Community solar allows electricity customers to buy or lease a percentage of an off-site solar array and receive credit on their electricity bills for the electricity generated commensurate with their share. The intent of community solar is to provide options for renters, homeowners, businesses, nonprofits and others to benefit from locally generated solar because they may be restricted in their ability to install solar panels onsite. Community solar attracts investments from solar firms that can develop and commission large-scale solar installations and engage local ratepayers to subscribe to a community solar project. Penn State University's College of Agricultural Sciences Center for Economic and Community Development found 235 currently planned solar facilities in Pennsylvania could generate \$1.8 billion in economic output and 11,631 jobs and when operational, generate \$83.3 million in economic output, increase property tax collections, and reduce consumer spending.³

SOLAR ENERGY'S ECONOMIC BENEFITS TO PENNSYLVANIANS

Solar's economic benefits uniquely span across customer classes and electricity markets. Solar works most efficiently during the middle of the day when electricity use is typically at its highest. When electricity demand is at its highest, electricity prices are also at their highest because conventional energy generation facilities that meet peak demand are expensive and inefficient. Peak solar energy generation coincides closely with peak demand, and reducing peak demand is one of the most important means of lowering electric ratepayer costs. Solar's low cost pulls down the peak price curves and results in reduced wholesale electricity prices. Further innovations in solar plus storage systems provide a new opportunity for grid operators to address peak demand throughout the year,⁴ but this scenario only occurs once significant solar penetration is achieved on the grid, which based on research is about 5% percent solar penetration in Pennsylvania.

Distributed solar generators provide for lower transmission and distribution infrastructure because the energy generation is closer to the location of energy demand and doesn't need to travel as far. And as electrification increases, a distributed grid becomes vital for the reliability of the grid as utilities build

² PJM Interconnection. (Accessed 2024, March 14). *PJM – Generation Attribute Tracking System (GATS)*. PJM. <https://gats.pjm-eis.com/gats2/PublicReports/GATSGenerators>

³ Penn State University College of Agricultural Sciences Center. (2020). *Potential Economic Impact of Community Solar in Pennsylvania*. Department of Agricultural Economics, Sociology, and Education. https://aeese.psu.edu/research/centers/cecd/publications/economic-impact/economic-impact-of-community-solar_sept-2020_psu-cecd.pdf

⁴ U.S. Department of Energy Office of Energy Efficiency and Renewable Energy. (2023, June 16). *Solar integration: Solar energy and storage basics*. Energy.gov. <https://www.energy.gov/eere/solar/solar-integration-solar-energy-and-storage-basics>

infrastructure to meet the new electricity demands of customers. Utility scale solar has the benefit of being the lowest cost resource in the wholesale electricity market, so when its available consumer prices are reduced. However, as mentioned above, the penetration of solar must reach at least 5% to begin to see wholesale price reductions. These are some of the reasons why solar is an attractive energy source to include in any grid's diverse set of electricity generation needs.

Over the years, several researchers have found that Pennsylvanians will benefit from increasing the state's solar goals. One study in particular that was completed in 2018 by Pennsylvania's Department of Environmental Protection Energy Programs Office identifies strategies to achieve a 10% increase in solar powered electricity in Pennsylvania.⁵ "Pennsylvania's Solar Future Plan" identified fifteen strategies for Pennsylvania to increase electricity generation from in-state solar energy. It found that **moving to 10% in-state solar on Pennsylvania's grid decreases wholesale electricity price while creating tens of thousands of jobs and billions in economic benefit to local communities and to the state without compromising grid reliability**. Solar energy is growing in Pennsylvania, however, solar currently provides less than 1% of Pennsylvania's electricity while over a quarter of the United States is currently achieving over 5% of energy from solar.⁶ The report shows results of modeling that demonstrate "the combination of fuel savings (free sunlight) and anticipated cost savings (avoided public health and environmental damages) **could result in a net benefit of over \$1.6 billion annually from 2018 to 2030" by moving to 10% solar.**⁷

Other researchers have found similar results:

1. A Power Grid Engineering and Markets (POWERGEM) study commissioned by Community Energy found that transitioning to *10% solar in PA would lower Pennsylvania's wholesale energy cost by \$619 million annually*. These savings start with 5% solar penetration. Moving to 10% solar would result in **\$9.2 billion** in private capital investment, \$5.3 billion in local economic benefit, **\$4.1 billion** in wages, **\$2.3 Billion** in farmer lease payments, **\$228 million** in local tax revenue from grid scale projects, and **66,507 jobs**.⁸
2. **Economic and Environmental Impact of Governor Shapiro's "30 x 30" Alternative Energy Pledge**, a report released by Advanced Energy United, MAREC Action, and American Clean Power Association, found that more than **\$13.1 billion** could be invested in Pennsylvania over the next seven years with **129,000 jobs** created if Pennsylvania adopted a 30% renewable energy by 2030 strategy.⁹
3. Penn State University's College of Agricultural Sciences Center for Economic and Community Development found 235 currently planned solar facilities in Pennsylvania could generate **\$1.8 billion** in economic output and **11,631 jobs** and when operational, generate **\$83.3 million** in economic output, increase property tax collections, and reduce consumer spending.¹⁰
4. PJM's Renewable Integration Study found that the **PJM system would not have any significant reliability issues operating with up to 30 percent of its energy (as distinct**

