



# Electric Power Outlook for Pennsylvania 2020-2025

August 2021

Pennsylvania Public Utility Commission

# **ELECTRIC POWER OUTLOOK FOR PENNSYLVANIA 2020–2025**

**August 2021**

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Technical Utility Services

Paul T. Diskin, *Director*

# Executive Summary

## Introduction

Section 524(a) of the Public Utility Code (Code) requires jurisdictional electric distribution companies (EDCs) to submit to the Pennsylvania Public Utility Commission (PUC or Commission) information concerning plans and projections for meeting future customer demand.<sup>1</sup> The PUC's regulations set forth the form and content of such information, which is to be filed on or before May 1 of each year.<sup>2</sup> Section 524(b) of the Code requires the Commission to prepare an annual report summarizing and discussing the data provided, on or before September 1. This report is to be submitted to the General Assembly, the Governor, the Office of Consumer Advocate and each affected public utility.<sup>3</sup>

Since the enactment of the *Electricity Generation Customer Choice and Competition Act*,<sup>4</sup> the Commission's regulations have been modified to reflect the competitive market. Thus, projections of generating capability and overall system reliability have been obtained from regional assessments.

***Note: Any comments or conclusions contained in this report do not necessarily reflect the views or opinions of the Commission or individual Commissioners. Although issued by the Commission, this report is not to be considered or construed as approval or acceptance by the Commission of any of the plans, assumptions, or calculations made by the EDCs or regional reliability entities and reflected in the information submitted.***

## Overview

This report concludes that sufficient generation, transmission and distribution capacity exists to reasonably meet the needs of Pennsylvania's electricity consumers for the foreseeable future.

Regional generation adequacy and reserve margins of the mid-Atlantic will be satisfied through 2030, provided planned generation and transmission projects will be forthcoming in a timely manner. The North American Electric Reliability Corporation (NERC) provided a reliability assessment of the Regional Transmission Organization (RTO), which is PJM Interconnection, LLC (PJM), and concluded that PJM will meet its reserve margin requirements.

In 2021, the PJM reserve margin requirement is 15.1% with an anticipated available reserve of 39.1%, as compared to a reserve margin requirement of 15.9% and anticipated available reserve of 39.43% in 2020. NERC also projects PJM will have enough generation capacity to meet its reserve margin requirements through 2030.<sup>5</sup>

Pennsylvania's aggregate electrical energy usage (residential, commercial, industrial, sales for resale, and other) in 2020 was 139,185 gigawatt hours (GWh) as compared to: 145,090 GWh in 2019; 148,333 GWh in 2018; and 142,740 GWh in 2017. Year-over-year (YOY) electric usage decreased by 4.07%. In general, commercial and industrial usage decreased YOY by 10.07% and

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<sup>1</sup> See 66 Pa.C.S. § 524(a).

<sup>2</sup> See 52 Pa. Code §§ 57.141—57.154.

<sup>3</sup> See 66 Pa.C.S. § 524(b).

<sup>4</sup> 66 Pa.C.S. §§ 2801—2812.

<sup>5</sup> See NERC, *2020 Long-Term Reliability Assessment*, December 2020, available at:

[https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC\\_LTRA\\_2020.pdf](https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC_LTRA_2020.pdf).

5.71%, respectively. Residential usage increased by 1.8%. The decrease in commercial and industrial usage, and the slight increase in residential usage, is likely indicative of the impacts on the economy of the COVID-19 pandemic. Pennsylvania's gross domestic product (GDP) for 2020 saw a YOY decrease of 3.5%, as compared to a YOY increase of 3.9% in 2019.<sup>6</sup>

Over the next five years, total Pennsylvania electric energy usage is projected to increase at an overall average annual rate of 0.43%. This includes an average residential growth rate decrease of 0.06%, a commercial growth rate increase of 0.59%, and an industrial growth rate increase of 0.81% for the entire five-year projected period.

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<sup>6</sup> US Bureau of Economic Analysis: <https://www.bea.gov/>.

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## ***Section 1 – Regional Electric Outlook***

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### ***Purpose***

The *Electric Power Outlook for Pennsylvania 2020-2025* discusses the current and future electric power supply and demand situation for the 11 investor-owned jurisdictional electric distribution companies (EDCs) operating in the state and the entities responsible for maintaining the reliability of the bulk electric supply system within the region that encompasses the state.

Pursuant to Title 66, Pennsylvania Consolidated Statutes, Section 524(b), the PUC annually submits this report to the General Assembly, the Governor, the Office of Consumer Advocate and affected public utilities. It also is posted on the Commission's website.<sup>7</sup>

The information contained in this report includes highlights of the past year, as well as the EDCs' projections of energy demand and peak load for 2020-2025. The state's seven largest EDCs<sup>8</sup> represent 99% of both jurisdictional electricity customers and electrical energy consumption in Pennsylvania. Accordingly, information regarding the other four smallest EDCs contained in this report is limited. The report also provides a regional perspective with statistical information on the projected resources and aggregate peak loads for the region that impacts Pennsylvania.

As permitted under Section 2809(e) of the Public Utility Code, the Commission has adopted revised regulations, reducing from 20 years to five years the reporting requirements and the reporting horizon for energy demand, connected peak load, and number of customers. Because Pennsylvania has a competitive retail electric market, certain information is no longer required to be reported. This includes information regarding generation facilities such as capital investments, energy costs, new facilities, and expansion of existing facilities.

Data for the report is submitted annually by EDCs, pursuant to the Commission's regulations.<sup>9</sup> Additionally, the Commission relies on reports and analyses of regional entities, including the ReliabilityFirst Corporation (RFC) and PJM, to obtain a more complete assessment of the current and future status of the electric power supply within the region. Sources also include data submitted by regional reliability councils to the North American Electric Reliability Corporation (NERC), which is subsequently forwarded to the U.S. Energy Information Administration (EIA).

### ***Regional Reliability Organizations***

In Pennsylvania, all major EDCs are interconnected with neighboring systems extending beyond state boundaries. These systems are organized into regional reliability entities responsible for ensuring the reliability of the bulk electric system.

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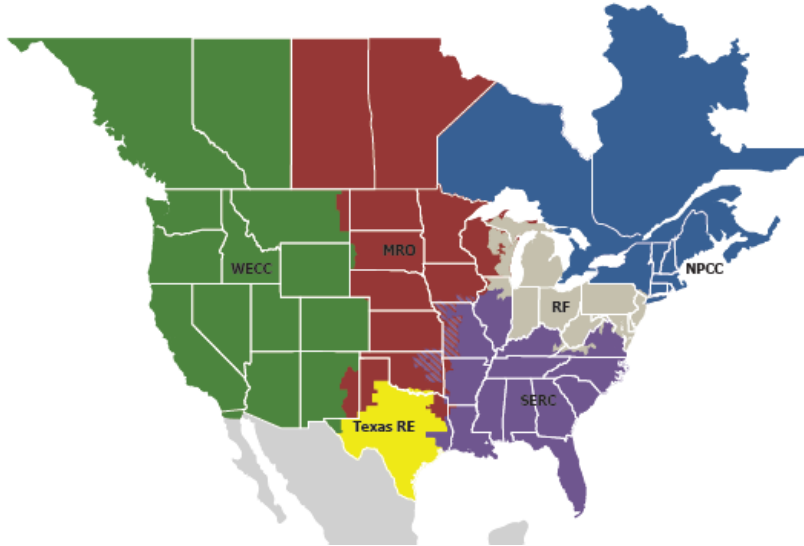
<sup>7</sup> The reports are available at [http://www.puc.pa.gov/utility\\_industry/electricity/electric\\_reports.aspx](http://www.puc.pa.gov/utility_industry/electricity/electric_reports.aspx).

<sup>8</sup> Those EDCs with at least 100,000 customers.

<sup>9</sup> See 52 Pa. Code §§ 57.141—57.154.

## *North American Electric Reliability Corporation*

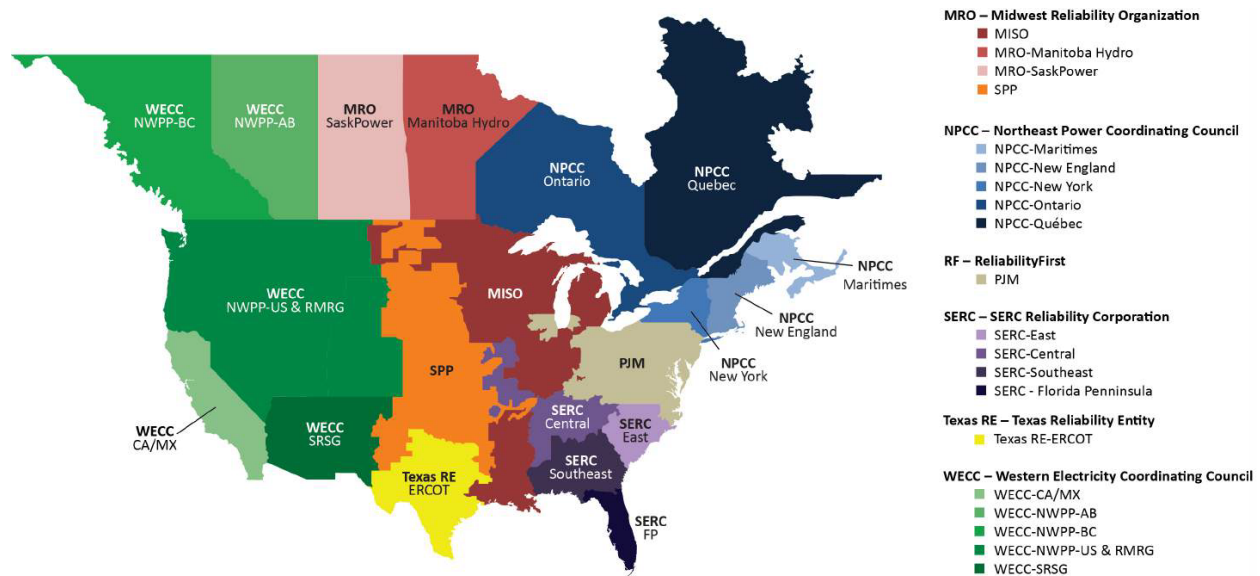
The North American Electric Reliability Corporation (NERC) has been granted legal authority by the Federal Energy Regulatory Commission (FERC) to enforce reliability standards and to mandate compliance with those standards. NERC oversees the reliability of the bulk power system that provides electricity to 334 million people, has a total demand of over 830 gigawatts (GW), has approximately 211,000 miles of high-voltage transmission lines (230,000 volts and greater), and represents more than \$1 trillion worth of assets.



As shown above, NERC's members operate in six regional reliability entities. Members include investor-owned utilities, federal and provincial entities, rural electric cooperatives, state/municipal and provincial utilities, independent power producers, independent system operators, merchant electricity generators, power marketers and end-use electricity customers. The membership accounts for virtually all the electricity supplied in the United States, Canada, and a portion of Baja California Norte, Mexico. The regional entity operating in Pennsylvania is ReliabilityFirst Corporation (RFC).

In order to conduct NERC reliability assessments, NERC further divides the Regional Entities into 20 assessment areas, shown below. NERC notes that this level of granularity allows it to better evaluate resource adequacy and ensure deliverability constraints between and among assessment areas are accounted for.





NERC establishes criteria, standards and requirements for its members and all assessment areas. All assessment areas must operate in a seamless and stable condition to prevent uncontrolled system separations and cascading outages caused by any single transient event.

### *NERC Reliability Assessment*

The *2020 Long-Term Reliability Assessment*<sup>10</sup> is NERC’s independent review of the 10-year reliability outlook for the North American bulk power system (BPS) while identifying trends, emerging issues, and potential risk. Also reported is insight on resource adequacy and operating reliability, as well as an overview of projected electricity demand growth for individual assessments areas. NERC also provides specific review of the PJM Regional Transmission Organization (RTO). In the 2020 assessment, NERC highlighted several key findings regarding issues that are emerging and have the potential to increase risks to reliability.

NERC noted that the *2020 Long-Term Reliability Assessment* served as a comprehensive, reliability-focused perspective on the 10-year outlook for the North American BPS and identified potential risks to inform industry planners and operators, regulators, and policy makers.

Based on data and information collected for its assessment, NERC has identified five key findings, which are detailed, below.

<sup>10</sup> See NERC, *2020 Long-Term Reliability Assessment*, December 2020, available at: [https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC\\_LTRA\\_2020.pdf](https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC_LTRA_2020.pdf)



## *NERC Key Findings*

- Resource Adequacy (Planning Reserve Margin, or PRM) – Projected reserves fall below the Reference Margin Level (RML) in the NPCC-Ontario assessment area beginning in 2022, and in the MISO assessment area in 2025. There is sufficient electricity resource capacity in all other areas. Specific items of note include:
  - Throughout the assessment period and particularly in the first five years, there is heightened uncertainty in demand projections stemming from the progression of the coronavirus (COVID-19) pandemic and the response of governments, society, and the electricity industry. Reserve margins are sensitive to demand forecast uncertainty. The uncertainty in demand forecast projections could exacerbate planning reserve shortfalls in areas that are below or near RMLs.
  - The MISO area will have adequate, but tighter, reserve margins for 2021. MISO and participating stakeholder action is needed to ensure future resource adequacy by achieving certainty of prospective resources beginning in 2025 when their Anticipated Reserve Margins (ARMs) falls below the RML.
  - Sufficient resources are planned to be available throughout the assessment period in all other areas.
  
- Assessment of Resource Adequacy across All Hours (Energy Adequacy) – NERC notes that while its probabilistic analysis indicates that resource adequacy meets or exceeds resource adequacy benchmarks, there is increasing risk of resource shortfalls during nonpeak hours in parts of the WI, MISO, and Texas assessment areas. Specific items of note include:
  - The deterministic PRM metric, especially in areas with higher penetrations of resources with energy limitations and uncertainty (i.e., wind, solar, natural gas, hydro), may not be a completely accurate way to measure an area’s resource adequacy during all hours of the year.
  - The traditional methods of assessing resource adequacy at peak load times may not accurately or fully reflect the ability of the new resource mix to supply energy and reserves for all hours. Energy limitations can exist, requiring probabilistic analysis methods to identify risks to reliability that result from shortfalls in the conversion of capacity to energy (energy adequacy). This new resource mix includes: natural gas-fired generation; unprecedented proportions of nonsynchronous resources, including renewables and battery storage; demand response; smart- and micro-grids; and other emerging technologies. Collectively, the new resources are more susceptible to energy sufficiency uncertainty.
  
- Resource Mix Changes – Variable energy resources continue to grow, and thermal resource capacity declines in most areas throughout this assessment period. As a result, increased attention is required for the planning and operating of a more complex resource mix. Specific items of note include:

- In many areas, variable energy resources are increasingly important to meet electricity demand. Sufficient flexible resources are needed in areas with high levels of variable generation to avoid shortfalls when variable resource output is insufficient to meet demand.
  - Inverter based resources, including most solar and wind as well as new battery or hybrid generation, respond to disturbances and dynamic conditions based on programmed logic and inverter controls. Maintaining a reliable system as the penetration of inverter-based resources increases requires planners and operators to be cognizant of potential disturbance-related performance issues.
  - Invalid or inaccurate generator models can contribute to steady-state or dynamic study result errors, affecting the reliability of the interconnected transmission system.
  - Additional fossil-fueled generator retirements could occur as a result of economic uncertainty and environmental goals.
- Distributed Energy Resource (DER) Growth – DER growth continues, prompting NERC, planners, and operators in areas where penetrations have reached or are approaching impactful levels to take actions to ensure planning processes and operating measures are in place to ensure reliability. Specific items of note include:
- Texas, Ontario, and areas in the Northeast United States are approaching impactful DER levels presently seen in the Western Interconnect (WI), leading to the implementation of more sophisticated planning and operating measures. Other areas are closely monitoring DER growth and incorporating DER projections in long-term planning.
- Pandemic Impacts – The ongoing pandemic is not presenting specific threats or degradation to the reliable operation of the BPS for this assessment period. However, it is producing increased uncertainty in future electricity demand projections and presents cyber security and operating risks. Specific items of note include:
- Most assessment areas did not adjust long-term forecasts for pandemic impacts in the *2020 Long-Term Reliability Assessment* because the effects on peak demand levels were unclear and duration of the pandemic is unpredictable. Summer operating experience in many areas showed increased residential demand that altered hourly load profiles and made up for decreased commercial/industrial load to match pre-pandemic peak demand levels.
  - Reduced industrial load can affect the availability of demand reduction programs that rely on curtailment of industrial customers during periods of high demand.

### *NERC Recommendations*

Based on the identified key findings, NERC formulated the following recommendations:

- NERC recommends that regulators and policymakers in risk areas should coordinate with electric industry planning and operating entities to develop policies that prioritize reliability, such as promoting the development and use of additional flexible resources, energy-assured generation, and resource diversity.
- NERC also recommends that regulators and policy makers should consider revising their resource adequacy requirements to consider new risks that emerge during nonpeak hours, limitations from neighboring systems during system-wide events, and the reduced resource diversity and/or increased reliance on a single fuel source or delivery mode.
- NERC recommends that industry should identify and commit flexible resources to meet increasing ramping and load-following requirements that result from increased variable energy resources and not solely to meet peak load capacity requirements.
- NERC should enhance the reliability assessment process by evaluating energy adequacy risks in seasonal reliability assessments to help inform stakeholders of reliability needs and potential solutions in the short-term.
- To better identify fuel supply risks during planning, NERC should collaborate with industry to identify design-basis fuel supply scenarios of normal and extreme events for use by BPS and resource planners.
- NERC should increase communication and outreach with state and provincial policymakers on resource adequacy risks and challenges to ensure the risks being presenting in all ERO reliability assessments are well known and understood.
- NERC should advance the efforts to modify existing Reliability Standards to account for inverter-based resource performance and characteristics. In particular, protection and control, data sharing, and modeling-related standards all need to consider the new risks imposed by inverter-based resources connected to both distribution systems and the BPS.
- NERC recommends that industry should verify that inverter-based resource models used for steady state and dynamic power systems analysis agree with the as-built, plant-specific settings, controls, and behaviors of the facility. Generator Owners/Operators should engage with equipment manufacturer sand coordinate with their Transmission Planner/Planning Coordinators to understand the modeling challenges and proactively address deficiencies identified in several NERC event reports and power system modeling assessments.
- Reliability entities and model-building designees should enhance their reviews of steady-state power flow and dynamics base case models for model deficiencies associated with existing and newly interconnecting BPS-connected inverter-based resources.
- NERC and industry should address aggregate DER data needs for transmission planning and operational studies and develop guidance for BPS planning with increasing DERs.

ReliabilityFirst Corporation (RFC), headquartered in Fairlawn, Ohio, is one of six NERC regional entities serving North America, and is the regional reliability entity for Pennsylvania. Its service territory consists of more than 72 million people in a 238,000 square-mile area covering New Jersey, Delaware, Pennsylvania, Maryland, District of Columbia, West Virginia, Ohio, Indiana; and parts of Michigan, Wisconsin, Illinois, Kentucky, Tennessee, and Virginia. Its membership includes load-serving entities (LSEs),<sup>11</sup> RTOs, suppliers and transmission companies.

The RFC controls reliability standards and enforcement by entering into delegation agreements with regional entities to ensure adequate generating capacity and transmission. Program areas include Compliance monitoring, enforcement, entity development, event analysis and situational awareness, regulation and certification, reliability assessment and performance analysis, risk analysis and mitigation, and standards.

To ensure the health and safety of staff and stakeholders during the COVID-19 pandemic, RFC instituted its business continuity plan in March 2020. This included the transition to telecommuting and use of videoconference calls for entity engagements rather than on-site visits. RFC noted that it has continued to operate seamlessly and accomplish its mission while COVID-19 mitigation procedures are in place.

RFC is responsible for resolving and enforcing noncompliance using a risk-based approach. RFC notes that this involves the following: assessing the risk of the noncompliance and understanding the root cause (and contributing cause(s)); working with entities to ensure they take steps to remediate the noncompliance and prevent recurrence; and processing the noncompliance through an appropriate resolution based on risk and other factors.

In 2020, RFC processed 461 noncompliances (excluding noncompliances where RFC was the Affected Regional Entity under the Multi-Regional Registered Entity program) — the majority of which were NERC Critical Infrastructure Protection (CIP)-related, and the overwhelming majority of which were compliance exceptions. Entities self-reported 90% of noncompliances.<sup>12</sup>

## ***Regional Transmission Organizations***

The two RTOs within the RFC footprint are PJM Interconnection, LLC (PJM) and Midcontinent Independent System Operator, Inc. (MISO).

### ***PJM Interconnection***

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<sup>11</sup> A Load Serving Entity (LSE) is any entity (or the duly designated agent of such an entity), including a load aggregator or power marketer that (a) serves end-users within the PJM Control Area, and (b) is granted the authority or has an obligation pursuant to state or local law, regulation or franchise to sell electric energy to end-users located within the PJM Control Area (definition from *PJM.com* glossary).

<sup>12</sup> See: <https://rfirst.org/about/publicreports/Public%20Reports/2020%20Annual%20Report.pdf>.



PJM is a regional transmission organization that ensures the reliability of the largest centrally dispatched control area in North America, covering 369,089 square miles. PJM coordinates the operation of more than 185,378 megawatts (MW) of generating capacity with 165,563 MW of available peak demand and more than 85,103 miles of transmission lines.<sup>13</sup> The PJM RTO coordinates the movement of electricity for over 65 million people through all or parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia and the District of Columbia. PJM manages a sophisticated regional

planning process for generation and transmission expansion to ensure the continued reliability of the electric system. PJM is responsible for maintaining the integrity of the regional power grid and for managing changes and additions to the grid to accommodate deactivating and new generating plants, substations, and transmission lines. In addition, PJM analyzes and forecasts future electricity needs of the region. Its planning process ensures that the electric system growth is efficient and takes place in an orderly fashion. PJM supports market innovation through its active support for demand response markets for energy, capacity and ancillary services, and helps ensure that appropriate infrastructure and operational capabilities are in place to support newly installed renewable energy and other generation facilities. PJM’s mission can be described as below:<sup>14</sup>

- Acts as a neutral, independent party. PJM operates a competitive wholesale electricity market and manages the high-voltage electricity grid to ensure reliability for more than 65 million people.
- PJM’s long-term regional planning process provides a broad, interstate perspective that identifies the most effective and cost-efficient improvements to the grid to ensure reliability and economic benefits on a system wide basis.
- An independent Board oversees PJM’s activities. Effective governance and a collaborative stakeholder process help PJM achieve its vision: “To be the electric industry leader – today and tomorrow – in reliable operations, efficient wholesale markets, and infrastructure development.”

PJM coordinates the continuous buying, selling and delivery of wholesale electricity through open and competitive spot markets. PJM balances the needs of suppliers, wholesale customers and other market participants, and continuously monitors market behavior in tandem with the Monitoring Analytics LLC, the PJM RTO Market Monitoring Unit.

PJM membership in 2020 was 1,038. In 2020, the PJM market amount billed decreased to \$33.6 billion as compared to: \$39.2 billion in 2019; \$49.8 billion in 2018; and \$41.17 billion in 2017. PJM’s 2020 transmission volumes were 757.3 terawatt hours (TWhs) as compared to: 787.3 TWhs in 2019; 806.5 TWhs in 2018; and 807 TWhs in 2017.<sup>15</sup>

<sup>13</sup> See PJM, *2020 PJM Annual Report*, available at <https://services.pjm.com/annualreport2020/>.

<sup>14</sup> <http://www.pjm.com/about-pjm/who-we-are.aspx>.

<sup>15</sup> See PJM, *2020 PJM Annual Report*, available at <https://services.pjm.com/annualreport2020/>.

PJM's annual growth for net energy load is expected to average 0.3% over the next 10 years and 0.3% over the next 15 years.<sup>16</sup> PJM received deactivation notifications throughout 2020, totaling 4,428 MW as compared to: 7,650 MW in 2019; 10,882 MW in 2018; 4,800 MW in 2017; 5,605 MW in 2016; 1,626 MW in 2015; and 4,291 in 2014. To replace retiring generators, there are over 21,546 MW of new generating resources under construction as of Dec. 31, 2020, with an additional 83,865 MW actively under study.<sup>17</sup>

### *PJM Bulk Power System Status – Winter Performance<sup>18</sup>*

PJM noted the electrical grid provided reliable service through the 2020–21 winter and noted the following aspects of the grid and generator performance in the 2020-21 winter:

- During February, temperatures were very close to normal in the eastern part of the RTO and well below normal in the western zones.
- Four Cold Weather Alerts were issued this winter – all occurring in February.
- Temperatures were at or slightly above average over the entire winter for most of the RTO footprint.
- Temperatures in the RTO's western zones, however, were below average for the season.
- Peaks were dampened this winter, most likely due to the ongoing impacts of COVID-19.
- During the cold weather experienced throughout President's Day week, PJM had unprecedented interchange.<sup>19</sup> During the top-10 peak interchange hours, interchange was more than three times higher than the 2020-21 winter average.
- During the top-10 peak interchange hours, PJM was exporting more than five times as many MW as it was importing. During the top-10 peak interchange hours, exports were two and a half times higher than the 2020/21 winter average.
- Natural gas interstate pipeline operations were relatively uneventful during this winter period with no major capacity restrictions.