⁵ Pennsylvania Department of Environmental Protection. (June 16, 2023). *Pennsylvania's Solar Future Plan*. <https://www.dep.pa.gov/Business/Energy/OfficeofPollutionPrevention/SolarFuture/Pages/Pennsylvania's-Solar-Future-Plan.aspx>

⁶ Glover, E. (2023, March 14). *The best and worst states for solar energy 2023*. Forbes Home. <https://www.forbes.com/home-improvement/solar/best-worst-states-solar/>

⁷ Pennsylvania Department of Environmental Protection. (June 16, 2023). *Pennsylvania's Solar Future Plan*. <https://www.dep.pa.gov/Business/Energy/OfficeofPollutionPrevention/SolarFuture/Pages/Pennsylvania's-Solar-Future-Plan.aspx>

⁸ Power Grid Engineering and Markets. (2019, June 18). *PA Solar Study*. Community Energy. <https://www.communityenergyinc.com/pasolarstudy>

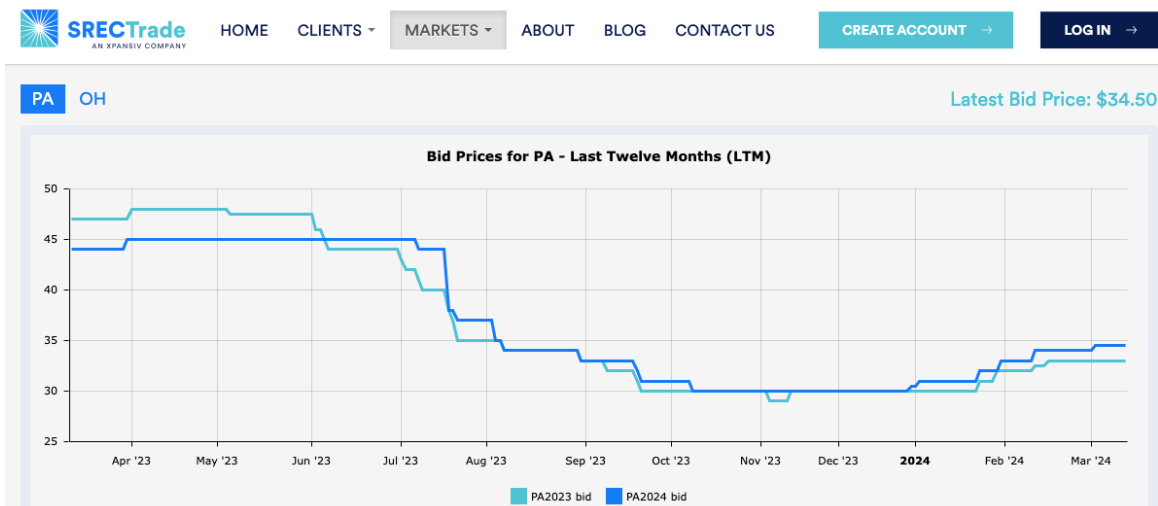
⁹ Gribbins, S. (2024, February 1). *New report: Implementing "30% by 2030" renewable energy policy would generate \$13 billion for PA*. Advanced Energy United. <https://blog.advancedenergyunited.org/articles/new-report-pennsylvania-30by30>

¹⁰ Penn State University College of Agricultural Sciences Center. (2020). *Potential Economic Impact of Community Solar in Pennsylvania*. Department of Agricultural Economics, Sociology, and Education. https://aese.psu.edu/research/centers/cecd/publications/economic-impact/economic-impact-of-community-solar_sept-2020_psu-cecd.pdf

from capacity) provided by wind and solar generation. Every scenario examined resulted in lower PJM fuel and VOM costs as well as lower average Locational Marginal Prices. The lower LMPs, when combined with the reduced capacity factors, resulted in lower gross and net revenues for the conventional generation resources. The renewable generation increased the amount of cycling (start up, shut down and ramping) on the existing fleet of generators, which will result in increased VOM costs on these units. However, these increased costs were small relative to the value of the fuel displacement.¹¹

A significant economic driver associated with solar energy that is authorized by Pennsylvania’s Alternative Energy Portfolio Standards Act of 2004 (AEPS) is a market-based energy credit trading system that provides alternative energy credits (AECs) to renewable energy generators that are exchanged on a marketplace. Electric utilities buy as many credits as required by the AEPS from qualified renewable energy facilities. The price of credits drives investment decisions into renewables by small (including homeowners) and large renewable purchasers alike. **Because the AEPS goals have not been updated and have flatlined as of May 2021, the price of the AECs is plummeting. This situation is lowering investment activity into solar in Pennsylvania** at a time when we should be ramping up solar deployment to taking advantage of the new federal opportunities.