### *PJM Pennsylvania State Infrastructure*

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<sup>16</sup> See PJM, *PJM Load Forecast Report January 2021*, available at: <https://www.pjm.com/-/media/library/reports-notices/load-forecast/2021-load-report.ashx>.

<sup>17</sup> See PJM, *PJM 2020 Regional Transmission Expansion Plan Report*, Book 1, available at: <https://www.pjm.com/-/media/library/reports-notices/2020-rtep/2020-rtep-book-1.ashx>.

<sup>18</sup> See PJM, *Winter Operations of the PJM Grid: Dec. 1, 2020 – Feb. 28, 2021*, available at: <https://www.pjm.com/-/media/committees-groups/committees/oc/2021/20210408/20210408-item-14-winter-operations-review.ashx>.

<sup>19</sup> Interchange is the import and export of energy across balancing authorities through the PJM Interchange Energy Market. For example, energy from PJM may be exported to MISO and vice versa, depending on balancing needs.



The Pennsylvania electric power outlook generally reflects the projections of RFC, which are based on forecasts of PJM and MISO. PJM evaluates regional data concerning the current and future condition of the bulk power system because it is planned on a regional rather than a state basis. While the aggregate load for the state's consumers can be determined, the availability and mix of electrical generation units cannot be predicted, since the complexities of weather, generation availability, and fuel prices will be the primary driving forces.

An RTO such as PJM has the primary responsibility to coordinate and plan future upgrades and expansion of the regional transmission system. PJM noted that a key part of the planning process is to evaluate existing generation deactivation, new generation interconnection, and merchant transmission interconnection requests. Although transmission planning is performed on a regional basis, most upgrades and expansion in Pennsylvania are planned to support the local delivery system and new generating facilities.

LSEs acquire capacity resources as follows: entering bilateral agreements; participating in the PJM-operated capacity market; owning generation; and/or pursuing load management options. The PJM generator interconnection process ensures new capacity resources satisfy LSE requirements to reliably meet their obligations.

All new generation that anticipates interconnecting and operating in parallel with the PJM transmission grid and participating in the PJM capacity and/or energy markets must submit an interconnection request to PJM for technical evaluation and approval. A summary of key information related to generation capacity and usage for the PJM RTO area and information specific to electric generation in Pennsylvania are provided in Appendices B and C of this report.

PJM Pennsylvania State Infrastructure Summary:<sup>20</sup>

- Existing Capacity: Natural gas represents approximately 44% of the total installed capacity in Pennsylvania while coal represents 21.3%, and nuclear 19.4%. In the PJM RTO area, natural gas is approximately 43.4% of total installed capacity while coal is 27.5% and nuclear 17.7%.
- Interconnection Requests: Solar represents approximately 54.6% of new interconnection requests in Pennsylvania, while natural gas represents approximately 32% of new requests. These percentages are almost the inverse of last year when natural gas represented approximately 54% of new interconnection requests.
- Deactivations: 78.3 MW of capacity gave notification of deactivation within Pennsylvania in 2020, as compared to 976.2 MW in 2019. See Appendix B for further details on the generation that gave notification of deactivation.
- Regional Transmission Expansion Plan (RTEP) 2020: Pennsylvania's RTEP 2020 projects a total of more than \$752.7 million in investment. Approximately 85.3% of that total is

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<sup>20</sup> See PJM, *PJM Pennsylvania State Infrastructure Report 2020*, available at: <https://www.pjm.com/-/media/library/reports-notice/state-specific-reports/2020/2020-pennsylvania-state-infrastructure-report.ashx>.



represented by supplemental projects.<sup>21</sup> These investment figures only represent RTEP projects that cost at least \$5 million. A listing of all RTEP projects over \$10 million, as well as those specific to Pennsylvania, may be found in PJM's RTEP.<sup>22</sup> The status of individual PJM Board-approved baseline and network RTEP projects, as well as that of Transmission Owner Supplemental Projects, is available on the PJM website.<sup>23</sup>

- Load Forecast: Pennsylvania summer peak load growth is expected to range between 0.2% and 0.9% annually over the next 10 years. The overall PJM RTO projected load growth rate is 0.3% over the next 10 years.
- Calendar Year 2020 Market Performance: Pennsylvania's average hourly LMPs were slightly below PJM's average hourly LMPs.
- Emissions: 2020 carbon dioxide, nitrogen oxides, and sulfur dioxide emissions all decreased from 2019 levels.
- The existing generating capacity in Pennsylvania totals 46,941 MW in 2020 as compared to 44,705 MW in 2019; 44,660 MW in 2018; 42,257 MW in 2017; and 45,700 MW in 2016.
- 2022-23 Capacity Market: PJM completed a successful Base Residual Auction (BRA) in early 2021.<sup>24</sup> The BRA procured 144,477 MW of resources for the period of Jun. 1, 2022, through May 31, 2023, at a total cost of \$3.9 billion. This total is \$4.4 billion less than in the previous auction, for the 2021/2022 Delivery Year, when adjusted for changes in Fixed Resource Requirement (FRR) elections.
  - The auction produced a price of \$50/MW-day for much of the PJM footprint, compared to \$140/MW-day in the most recent auction in 2018. Prices are higher in some regions due to transmission limits.
  - Renewable resources increased in the capacity market, with a total of 1,728 MW of wind cleared in the auction, which was an increase of 312 MW over the previous capacity auction. Solar increased by 942 MW over the previous capacity auction, with 1,512 MW clearing.

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<sup>21</sup> Supplemental projects, known at one time as Transmission Owner initiated projects, are not required for compliance with system reliability, operational performance or market efficiency economic criteria, as determined by PJM. PJM reviews these projects to ensure they do not introduce other reliability criteria violations. While not subject to PJM Board approval, they are included in PJM's RTEP models. See PJM, *PJM 2020 Regional Transmission Expansion Plan Report*, Book 1, available at: <https://www.pjm.com/-/media/library/reports-notice/2020-rtep/2020-rtep-book-1.ashx>.

<sup>22</sup> *Id.*, Pennsylvania-specific information begins on page 185.

<sup>23</sup> <https://www.pjm.com/planning/project-construction>.

<sup>24</sup> <https://www.prnewswire.com/news-releases/pjm-successfully-clears-capacity-auction-to-ensure-reliable-electricity-supplies-301304562.html>.

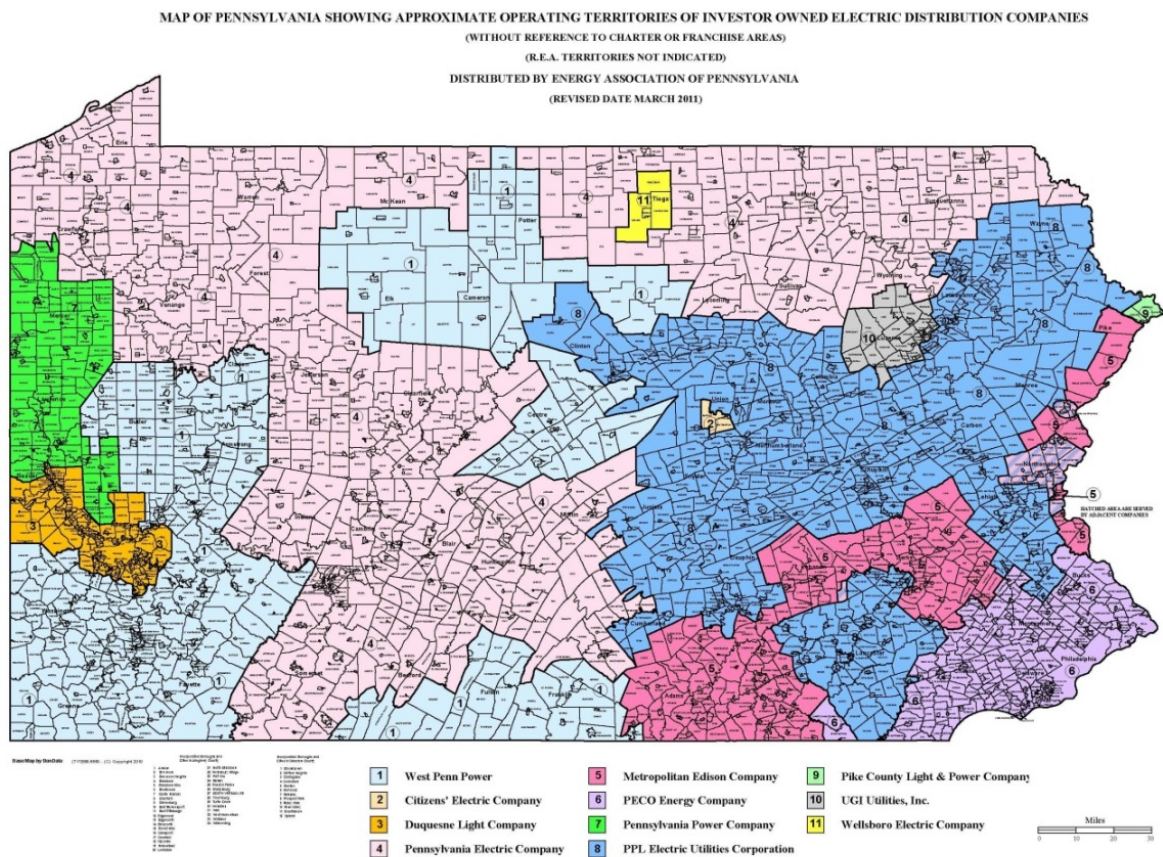
## Section 2 – Pennsylvania Electric Outlook

### *Electric Distribution Companies*

Eleven EDCs currently serve the electricity needs of most Pennsylvania's homes, businesses and industries. Cooperatives and municipal systems provide service to several rural and urban areas. The Commission does not regulate the cooperative and municipal electric systems. The 11 jurisdictional EDCs are:

- Citizens' Electric Company
- Duquesne Light Company
- Metropolitan Edison Company (FirstEnergy)
- Pennsylvania Electric Company (FirstEnergy)
- Pennsylvania Power Company (FirstEnergy)
- PPL Electric Utilities Corporation
- PECO Energy Company (Exelon)
- Pike County Light & Power Company
- UGI Utilities Inc. – Electric Division
- Wellsboro Electric Company
- West Penn Power Company (FirstEnergy)

*Figure 1 Map of EDC Service Territories*



Each LSE is responsible to make provisions for adequate generating resources to serve its customers. The local EDC or a Commission approved alternative default service provider (DSP)<sup>25</sup> must acquire electricity, pursuant to a Commission approved competitive procurement process, for customers who:

1. Contract with a competitive Electric Generation Supplier (EGS). Contracting with an EGS allows customers to choose an electric provider in the competitive retail market. The Commission provides a website that provides a one source comparison of EGS electric offers and allows electric customer to directly link into an EGS website to switch electric services.<sup>26</sup>

or,

2. Stay with the local EDC or Commission approved DSP. Under current law, the default electric generation prices are required to be based upon a “prudent mix” procurement strategy that will produce the least cost to customers over time.<sup>27</sup>

<sup>25</sup> 66 Pa.C.S. § 2803.

<sup>26</sup> <http://www.papowerswitch.com>.

<sup>27</sup> 66 Pa.C.S. § 2807(e)(3).

## *Alternative Energy Portfolio Standards*

The PUC continues to implement procedures and guidelines necessary to carry out the requirements of the Alternative Energy Portfolio Standards Act (AEPS) of 2004 (Act 213).<sup>28</sup> Act 213 requires that an annually increasing percentage of electricity sold to Pennsylvania retail customers be derived from alternative energy resources. The amount of electricity to be supplied by alternative resources increased to its peak total of 18% in 2021. In 2008, the Commission adopted regulations pertaining to the AEPS obligations of EDCs and EGSs.<sup>29</sup>

Eligible resources are categorized as Tier I and Tier II. Tier I resources include solar, wind, low-impact hydropower, geothermal, biologically derived methane gas, fuel cells, biomass (including electricity generated in Pennsylvania utilizing by-products of the pulping process and wood manufacturing process, including bark, wood chips, sawdust and lignins in spent pulping liquors)<sup>30</sup> and coal mine methane. Tier II resources include waste coal, demand side management, distributed generation, large-scale hydropower, by-products of wood pulping and wood manufacturing, municipal solid waste, and integrated combined coal gasification technology.

Act 213 requires that by 2021, 8% of the electricity sold in each EDC service territory be derived from Tier I resources, including solar, and 10% from energy derived from Tier II resources. Act 213 set forth a 15-year schedule for complying with its mandates, as shown in Table 1 below. All EDCs and EGSs have been required to comply since Jan. 1, 2011.

*Table 1 – Alternative Energy Portfolio Standards*

<b>Year</b>	<b>Period</b>	<b>Tier I (incl. Solar)</b>	<b>Tier II</b>	<b>Solar PV</b>
1	June 1, 2006 through May 31, 2007	1.50%	4.20%	0.0013%
2	June 1, 2007 through May 31, 2008	1.50%	4.20%	0.0030%
3	June 1, 2008 through May 31, 2009	2.00%	4.20%	0.0063%
4	June 1, 2009 through May 31, 2010	2.50%	4.20%	0.0120%
5	June 1, 2010 through May 31, 2011	3.00%	6.20%	0.0203%
6	June 1, 2011 through May 31, 2012	3.50%	6.20%	0.0325%
7	June 1, 2012 through May 31, 2013	4.00%	6.20%	0.0510%
8	June 1, 2013 through May 31, 2014	4.50%	6.20%	0.0840%
9	June 1, 2014 through May 31, 2015	5.00%	6.20%	0.1440%
10	June 1, 2015 through May 31, 2016	5.50%	8.20%	0.2500%
11	June 1, 2016 through May 31, 2017	6.00%	8.20%	0.2933%
12	June 1, 2017 through May 31, 2018	6.50%	8.20%	0.3400%
13	June 1, 2018 through May 31, 2019	7.00%	8.20%	0.3900%
14	June 1, 2019 through May 31, 2020	7.50%	8.20%	0.4433%
15	June 1, 2020 through May 31, 2021	8.00%	10.00%	0.5000%

To meet the requirements of Act 213, EDCs and EGSs acquire alternative energy credits (AECs) in quantities commensurate with the required tier percentage and the electricity sold to retail customers.

<sup>28</sup> Alternative Energy Portfolio Standards Act, effective Feb. 28, 2005; 73 P.S. §§ 1648.1—1648.8.

<sup>29</sup> See Docket No. L-00060180; 52 Pa. Code §§ 75.61-75.70.

<sup>30</sup> See 66 Pa.C.S. § 2814(b).

AECs are separate from the electricity sold to customers. An AEC represents one megawatt hour (MWh) of qualified alternative electric generation or conservation, whether self-generated, purchased along with the electric commodity, or purchased separately through a tradable instrument.<sup>31</sup>

AECs are earned when a qualified facility generates one MWh of electricity through either estimated or actual metered production. An AEC is a tradable certificate that represents the characteristics of electricity generated from a facility. An AEC can be sold or traded separately from the power. AECs are generally purchased by EDCs and EGSs in order to meet the percentages required under AEPS for any given year. However, AECs can be voluntarily retired – often in the interest of claiming the associated attributes. AECs can be traded multiple times until they are retired for compliance purposes. An AEC can only be retired once and may not be used to satisfy any other obligations, whether voluntarily or mandated by a renewable energy portfolio standard in another state.

The Commission, through its Pennsylvania AEC program administrator verifies that EGSs and EDCs are complying with the minimum requirements of Act 213. PJM EIS' Generation Attribute Tracking System (GATS) is the alternative energy credit registry used to track alternative energy credit creation and transfer among qualified alternative energy systems. GATS is used by EDCs and EGSs to verify compliance with the requirements of Act 213.

Under Act 213, the Commission adopted regulations promoting onsite generation by customer-generators using renewable resources and eliminated previously existing barriers to net metering.<sup>32</sup> The regulations also provide for required metering capabilities and a compensation mechanism that reimburses customer-generators for surplus energy supplied to the electric grid.<sup>33</sup> Act 35 of 2007 amended Act 213. One aspect of Act 35 altered the reconciliation mechanism used to compensate resellers for surplus energy supplied through net metering.<sup>34</sup>

The Commission also adopted regulations that govern interconnection for customer-generators. The regulations strive to eliminate barriers which may have previously existed with regard to interconnection, while ensuring that interconnection by customer-generators will not pose unnecessary risks to the Commonwealth's electric distribution systems.<sup>35</sup>

On Oct. 27, 2016, the Commission adopted regulations to revise and update existing regulations to comply with Act 129 of 2008, and Act 35 of 2007, and to clarify certain issues of law, administrative procedure and policy.<sup>36</sup> On Apr. 19, 2018, the Commission adopted a Final Implementation Order to provide the Commission's interpretation and implementation of Section 11.1 of Act 40 of 2017.<sup>37</sup> Effective Oct. 30, 2017, Act 40 contained a section that further amended Act 213 by establishing geographical limits on solar photovoltaic (solar PV) systems that qualify for the solar PV share requirements of the AEPS. On May 6, 2021, the Commission adopted a Final Implementation Order

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<sup>31</sup> See 52 Pa. Code §§ 75.61—75.70.

<sup>32</sup> Net metering measures the difference between the electricity supplied by an electric utility or EGS and the electricity generated by a customer-generator when any portion of the electricity generated by the alternative energy generating system is used to offset part or all of the customer-generator's requirements for electricity. See 52 Pa. Code § 75.12.

<sup>33</sup> See Docket No. L-00050174; 52 Pa. Code §§ 75.11-75.15.

<sup>34</sup> *Id.*

<sup>35</sup> See Docket No. L-00050175; 52 Pa. Code §§ 75.21-75.40.

<sup>36</sup> See Docket No. L-2014-2404361; 52 Pa. Code §§ 75.1-75.72.

<sup>37</sup> See Docket No. M-2017-2631527.



to provide the Commission’s interpretation as well as implementation of Sections 10 and 14 of Act 114.<sup>38</sup>

Effective Nov. 23, 2020, Act 114 at Section 10 amended the Act 213 by revising the definition of customer-generator. Section 10 added the following to the definition of customer-generator: net-metered distributed generation systems owned, operated, or supporting the Department of Military and Veterans Affairs (DMVA) on property owned or leased and operated by the DMVA with a nameplate capacity not exceeding the DMVA’s annual electric needs to support the DMVA’s facilities on its property. Furthermore, Act 114 at Section 14 amended Act 213 by establishing geographic limits on Tier II alternative energy resource systems that qualify for the Tier II share requirements of the AEPS.

As of May 31, 2021, Pennsylvania had certified 37,149<sup>39</sup> alternate energy facilities, of which 30,263 are located within the state. For additional information on Alternative Energy in Pennsylvania, please visit the Commission’s website.<sup>40</sup>

### ***Energy Efficiency and Conservation (Act 129)***

Act 129 of 2008<sup>41</sup> required the 7 EDCs<sup>42</sup> with at least 100,000 customers<sup>43</sup> to establish an energy efficiency and conservation (EE&C) plan. The Act is being implemented in phases. Phases I through III are complete. However, it has not yet been determined whether the EDCs are in compliance with the Phase III energy efficiency and peak demand reduction targets. Phase IV of Act 129, the current five-year phase, began on Jun. 1, 2021, and will end on May 31, 2026.

Phase III began on June 1, 2016, and ended on May 31, 2021. The EDCs’ consumption and peak demand reduction requirements are provided in Table 2 below. While the EDCs must implement energy efficiency programs all five years of Phase III, the Commission required demand response programs only during the last four years of the phase, recognizing the time necessary to develop and implement such programs.<sup>44</sup> Using the design and budgetary allocation information provided by the Commission, the Act 129 Statewide Evaluator (SWE)<sup>45</sup> found no cost-effective demand response potential in the Penelec service territory and, therefore, the Commission did not prescribe a peak demand reduction requirement for Penelec.

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<sup>38</sup> See Docket No. M-2020-3023323.

<sup>39</sup> See [Reports – Pennsylvania Alternative Energy Portfolio Standard Program \(pennaeps.com\)](https://www.pennaeps.com).

<sup>40</sup> [http://www.puc.pa.gov/consumer\\_info/electricity/alternative\\_energy.aspx](http://www.puc.pa.gov/consumer_info/electricity/alternative_energy.aspx).

<sup>41</sup> Act 129 of 2008, effective Nov. 14, 2008; 66 Pa. C.S. §§2806.1-2806.2.

<sup>42</sup> The 7 EDCs with Act 129 Energy Efficiency and Conservation obligations are Duquesne Light Company, Metropolitan Edison Company, PECO Energy Company, Pennsylvania Electric Company, Pennsylvania Power Company, PPL Electric Utilities Corporation, and West Penn Power Company.

<sup>43</sup> See 66 Pa.C.S. § 2806.1.

<sup>44</sup> See *Energy Efficiency and Conservation Program Implementation Order*, Docket No. M-2014-2424864, entered June 19, 2015.

<sup>45</sup> The Act 129 Statewide Evaluator (SWE) is a contractor for the Commission that evaluates the EDCs energy efficiency and conservations programs.

**Table 2 - Phase III Electric Consumption and Peak Demand Reduction Targets**

EDC	Phase III Five-Year Electric Consumption Reduction Targets (MWh)	Phase III Four-Year Peak Demand Reduction Targets – Average Annual Potential Savings (MW)
Duquesne	440,916	42
Met-Ed	599,352	49
PECO	1,962,659	161
Penelec	566,168	0
Penn Power	157,371	17
PPL	1,443,035	92
West Penn	540,986	64

For Phase III, the Commission required that all EDCs file semiannual, preliminary annual, and final annual reports, which provide the reported savings for that program year. The EDCs recently filed their semiannual reports for the fifth year of Phase III, Program Year 12 (PY 12).<sup>46</sup> The SWE monitors and verifies data collection, quality assurance and the results of each EDCs EE&C Plan. Table 3, below, summarizes unverified Phase III electric consumption savings reported by the EDCs, through PY 12, and the SWE verified electric consumption and peak demand savings through PY 11.

**Table 3 - Phase III Electric Consumption and Peak Demand Savings since Jun. 1, 2016**

EDC	Phase III – PY8 through PY11 Verified Electric Consumption Savings (MWh)	% Of Verified Phase III Target	Phase III to date Unverified Electric Consumption Savings (MWh)	Phase III – PY9 through PY11 Verified Peak Demand Savings (MW)
Duquesne	466,034	106	515,524	55.2
Met-Ed	674,179	112	693,597	53.0
PECO	1,508,937	77	1,690,160	167.1
Penelec	664,265	117	680,182	0 *
Penn Power	214,215	136	218,729	39.9
PPL	1,498,971	104	1,568,191	112.8
West Penn	625,016	116	647,629	112.4

\* The Commission did not prescribe a peak demand reduction requirement for Penelec.

PY 8: Jun. 1, 2016 – May 31, 2017

PY 9: Jun. 1, 2017 – May 31, 2018

PY 10: Jun. 1, 2018 – May 31, 2019

PY 11: Jun. 1, 2019 – May 31, 2020

PY 12: Jun. 1, 2020 – May 31, 2021

<sup>46</sup> See the EDCs Semiannual Reports for PY 12 available at:

[http://www.puc.pa.gov/filing\\_resources/issues\\_laws\\_regulations/act\\_129\\_information/electric\\_distribution\\_company\\_act\\_129\\_reporting\\_requirements.aspx](http://www.puc.pa.gov/filing_resources/issues_laws_regulations/act_129_information/electric_distribution_company_act_129_reporting_requirements.aspx)



It appears that the EDCs are on their way to meet their Phase III five-year electric consumption and peak demand reduction requirements. Final annual reports for PY 12 are due to the Commission by Nov. 15, 2021.

In its planning for Phase IV, the Commission directed the SWE to perform electric baseline studies to establish baseline energy use and building characteristics for the residential, commercial and industrial sectors. The SWE submitted the final residential and non-residential baseline studies to the Commission on Feb. 12, 2019.<sup>47</sup>

The Commission further directed the SWE to perform an EE and Peak Demand Reduction (EEPDR) potential study to inform the Commission of the energy savings potential remaining in the EDCs' service territories. This data was used to assist the Commission to determine energy efficiency and conservation consumption reduction targets for Phase IV. The SWE submitted the final EEPDR potential study to the Commission on Feb. 28, 2020.<sup>48</sup>

In addition, the Commission tasked the SWE to conduct a Dispatchable Demand Response (DDR) potential study to determine if cost-effective dispatchable demand response potential remains in the EDCs service territories for the next phase of Act 129. The SWE submitted the final DDR potential study to the Commission on Feb. 28, 2020.<sup>49</sup> The EEPDR and DDR Potential Studies were released publicly via a Commission Secretarial Letter served March 2, 2020.<sup>50</sup> Following a review of the SWE's EEPDR and DDR Potential Studies, the Commission determined that additional consumption and peak demand reduction targets were cost-effective.