Due to the outdated goals of the current AEPS, the supply of solar AECs in the market currently exceeds the demand to purchase those credits by utilities as outlined in the AEPS. Therefore, the price of those credits is dropping dramatically. This situation is lowering investor interest and confidence in developing solar projects in Pennsylvania. Increasing the AEPS solar goals will increase the price of the credits and spawn more development. The following graph from SREC Trade illustrates the change in solar AEC prices (also known as SRECs) in the past year.



Source: SREC Trade, <https://www.srectrade.com/markets/rps/srec/pennsylvania>, March 14, 2024

Federal programs for solar authorized by the Inflation Reduction Act (IRA) are another enormous growth opportunity, but **Pennsylvania is losing out to neighboring states with more competitive renewable energy goals** as investors seek to maximize their return on investment and attract the most talented workers. Policies like the federal Domestic Content Bonus Credit and Energy Community Bonus Credit programs authorized by the IRA compliment Pennsylvania’s energy and manufacturing legacy, however, no action has been taken by Pennsylvania’s General Assembly to capitalize on the economic potential of solar and the availability of these programs. As a result of

¹¹ PJM Interconnection. (2016, September). *PJM - Renewable integration study reports*. <https://www.pjm.com/committees-and-groups/closed-groups/irs/pris.aspx>

other state policies, Virginia has 4,841 MW of solar¹², New Jersey has 5,276 MW of solar¹³, and New York has 5,560 MW of solar¹⁴, while *Pennsylvania (the 6th largest state in the nation) has only 1,491 MW of solar¹⁵.*

The lack of action by previous administrations and legislatures on this critical issue is needlessly costing Pennsylvanians billions of dollars each year. The economic cost of doing nothing grows larger every day. The current energy scenario is shifting the high cost of natural gas volatility to Pennsylvania ratepayers to shoulder the burden. The only solution to this problem is to increase renewable energy, energy storage, and energy efficiency.

The lack of diversity in Pennsylvania's electricity mix, for which natural gas dominance is predicted to comprise 70% by 2030, is also contributing to alarming electricity price increases already. According to the PA Public Utility Commission, **2022 rate increases ranged from 35% - 56%** across all major electric distribution companies, *"fueled in large part by shifts in supply and demand for natural gas."*¹⁶ The Committee must consider the benefits of diversifying the Commonwealth's electricity generation portfolio by increasing solar energy resources to insulate electricity ratepayers from volatility in energy markets, stabilize electricity rates, and lower consumer energy bills.

In addition, the lack of action on the AEPS to date has put Pennsylvania at a competitive disadvantage as other states reap the benefits of renewables with their more attractive policies. In fact, Pennsylvania is now 50th in the nation for the percent growth in renewable energy since 2013 because of the lack of action on the AEPS.¹⁷ Research shows that moving to just 10% solar by 2030 would result in more than 60,000 direct jobs, and thousands of people working in supporting industries such as land surveyors, pile drivers, electricians, attorneys, financiers, engineers, realtors, and others, not to mention the secondary ripple effects of these jobs to local economies.

Solar's versatility enables owners to participate in a variety of markets. In addition to community solar business models and other shared solar models, solar can also contribute to the growth of virtual power plants, which are a collection of small-scale energy resources that can provide the same economic value as a centralized power plant by leveraging the power of aggregation. With the right investments in the grid, Pennsylvania's 53,000+ solar owners could provide significant economic benefits for themselves and their neighbors through virtual power plant (VPPs) arrangements across Pennsylvania. Solar also supports economic policies that focus on reducing costs by increasing efficiency, such as demand response and time of use programs.

The Pennsylvania Solar Center is encouraged by Governor Shapiro's recent announcement to expand the renewable energy portfolio standard to 35% by 2035. While that is an important positive first step, the legislature should assure that there are specific provisions in the language of the proposal that would support distributed energy resources, so that Pennsylvania will have the necessary infrastructure in place for effective demand response programs and VPPs that will benefit all Pennsylvanians in the future. We cannot wait to build that infrastructure; it must start now.

In conclusion, solar energy is an important and necessary component of Pennsylvania's long-term economic development strategy. The state must prepare for the modern energy economy in order to take full advantage of new technologies of the 21st century grid, to provide new energy economy jobs

¹² <https://www.seia.org/state-solar-policy/virginia-solar>

¹³ <https://www.seia.org/state-solar-policy/new-jersey-solar>

¹⁴ <https://www.seia.org/state-solar-policy/new-york-solar>

¹⁵ <https://www.seia.org/state-solar-policy/pennsylvania-solar>

¹⁶ Pennsylvania Public Utility Commission. (2022, May 9). *PUC alerts consumers of June 1 price changes for electric generation*. PA PUC. <https://www.puc.pa.gov/press-release/2022/puc-alerts-consumers-of-june-1-price-changes-for-electric-generation>

¹⁷ <https://environmentamerica.org/pennsylvania/articles/pennsylvania-falling-behind-in-renewable-energy-race/#:~:text=Clean%20energy%20is%20lagging%20behind,and%20geothermal%20generation%20since%202013.>

to our citizens, and to create energy security and reliability. Pennsylvania can unlock the benefits of solar and other renewables by modernizing the AEPS to increase Tier I and solar carveout goals, and permit community solar. Thank you for the opportunity to submit comments on this important topic. The Pennsylvania Solar Center is always available to discuss the costs and benefits of solar with any member of the Committee. We applaud your efforts on this important issue of creating an affordable, reliable, and secure energy future for all Pennsylvanians.

BACKGROUND

The composition of Pennsylvania's existing electricity generation sources is important when analyzing the economic impacts of solar. Over the past decade, Pennsylvania's electricity sector has experienced a tremendous shift in its primary electric generation resources. According to the most recent Pennsylvania Public Utility Commission (PA PUC) Alternative Energy Portfolio Standards Act of 2004 (AEPS) Compliance Report issued for the 2021-2022 compliance period¹⁸, coal accounted for 48% of Pennsylvania's electricity generation and natural gas accounted for 15% in 2010. In 2022, over 50% of electricity was generated using natural gas and 11.5% was generated by coal. Renewables provided only 4.5%¹⁹ with solar providing less than 1% of Pennsylvania's net electricity in-state generation.²⁰

This relatively rapid shift in primary electricity generation resources infuses new risks and uncertainties for Electric Distribution Companies (EDCs), Electric Generation Suppliers (EGSs) and ultimately Pennsylvania's electricity consumers.

Pennsylvania's Public Utility Code requires electric utilities and electricity suppliers to purchase power on the competitive wholesale electricity markets which is then sold to end-use customers²¹ determined by the lowest cost resource bid on the wholesale electricity market.²² However, when a majority of electricity is generated by a single energy resource, the cost of electricity becomes more closely coupled with the cost of that energy resource and the associated market dynamics of the resource that electricity generation is relied on. This scenario was illustrated in 2022 when, as the PA PUC noted, "higher wholesale market prices for electricity, fueled in large part by shifts in supply and demand for natural gas, have increased purchasing costs for electric distribution companies (EDCs)..."²³. As noted, natural gas accounted for over 50% of Pennsylvania's electricity generation in 2022. Natural gas also accounts for the majority of electricity generation in the PJM's service territory.²⁴ Unpredictable domestic and geopolitical conditions have caused natural gas prices to become uncharacteristically unstable, consequently causing electricity prices in Pennsylvania to become uncharacteristically unstable and negatively impacting electricity consumers.

The security of Pennsylvania's energy costs is reliant on many factors, but diversification, particularly with renewables, minimizes the risk of any energy resource's potential to unpredictably disrupt other

¹⁸ Pennsylvania Public Utility Commission in cooperation with the Pennsylvania Department of Environmental Protection. (2022). *Alternative Energy Portfolio Standards Act of 2004 Compliance for Reporting Year 2021-2022*. Pennsylvania Alternative Energy Portfolio Standard Program. <https://pennaeps.com/wp-content/uploads/2023/03/aeps-2022-report-final-032223- dm.pdf>

¹⁹ Pennsylvania Public Utility Commission in cooperation with the Pennsylvania Department of Environmental Protection. (2022). *Alternative Energy Portfolio Standards Act of 2004 Compliance for Reporting Year 2021-2022*. Pennsylvania Alternative Energy Portfolio Standard Program. <https://pennaeps.com/wp-content/uploads/2023/03/aeps-2022-report-final-032223- dm.pdf>

²⁰ Pennsylvania Department of Environmental Protection. (accessed on June 16, 2023). *Finding Pennsylvania's Solar Future*. <https://www.dep.pa.gov/Business/Energy/OfficeofPollutionPrevention/SolarFuture/Pages/Finding-Pennsylvania%E2%80%99s-Solar-Future.aspx>