On June 18, 2020, the Commission adopted a Final Implementation Order prescribing targets for a Phase IV of the Act 129 EE&C Program.<sup>51</sup> Phase IV does not include a dedicated target for DDR. The Commission found that peak demand reductions from EE measures are longer lasting than DDR programming and will persist for years after Phase IV has ended. In addition, peak demand reductions from EE measures are available every day rather than just a small number of DR event days and can be recognized in PJM's Forward Capacity Market.<sup>52</sup>

Phase IV began on June 1, 2021, and will end on May 31, 2026. The EDCs' Phase IV electric consumption and peak demand reduction requirements are provided in Table 4 below.

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<sup>47</sup> The 2018 Pennsylvania Residential and Non-Residential Baseline Studies are available at: <https://www.puc.pa.gov/filing-resources/issues-laws-regulations/act-129/act-129-statewide-evaluator-swe/>.

<sup>48</sup> See *Pennsylvania Act 129 Phase IV Energy Efficiency and Peak Demand Reduction Market Potential Study Report*, filed by NMR Group, Inc. on Feb. 28, 2020, at Docket No. M-2020-3015229.

<sup>49</sup> See *Pennsylvania Act 129 Phase IV Demand Response Potential Study*, filed by NMR Group, Inc. on Feb. 28, 2020, at Docket No. M-2020-3015229.

<sup>50</sup> Secretarial Letter, at Docket No. M-2020-3015229, served Mar. 2, 2020.

<sup>51</sup> See *Energy Efficiency and Conservation Program Implementation Order*, at Docket No. M-2020-3015228, entered June 18, 2020, at 7-8.

<sup>52</sup> *Id.* at 62.

**Table 4 - Phase IV Electric Consumption and Peak Demand Reduction Targets**

<b>EDC</b>	<b>Phase IV Electric Consumption Reduction Targets (MWh)</b>	<b>Phase IV Peak Demand Reduction Targets (MW)</b>
<b>Duquesne</b>	348,126	62
<b>Met-Ed</b>	463,215	76
<b>PECO</b>	1,380,837	256
<b>Penelec</b>	437,676	80
<b>Penn Power</b>	128,909	20
<b>PPL</b>	1,250,157	229
<b>West Penn</b>	504,951	86

For Phase IV, the Commission concluded that it was unnecessary to continue requiring preliminary annual reports in addition to the final annual reports. Therefore, to streamline the reporting process, the preliminary annual report was eliminated, while maintaining the semiannual and final annual reporting process. In addition, in the interest of providing the final annual reports to the public in a much timelier fashion, the Commission required the EDCs to submit the final annual reports by September 30 of each year. Semiannual reports are due to the Commission by January 15 of each year.<sup>53</sup>

### ***Statewide Review of Electrical Energy Usage***

As shown on Tables 5 and 6 below, Pennsylvania’s Total electrical consumption energy usage (residential, commercial, industrial, sales for resale, and other) in 2020, was 139,185 gigawatt hours (GWh), as compared to 145,090 GWh in 2019, which is a year-over-year (YOY) decrease of 4.07% in electric usage. In general, commercial and industrial usage decreased YOY by 10.07% and 5.71%, respectively. Residential usage increased by 1.8%. The decrease in commercial and industrial usage, and the slight increase in residential usage, is likely indicative of the impacts on the economy of the COVID-19 pandemic. Pennsylvania’s gross domestic product (GDP) for 2020 saw a YOY decrease of 3.5%, as compared to a YOY increase of 3.9% in 2019.<sup>54</sup>

Also, in 2020, the total number of electrical customers were 5,876,336, as compared to 5,843,061 in 2019, which is a YOY increase of 0.57%.

<sup>53</sup> *Id.* at 102-103.

<sup>54</sup> US Bureau of Economic Analysis: <https://www.bea.gov/>.

**Table 5 – PA EDC customers served, energy usage, and peak load (2020)**

Company	Total Customers Served	Residential (MWh)	Commercial (MWh)	Industrial (MWh)	Other (MWh)	Sales For Resale (MWh)	Total Consumption (MWh)	System Losses (MWh)	Company Use (MWh)	Net Energy For Load (MWh)	Peak Load (MW)
Duquesne	605,732	4,217,353	5,521,887	2,343,244	50,910	26,245	12,159,639	777,429	18,212	12,955,280	2,667
Met-Ed	577,501	5,749,929	2,003,227	6,029,280	27,250	481,805	14,291,491	1,051,649	0	15,343,140	2,976
Penleec	587,567	4,318,774	2,293,017	6,288,631	34,998	2,779,572	15,714,992	1,248,980	0	16,963,972	2,908
Penn Power	168,118	1,674,333	668,421	1,925,925	3,240	156,133	4,428,052	233,212		4,661,264	889
PPL	1,449,702	14,591,706	13,128,561	8,353,642	97,401	0	36,171,310	2,608,158	53,112.00	38,832,580	7,049
PECO	1,676,350	14,040,747	7,210,182	13,668,658	582,817	4,142	35,506,546	1,877,755	33,516	37,417,817	8,148
West Penn	730,526	7,177,880	2,584,322	9,094,327	22,258	719,439	19,598,226	1,193,862	0	20,792,088	3,827
UGI	62,656	570,953	300,399	100,986	4,697	135	977,170	71,425	1,216	1,049,811	211
Citizens'	7,070	86,340	27,452	46,726	412	0	160,930	2,575	131	163,636	40
Pike County	4,736	31,835	41,479	0	390	0	73,704	0	28	73,732	18
Wellsboro	6,378	44,454	30,483	27,334	165	87	102,523	7,554	211	110,288	22
<b>Total</b>	<b>5,876,336</b>	<b>52,504,304</b>	<b>33,809,430</b>	<b>47,878,753</b>	<b>824,538</b>	<b>4,167,558</b>	<b>139,184,583</b>	<b>9,072,599</b>	<b>106,426</b>	<b>148,363,608</b>	<b>28,755</b>
<b>% of Total</b>		37.72%	24.29%	34.40%	0.59%	2.99%	100%				

**Table 6 – PA EDC customers served, energy usage, and peak load (2019)**

Company	Total Customers Served	Residential (MWh)	Commercial (MWh)	Industrial (MWh)	Other (MWh)	Sales For Resale (MWh)	Total Consumption (MWh)	System Losses (MWh)	Company Use (MWh)	Net Energy For Load (MWh)	Peak Load (MW)
Duquesne	602,224	4,047,883	6,053,152	2,472,177	52,753	29,018	12,654,983	783,396	24,434	13,462,813	2,662
Met-Ed	572,912	5,640,661	2,133,471	6,458,981	27,372	526,676	14,787,161	1,088,646	0	15,875,807	2,974
Penleec	586,517	4,265,867	2,442,961	6,743,219	35,232	2,695,234	16,182,513	1,320,440	0	17,502,953	2,866
Penn Power	167,058	1,638,166	957,357	2,065,656	3,248	169,158	4,833,585	220,768		5,054,354	915
PPL	1,449,737	14,489,987	14,727,632	7,888,629	90,088	0	37,196,337	2,682,337	58,340.00	39,937,013	7,069
PECO	1,656,514	13,649,535	7,982,780	14,957,590	734,250	3,569	37,327,724	2,112,500	43,501	39,483,725	8,428
West Penn	727,552	7,152,299	2,880,389	10,002,645	22,060	746,317	20,803,711	1,227,056	0	22,030,767	3,740
UGI	62,336	532,737	309,814	113,191	2,273	114	958,128	93,918	1,368	1,053,415	202
Citizens'	7,046	87,311	30,715	49,504	464	0	167,994	3,864	142	172,000	40
Pike County	4,819	29,879	43,368	0	187	0	73,406	0	28	73,434	17
Wellsboro	6,346	43,322	31,990	28,696	237	93	104,338	7,690	211	112,239	20
<b>Total</b>	<b>5,843,061</b>	<b>51,577,647</b>	<b>37,593,629</b>	<b>50,780,288</b>	<b>968,164</b>	<b>4,170,179</b>	<b>145,089,907</b>	<b>9,540,615</b>	<b>128,024</b>	<b>154,758,546</b>	<b>29,204</b>
<b>% of Total</b>		35.55%	25.91%	35.00%	0.67%	2.87%	100%				

As shown on Table 7, below, the total average annual aggregate five-year energy usage growth projection for the residential, commercial, and industrial classes is projected to increase 0.43% per year. This includes an average residential growth rate decrease of 0.06%, a commercial growth rate increase of 0.59%, and an industrial growth rate increase of 0.81% for the entire five-year projected period.

**Table 7 – Average Aggregate Five-year Electrical Energy Projection**

Energy Usage Projection (GWh)				
Year	Residential	Commercial	Industrial	Total
2021	50,824	34,812	49,689	135,325
2022	50,428	35,530	50,974	136,932
2023	50,539	35,754	51,388	137,681
2024	50,718	35,846	51,427	137,991
2025	50,698	35,642	51,315	137,655
average annual growth (%)	-0.06	0.59	0.81	0.43

Figure 2 below represents, in Gigawatt-hours, the Pennsylvania historic usage for residential, commercial, and industrial retail from 1972 through 2020 and forecasted Gigawatt-hours usage from 2021 through 2025.

*Figure 2 – Pennsylvania Retail Energy Usage and Five-year Forecast (GWh)*

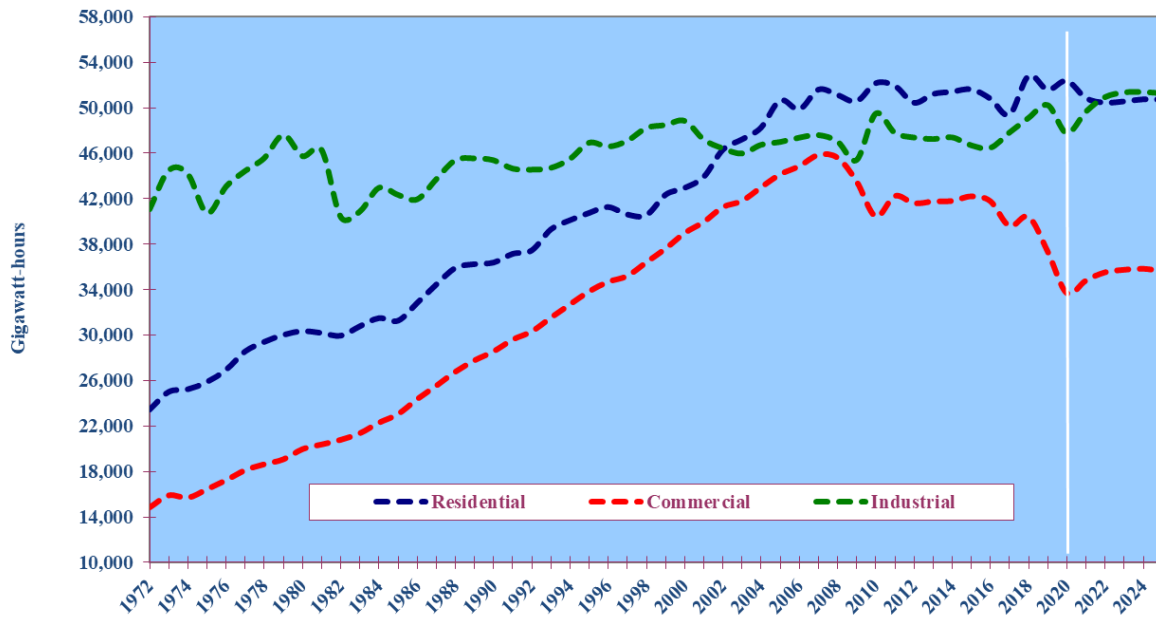


Figure 3, below, shows average residential usage and nominal cost from 1940 to 2020. Between 1970 and 2010, average residential yearly usage in Pennsylvania increased 1.4% each year, while average yearly cost increased 4.1% each year during this period.

During the last 10 years, average residential yearly usage decreased 0.23% each year, while average yearly cost decreased 1.02% a year. Note that these are not weighted averages (accounting for customer counts of each utility) and are only for the large EDCs.

In 2020, the average Pennsylvania customer used 10.13 MWh as compared to 10.05 MWh in 2019, and 10.43 MWh in 2018. In 2020, the average Pennsylvania customer paid 11.43 cents per kWh, which was unchanged from 2019, and as compared to 11.25 cents per kWh in 2018.

**Figure 3 – Average Residential Nominal Cost (cents/kWh) and Usage (MWh/year)**

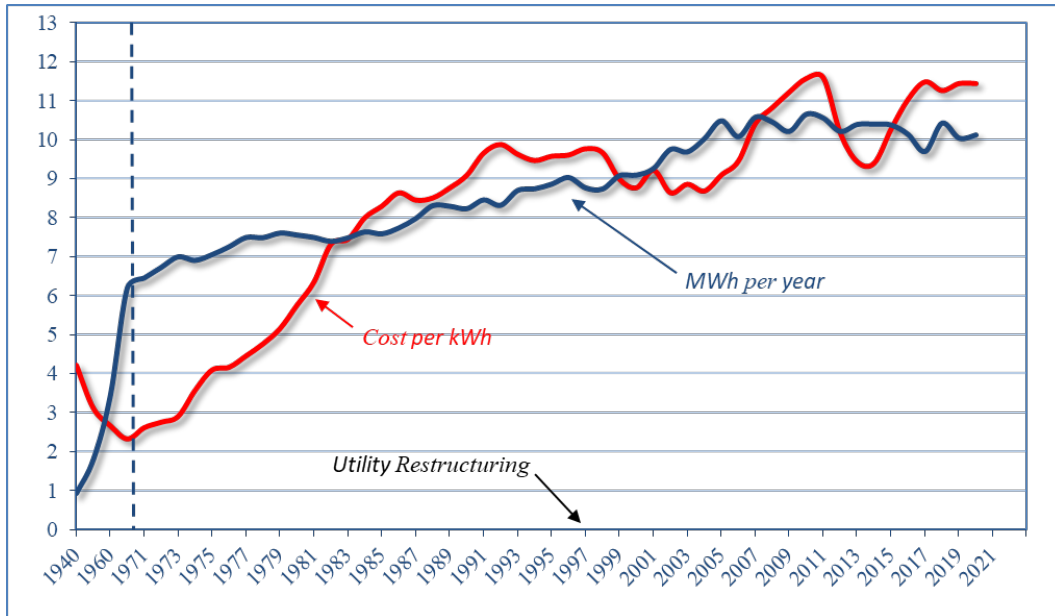


Figure 4, below, shows Pennsylvania’s aggregate non-coincidental peak load demand from 2011 through 2020 and the associated five-year projections estimated during the last three years.

**Figure 4 – Pennsylvania Aggregate Non-Coincidental Peak Load (MW)**

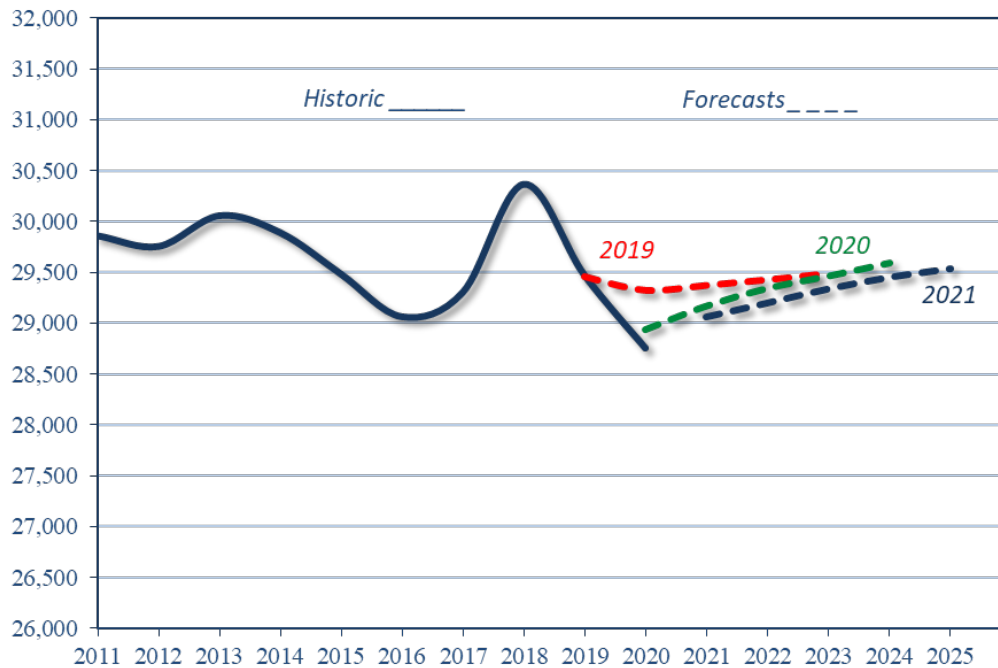
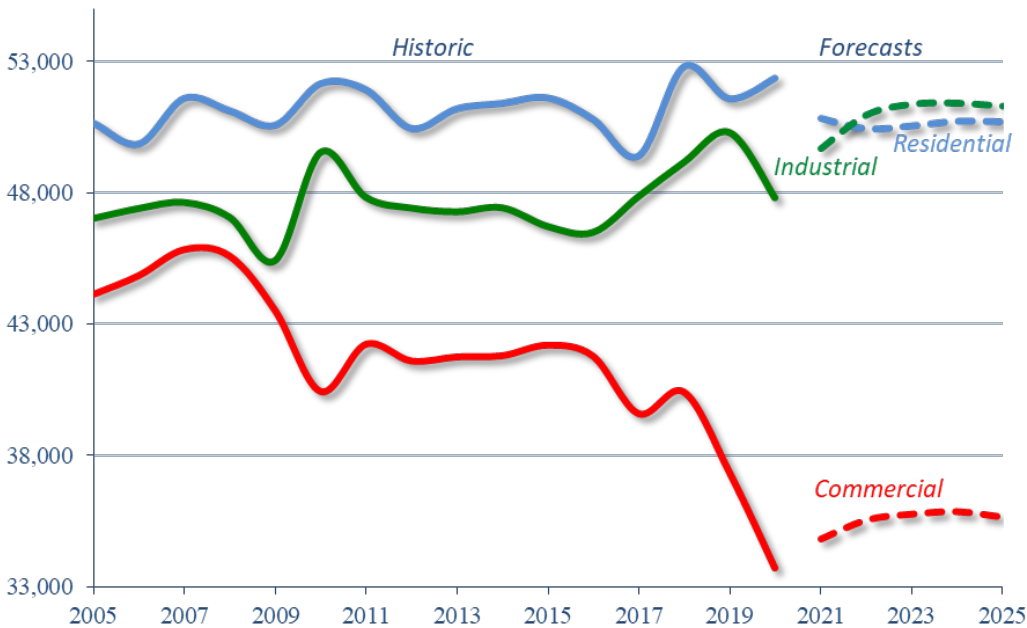


Figure 5, below, shows Pennsylvania’s aggregate energy demand from 2005 through 2020 and the associated five-year projections.

**Figure 5 – Pennsylvania Aggregate Energy Demand (GWh)**



**Summary of Data for the Seven Largest EDCs**

Individual EDC forecasts are more specific to customers and geographical areas. Each EDC bases its forecasts on financial forecasts of its choosing. The EDCs’ forecasts are more specific for each territory than the PJM forecast, which is a broader forecast that includes all Pennsylvania EDC territories.

The following section provides historic and projected energy usage and peak load demand statistics, for Pennsylvania’s seven largest EDCs.

**Duquesne Light Company (Duquesne)**

Duquesne provides electric service to about 605,732 customers in the City of Pittsburgh and portions of Allegheny and Beaver counties in Southwestern Pennsylvania. Duquesne’s 2020 energy usage total was 12,159 as compared to: 12,654 GWh in 2019; 13,178 GWh in 2018; 12,673 GWh in 2017; and 13,173 GWh in 2016. Year-over-year (YOY) energy usage decreased 3.9%. Duquesne’s total usage mix consisted of residential (34.7%), commercial (45.4%), industrial (19.3%), other (0.42%) and sales for resale (0.21%).



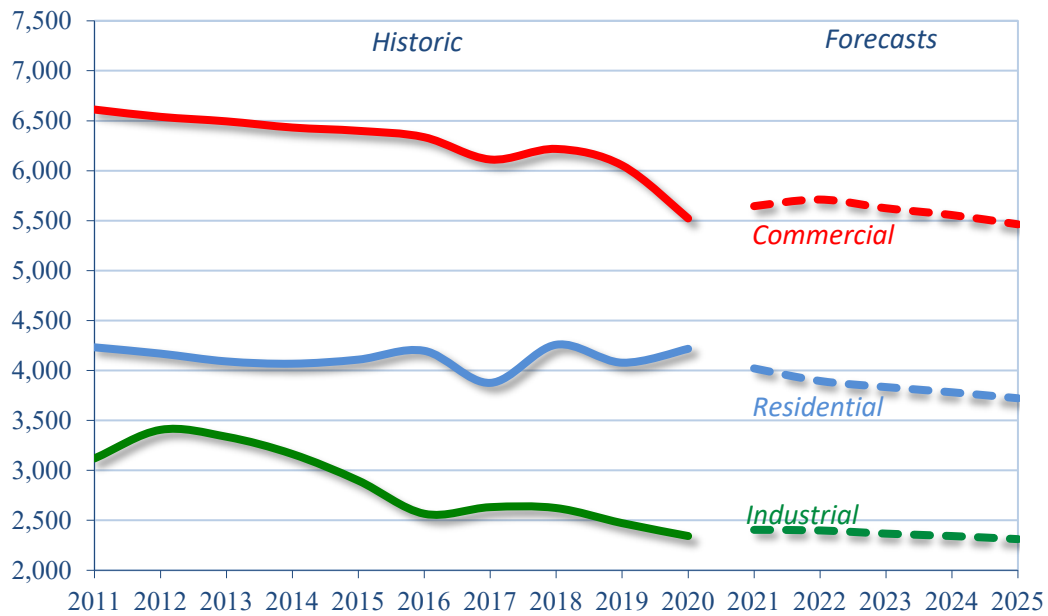
Over the next five years, total energy usage is projected to decrease at an average annual rate of 1.0%. This includes a residential usage average annual decrease of 2.5%, commercial usage decrease of 0.2%, and industrial usage decrease by 0.3%. See Figure 6.

Duquesne's highest summer peak load in 2020 was 2,667 MW. This represents a YOY increase of 0.2% from the previous year's peak of 2,662 MW. The five-year peak load forecast is projected to increase by an average of 1.5% per year. See Figure 7.

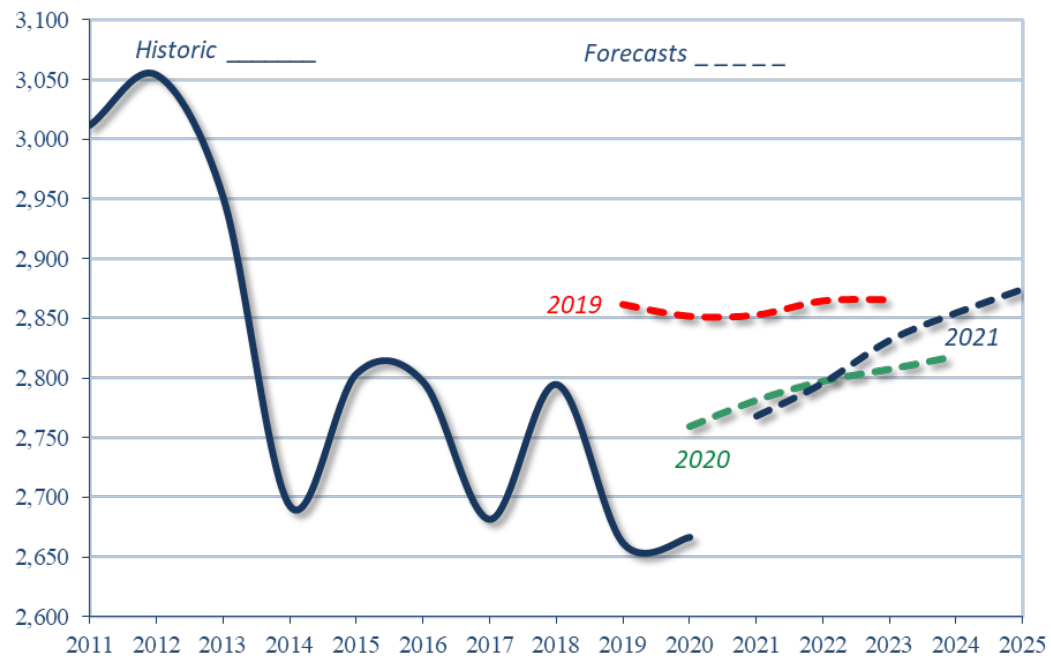
Refer to Appendix A, Tables A01-A04 for Duquesne's forecasts of peak load and residential, commercial and industrial energy demand, filed with the Commission in years 2011 through 2020.