²¹ 52 Pa. Code Ch. 54. Electricity Generation Customer Choice

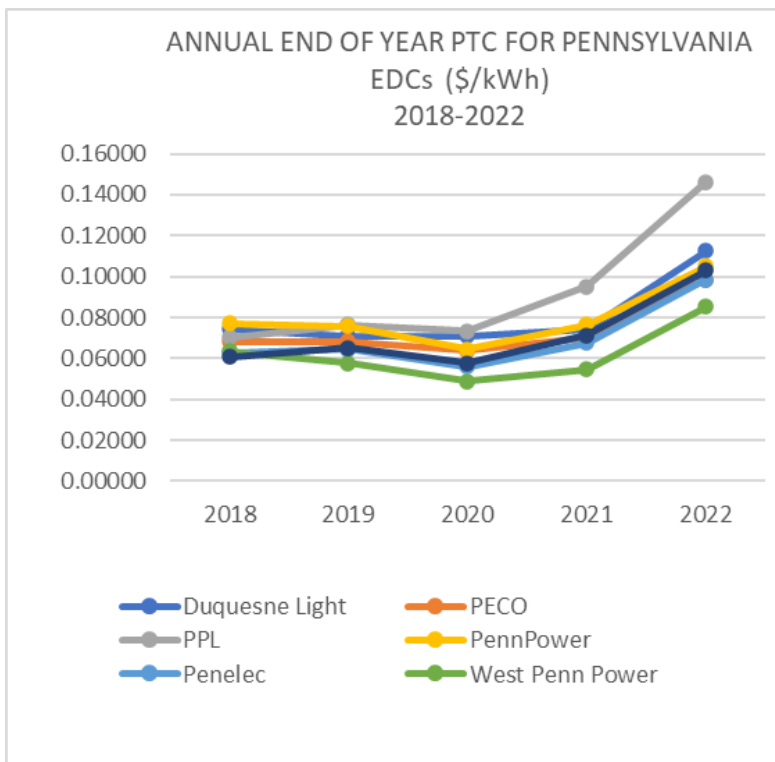
²² Act No. 138 of 1996

²³ Pennsylvania Public Utility Commission. (2022, May 9). *PUC alerts consumers of June 1 price changes for electric generation*. PA PUC. <https://www.puc.pa.gov/press-release/2022/puc-alerts-consumers-of-june-1-price-changes-for-electric-generation>

²⁴ PJM Interconnection. (2023, June 16). *PJM - Markets & Operations*. PJM. <https://www.pjm.com/markets-and-operations.aspx>

energy markets and negatively impact electricity customers. The Committee is strongly encouraged to consider the risks and resulting costs to electricity consumers by allowing any energy resource to comprise a majority share of Pennsylvania’s electricity generation. The following graph titled “Annual End of Year PTC for Pennsylvania EDCs (\$/kWh) 2018-2022” and table titled “Annual End of Year YOY % PTC Change” highlight the recent price increases experienced by Pennsylvania ratepayers as a result of majority reliance on one energy resource for electricity generation.²⁵

We encourage the Committee to consider analyzing the ratepayer cost of limited electric generation diversity as well as cost trends that could result from not requiring a more diverse electric generation portfolio. **It is the opinion of the PA Solar Center that the largest current risk to ratepayers comes from the state’s lack of action to diversify its energy mix, and ratepayers will continue to be subjected to price shocks from energy resources susceptible to volatility, such as of natural gas, unless Pennsylvania’s limited energy diversification issue is remedied.**



ANNUAL END OF YEAR YOY % PRICE TO COMPARE CHANGE

	2019	2020	2021	2022
Duquesne Light	-4.70%	+0.14%	+4.22%	+51.82%
PECO	+0.15%	-6.75%	+10.24%	+40.36%
PPL	+8.41%	-4.13%	+29.86%	+53.78%
PennPower	-1.82%	-14.83%	+18.77%	+37.27%

²⁵ PA Power Switch the Official Electric Shopping Website of the Pennsylvania Public Utility Commission. (2023, June 16). *Shop for your home | PA power switch*. PA Power Switch. <https://www.papowerswitch.com/shop-for-electricity/shop-for-your-home/>

Penelec	+2.54%	-13.21%	+20.78%	+45.76%
West Penn Power	-9.29%	-15.09%	+11.37%	+56.36%
Met-Ed	+7.25%	-11.57%	+23.57%	+44.83%

Data included in graph and table above retrieved from PA Power Switch, The Official Electric Shopping Website of the Pennsylvania Public Utility Commission. <https://www.papowerswitch.com/shop-for-electricity/shop-for-your-home/>