**Figure 6 Duquesne energy usage (GWh)**

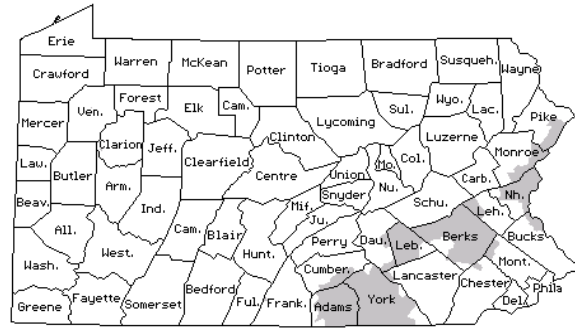


**Figure 7 Duquesne peak load (MW)**



*Metropolitan Edison Company (Met-Ed)*

Met-Ed provides electric service to about 577,501 customers in all or portions of 14 counties in Eastern and Southcentral Pennsylvania. Met-Ed’s 2020 energy usage total was 14,291 GWh as compared to: 14,787 GWh in 2019; 14,974 GWh in 2018; 14,297 GWh in 2017; and 14,441 GWh in 2016. Year-over-year (YOY) energy usage decreased 3.4%. Met-Ed’s total usage mix consisted of residential (40.2%), commercial (14%), industrial (42.2 %) and sales for resale (3.4%).

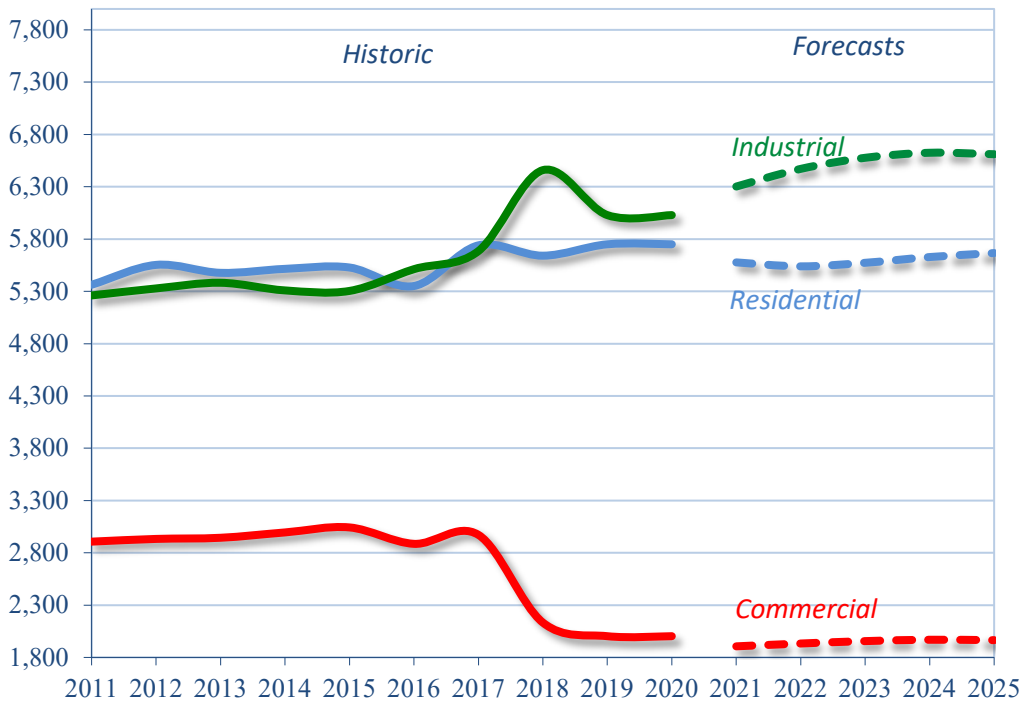


Over the next five years, total energy usage is projected to increase at an average annual rate of 0.7%. This includes a residential usage average annual decrease of 0.3%, commercial usage decrease of 0.4%, and industrial usage increase by 1.9%. See Figure 8.

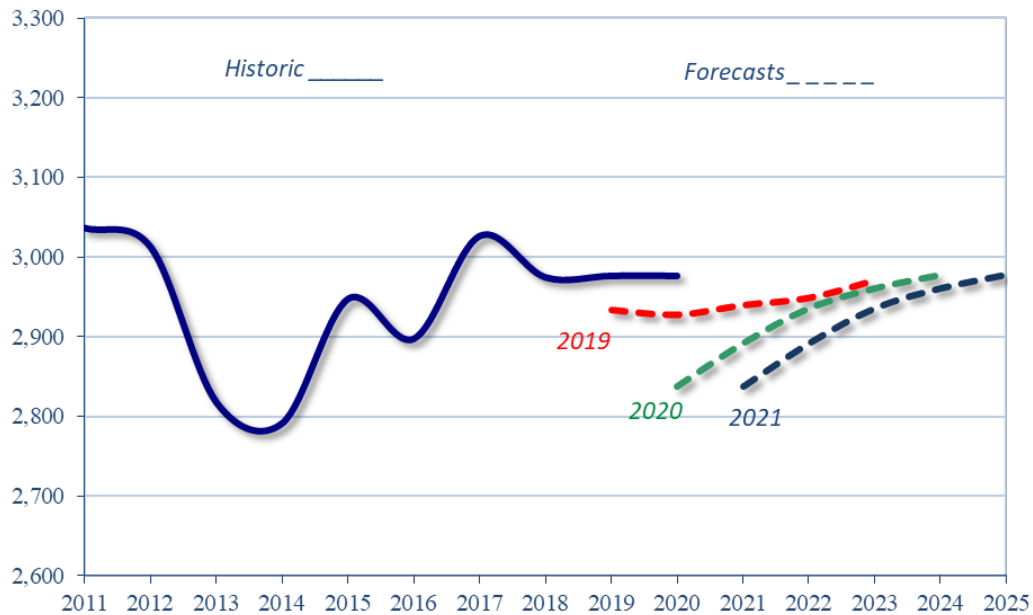
Met-Ed’s highest summer peak load in 2020 was 2,976 MW, which was the same as 2019. The five-year peak load forecast is projected to stay about the same every year. See Figure 9.

Refer to Appendix A, Tables A05-A08 for Met-Ed’s forecasts of peak load and residential, commercial and industrial energy demand, filed with the Commission in years 2011 through 2020.

**Figure 8 Met-Ed energy usage (GWh)**

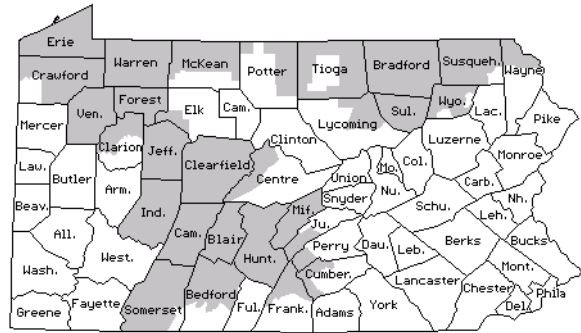


**Figure 9 Met-Ed peak load (MW)**



### *Pennsylvania Electric Company (Penelec)*

Penelec provides electric service to about 587,567 customers in all or portions of 29 counties in Western and Northern Pennsylvania. Penelec’s 2020 energy usage total was 15,715 GWh as compared to: 16,182 GWh in 2019; 16,600 GWh in 2018; 16,054 GWh in 2017; and 16,245 GWh in 2016. Year-over-year (YOY) energy usage decreased 2.9%. Penelec’s total usage mix consisted of residential (27.5%), commercial (14.6%), industrial (40.0%), and sales for resale (17.7%).

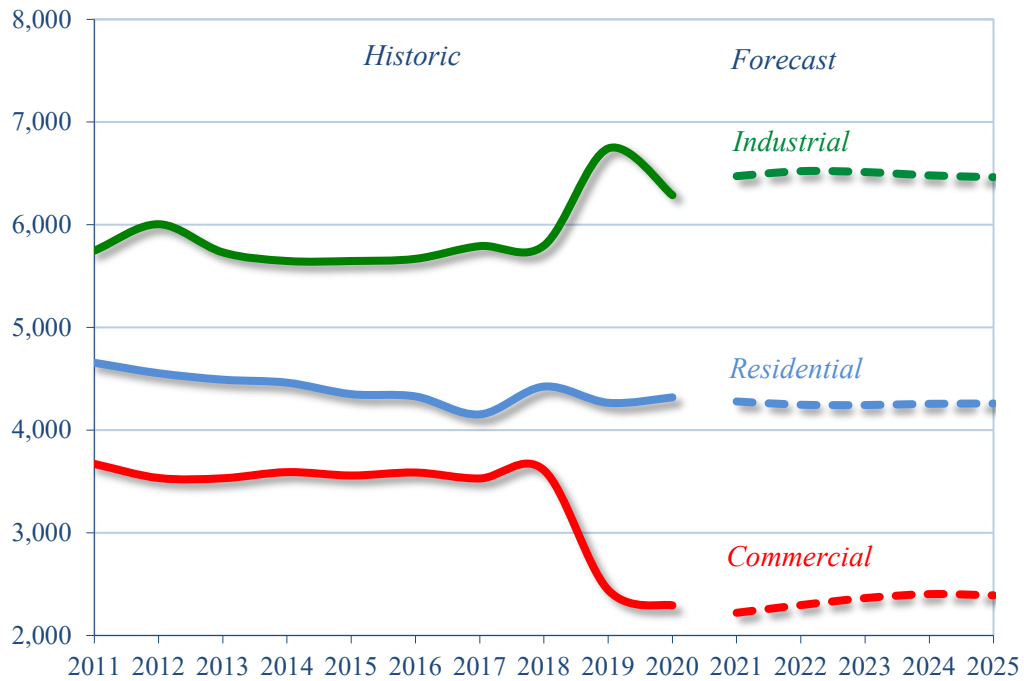


Over the next five years, total energy usage is projected to increase at an average annual rate of 0.3%. This includes a residential usage average annual decrease of 0.3%, commercial usage increase of 0.8%, and industrial usage increase by 0.6%. See Figure 10.

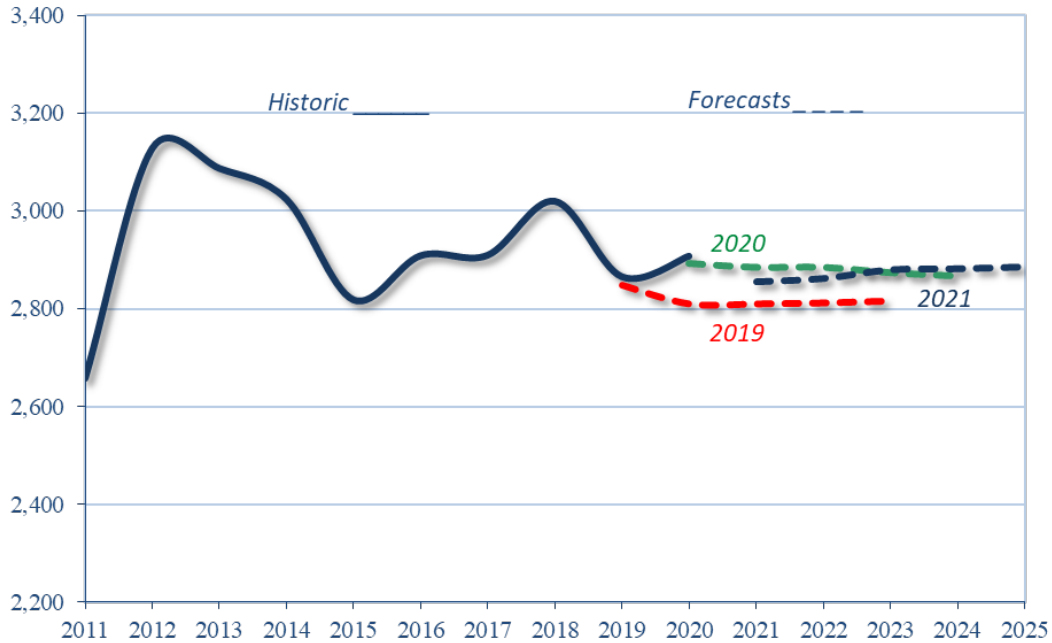
Penelec’s highest summer peak load in 2020 was 2,908 MW. This represents a YOY increase of 1.5% from the previous year’s peak of 2,866 MW. The five-year peak load forecast is projected to increase by an average of 0.2% per year. See Figure 11.

Refer to Appendix A, Tables A09-A12 for Penelec’s forecasts of peak load and residential, commercial and industrial energy demand, filed with the Commission in years 2011 through 2020.

**Figure 10 Penelec energy usage (GWh)**

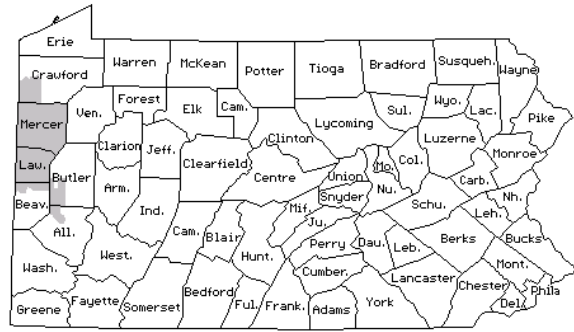


**Figure 11 Penelec peak load (MW)**



### *Pennsylvania Power Company (Penn Power)*

Penn Power provides electric service to about 168,118 customers in all or portions of six counties in Western Pennsylvania. Penn Power's 2020 energy usage total was 4,427 GWh as compared to: 4,833 GWh in 2019; 5,074 GWh in 2018; 4,875 GWh in 2017; and 4,861 GWh in 2016. Year-over-year (YOY) energy usage decreased 8.4%. Penn Power's total usage mix consisted of residential (37.8%), commercial (15.1%), industrial (43.5%), and sales for resale (3.5%).

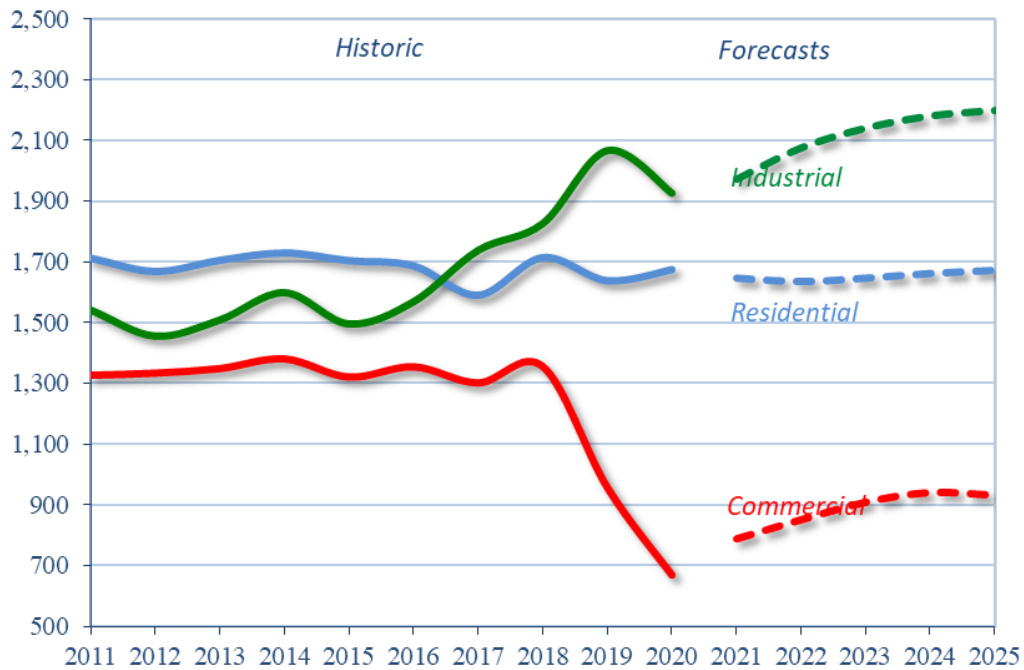


Over the next five years, total energy usage is projected to increase at an average annual rate of 2.4%. This includes residential usage remaining around the same, a commercial average annual usage increase of 6.9%, and industrial usage increase by 2.7%. See Figure 12.

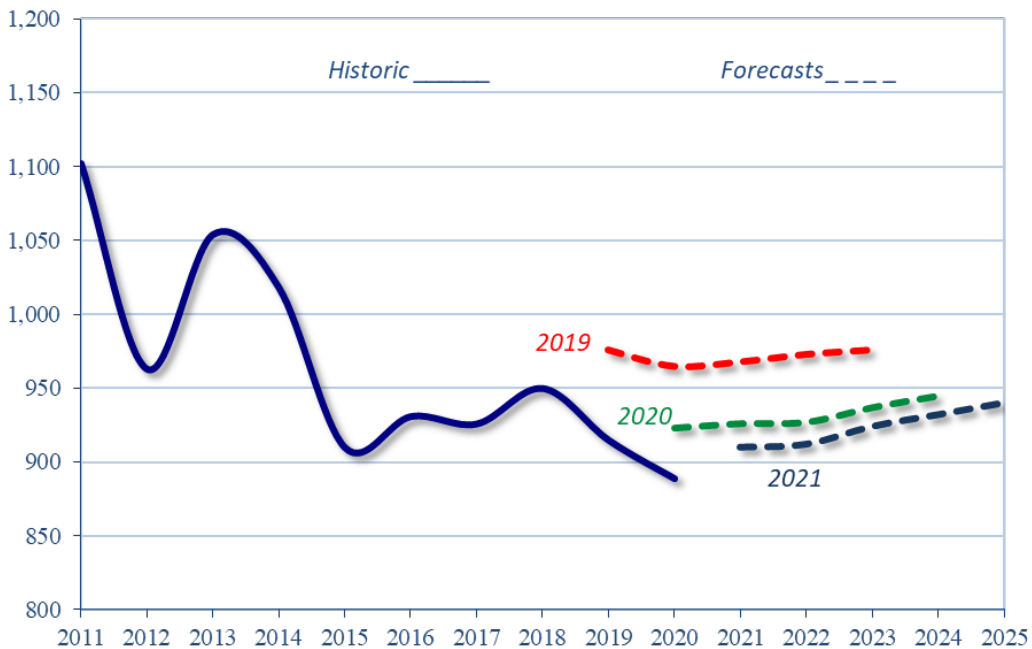
Penn Power's highest summer peak load in 2020 was 889 MW. This represents a YOY decrease of 2.8% from the previous year's peak of 915 MW. The five-year peak load forecast is projected to increase by an average of 1.1% per year. See Figure 13.

Refer to Appendix A, Tables A13-A16 for Penn Power's forecasts of peak load and residential, commercial and industrial energy demand, filed with the Commission in years 2011 through 2020.

**Figure 12 Penn Power energy usage (GWh)**

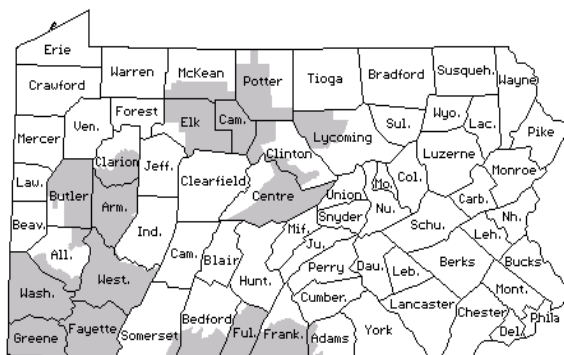


**Figure 13 Penn Power peak load (MW)**



### *West Penn Power Company (West Penn)*

West Penn provides electric service to 730,526 customers in all or portions of 24 counties in Western, North and South-Central Pennsylvania. West Penn's 2020 energy usage total was 19,598 as compared to: 20,809 in 2019; 21,298 GWh in 2018; 20,299 GWh in 2017; and 20,702 GWh in 2016. Year-over-year (YOY) energy usage decreased 5.8%. West Penn's total usage mix consisted of residential (36.6%), commercial (13.2%), industrial (46.4%), and sales for resale (3.7%).



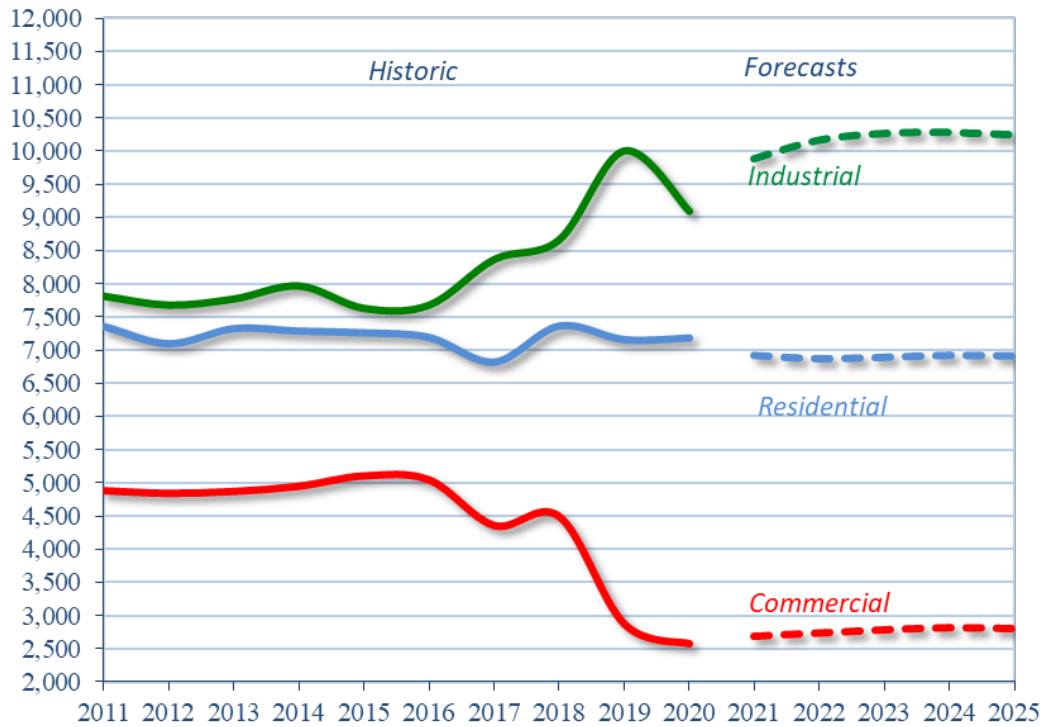
Over the next five years, total energy usage is projected to increase at an average annual rate of 1.1%. This includes a residential usage average annual decrease in of 0.7%, commercial usage increase of 1.7%, and industrial usage increase by 2.4%. See Figure 14.

West Penn's highest summer peak load in 2020 was 3,827 MW. This represents a YOY increase of 2.3% from the previous year's peak of 3,740 MW. The five-year peak load forecast is projected to increase by an average of 0.3% per year. See Figure 15.

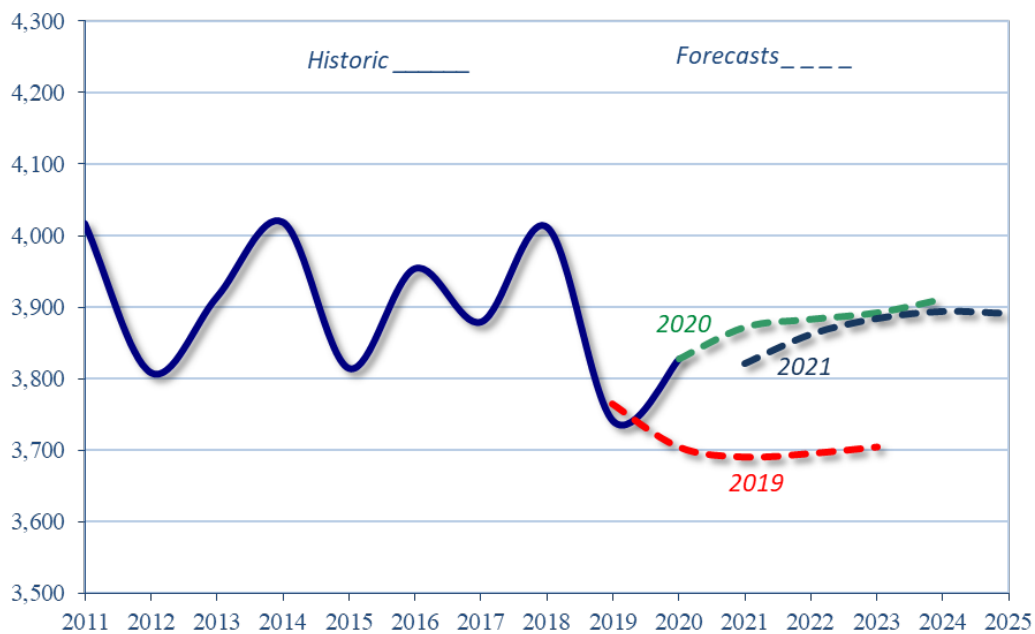
Refer to Appendix A, Tables A25-A28 for West Penn's forecasts of peak load and residential, commercial and industrial energy demand, filed with the Commission in years 2011 through 2020.



**Figure 14 West Penn energy usage (GWh)**

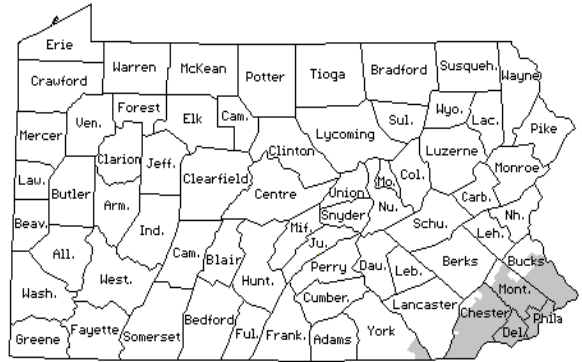


**Figure 15 West Penn peak load (MW)**



***PECO Energy Company (PECO)***

PECO is the largest electric utility in Pennsylvania, providing service to about 1,656,514 customers in the City of Philadelphia and all or portions of six counties in Southeastern Pennsylvania. PECO’s 2020 energy usage total was 35,507 GWh as compared to: 37,327 GWh in 2019; 38,468 GWh in 2018; 37,234 GWh in 2017; and 37,940 GWh in 2016. Year-over-year (YOY) energy usage decreased 4.9%. PECO’s total usage mix consisted of residential (39.5%), commercial (20.3%), industrial (38.5%), other (1.6%) and sales for resale (less than 1%).

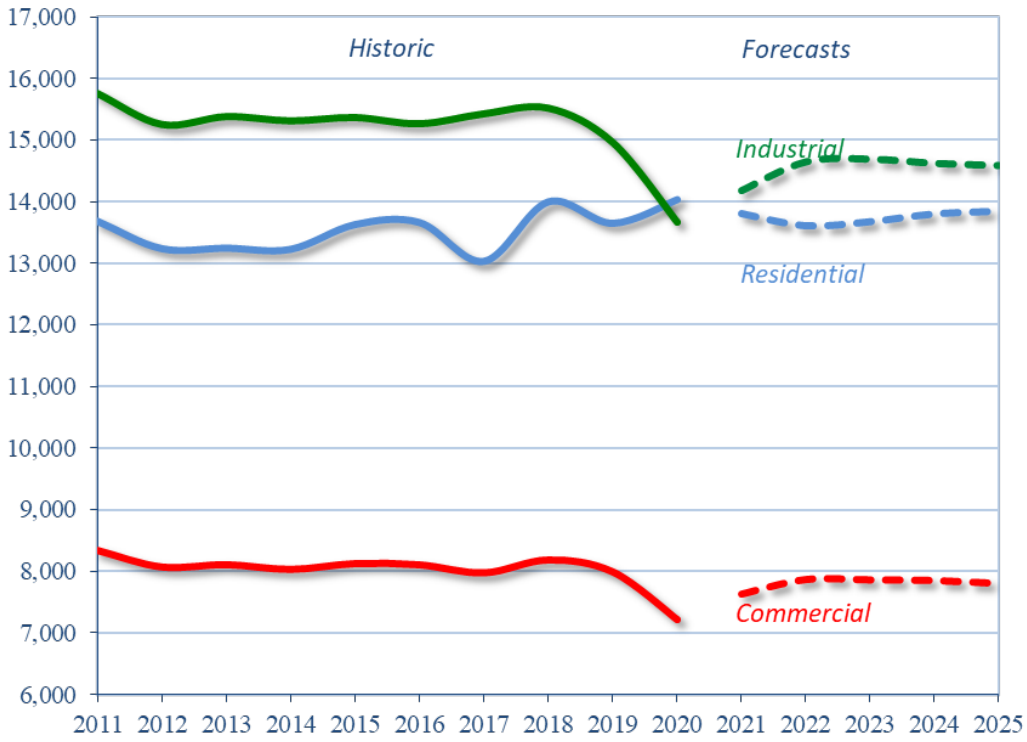


Over the next five years, total energy usage is projected to increase at an average annual rate of 0.8%. This includes a residential usage average annual decrease of 0.3%, commercial usage average annual increase of 1.6% and industrial usage increase by 1.3%. See Figure 16.

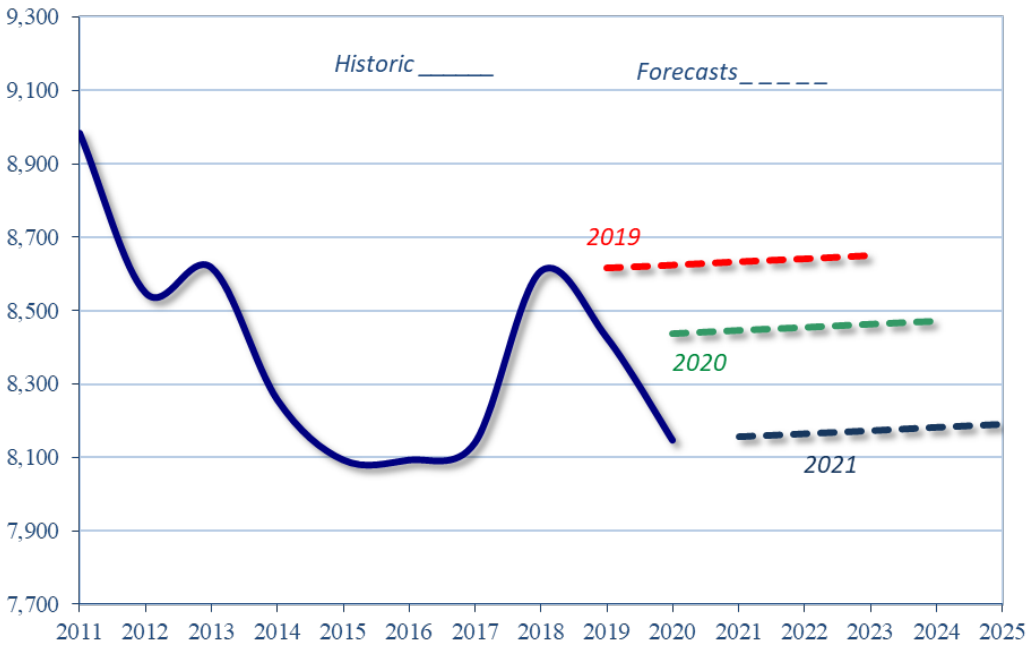
PECO’s highest summer peak load in 2020 was 8,148 MW. This represents a YOY decrease of 3.3% from the previous year’s peak of 8,428 MW. The five-year peak load forecast is projected to increase by an average of 0.1% per year. See Figure 17.

Refer to Appendix A, Tables A21-A24 for PECO’s forecasts of peak load and residential, commercial and industrial energy demand, filed with the Commission in years 2011 through 2020.

**Figure 16 PECO energy usage (GWh)**

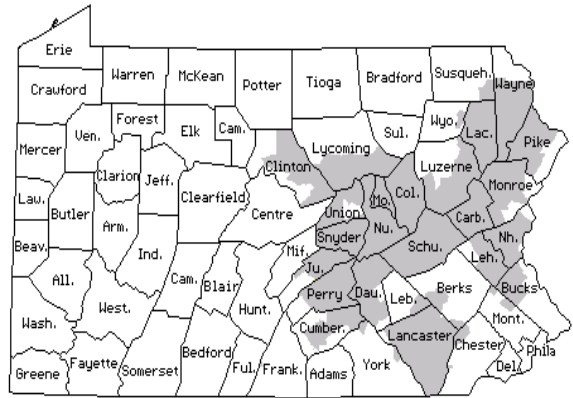


**Figure 17 PECO Energy Company peak load (MW)**



***PPL Electric Utilities Corporation (PPL)***

PPL provides service to about 1,449,702 customers over a 10,000-square-mile area in all or portions of 29 counties in Central Eastern Pennsylvania. PPL’s 2020 energy usage total was 36,171 GWh as compared to: 37,196 GWh in 2019; 37,371 GWh in 2018; 35,996 GWh in 2017; and 36,311 GWh in 2016. Year-over-year (YOY) energy usage decreased 2.8%. PPL’s total usage mix consisted of residential (40.3%), commercial (36.3%), industrial (23.1%), and other (less than 1%).

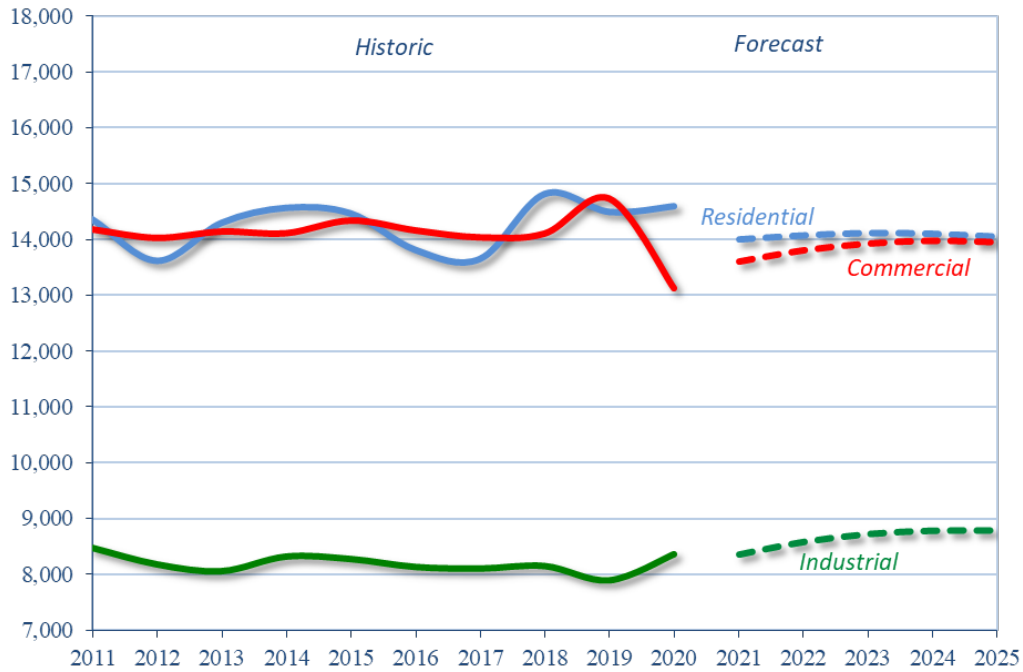


Over the next five years, total energy usage is projected to increase at an average annual rate of 0.4%. This includes a residential usage average annual decrease of 0.8%, commercial usage increase of 1.2%, and industrial usage increase of 1.0%. See Figure 18.

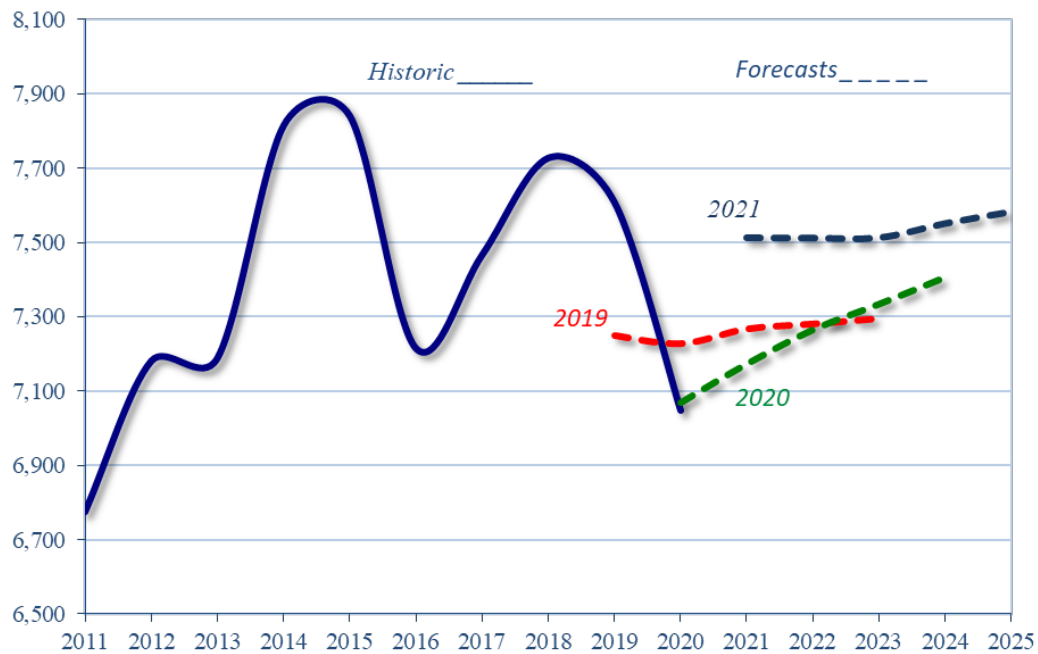
PPL’s highest summer peak load in 2020 was 7,049 MW. This represents a YOY decrease of 7.4% from the previous year’s peak of 7,609 MW. The five-year peak load forecast is projected to increase by an average of 1.5% per year. See Figure 19.

Refer to Appendix A, Tables A17-A20 for PPL’s forecasts of peak load and residential, commercial and industrial energy demand, filed with the Commission in years 2011 through 2020.

**Figure 18 PPL Electric Utilities Corporation energy usage (GWh)**



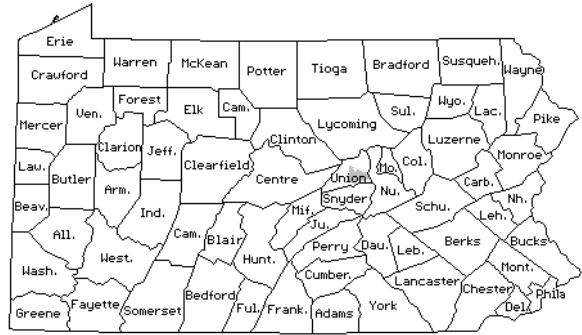
**Figure 19 PPL Electric Utilities Corporation peak load (MW)**



## Summary of Data for the Four Smallest EDCs

### Citizens' Electric Company (Citizens')

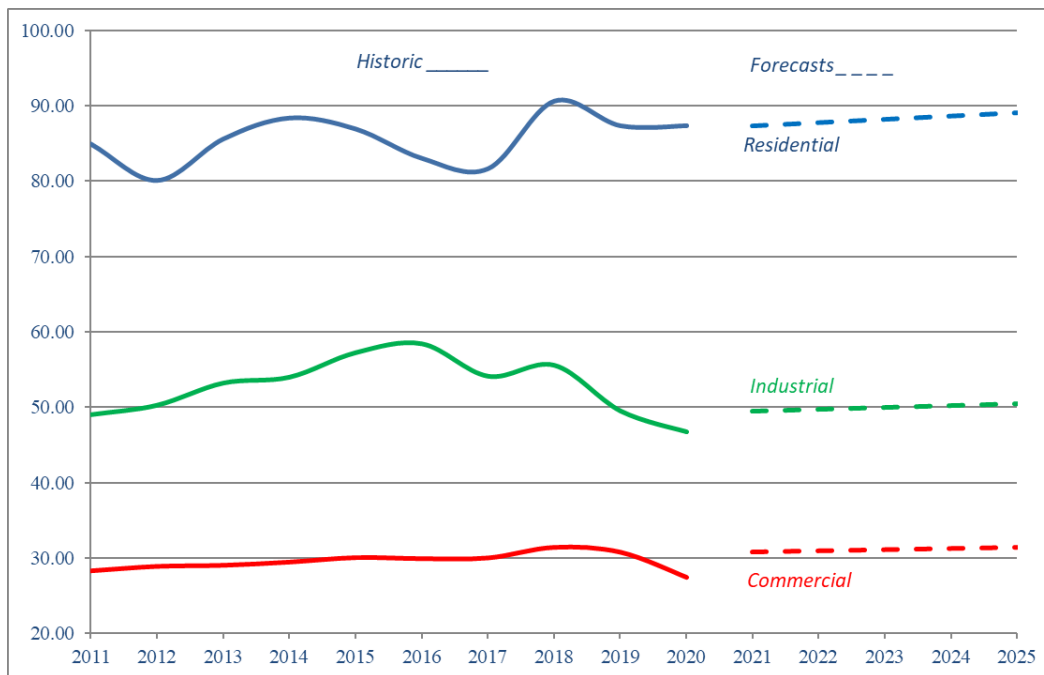
Citizens' provides service to about 7,070 customers in Union County, Pennsylvania. Citizens' 2020 energy usage total was 161 GWh as compared to: 168 GWh in 2019; 178 GWh in 2018; 166 GWh in 2017; and 172 GWh in 2016. Year-over-year (YOY) energy usage decreased 4.2%. Citizens' total usage mix consisted of residential (57.3%), commercial (17.1%), industrial (29.0%), and other (less than 1%).



Over the next five years, total energy usage is projected to increase at an average annual rate of 1.3%. This includes a residential usage average annual increase of 0.6%, commercial usage increase of 2.7%, and industrial usage increase by 1.6%. See Figure 20.

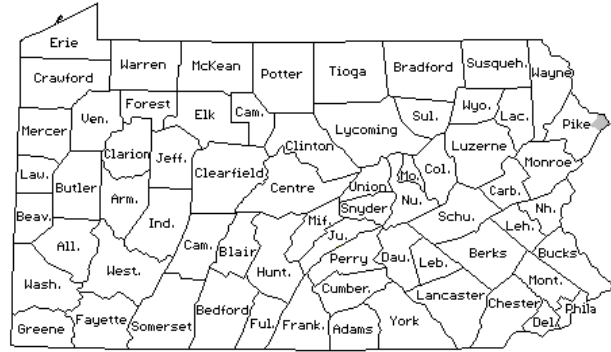
Citizens' highest winter peak load in 2020 was 42 MW. This represents a YOY increase of 4% from the previous year's peak of 40.4 MW. The five-year peak load forecast is projected to increase by an average of 0.93% per year.

Figure 20 Citizens' energy usage (GWh)



***Pike County Light & Power Company (Pike)***

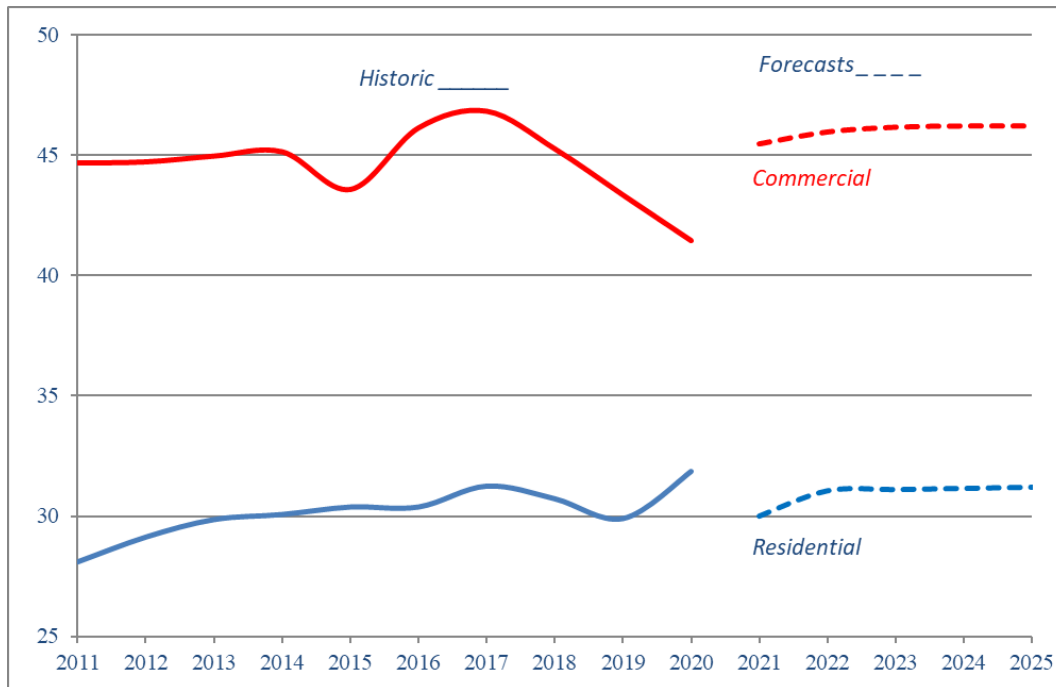
Pike provides service to about 4,736 customers in Eastern Pike County, Northeastern Pennsylvania. Pike’s 2020 energy usage total was 74 GWh as compared to: 73 GWh in 2019; 76 GWh in 2018; 78 GWh in 2017; and 78 GWh in 2016. Year-over-year (YOY) energy usage increased by 0.4%. Pike’s total usage mix consisted of residential (43.2%), commercial (56.3%), and other (0.5%). Pike has no industrial customers or sales for resale.



Over the next five years, total energy usage is projected to increase at an average annual rate of 1.1%. This includes a residential usage average annual decrease of 0.4%, and a commercial usage increase of 2.2%. See Figure 21.

Pike’s highest summer peak load in 2020 was 17.5 MW. This represents a YOY increase of 2.9% from the previous year’s peak of 17.0 MW. The five-year peak load forecast is projected to increase by an average of 1.52% per year.

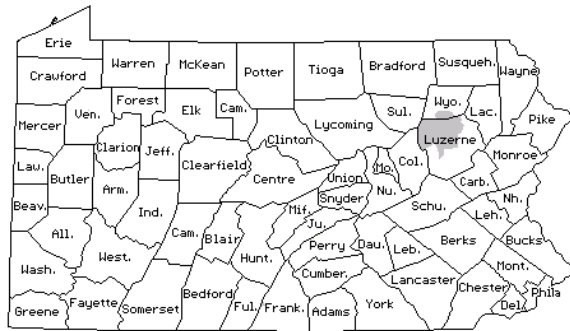
***Figure 21 Pike County Light & Power energy usage (GWh)***





**UGI Utilities Inc.—Electric Division (UGI)**

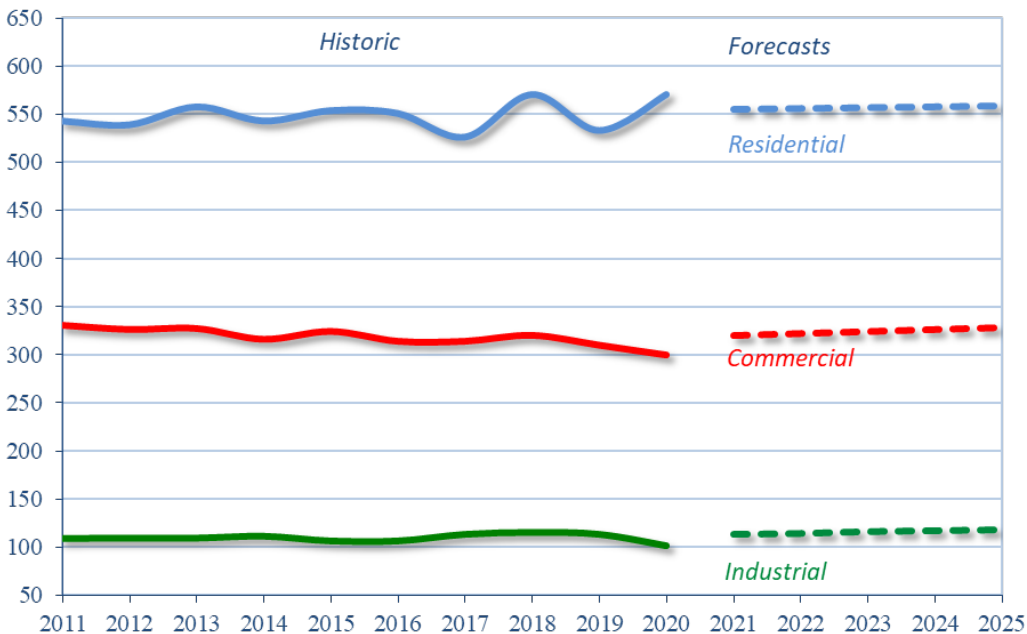
UGI provides electric service to about 62,656 customers in Northwestern Luzerne and Southern Wyoming counties in Pennsylvania. UGI’s 2020 energy usage total was 977 GWh as compared to: 958 GWh in 2019; 1,009 GWh in 2018; 957 GWh in 2017; and 977 GWh in 2016. Year-over-year (YOY) energy usage increased 2.0%. UGI’s total usage mix consisted of residential (58.4%), commercial (30.7%), industrial (10.3%), and sales for resale (less than 1%).



Over the next five years, total energy usage is projected to increase at an average annual rate of 0.7%. This includes a residential usage average annual decrease of 0.4% commercial usage increase of 1.8%, and industrial usage increase by 3.2%. See Figure 22.