To protect ratepayers from future price fluctuations, Pennsylvania must diversify its electricity mix by increasing its renewable energy generation goals from the current 8% goal defined in the Alternative Energy Portfolio Standards Act of 2004 (AEPS) to 30% by 2030. The U.S. average for a state’s utility-scale net electricity generation that comes from renewables is 24.5%, but in Pennsylvania, the Commonwealth currently gets less than 5.0% from renewables, which is a direct result of Pennsylvania’s outdated AEPS.²⁶

THE ALTERNATIVE ENERGY PORTFOLIO STANDARDS ACT OF 2004 (AEPS)

The most effective and proven mechanism for diversifying Pennsylvania’s electricity mix has been and continues to be the AEPS. The AEPS framework mandates that EDCs and EGSs purchase and sell the least cost resource through a competitive procurement process to meet incremental purchasing of alternative electricity generation resources. It requires electricity to be purchased from a diverse portfolio of electricity generation sources which protects consumers from having one resource with too much influence on electricity prices. The AEPS also encourages “the sale of electric energy generated from renewable and environmentally beneficial sources,”²⁷ recognizing the opportunity for innovation in clean energy and environmental protection in Pennsylvania’s electricity generation sector.

The AEPS Tier I renewable resources provides multiple benefits to ratepayers and offers some of the lowest cost electricity available. For one, the fuel sources for wind turbines and solar panels are free, providing for near zero variable operating costs. The primary cost of solar and wind energy is focused on the initial capital needed for labor, equipment, and the cost of construction. These initial costs are incurred at the beginning of a solar and wind electricity generation asset’s life and remain largely unchanged for the lifetime of the system, which can be 30 years or more. This combination of very low operating costs and fixed upfront capital costs provides a stable, reliable, and very low price offering for electricity generated by wind and solar on the wholesale market.

Currently, the AEPS requires 18% of Pennsylvania’s electricity bought by consumers to come from alternative sources, with only 8% coming from renewable resources, and only 0.5% required from in-state solar. These goals, established in 2004, were easily achieved by 2021, a timeframe mandated in the AEPS. Since its adoption, the AEPS has successfully delivered numerous economic benefits to farmers, commercial building owners, homeowners, local governments, and businesses across Pennsylvania. Large institutions such as universities, large businesses, municipalities and others are entering into long-term contracts to purchase power from utility-scale solar projects that are delivering stable and reduced energy costs for 20 years or more. When the AEPS was adopted, Pennsylvania’s solar industry was non-existent. Today, over 1,275 MW of solar capacity is installed across Pennsylvania with over 65,000 solar installations, enough to power 163,602 homes, activating 4,288 jobs and attracting over \$3.5 billion in investment.²⁸ The AEPS has also resulted in a total of almost 10,000 jobs across all renewable energy sectors. In short – the policy has been effective and achieved its objectives at a minimal price to the citizens of the state.

²⁶ U.S. Energy Information Administration. (2024, February 15). *State energy profile data*. U.S. Energy Information Administration (EIA). <https://www.eia.gov/state/data.php?sid=PA>

²⁷ Act No. 213 of 2004

²⁸ Solar Energy Industries Association. (2023, June 16). *Pennsylvania Solar*. SEIA. <https://www.seia.org/state-solar-policy/pennsylvania-solar>

The primary policy in Pennsylvania that supports homeowners, businesses, farmers, schools, and municipalities that install solar energy systems on their properties is the AEPS. The AEPS allows these stakeholders who install solar on their property to obtain a credit on their electricity bill for the energy produced from the solar system, a process called net metering. On a monthly basis throughout the year, onsite solar owners receive credit for excess generation that provides compensation for energy generated and provided to the grid. Net metering is an important policy to build renewable energy markets, and the PA Solar Center strongly urges that the state keep net metering rules intact for the foreseeable future. There may be some opportunity for reform once the state reaches a much higher penetration of solar as other states have seen, but altering the basic net metering rules at this time would cause irreparable damage to the distributed solar market at a time when the state should be focusing on building a strong renewables base. Further, there may be some opportunity to review excess generation and so-called “merchant generators.”

In addition, every 1,000 kWh of generation from a renewable energy system earns one Alternative Energy Credit (AEC). This AEC is earned by the owner of the solar array which can be sold to EDCs and EGSs that are required to purchase AECs to meet their obligated number of credits to satisfy the EDCs and EGSs AEPS requirements. Oftentimes, solar owners will sell AECs to companies that aggregate AECs from across the United States to purchase from generators and sell to EDCs and EGSs that need to meet AEPS obligations.