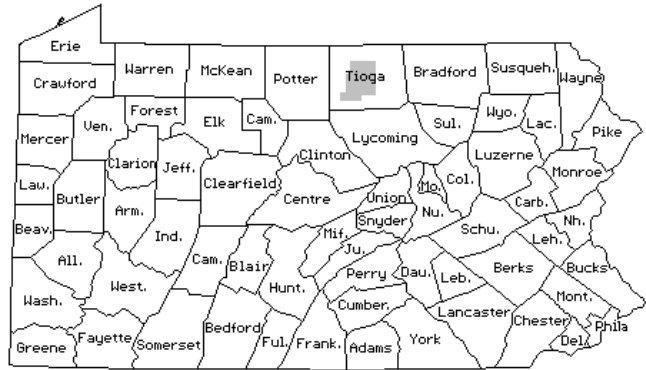
UGI highest summer peak load in 2020 was 211 MW. This represents a YOY increase of 4.5% from the previous year’s peak of 202 MW. The five-year peak load forecast is projected to decrease an average of 1.9% per year.

**Figure 22 UGI Utilities Inc. energy usage (GWh)**



**Wellsboro Electric Company (Wellsboro)**

Wellsboro provides electric service to about 6,378 customers in Tioga County, North Central Pennsylvania. Wellsboro’s 2020 energy usage total was 103 GWh as compared to: 104 GWh in 2019; 106 GWh in 2018; 105 GWh in 2017; and 122 GWh in 2016. Year-over-year (YOY) energy usage decreased 1.7%. Wellsboro’s total usage mix consisted of residential (43.4%), commercial (29.7%), industrial (26.7%), and other/sales for resale (less than 1%).

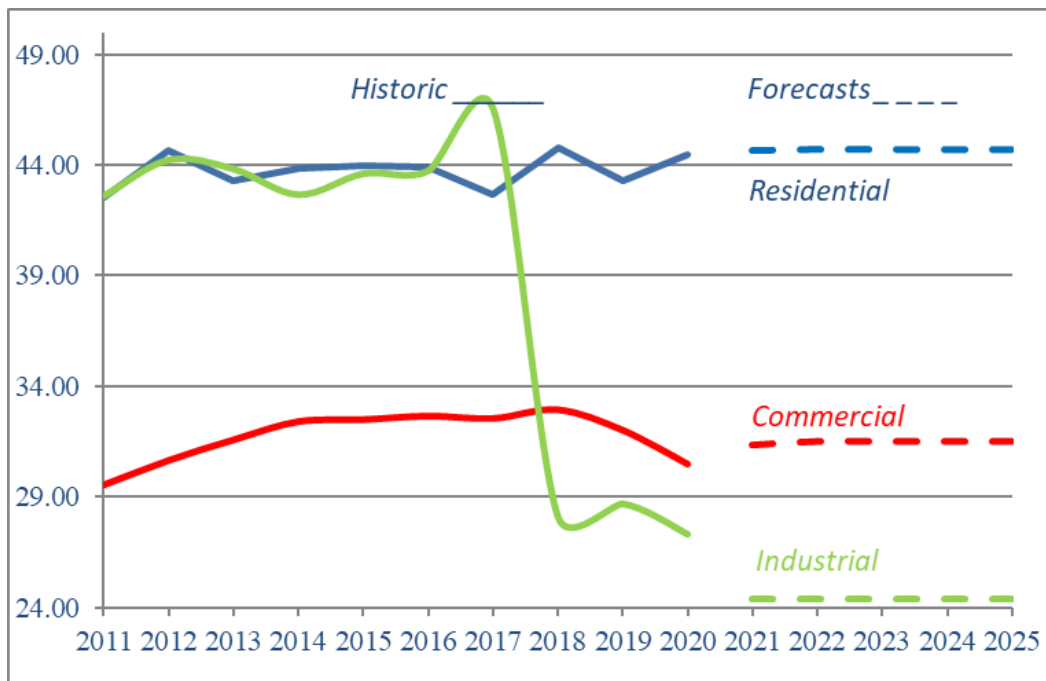


Over the next five years, total energy usage is projected to decrease at an average annual rate of 0.5 %. This includes a residential usage average annual increase of 0.1%, commercial usage increase of 0.7%, and industrial usage decrease of 2.3%. See Figure 23.

Note: the dramatic drop in Industrial usage in 2017 is due to two large industrial customers leaving region in 2017.

Wellsboro’s highest summer peak load in 2020 was 20 MW. This represents a YOY increase of 8.5% from the previous year’s peak of 20 MW. The five-year peak load forecast is projected increase an average of 1.64% per year.

**Figure 23 Wellsboro Electric Company energy usage (GWh)**



## *Appendix A – Data Tables*

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The following tables provide actual and projected peak load as well as residential, commercial and industrial energy demand by EDC. The five-year projections are filed each year by the large EDCs. Actual values are provided for years 2011 through 2020 and values are listed in the second column labeled “Actual.” The lower-right-most-column in the body of the table is the latest five-year projection for years 2021 through 2025.

**Table A01 Duquesne Light Company  
Actual and Projected Peak Load (MW)**

Year	Actual	Projected Peak Load Requirements (Year Forecast Was Filed)										
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
2011	3012	2944										
2012	3054	3000	2935									
2013	2951	3053	2980	2966								
2014	2693	3088	3045	3021	2997							
2015	2804	3125	3102	3083	3056	2969						
2016	2797		3132	3135	3094	3005	2893					
2017	2682			3167	3118	3026	2918	2884				
2018	2795				3143	3042	2938	2895	2872			
2019	2662					3056	2950	2901	2874	2862		
2020	2667						2942	2890	2861	2852	2759	
2021								2882	2862	2853	2781	2768
2022									2869	2865	2797	2796
2023										2866	2807	2832
2024											2818	2855
2025												2875

**Table A03 Duquesne Light Company  
Actual and Projected Commercial Energy Demand (GWh)**

Year	Actual	Projected Commercial Energy Demand (Year Forecast Was Filed)										
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
2011	6612	6681										
2012	6539	6782	6682									
2013	6494	6854	6749	6642								
2014	6432	6957	6842	6640	6600							
2015	6399	7056	6929	6640	6621	6494						
2016	6335		7017	6645	6648	6503	6371					
2017	6112			6641	6643	6472	6327	6261				
2018	6218				6654	6455	6299	6232	6072			
2019	6053					6430	6254	6187	6024	6098		
2020	5522						6210	6151	5980	6029	6057	
2021								6082	5905	5973	5986	5645
2022									5833	5896	5881	5711
2023										5804	5807	5624
2024											5754	5556
2025												5463

**Table A02 Duquesne Light Company  
Actual and Projected Residential Energy Demand (GWh)**

Year	Actual	Projected Residential Energy Demand (Year Forecast Was Filed)										
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
2011	4232	4213										
2012	4169	4275	4350									
2013	4091	4332	4436	4246								
2014	4068	4402	4509	4260	4217							
2015	4109	4474	4579	4265	4230	4176						
2016	4197		4676	4284	4266	4202	4081					
2017	3876			4306	4266	4184	4068	4004				
2018	4258				4272	4172	4067	3987	3949			
2019	4078					4164	4053	3955	3915	4011		
2020	4217						4012	3908	3856	3971	4005	
2021								3863	3797	3913	3951	4021
2022									3747	3862	3908	3895
2023										3816	3864	3834
2024											3821	3782
2025												3722

**Table A04 Duquesne Light Company  
Actual and Projected Industrial Energy Demand (GWh)**

Year	Actual	Projected Industrial Energy Demand (Year Forecast Was Filed)										
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
2011	3120	2865										
2012	3406	2846	3185									
2013	3337	2815	3226	3501								
2014	3164	2770	3252	3035	2787							
2015	2898	2724	3272	3032	2778	2909						
2016	2566		3289	3031	2762	2896	2890					
2017	2632			3031	2734	2873	2852	2665				
2018	2623				2711	2851	2837	2658	2675			
2019	2472					2826	2819	2640	2656	2719		
2020	2343						2803	2638	2650	2783	2641	
2021								2618	2627	2733	2553	2405
2022									2605	2712	2519	2399
2023										2692	2485	2367
2024											2457	2343
2025												2312

**Table A05 Metropolitan Edison Company  
Actual and Projected Peak Load (MW)**

Year	Actual	Projected Peak Load Requirements (Year Forecast Was Filed)										
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
2011	3036	2911										
2012	3012	2928	2881									
2013	2817	2962	2887	2958								
2014	2791	2995	2898	2965	2975							
2015	2947	3028	2910	2974	2979	2987						
2016	2897		2932	2996	2985	2995	2901					
2017	3026			3017	2987	2997	2895	2926				
2018	2974				2986	2996	2872	2907	2921			
2019	2976					2995	2855	2874	2871	2934		
2020	2976						2856	2865	2868	2928	2837	
2021								2875	2876	2940	2891	2837
2022									2883	2949	2935	2891
2023										2971	2960	2935
2024											2977	2960
2025												2977

**Table A07 Metropolitan Edison Company  
Actual and Projected Commercial Energy Demand (GWh)\***

Year	Actual	Projected Commercial Energy Demand (Year Forecast Was Filed)										
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
2011	2907	2871										
2012	2933	2909	2900									
2013	2944	2948	2930	2914								
2014	2995	2997	2937	2931	2983							
2015	3043	2995	2940	2964	2929	2919						
2016	2886		2956	2984	2938	2923	2953					
2017	2972			2989	2938	2927	2948	2952				
2018	2133				2923	2925	2941	2948	2940			
2019	2003					2921	2935	2924	2899	2101		
2020	2003						2925	2904	2873	2081	1906	
2021								2912	2875	2083	1393	1906
2022									2880	2089	1956	1933
2023										2146	1969	1956
2024											1965	1969
2025												1965

\* The 2010 actual and 2011 forecast are based on a reclassification of the commercial and industrial classes.

**Table A06 Metropolitan Edison Company  
Actual and Projected Residential Energy Demand (GWh)**

Year	Actual	Projected Residential Energy Demand (Year Forecast Was Filed)										
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
2011	5363	5201										
2012	5553	5184	5297									
2013	5477	5183	5159	5354								
2014	5515	5212	5042	5421	5533							
2015	5528	5210	4979	5438	5378	5190						
2016	5351		4993	5457	5392	5042	5316					
2017	5740			5476	5382	4925	5242	5347				
2018	5641				5351	4840	5154	5265	5318			
2019	5750					4760	5083	5201	5239	5460		
2020	5750						5044	5166	5201	5422	5577	
2021									5172	5198	5418	5539
2022										5203	5428	5539
2023											5553	5628
2024												5666
2025												5666

**Table A08 Metropolitan Edison Company  
Actual and Projected Industrial Energy Demand (GWh)\***

Year	Actual	Projected Industrial Energy Demand (Year Forecast Was Filed)										
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
2011	5261	5434										
2012	5328	5652	5411									
2013	5382	5765	5521	5322								
2014	5309	5851	5561	5381	5413							
2015	5304	5847	5587	5456	5472	5350						
2016	5512		5612	5508	5507	5372	5360					
2017	5685			5524	5523	5467	5428	5449				
2018	6459				5532	5474	5408	5443	5451			
2019	6029					5467	5397	5396	5372	6396		
2020	6029						5458	5388	5409	6422	6302	
2021								5419	5450	6466	6471	6302
2022									5472	6507	6577	6471
2023										6876	6625	6577
2024											6611	6625
2025												6611

\* The 2010 actual and 2011 forecast are based on a reclassification of the commercial and industrial classes.

**Table A09 Pennsylvania Electric Company  
Actual and Projected Peak Load (MW)**

Year	Actual	Projected Peak Load Requirements (Year Forecast Was Filed)											
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	
2011	2659	2465											
2012	3128	2452	2515										
2013	3087	2458	2544	2938									
2014	3024	2496	2579	2942	2927								
2015	2819	2531	2625	2987	2935	2888							
2016	2909		2662	3039	2946	2896	2890						
2017	2910			3081	2962	2904	2898	2797					
2018	3020				2968	2904	2906	2794	2823				
2019	2866					2902	2907	2775	2809	2849			
2020	2908						2907	2751	2779	2811	2892		
2021									2739	2775	2811	2884	2855
2022										2779	2813	2884	2862
2023											2817	2873	2880
2024												2866	2882
2025													2886

**Table A11 Pennsylvania Electric Company  
Actual and Projected Commercial Energy Demand (GWh)\***

Year	Actual	Projected Commercial Energy Demand (Year Forecast Was Filed)											
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	
2011	3671	5196											
2012	3534	5215	3562										
2013	3531	5257	3526	3512									
2014	3591	5343	3593	3535	3553								
2015	3558	5424	3650	3510	3552	3649							
2016	3587		3698	3503	3582	3582	3539						
2017	3529			3503	3604	3614	3545	3483					
2018	3610				3608	3619	3551	3454	3525				
2019	2443					3607	3553	3426	3516	3506			
2020	2293						3552	3392	3499	3459	2485		
2021								3352	3473	3424	2459	2221	
2022									3472	3406	2446	2296	
2023										3397	2440	2364	
2024											2449	2403	
2025													2391

\* The 2010 actual and 2011 forecast are based on a reclassification of the commercial and industrial classes.

**Table A10 Pennsylvania Electric Company  
Actual and Projected Residential Energy Demand (GWh)**

Year	Actual	Projected Residential Energy Demand (Year Forecast Was Filed)											
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	
2011	4656	4569											
2012	4554	4489	4460										
2013	4491	4443	4304	4257									
2014	4462	4442	4387	4164	4469								
2015	4350	4486	4539	4145	4513	4491							
2016	4328		4653	4157	4525	4373	4145						
2017	4153			4156	4554	4393	4011	4248					
2018	4424				4583	4394	3923	4229	4238				
2019	4266					4377	3856	4181	4157	4187			
2020	4319						3791	4133	4090	4134	4141		
2021								4112	4056	4104	4111	4279	
2022									4057	4104	4109	4247	
2023										4112	4104	4244	
2024											4112	4256	
2025												4259	

**Table A12 Pennsylvania Electric Company  
Actual and Projected Industrial Energy Demand (GWh)\***

Year	Actual	Projected Industrial Energy Demand (Year Forecast Was Filed)											
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	
2011	5748	4126											
2012	6005	4222	6026										
2013	5731	4370	6175	5883									
2014	5647	4607	6266	5993	5696								
2015	5647	4674	6304	6062	5808	5747							
2016	5668		6325	6133	5867	5822	5723						
2017	5792			6130	5894	5931	5746	5602					
2018	5797				5896	6017	5721	5617	5822				
2019	6743					5998	5675	5602	5832	5807			
2020	6288						5623	5569	5757	5720	6520		
2021									5548	5751	5770	6587	6473
2022										5790	5819	6474	6522
2023											5854	6394	6513
2024												6327	6481
2025													6463

\* The 2010 actual and 2011 forecast are based on a reclassification of the commercial and industrial classes.

**Table A13 Pennsylvania Power Company  
Actual and Projected Peak Load (MW)**

Year	Actual	Projected Peak Load Requirements (Year Forecast Was Filed)										
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
2011	1102	944										
2012	963	947	1010									
2013	1054	983	1001	929								
2014	1018	1002	1003	930	867							
2015	910	1010	1006	953	873	931						
2016	931		1010	969	880	940	992					
2017	926			980	885	947	999	973				
2018	950				889	949	1003	965	983			
2019	915					949	1004	956	979	976		
2020	889						1006	951	975	965	923	
2021								945	977	968	926	910
2022									985	973	927	912
2023										976	937	924
2024											945	932
2025												940

**Table A15 Pennsylvania Power Company  
Actual and Projected Commercial Energy Demand (GWh)**

Year	Actual	Projected Commercial Energy Demand (Year Forecast Was Filed)										
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
2011	1327	1300										
2012	1334	1267	1291									
2013	1349	1272	1297	1337								
2014	1381	1277	1314	1347	1345							
2015	1321	1278	1335	1358	1322	1180						
2016	1355		1334	1365	1326	1048	1311					
2017	1302			1374	1332	1049	1315	1345				
2018	1356				1332	1047	1319	1330	1317			
2019	957					1040	1321	1314	1312	1307		
2020	668						1321	1302	1303	1287	1016	
2021								1289	1295	1262	996	787
2022									1293	1237	977	850
2023										1221	967	908
2024											1023	940
2025												931

**Table A14 Pennsylvania Power Company  
Actual and Projected Residential Energy Demand (GWh)**

Year	Actual	Projected Residential Energy Demand (Year Forecast Was Filed)											
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	
2011	1711	1664											
2012	1668	1624	1590										
2013	1704	1638	1588	1645									
2014	1728	1664	1582	1627	1677								
2015	1703	1684	1589	1619	1685	1752							
2016	1686		1588	1625	1691	1689	1597						
2017	1591			1649	1699	1703	1563	1651					
2018	1713				1705	1713	1545	1632	1640				
2019	1638					1714	1532	1609	1617	1630			
2020	1674							1520	1593	1604	1612	1613	
2021									1584	1595	1604	1604	1647
2022										1598	1606	1608	1636
2023											1614	1616	1647
2024												1657	1662
2025													1672

**Table A16 Pennsylvania Power Company  
Actual and Projected Industrial Energy Demand (GWh)**

Year	Actual	Projected Industrial Energy Demand (Year Forecast Was Filed)												
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021		
2011	1542	1527												
2012	1456	1652	1513											
2013	1509	1705	1483	1473										
2014	1599	1725	1486	1518	1596									
2015	1496	1738	1490	1519	1743	1847								
2016	1569		1490	1488	1739	2079	1637							
2017	1738				1485	1729	2202	1696	1513					
2018	1826					1731	2256	1742	1476	1702				
2019	2066							2278	1775	1465	1713	1727		
2020	1926								1790	1467	1726	1728	2088	
2021										1460	1757	1781	2121	1970
2022											1794	1833	2153	2075
2023												1866	2220	2141
2024													2298	2182
2025														2200



**Table A17 PPL Electric Utilities Corporation  
Actual and Projected Peak Load (MW)**

Year	Actual	Projected Peak Load Requirements (Year Forecast Was Filed)										
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
2011	6776	7101										
2012	7182	7138	7331									
2013	7190	7142	7400	7271								
2014	7816	7216	7484	7403	7334							
2015	7842	7282	7622	7556	7477	7220						
2016	7216		7731	7691	7568	7314	7209					
2017	7468			7785	7635	7408	7298	7209				
2018	7729				7686	7467	7385	7298	7248			
2019	7609					7511	7435	7385	7215	7250		
2020	7049						7427	7435	7194	7229	7069	
2021								7427	7208	7267	7173	7513
2022									7243	7280	7265	7512
2023										7294	7334	7513
2024											7406	7552
2025												7584

**Table A19 PPL Electric Utilities Corporation  
Actual and Projected Commercial Energy Demand (GWh)**

Year	Actual	Projected Commercial Energy Demand (Year Forecast Was Filed)										
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
2011	14179	10756										
2012	14027	10860	14217									
2013	14140	11022	14270	14354								
2014	14111	11251	14411	14524	14414							
2015	14336	11499	14580	14740	14570	14235						
2016	14160		14754	14998	14741	14234	14214					
2017	14037			15137	14859	14376	14257	14394				
2018	14105				14985	14440	14326	14517	14353			
2019	14728					14484	14357	14578	14372	13986		
2020	13129						14357	14560	14336	13880	14721	
2021								14493	14307	13818	14776	13609
2022									14260	13810	14799	13807
2023										13802	14803	13926
2024											14827	13976
2025												13950

**Table A18 PPL Electric Utilities Corporation  
Actual and Projected Residential Energy Demand (GWh)**

Year	Actual	Projected Residential Energy Demand (Year Forecast Was Filed)										
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
2011	14356	14142										
2012	13616	14120	13848									
2013	14295	14005	13658	13607								
2014	14563	14161	13667	13575	13588							
2015	14462	14335	13738	13602	13644	13647						
2016	13810		13896	13695	13769	13720	13721					
2017	13650			13678	13814	13732	13750	13856				
2018	14811				13908	13781	13825	13940	13588			
2019	14490					13790	13826	13982	13499	14050		
2020	14592						13679	13853	13448	13960	14399	
2021								13750	13253	13901	14383	14011
2022									13045	13845	14383	14076
2023										13827	14382	14115
2024											14382	14102
2025												14056

**Table A20 PPL Electric Utilities Corporation  
Actual and Projected Industrial Energy Demand (GWh)**

Year	Actual	Projected Industrial Energy Demand (Year Forecast Was Filed)										
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
2011	8467	12151										
2012	8173	12116	8475									
2013	8052	12269	8468	8133								
2014	8313	12450	8501	8182	8092							
2015	8269	12686	8550	8281	8171	7966						
2016	8128		8603	8407	8260	8066	8283					
2017	8098			8459	8324	8129	8354	8370				
2018	8144				8365	8168	8420	8467	8421			
2019	7889					8189	8450	8521	8486	8109		
2020	8354						8450	8520	8440	8058	7814	
2021								8520	8406	8025	7836	8364
2022									8345	7997	7855	8585
2023										7965	7872	8724
2024											7891	8783
2025												8787

**Table A21 PECO Energy Company  
Actual and Projected Peak Load (MW)**

Year	Actual	Projected Peak Load Requirements (Year Forecast Was Filed)										
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
2011	8984	8786										
2012	8549	8770	8926									
2013	8618	8842	8956	8529								
2014	8258	8916	8987	8580	8627							
2015	8094	8991	9018	8631	8635	8259						
2016	8094		9049	8683	8644	8267	8102					
2017	8141			8735	8653	8275	8110	8102				
2018	8608				8661	8284	8118	8110	8149			
2019	8428					8292	8126	8118	8157	8617		
2020	8148						8135	8126	8165	8625	8436	
2021								8135	8174	8634	8445	8156
2022									8182	8642	8453	8164
2023										8651	8462	8172
2024											8470	8181
2025												8189

**Table A23 PECO Energy Company  
Actual and Projected Commercial Energy Demand (GWh)**

Year	Actual	Projected Commercial Energy Demand (Year Forecast Was Filed)											
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	
2011	8332	8589											
2012	8063	8705	8360										
2013	8101	8879	8443	7821									
2014	8025	9057	8528	7790	7858								
2015	8118	9238	8613	7868	7936	8021							
2016	8099		8699	7947	8015	8017	8044						
2017	7968				8026	8096	8013	8020	8132				
2018	8177					8177	8009	8016	8073	7992			
2019	7983						8005	8018	8063	8043	8143		
2020	7210							8019	8046	8049	8156	7976	
2021									7995	8038	8163	7936	7638
2022										8042	8163	7917	7873
2023											8163	7892	7866
2024												7882	7857
2025													7809

**Table A22 PECO Energy Company  
Actual and Projected Residential Energy Demand (GWh)**

Year	Actual	Projected Residential Energy Demand (Year Forecast Was Filed)										
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
2011	13686	13912										
2012	13233	14037	13669									
2013	13241	14317	13806	13392								
2014	13222	14604	13944	14463	13343							
2015	13630	14896	14083	14608	13346	13288						
2016	13664		14224	14754	13349	13355	13366					
2017	13024			14902	13351	13422	13341	13436				
2018	14005				13354	13489	13352	13423	13266			
2019	13650					13556	13354	13404	13240	13581		
2020	14041						13360	13428	13182	13661	13600	
2021								13346	13104	13718	13570	13809
2022									13009	13741	13580	13602
2023										13762	13599	13672
2024											13671	13804
2025												13848

**Table A24 PECO Energy Company  
Actual and Projected Industrial Energy Demand (GWh)**

Year	Actual	Projected Industrial Energy Demand (Year Forecast Was Filed)											
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	
2011	15755	15991											
2012	15253	16153	15755										
2013	15379	16476	15912	15481									
2014	15310	16806	16071	15714	15609								
2015	15365	17142	16232	15949	15844	15302							
2016	15263		16394	16188	16081	15294	15547						
2017	15425			16431	16322	15287	15515	15016					
2018	15516				16567	15279	15513	15364	15421				
2019	14958					15271	15517	15320	15293	15385			
2020	13669							15529	15356	15306	15415	14430	
2021									15355	15247	15431	14444	14173
2022										15217	15431	14598	14647
2023											15431	14715	14692
2024												14687	14623
2025													14587

**Table A25 West Penn Power Company  
Actual and Projected Peak Load (MW)**

Year	Actual	Projected Peak Load Requirements (Year Forecast Was Filed)										
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
2011	4017	3757										
2012	3808	3754	3758									
2013	3914	3786	3771	3784								
2014	4019	3879	3840	3846	4075							
2015	3814	3928	3903	3908	3945	3793						
2016	3954		3964	3980	4012	3842	3793					
2017	3879			4015	4065	3927	3840	3776				
2018	4012				4077	4020	3886	3789	3806			
2019	3740					4031	3916	3775	3801	3764		
2020	3827						3917	3767	3796	3704	3828	
2021								3762	3798	3690	3872	3821
2022									3804	3695	3883	3862
2023										3704	3892	3884
2024											3911	3894
2025												3891

**Table A27 West Penn Power Company  
Actual and Projected Commercial Energy Demand (GWh)**

Year	Actual	Projected Commercial Energy Demand (Year Forecast Was Filed)										
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
2011	4889	4909										
2012	4849	4931	4819									
2013	4878	4979	4930	4845								
2014	4956	5091	5083	4909	4860							
2015	5112	5229	5229	4946	4897	4996						
2016	5051		5343	4979	4932	4957	4900					
2017	4364			5047	4962	5015	4915	4995				
2018	4500				4962	5029	4941	4953	4285			
2019	2880					5006	4952	4918	4246	4261		
2020	2584						4954	4884	4208	4260	2879	
2021								4857	4184	4266	2882	2686
2022									4184	4273	2880	2738
2023										4279	2868	2786
2024											2862	2819
2025												2805

**Table A26 West Penn Power Company  
Actual and Projected Residential Energy Demand (GWh)**

Year	Actual	Projected Residential Energy Demand (Year Forecast Was Filed)										
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
2011	7349	7139										
2012	7092	7122	7121									
2013	7318	7047	7149	7146								
2014	7281	7073	7188	7282	7311							
2015	7255	7148	7231	7369	7302	7383						
2016	7186		7281	7431	7303	7157	6775					
2017	6817			7493	7319	7244	6634	6892				
2018	7358				7335	7298	6548	6834	6931			
2019	7152					7303	6473	6752	6906	6988		
2020	7178						6407	6660	6819	6901	6931	
2021								6614	6756	6851	6844	6925
2022									6756	6858	6849	6877
2023										6864	6846	6897
2024											6862	6926
2025												6916


**Table A28 West Penn Power Company  
Actual and Projected Industrial Energy Demand (GWh)**

Year	Actual	Projected Industrial Energy Demand (Year Forecast Was Filed)										
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
2011	7818	7833										
2012	7685	8025	8029									
2013	7777	8146	8172	8087								
2014	7972	8264	8334	8303	7947							
2015	7635	8346	8487	8542	8161	8053						
2016	7684		8608	8786	8331	8492	8287					
2017	8371			8878	8466	8903	8641	7947				
2018	8667				8495	9321	8798	8072	8785			
2019	10003					9700	8847	8114	8873	8617		
2020	9094						8852	8179	8865	8540	10074	
2021								8199	8920	8651	10209	9889
2022									8920	8760	10306	10161
2023										8813	10375	10258
2024											10857	10273
2025												10237

## Appendix B – Plant Additions and Upgrades

Table B-1 provides detail of PJM interconnection requests for new generating resources located in Pennsylvania.<sup>55</sup> Currently Pennsylvania has 2,503 MW under construction as compared to: 2,831 MW in 2019, 6,600 MW in 2018; 9,636 MW in 2017; 7,142 MW in 2016; 8,202 MW in 2015; and 4,629 MW in 2014. Table B-2 details the generation deactivations for Pennsylvania from Jan. 1, 2020, through Dec. 31, 2020.