The cost of these benefits from the AEPS is supplemented by electricity customers in Pennsylvania, and the 2020 AEPS Compliance Report calculated that “approximately \$0.012 (1.2 cents) of every electric service-related dollar is spent on AEPS compliance”, which also includes compliance with Tier I, Tier II, and the solar carveout.²⁹ Tier II requires the largest portion of the AEPS - requiring 10% of our electricity to come from alternative resources such as waste coal, large-scale hydro and other resources. Tier II credits are currently trading on a spot market at a higher price than Tier I or solar carve out credits. Therefore, electricity customers ratepayers are going to be paying more for a limited number of facilities that were built before the AEPS passage in 2004 and which have created few jobs. Tier I and the solar carveout, on the other hand, which includes wind, geothermal, solar and other renewable resources, spawned the build out of more than 46,000 new facilities since the passage of the AEPS, created 10,000 jobs, infused billions of dollars in investment into the state, and saved consumers money.

When compared to other states with restructured electricity markets that have adopted policies similar to the AEPS, Pennsylvania ranks as one of the lowest costs of compliance for electric utilities purchasing Alternative Energy Credits (AECs) and Alternative Compliance Payments (ACPs).³⁰ Comparing the relative benefits enabled by the AEPS to its costs is difficult, but it is unquestionable that the AEPS has contributed to the growth of new electricity generation sectors in Pennsylvania that are in strong positions to support the stabilization of Pennsylvania’s electricity prices, strengthen energy security, ensure freedom from external threats to electricity prices, and to create jobs and generate billions of dollars in economic development and private investment into for the state.

OVERVIEW OF PENNSYLVANIA’S 2023-2024 LEGISLATIVE PROPOSALS

²⁹ Pennsylvania Public Utility Commission in cooperation with the Pennsylvania Department of Environmental Protection. (2020). *Alternative Energy Portfolio Standards Act Compliance for Reporting Year 2020*. Pennsylvania Public Utility Commission | Regulating Utility Services | PA PUC. <https://www.puc.pa.gov/media/1410/aeps-annreport2020.pdf>

³⁰ Pennsylvania Department of Environmental Protection. (June 16, 2023). *Finding Pennsylvania’s Solar Future*. <https://www.dep.pa.gov/Business/Energy/OfficeofPollutionPrevention/SolarFuture/Pages/Finding-Pennsylvania%E2%80%99s-Solar-Future.aspx>

Several legislative proposals have been introduced in Pennsylvania's 2023-2024 session of the General Assembly that would impact the Commonwealth's solar industry, and thus impact Pennsylvania ratepayers. It is important to note that state government intervention in Pennsylvania energy markets has consistently resulted in benefits to ratepayers over the past few decades. Pennsylvania's Electricity Generation Customer Choice and Competition Act of 1996 allowed customers to shop for their electric generation provider for the first time and shifted the capital risk for constructing and operating new electricity generators from ratepayers to the private sector. In 2004, the Alternative Energy Portfolio Standards Act was adopted which enabled innovation in Pennsylvania's electricity generation sector, growing jobs and investments in the solar industry.

When analyzing the impacts of legislation on solar, it is important to consider the three distinct market segments of the solar industry. The customer-generator (Rooftop Solar/on-site solar) market consists of small installations, typically providing local electricity needs in the range of 3 kilowatts (kW) and up to 3,000 kW (and up to 5,000 kW in special cases) with any excess going directly into the distribution grid. These also include residential markets (up to 50kW) and commercial systems that are typically 50kW to 3,000 kW. The Utility Scale solar market includes large solar installations that provide electricity to the transmission grid for regional transmission operators to dispatch and are typically sized in the range of 5 megawatts (MW) to 100 MW or more. The Community Solar market represents an innovative business model that enables access to solar power for electricity users who cannot install solar energy generation on-site; however, this is not currently available in Pennsylvania. Community Solar installations could range from small shared systems up to 5,000 kW, depending on the program enabled by legislation in Pennsylvania. Each of these market segments experience different economies of scale, customer classes, and other market factors that result in different benefits and impacts to different ratepayers.

Currently, HB 1467 would amend the Alternative Energy Portfolio Standards Act and have positive benefits to Pennsylvania electricity consumers:

House Bill 1467 : Modernizing Pennsylvania's Renewable Energy Standards³¹

- Amends the Alternative Energy Portfolio Standards (AEPS) to increase the Tier I goal from 8% to 30% by 2030 and increase the solar carveout from 0.5% to 14%.
- This bill would enable community solar under the AEPS to ensure equivalent treatment of solar Alternative Energy Credits (AECs) administered through an existing and operational program. Community solar growth and performance would be predictable and the program would be administered under existing procedures currently implemented by electric utilities, developers and other solar stakeholders.
- The solar carveout would be segmented under three distinct categories with separate goals to appropriately recognize their varying market costs and benefits: customer-generator (rooftop/on-site solar) would be 4%, utility-scale would be 8%, and community solar would be 2%.
- For customer-generator and community solar, the lifetime of the AECs is 15 years at which time will transition to Tier I AECs.
- This bill also includes modifications to the Alternative Compliance Payments (ACPs) for solar projects respective of the differing market conditions each solar category experiences.
- Based on the cost of compliance and compared to existing proposals, HB 1467 proposes the least cost and most benefit to ratepayers.