**Table B-1, New Generation Queue for Pennsylvania – Interconnection Requests (Dec 31, 2020)**



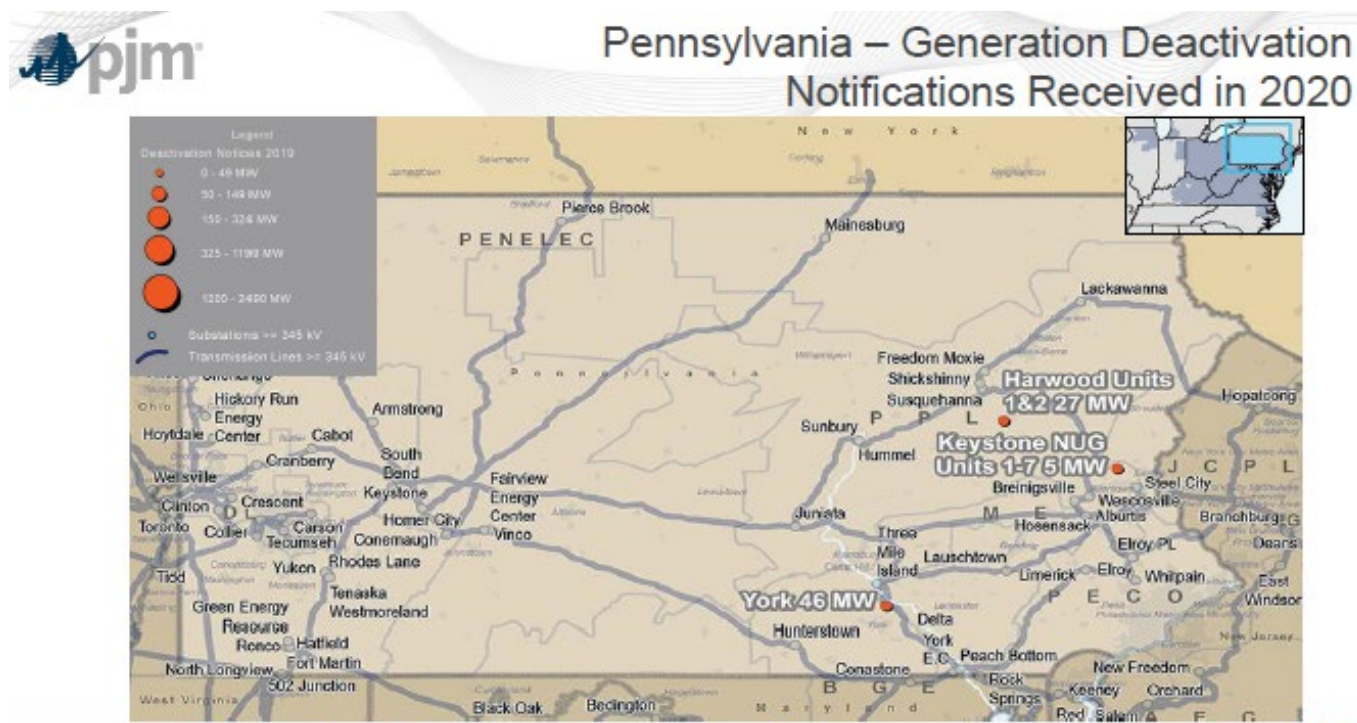
**Pennsylvania – Interconnection Requests by Fuel Type**  
(Unforced Capacity – as of Dec. 31, 2020)

		In Queue						Complete				Grand Total	
		Active		Suspended		Under Construction		In Service		Withdrawn		Projects	Capacity (MW)
		Projects	Capacity (MW)	Projects	Capacity (MW)	Projects	Capacity (MW)	Projects	Capacity (MW)	Projects	Capacity (MW)	Projects	Capacity (MW)
<b>Non-Renewable</b>	Coal	0	0.0	0	0.0	0	0.0	17	229.0	28	14,354.6	45	14,583.6
	Diesel	0	0.0	0	0.0	1	4.1	3	33.3	12	51.5	16	88.9
	Natural Gas	13	952.6	1	950.0	27	2,210.1	98	20,477.1	245	89,688.0	384	114,277.8
	Nuclear	2	0.0	0	0.0	1	44.0	14	2,565.0	12	1,731.0	29	4,340.0
	Oil	0	0.0	0	0.0	6	7.5	3	9.4	9	1,307.0	18	1,323.9
	Other	0	0.0	0	0.0	0	0.0	2	306.5	6	344.0	8	650.5
	Storage	38	976.5	2	11.8	1	0.0	5	0.0	39	722.8	85	1,711.1
<b>Renewable</b>	Biomass	0	0.0	0	0.0	0	0.0	2	15.4	4	36.5	6	51.9
	Hydro	6	506.5	0	0.0	0	0.0	12	480.8	17	443.9	35	1,431.1
	Methane	0	0.0	0	0.0	0	0.0	24	130.7	37	201.3	61	332.0
	Solar	312	6,704.5	9	129.4	49	190.2	10	37.4	181	2,961.7	561	10,023.2
	Wind	5	101.7	2	21.4	3	47.0	39	259.6	137	1,749.0	186	2,178.7
	Wood	0	0.0	0	0.0	0	0.0	0	0.0	1	16.0	1	16.0
	<b>Grand Total</b>	<b>376</b>	<b>9,241.7</b>	<b>14</b>	<b>1,112.7</b>	<b>88</b>	<b>2,502.9</b>	<b>229</b>	<b>24,544.2</b>	<b>728</b>	<b>113,607.2</b>	<b>1,435</b>	<b>151,008.7</b>

**Note:** The "Under Construction" column includes both "Engineering and Procurement" and "Under Construction" project statuses.

<sup>55</sup> See PJM, *PJM Pennsylvania State Infrastructure Report 2020*, available at: <https://www.pjm.com/-/media/library/reports-notices/state-specific-reports/2020/2020-pennsylvania-state-infrastructure-report.ashx>.

**Table B-2, 2020 Pennsylvania Actual Generation Deactivations and Deactivation Notifications Received in 2020**



Unit	TO Zone	Fuel Type	Request Received to Deactivate	Actual or Projected Deactivation Date	Age (Years)	Capacity (MW)
Keystone NUG Recovery (Unites 1-7)	PPL	Methane	2/28/2020	6/1/2020	25	4.9
Harwood Unit 1	PPL	Oil	10/29/2020	5/31/2021	53	13.6
Harwood Unit 2	PPL	Oil	10/29/2020	5/31/2021	53	13.6
York Generation Facility	Met-ED	Natural Gas	10/29/2020	5/31/2021	31	46.2

In 2020, there were 78.3 MW of actual Pennsylvania generation retirements as compared to 931.1 MW in 2019, 76.1 MW in 2018, 14 MW in 2017, and 177 MW in 2016. PJM received four new Pennsylvania Deactivation Notices in 2020 with projected deactivation dates as shown in Table B-2.

## Appendix C – Pennsylvania Generation Capability/Facilities

Table C-1 represents the PJM region installed electrical capacity percentage and actual generation percentage by energy source from 2016 through 2020.<sup>56</sup> Chart C represents the 2020 and 2019 Pennsylvania installed capacity percentage by energy source.<sup>57</sup> Table C-2 represents existing generating facilities by located in Pennsylvania.<sup>58</sup>

**Table C-1 PJM Region Electrical Power Supply Mix**

PJM Region Electricity Supply Mix 2020/2019/2018/2017/2016 (percent)										
Energy Source	Capacity					Generation				
	2020	2019	2018	2017	2016	2020	2019	2018	2017	2016
Coal	27	30.5	32.7	35.4	36.5	19.3	23.8	28.6	31.8	33.9
Nuclear	17.5	17.5	17.6	18	18.1	34.2	33.6	34.2	35.6	34.4
Natural Gas	45.6	42.3	40.2	36.8	35.7	39.8	36.2	30.9	27.1	26.7
Hydro, Wind, Solar & Other	7	6.3	6.1	6	6	6.4	5.9	5.9	5.7	4.7
Oil	3	3.4	3.4	3.6	3.7	0.3	0.2	0.4	0.3	0.3

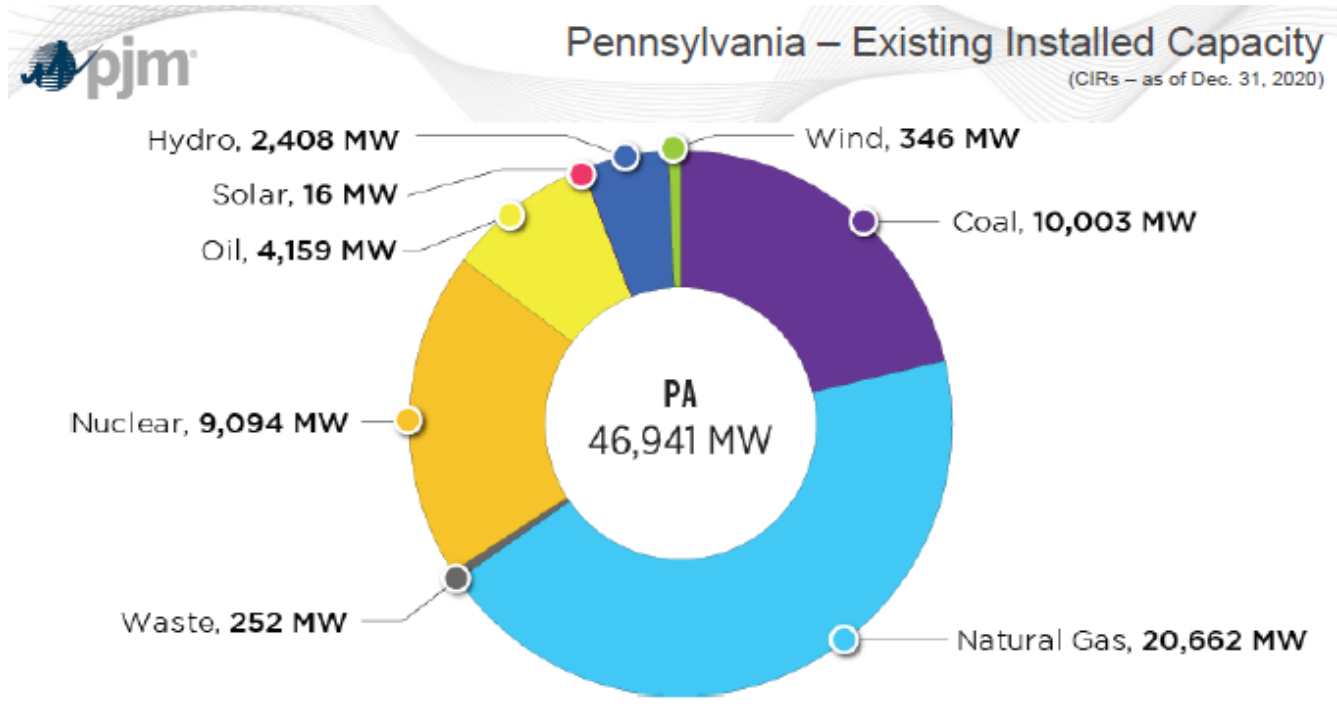
<sup>56</sup> *State of the Market Report for PJM*, Volume II, Sections 3 & 5 reporting years 2020, 2019, 2018, 2017, and 2016. Available at: [www.monitoringanalytics.com](http://www.monitoringanalytics.com).

<sup>57</sup> See PJM, *PJM Pennsylvania State Infrastructure Report 2020*, available at: <https://www.pjm.com/-/media/library/reports-notices/state-specific-reports/2020/2020-pennsylvania-state-infrastructure-report.ashx>.

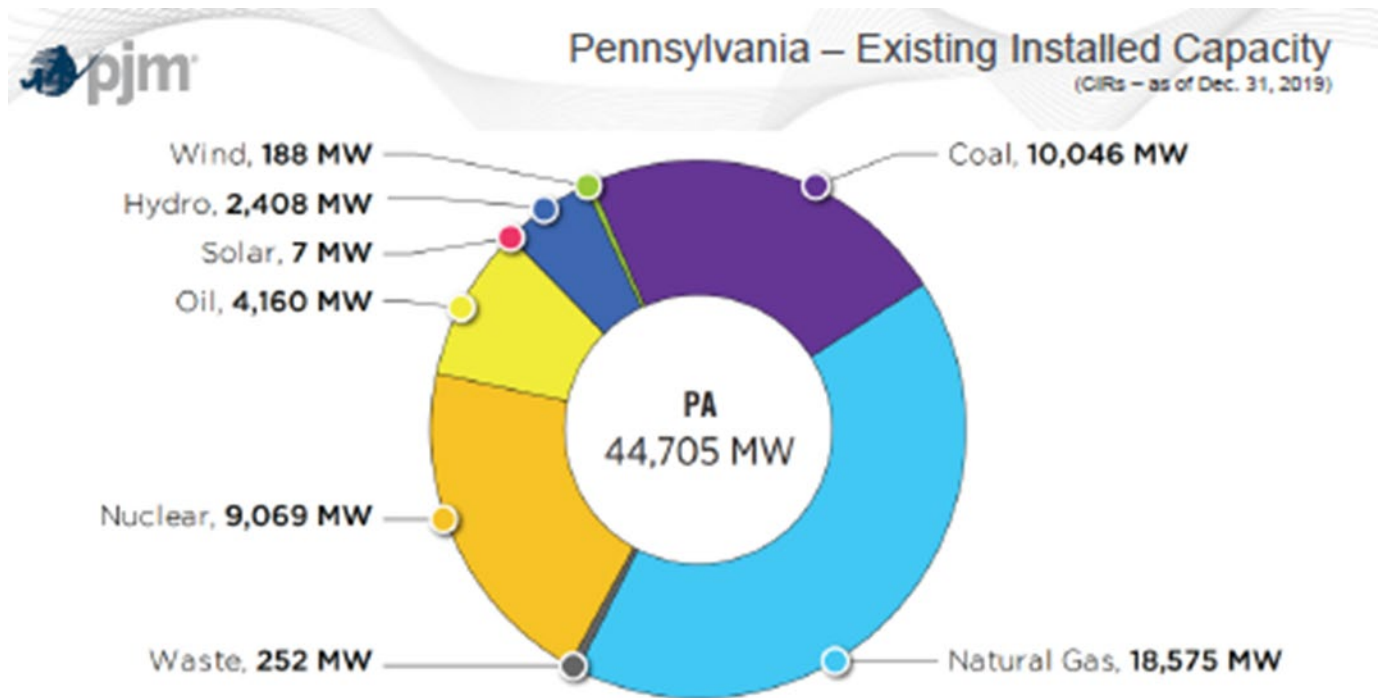
<sup>58</sup> Data accessed through S&P Global Market Intelligence as of Jul. 1, 2021. Note: S&P Global Market Intelligence uses the best available data to estimate the power market region for each power plant unit and electric utility. Estimates are based on ownership, purchase power agreements, interconnected utilities, membership lists (load serving or transmission owning), and geographically based public information. Power plant units which belong to more than one power market region are allocated on a percentage basis of their operating capacity. Companies which belong to more than one power market region will be wholly placed into each region to which they are assigned.

Chart C – Electrical Power Capacity Mix

2020 Pennsylvania Installed Capacity



2019 Pennsylvania Installed Capacity





**Table C-2 Electric Generating Facilities in Pennsylvania**

<i>Power Plant</i>	<i>Owner Name</i>	<i>Ultimate Parent</i>	<i>Fuel Type</i>	<i>Operating Capacity (MW)</i>	<i>First Unit Online</i>	<i>Last Unit Online</i>
Allenwood (PPLRE Lycoming County Landfill Project)	Talen Renewable Energy	Energy Power Partners LLC	Biomass	3.2	10/2012	10/2012
Andromeda One A Biomass Plant	Andromeda Green Energy	Andromeda Green Energy	Biomass	4.0	2/2016	2/2016
Archbald Cogeneration	PEI Power Corporation	Energy Transfer LP	Biomass	20.0	9/1988	9/1988
Arden Landfill	WM Renewable Energy LLC	Waste Management Inc.	Biomass	4.8	2/2009	2/2009
Broad Mountain Landfill Facility	UGI Development Company	UGI Corp.	Biomass	9.8	1/2009	1/2009
Covanta Plymouth (Montenay Montgomery)	Covanta Plymouth Renewable	Covanta Holding Corp.	Biomass	28.0	12/1991	12/1991
Dart Container Corp Cogen	Dart Container Corp.	Dart Container Corp.	Biomass	10.4	12/2012	12/2012
Delaware County Resource Recovery Facility	Covanta Delaware Valley	Covanta Holding Corp.	Biomass	75.0	4/1991	4/1991
Frey Farm Landfill	Talen Renewable Energy	Energy Power Partners LLC	Biomass	1.6	1/2006	1/2006
Gettysburg Energy & Nutrient Recovery Facility (GENRF)	EnergyWorks BioPower	EnergyWorks BioPower	Biomass	2.7	6/2013	6/2013
Glades Pike Cogeneration Plant IC	State Correctional Inst (Laure	State Correctional Inst (Laure	Biomass	3.2	10/2011	10/2011
Glendon Plant	Talen Renewable Energy	Energy Power Partners LLC	Biomass	3.2	6/2011	6/2011
Greater Lebanon Refuse Authority Landfill	Talen Renewable Energy	Energy Power Partners LLC	Biomass	3.2	9/2007	9/2007
Green Knight Energy Center	Waste Management Inc.	Waste Management Inc.	Biomass	8.7	2/2001	2/2001
Honey Brook Generating Station (Granger)	Granger Electric Co	Granger Electric Co	Biomass	3.2	12/2006	8/2010
IESI Blue Ridge Landfill	Talen Renewable Energy	Energy Power Partners LLC	Biomass	6.4	1/2013	1/2013
Johnsonburg Mill	Domtar Paper Co. LLC	Domtar Corp.	Biomass	49.0	2/1993	2/1993
Lakeview Gas Recovery	WM Renewable Energy LLC	Waste Management Inc.	Biomass	6.0	5/1997	6/1997
Lancaster County Resource Recovery	Covanta Lancaster Inc.	Covanta Holding Corp.	Biomass	32.4	5/1991	5/1991
Lycoming County Landfill Project (PPL Renewable)	Talen Renewable Energy	Energy Power Partners LLC	Biomass	3.0	10/2012	10/2012
Morgantown Generating Station	Granger Electric Co	Granger Electric Co	Biomass	1.6	5/2016	5/2016
Mountain View Landfill	CCI Power Holdings	Energy Trading Innovations	Biomass	14.4	3/2003	3/2003
Northern Tier Landfill	Talen Renewable Energy	Energy Power Partners LLC	Biomass	1.6	1/2009	1/2009
Pine Grove Landfill	CCI Power Holdings	Energy Trading Innovations	Biomass	5.4	2/2008	2/2008
Pioneer Crossing Landfill	Fortistar LLC	Fortistar LLC	Biomass	8.0	10/2008	11/2013
PWD Northeast WPCP Biogas Cogen	Philadelphia Water Department	Philadelphia Water Department	Biomass	5.6	12/2013	12/2013
SECCRA Community Landfill	Southeastern Chester County Re	Southeastern Chester County Re	Biomass	2.5	1/2007	11/2010
Shippensburg (Cumberland County) Landfill	Talen Renewable Energy	Energy Power Partners LLC	Biomass	6.4	1/2009	1/2009
Susquehanna Resource Management Complex (Harrisburg Facility Cogen)	Covanta Harrisburg, Inc.	Covanta Holding Corp.	Biomass	16.7	10/1986	4/2006
Tullytown Landfill Gas Facility	WM Renewable Energy LLC	Waste Management Inc.	Biomass	1.6	3/2013	3/2013
Wheelabrator Falls	Wheelabrator Falls Inc.	Energy Capital Partners LLC	Biomass	43.9	5/1994	5/1994
York County Resource Recovery Center	Covanta York Renewable Energy	Covanta Holding Corp.	Biomass	36.5	11/1989	11/1989
Zook Generating Station (L&S Sweetners)	Granger Electric Co	Granger Electric Co	Biomass	3.2	10/2013	10/2013
Brunner Island	Talen Generation LLC	Talen Energy Corporation	Coal	1,411.0	5/1961	6/1969
Cheswick	NRG Power Midwest	GenOn Holdings Inc.	Coal	565.0	6/1970	6/1970
Colver Power Project	Colver Green Energy LLC	Generation Holdings LP	Coal	110.0	2/1995	2/1995
Conemaugh	ArcLight Capital Partners LLC	ACHP B L.P.	Coal	1,700.0	5/1970	5/1971
Ebensburg Power Company	Ebensburg Power Co	Generation Holdings LP	Coal	50.0	5/1991	5/1991
Homer City	Homer City Generation, L.P.	Homer City Generation, L.P.	Coal	1,900.4	6/1969	11/1977