Because the AEPS Tier I goal of 8% resources has been met, the state will need to add an additional 22% of these resources to the grid by 2030 or about 42,800,000 MWh of generation in order to reach 30% renewables as proposed in HB 1467. Below outlines the in-state solar carve out prescribed by

³¹ Pennsylvania General Assembly. (2023, March 15). *Regular Session 2023-2024 Senate Bill 230*. <https://www.legis.state.pa.us/cfdocs/billInfo/billInfo.cfm?sYear=2023&slnd=0&body=s&type=b&bn=230>

the bill, which states that 14% (including the current 0.5% in-state solar carve out) come from in-state solar and the remaining 16% (including the current 7.5% Tier I) come from Tier I non-solar carve out, which will continue to permit in-state and out-of-state Tier I PJM resources. This chart summarizes the proposed changes compared to the current AEPS bill.

Table. Current AEPS Goals and Proposed Additions by HB 1467

	Current AEPS Tier I Goal by 2021	Proposed Addition in HB 1467 by 2030	Proposed Total by 2030 by HB 1467
Tier I resources (permitted from PJM)	7.5%	8.5%	16%
Tier I In-State Solar Carve out:	0.5%		
Utility Scale	Not specified	8%	8%
Community Solar	Not permitted	2%	2%
Customer Generated	Not specified	3.5%	4%*
Total Tier I goal	8%	22%	30%

*includes original 0.5% solar carve out goal

PA SOLAR CENTER POSITION ON HOUSE BILL 1467

The PA Solar Center supports this bill with modifications that include prevailing wage requirements for projects larger than 1MWac to align with the provisions in the federal Inflation Reduction Act as well as addressing excess generation language that allows so-called "merchant generators." HB 1467 provides a necessary increase to the state's renewable energy and in-state solar goals that will send important market signals to investors. The bill also enables community solar in an equitable process in line with other renewable resources. With the recent federal Inflation Reduction Act, Pennsylvania needs to act swiftly so the state can take full advantage of building its renewable energy market as well as the potential 60,000+ jobs and billions in private investment that this bill is estimated to bring.

ADDITIONAL BACKGROUND ON COMMUNITY SOLAR

Community solar is a business model that requires enabling legislation in Pennsylvania to allow solar projects to benefit multiple customers from an off-site solar array. In other states where community solar is permitted, electric customers can buy or lease a percentage of an off-site solar array and receive credit on their electric bills for the electricity generated commensurate with their share. The intent of a community solar program is to provide the option for renters, homeowners, businesses, nonprofits, and others the benefit of locally generated solar because they may be restricted in their ability to install solar panels on-site for some reason.³²

Over the past several years, there have been many community solar proposals considered by Pennsylvania's General Assembly. Some of the issues being discussed in Pennsylvania include ownership opportunities of community solar installations, minimum subscription requirements, the incentive mechanism, and maximum capacity requirements. It is important to underscore the intent of community solar legislation in the context of Pennsylvania's energy landscape, which is that community solar programs should both attract investments from firms that specialize in developing and commissioning community solar installations as well as protect electricity customers from unforeseeable changes to Pennsylvania's energy landscape with the overall goal of ensuring more electricity customers can access the benefits of solar that specifically guarantee savings.

³² U.S. Department of Energy Office of Energy Efficiency and Renewable Energy. (2023, June 16). *Community solar basics*. Energy.gov. <https://www.energy.gov/eere/solar/community-solar-basics>

In addition, while the PA Solar Center supports community solar, it must be passed in tandem or as a part of an AEPS expansion to not further harm the current AEC market. A strong AEPS is also needed to create a robust community solar program.

CONCLUSION

In conclusion, Pennsylvania must prepare for the modern energy economy in order to take full advantage of technologies of the 21st century grid, to provide thousands of new energy economy jobs to our citizens, and to create energy security and reliability. Pennsylvania can unlock the benefits of solar and other renewables by modernizing the AEPS to increase Tier I and solar carveout goals, and permit community solar.

Thank you for the opportunity to submit comments on this important topic. The Pennsylvania Solar Center is always available to discuss the costs and benefits of solar with any member of the Committee. We applaud your efforts on this important issue of creating an affordable, reliable, and secure energy future for all Pennsylvanians.