**Table C-2 Electric Generating Facilities in Pennsylvania (cont'd)**

<i>Power Plant</i>	<i>Owner Name</i>	<i>Ultimate Parent</i>	<i>Fuel Type</i>	<i>Operating Capacity (MW)</i>	<i>First Unit Online</i>	<i>Last Unit Online</i>
John B Rich Memorial Power Station	RI-CORP Development	RI-CORP Development	Coal	80.0	2/1988	2/1988
Keystone	ArcLight Capital Partners LLC	ACHP B L.P.	Coal	1,700.0	8/1967	7/1968
Montour	Talen Generation LLC	Talen Energy Corporation	Coal	1,504.0	3/1972	4/1973
Mount Carmel Cogeneration	Mt Carmel Co-Gen	Kenneth Pollock & Connie Rado	Coal	43.0	1/1990	1/1990
P.H. Glatfelter Company - Pennsylvania	P H Glatfelter Co	P H Glatfelter Co	Coal	85.0	5/1948	1/1994
Panther Creek	Panther Creek Power Operating	ArcLight Capital Holdings LLC	Coal	83.0	7/1992	7/1992
Scrubgrass	U.S. Operating Services Co	U.S. Operating Svc Holdings	Coal	86.4	6/1993	6/1993
Seward Waste Coal	Robindale Energy Services Inc	Robindale Energy Services Inc	Coal	521.0	11/2004	11/2004
St. Nicholas Cogeneration	Schuylkill Energy Resources In	Schuylkill Energy Resources In	Coal	86.0	9/1990	9/1990
Westwood Generating Station	WPS Westwood Generation LLC	RCL Holdings Ltd	Coal	30.0	6/1987	6/1987
AE Hunlock 4	UGI Development Company	UGI Corp.	Natural Gas	48.3	12/2000	12/2000
Allegheny Energy 3, 4 and 5 (Springdale)	Aspen Generating LLC	LS Power Group	Natural Gas	550.0	7/2003	7/2003
Allegheny Energy Units 1 and 2 (Springdale)	Aspen Generating LLC	LS Power Group	Natural Gas	88.0	12/1999	12/1999
Allegheny Energy Units 12 & 13 (Chambersburg)	Aspen Generating LLC	LS Power Group	Natural Gas	88.0	11/2001	11/2001
Allegheny Energy Units 8 and 9 (Cans Plant)	Aspen Generating LLC	LS Power Group	Natural Gas	88.0	11/2000	11/2000
Alpaca Gas Project	IMG Midstream LLC	COFRA Holding AG	Natural Gas	20.4	4/2017	4/2017
Archbald Power Station	PEI Power Corporation	Energy Transfer LP	Natural Gas	59.2	5/2001	2/2010
Armstrong County	Ihi Power Services Corp.	Ihi Power Services Corp.	Natural Gas	829.7	5/2002	5/2002
Beaver Dam Gas Project	IMG Midstream LLC	COFRA Holding AG	Natural Gas	21.0	5/2016	5/2016
Bethlehem CC	Conectiv Bethlehem LLC	Calpine Corp.	Natural Gas	1,134.0	1/2003	1/2003
Birdsboro Combined Cycle Plant	NAES Corp	ITOCHU Corp.	Natural Gas	485.0	5/2019	5/2019
Blossburg	NRG REMA , LLC	GenOn Holdings Inc.	Natural Gas	19.0	5/1971	5/1971
Brunot Island CC	NRG Power Midwest	GenOn Holdings Inc.	Natural Gas	269.4	6/1973	7/1974
Bucknell University	Bucknell University	Bucknell University	Natural Gas	6.7	10/1991	6/1998
Chester Operations CC	Kimberly-Clark Corp.	Kimberly-Clark Corp.	Natural Gas	56.4	8/2020	8/2020
CPV Fairview Energy Center	NAES Corp	ITOCHU Corp.	Natural Gas	1,100.0	12/2019	12/2019
East Campus Plant	The PA State University	The PA State University	Natural Gas	8.9	6/2011	6/2011
ECP Uptown Campus Cogeneration Facility	ECP Uptown Campus LLC	ECP Uptown Campus LLC	Natural Gas	5.6	11/1997	11/1997
Eddystone 3-4	Exelon Power	Exelon Corp.	Natural Gas	760.0	9/1974	6/1976
Fairless Works Energy Center	Starwood Energy Group Gbl LLC	Starwood Energy Group Gbl LLC	Natural Gas	1,334.4	5/2004	6/2004
Falling Spring	Chambersburg Borough of	Chambersburg Borough of	Natural Gas	7.1	12/1967	6/2001
Fayette Energy Facility	Vistra Corp	Vistra Corp	Natural Gas	705.0	6/2003	6/2003
Grays Ferry Cogeneration	Grays Ferry Cogeneration Ptnsh	Veolia Environnement SA	Natural Gas	183.6	10/1997	10/1997
Handsome Lake Energy	Handsome Lake Energy LLC	Handsome Lake Energy LLC	Natural Gas	267.5	7/2001	8/2001
Hazleton Cogeneration	NAES Corp	ITOCHU Corp.	Natural Gas	150.9	1/1989	6/2002
Hickory Run Energy Station	NAES Corp	ITOCHU Corp.	Natural Gas	950.0	5/2020	5/2020
Hill at Whitmarsh	Talen Renewable Energy	Energy Power Partners LLC	Natural Gas	1.6	5/2007	5/2007
Hunlock Repowering	UGI Development Company	UGI Corp.	Natural Gas	129.0	7/2011	7/2011
Huntertown CC	NAES Corp	ITOCHU Corp.	Natural Gas	855.0	7/2003	7/2003
Indiana University of Pennsylvania	IN University PA	IN University PA	Natural Gas	24.0	3/1988	3/1988

**Table C-2 Electric Generating Facilities in Pennsylvania (cont'd)**

<i>Power Plant</i>	<i>Owner Name</i>	<i>Ultimate Parent</i>	<i>Fuel Type</i>	<i>Operating Capacity (MW)</i>	<i>First Unit Online</i>	<i>Last Unit Online</i>
Jefferson Torresdale Hospital IC Project (Cogen)	Jefferson Torresdale Hospital	Jefferson Torresdale Hospital	Natural Gas	1.1	5/2016	5/2016
Juniata Locomotive Shop GT Project	Norfolk Southern Corporation	Norfolk Southern Corporation	Natural Gas	1.5	4/2015	4/2015
Lackawanna Energy Center	Invenergy LLC	Invenergy LLC	Natural Gas	1,479.0	3/2018	1/2019
Liberty Electric Power	Liberty Electric Power LLC	Vistra Corp	Natural Gas	562.0	5/2002	5/2002
Lower Mount Bethel	Talen Energy Corporation	Riverstone Holdings-D, L.P.	Natural Gas	553.2	2/2004	3/2004
Marcus Hook	Marcus Hook Energy	Starwood Energy Group Gbl LLC	Natural Gas	908.0	12/2004	12/2004
Martins Creek 3 and 4	Talen Generation LLC	Talen Energy Corporation	Natural Gas	1,700.0	10/1975	3/1977
Martins Creek CT	Talen Generation LLC	Talen Energy Corporation	Natural Gas	72.0	6/1971	6/1971
Mehoopany	Procter & Gamble Paper Product	Procter & Gamble Paper Product	Natural Gas	1.6	10/1984	10/1984
Mehoopany CT	Procter & Gamble Paper Product	Procter & Gamble Paper Product	Natural Gas	123.0	6/1985	4/2013
Milan Gas Project	IMG Midstream LLC	COFRA Holding AG	Natural Gas	20.4	4/2017	4/2017
Mount Joy Wire	Mount Joy Wire Corp.	Mount Joy Wire Corp.	Natural Gas	1.1	12/2011	12/2011
Moxie Freedom Generating Plant	Ethos Energy	Ethos Energy	Natural Gas	1,058.0	8/2018	8/2018
Navy Yard Natural Gas Plant	Ameresco Inc.	Ameresco Inc.	Natural Gas	8.0	1/2018	11/2018
New Castle	NRG Power Midwest	GenOn Holdings Inc.	Natural Gas	320.0	11/1939	6/1964
Newman & Company Inc.	Newman & Co.	Newman & Co.	Natural Gas	1.8	5/1964	5/1964
Ontelaunee Energy Center	Dynegy Power	Vistra Corp	Natural Gas	591.2	5/2002	5/2002
Orchard Park	Chambersburg Borough of	Chambersburg Borough of	Natural Gas	23.2	12/2003	12/2003
Oxbow Creek Energy	IMG Midstream LLC	COFRA Holding AG	Natural Gas	21.0	12/2019	12/2019
Panda Hummel Station (Sunbury Repower CC)	Sunbury Generation LP	Corona Power	Natural Gas	1,140.0	6/2018	6/2018
Panda Liberty Generating Station (Moxie Liberty)	The Carlyle Group	The Carlyle Group	Natural Gas	850.0	10/2016	10/2016
Patriot Power Generation Plant (Moxie Patriot)	The Carlyle Group	The Carlyle Group	Natural Gas	850.0	7/2016	7/2016
Paxton Creek Cogeneration	Clearway Energy Inc.	Global Infrastructure Mgmt	Natural Gas	12.0	11/1986	11/1986
Phoenix Contact - CCHP Plant	Phoenix Contact USA, Inc.	Phoenix Contact USA, Inc.	Natural Gas	1.0	3/2014	3/2014
PPL Ironwood	Helix Generation LLC	LS Power Group	Natural Gas	774.7	12/2001	12/2001
Roundtop	IMG Midstream LLC	COFRA Holding AG	Natural Gas	21.0	10/2015	10/2015
Shawville	NRG REMA , LLC	GenOn Holdings Inc.	Natural Gas	589.7	3/1954	4/1960
Spring House IC Plant	Janssen Pharmaceuticals Inc.	Johnson & Johnson	Natural Gas	3.8	4/2013	4/2013
Temple SEGF Plant	Temple University	Temple University	Natural Gas	16.0	5/1993	5/1993
Tenaska Westmoreland Generating Station	Tenaska Operations	Tenaska Energy Inc.	Natural Gas	1,055.2	12/2018	12/2018
Warren CT	NRG REMA , LLC	GenOn Holdings Inc.	Natural Gas	50.1	9/1972	9/1972
West Campus Plant	The PA State University	The PA State University	Natural Gas	5.0	1/1938	3/2016
West Point Facility	Merek & Co.	Merek & Co.	Natural Gas	66.0	1/1989	4/2001
West Point Facility IC	Merek & Co.	Merek & Co.	Natural Gas	11.6	1/1972	5/2020
Wolf Run Energy Project	IMG Midstream LLC	COFRA Holding AG	Natural Gas	22.0	6/2019	6/2019
York 2 Energy Center	Calpine Corp.	Volt Parent Lp	Natural Gas	858.9	3/2019	3/2019
York Cogeneration	Sapphire Power Generation Hold	Talen Energy Corporation	Natural Gas	46.9	4/1989	8/1989
York Energy Center (Delta Power Project)	Conectiv Mid Merit LLC	Volt Parent Lp	Natural Gas	545.0	3/2011	3/2011
Altairano PJM Li-ion Battery Storage Project	AES Energy Storage LLC	The AES Corp.	Other Fuel	1.0	1/2009	1/2009
Clairton Works	U.S. Steel Corp.	U.S. Steel Corp.	Other Fuel	26.0	1/1955	1/1955

**Table C-2 Electric Generating Facilities in Pennsylvania (cont'd)**

<i>Power Plant</i>	<i>Owner Name</i>	<i>Ultimate Parent</i>	<i>Fuel Type</i>	<i>Operating Capacity (MW)</i>	<i>First Unit Online</i>	<i>Last Unit Online</i>
Erie Coke Corporation	Erie Coke Corp.	Erie Coke Corp.	Other Fuel	1.3	1/1953	1/1953
Green Mountain Battery Storage System	NextEra Energy Resources LLC	NextEra Energy Inc.	Other Fuel	10.4	5/2016	5/2016
Hazle Township Flywheel Energy Storage	Convergent Energy and Power LP	Energy Capital Partners LLC	Other Fuel	20.0	9/2013	7/2014
Meyersdale Windpower Battery Storage	FPL Energy Meyersdale	FPL Energy Meyersdale	Other Fuel	18.0	12/2015	12/2015
Mon Valley Works	U.S. Steel Corp.	U.S. Steel Corp.	Other Fuel	67.9	6/1943	2/2002
Allentown	Talen Energy Supply LLC	Riverstone Holdings-D, L.P.	Petroleum Products	56.0	7/1967	7/1967
Brunot Island	NRG Power Midwest	GenOn Holdings Inc.	Petroleum Products	15.0	3/1972	3/1972
Chester	Exelon Power	Exelon Corp.	Petroleum Products	54.0	2/1969	5/1969
Conemaugh IC	ArcLight Capital Partners LLC	ACHP B L.P.	Petroleum Products	11.2	2/1970	2/1970
Croydon	Exelon Power	Exelon Corp.	Petroleum Products	512.0	6/1974	8/1974
Delaware CT	Exelon Power	Exelon Corp.	Petroleum Products	74.0	4/1969	7/1970
Eddystone CT	Exelon Power	Exelon Corp.	Petroleum Products	76.0	5/1967	6/1970
Falls	Exelon Power	Exelon Corp.	Petroleum Products	60.0	5/1970	6/1970
Fishbach	Talen Energy Supply LLC	Riverstone Holdings-D, L.P.	Petroleum Products	28.0	8/1969	8/1969
General Electric Company	General Electric Co.	General Electric Co.	Petroleum Products	4.3	6/1984	6/1984
Hamilton	NRG REMA , LLC	GenOn Holdings Inc.	Petroleum Products	24.0	6/1971	6/1971
Harrisburg	Talen Energy Supply LLC	Riverstone Holdings-D, L.P.	Petroleum Products	42.0	3/1967	3/1967
Harwood	Talen Energy Supply LLC	Riverstone Holdings-D, L.P.	Petroleum Products	27.0	7/1967	7/1967
Hunterstown	NRG REMA , LLC	GenOn Holdings Inc.	Petroleum Products	60.0	5/1971	5/1971
Jenkins	Talen Energy Supply LLC	Riverstone Holdings-D, L.P.	Petroleum Products	28.0	7/1969	8/1969
Keystone IC	ArcLight Capital Partners LLC	ACHP B L.P.	Petroleum Products	11.2	11/1968	11/1968
Lock Haven	Talen Energy Supply LLC	Riverstone Holdings-D, L.P.	Petroleum Products	14.0	11/1969	11/1969
Moser	Exelon Power	Exelon Corp.	Petroleum Products	60.0	5/1970	6/1970
Mountain	NRG REMA , LLC	GenOn Holdings Inc.	Petroleum Products	50.0	6/1972	6/1972
New Castle IC	NRG Power Midwest	GenOn Holdings Inc.	Petroleum Products	2.5	12/1968	12/1968
Orrtanna	NRG REMA , LLC	GenOn Holdings Inc.	Petroleum Products	26.0	5/1971	5/1971
Portland CT	NRG REMA , LLC	GenOn Holdings Inc.	Petroleum Products	190.0	12/1967	4/1997
PPG Industries Works 6 IC Facility	PPG Industries Inc.	PPG Industries Inc.	Petroleum Products	5.0	7/1972	5/1996
PPG Monroeville Chemicals Center	PPG Monroeville Chemicals	PPG Industries Inc.	Petroleum Products	1.1	10/1998	9/2000
PPG Place	PPG Industries Inc.	PPG Industries Inc.	Petroleum Products	2.3	5/1990	6/1998
Richmond CT	Exelon Power	Exelon Corp.	Petroleum Products	132.0	6/1973	6/1973
Schuylkill CT	Exelon Power	Exelon Corp.	Petroleum Products	38.0	5/1969	6/1971
Shawnee CT	NRG REMA , LLC	GenOn Holdings Inc.	Petroleum Products	24.0	6/1972	6/1972
Shawville IC	NRG REMA , LLC	GenOn Holdings Inc.	Petroleum Products	6.0	4/1960	4/1966
Southwark	Exelon Power	Exelon Corp.	Petroleum Products	72.0	6/1967	11/1968
Sunbury CT	Sunbury Generation LP	Corona Power	Petroleum Products	36.0	11/1971	11/1971
Sunbury IC	Sunbury Generation LP	Corona Power	Petroleum Products	5.0	4/1967	4/1967
Titus CT	NRG REMA , LLC	GenOn Holdings Inc.	Petroleum Products	35.0	12/1967	8/1970
Tolna	NRG REMA , LLC	GenOn Holdings Inc.	Petroleum Products	50.0	6/1972	6/1972
West Shore	Talen Energy Supply LLC	Riverstone Holdings-D, L.P.	Petroleum Products	28.0	8/1969	8/1969

**Table C-2 Electric Generating Facilities in Pennsylvania (cont'd)**

<i>Power Plant</i>	<i>Owner Name</i>	<i>Ultimate Parent</i>	<i>Fuel Type</i>	<i>Operating Capacity (MW)</i>	<i>First Unit Online</i>	<i>Last Unit Online</i>
Williamsport	Talen Energy Supply LLC	Riverstone Holdings-D, L.P.	Petroleum Products	27.0	8/1967	8/1967
500 Virginia Solar	500 Virginia Solar Lp	500 Virginia Solar Lp	Solar	1.0	7/2011	7/2011
ABE4 Solar Project	Mid-River PA LLC	Mid-River PA LLC	Solar	3.0	9/2020	9/2020
Air Products Solar (Trexlerstown Solar)	Air Products Energy Entrprs	Air Products & Chemicals Inc.	Solar	1.9	6/2011	6/2011
Aqua Ingrams Mill Solar	Essential Utilities Inc.	Essential Utilities Inc.	Solar	0.9	12/2009	12/2009
Beaver Solar	Tangent Energy Solutions Inc.	Tangent Energy Solutions Inc.	Solar	1.3	12/2012	12/2012
Carlisle Area School District	Carlisle Area School	Carlisle Area School	Solar	1.3	10/2010	10/2010
Conshohocken -Solar	Sun Power Electric	Conservation Services Group	Solar	0.1	4/1999	4/1999
Crayola Solar Park	Talen Renewable Energy	Energy Power Partners LLC	Solar	2.8	5/2010	11/2011
Dickinson Solar Project (Carlisle)	Dickinson Solar LLC	NextEra Energy Inc.	Solar	3.0	12/2016	12/2016
Elizabethtown Solar	Community Energy Solar	Community Energy Inc.	Solar	2.0	2/2016	2/2016
Elk Hill Solar 2 Project	Elk Hill Solar 2 LLC	Lightsource Holdings 1 Ltd.	Solar	15.0	12/2020	12/2020
Exelon-Conergy Solar Energy Center	MF Mesa Lane	Kawa Capital Mgmt Inc.	Solar	1.5	11/2008	11/2008
Fort Indiantown Gap Solar Project (FTIG)	Standard Solar Inc.	Caisse de dépôt et placement	Solar	3.0	1/2019	1/2019
IKEA Conshohocken Rooftop PV System	IKEA Energy US LLC	Stichting INGKA Foundation	Solar	1.0	7/2012	7/2012
Keystone Solar Project	Keystone Solar	Keystone Solar	Solar	5.0	9/2012	9/2012
Knouse Foods Solar Plant	Knouse Foods Cooperative	Knouse Foods Cooperative	Solar	3.0	12/2010	12/2010
Lincoln Financial Field Solar Plant	Clearway Renew LLC	Global Infrastructure Mgmt	Solar	2.9	1/2013	1/2013
Longwood Gardens Solar Plant	Ecogy Pennsylvania Systems Llc	Ecogy Pennsylvania Systems Llc	Solar	1.3	5/2010	5/2010
Marlboro Mushrooms Solar Field	Marlborough Mushrooms	Marlborough Mushrooms	Solar	1.0	11/2011	11/2011
Martin Limestone Solar Array Plant	Sunstream Energy Llc	Sunstream Energy Llc	Solar	1.0	12/2012	12/2012
Masser Farms Realty Solar	Masser Farms Realty, Ltd.	Masser Farms Realty, Ltd.	Solar	1.0	5/2011	5/2011
Merck-Upper Gwynedd Solar Array	Ray Angelini, Inc.	Ray Angelini, Inc.	Solar	1.5	5/2011	5/2011
Morgantown Solar Park	Hankin Group	Hankin Group	Solar	1.6	11/2011	11/2011
PA Solar Park II Project	Con Edison Development	Consolidated Edison Inc.	Solar	10.0	1/2020	1/2020
PA Solar Park Project	Con Edison Development	Consolidated Edison Inc.	Solar	10.0	10/2012	10/2012
PA4 Solar Farm	DEPCOM Power Inc.	DEPCOM Power Inc.	Solar	3.6	5/2019	5/2019
Pickering Solar	Essential Utilities Inc.	Essential Utilities Inc.	Solar	1.4	1/2012	1/2012
Pocono Raceway Solar Project	EDF Renewables Inc.	Government of France	Solar	3.0	8/2010	8/2010
Romark PA Solar	Romark Logistics Of Pa, Inc.	Romark Logistics Of Pa, Inc.	Solar	1.8	11/2011	11/2011
Susquehanna University Solar Project	TerraForm Power Inc	Brookfield Asset Mgmt Inc.	Solar	3.0	9/2018	9/2018
Temple Solar Arrays Project	UGI Energy Services Inc.	UGI Corp.	Solar	2.2	5/2011	5/2011
TPE Pennsylvania Solar 1	DEPCOM Power Inc.	DEPCOM Power Inc.	Solar	3.6	8/2019	8/2019
Turnkey Project - GlaxoSmith	GlaxoSmithKline Cnsnr Hlthcr L	GlaxoSmithKline	Solar	1.6	12/2010	12/2010
University Park Solar Project	SS Pa II PSU LLC	SS Pa II PSU LLC	Solar	1.5	12/2018	12/2018
Whitetail Solar 1	Whitetail Solar 1 LLC	Lightsource bp Renewable Energy	Solar	13.5	12/2019	12/2019
Whitetail Solar 2	Lightsource bp Renewable Energy	Lightsource bp Renewable Energy	Solar	20.0	9/2020	9/2020
Whitetail Solar 3	Lightsource bp Renewable Energy	Lightsource bp Renewable Energy	Solar	20.0	8/2020	8/2020
Beaver Valley	Energy Harbor Nuclear Corp	Energy Harbor Corp	Uranium	1,872.0	9/1976	11/1987
Limerick	Exelon Nuclear	Exelon Corp.	Uranium	2,386.0	2/1986	1/1990

**Table C-2 Electric Generating Facilities in Pennsylvania (cont'd)**

<i>Power Plant</i>	<i>Owner Name</i>	<i>Ultimate Parent</i>	<i>Fuel Type</i>	<i>Operating Capacity (MW)</i>	<i>First Unit Online</i>	<i>Last Unit Online</i>
Peach Bottom	Exelon Generation Company	Exelon Corp.	Uranium	2,658.0	7/1974	12/1974
Susquehanna Nuclear	Susquehanna Nuclear, LLC	Talen Energy Corporation	Uranium	2,494.0	6/1983	2/1985
Allegheny 5	Ontario Power Generation	Ontario Power Generation	Water	10.0	10/1988	10/1988
Allegheny 6	Ontario Power Generation	Ontario Power Generation	Water	12.0	11/1988	11/1988
Beaver Valley Patterson Dam	Enel Green Power North Am Inc.	Enel S.p.A.	Water	1.2	9/1982	9/1982
Conemaugh Hydroelectric	Pennsylvania Renewable Resourc	Pennsylvania Renewable Resourc	Water	15.0	2/1989	2/1989
Holtwood Hydroelectric Plant	Talen Energy Supply LLC	Riverstone Holdings-D, L.P.	Water	249.0	10/1910	11/2013
Kinzua Pumped Storage Project (Seneca)	PE Hydro Generation LLC	ISquared Capital Advisors LLC	Water	482.0	1/1970	1/1970
Mahoning Creek	Ontario Power Generation	Ontario Power Generation	Water	6.7	12/2013	12/2013
Muddy Run Pumped Storage Facility	Exelon Power	Exelon Corp.	Water	1,070.0	4/1967	2/1968
Piney	Brookfield Power Piney & Deep	Brookfield Power Piney & Deep	Water	33.2	6/1924	2/1928
Safe Harbor	Safe Harbor Water Power Corp.	Brookfield Asset Mgmt Inc.	Water	417.5	12/1931	4/1986
Townsend Hydro	Beaver Falls Municipal Authori	Beaver Falls Municipal Authori	Water	4.2	10/1987	10/1987
Wallenpaupack	Brookfield Renewable	Brookfield Asset Mgmt Inc.	Water	44.0	6/1926	6/1926
Warrior Ridge Hydroelectric	American Hydro Power Co.	American Hydro Power Co.	Water	2.8	12/1985	12/1985
Wm F Matson Generating Station	Allegheny Electric Coop	Allegheny Electric Coop	Water	21.7	6/1988	6/1988
York Haven	Ontario Power Generation	Ontario Power Generation	Water	19.0	12/1905	12/1905
Yough Hydro Power	D/R Hydro Co.	D/R Hydro Co.	Water	12.2	12/1989	12/1989
Allegheny Ridge Wind Farm	Allegheny Ridge Wind Farm LLC	OMERS Administration Corp.	Wind	80.0	6/2007	6/2007
Armenia Mountain Wind	ALLETE Clean Energy	ALLETE Inc.	Wind	100.5	12/2009	12/2009
Big Level Wind Project (Cunningham)	TransAlta Renewables Inc.	TransAlta Corp	Wind	90.0	12/2019	12/2019
Casselman Wind	Avangrid Renewables LLC	Iberdrola SA	Wind	34.5	12/2007	12/2007
Chestnut Flats Windfarm	Chestnut Flats Lessee LLC	Government of France	Wind	38.0	12/2011	12/2011
Forward WindPower LLC	Clearway Energy Inc.	Global Infrastructure Mgmt	Wind	29.4	4/2008	4/2008
Highland North Wind Farm	BlackRock Inc.	BlackRock Inc.	Wind	75.0	3/2012	3/2012
Highland Wind Project (Krayn Wind)	Cambria Wind LLC	Corporación Masaveu	Wind	62.5	8/2009	8/2009
Laurel Hill	Laurel Hill Wind Energy	Duke Energy Corp	Wind	69.0	9/2012	9/2012
Locust Ridge II	Avangrid Renewables LLC	Iberdrola SA	Wind	102.0	5/2009	5/2009
Locust Ridge Wind Farm	Avangrid Renewables LLC	Iberdrola SA	Wind	26.0	2/2007	2/2007
Lookout WindPower LLC	Clearway Energy Inc.	Global Infrastructure Mgmt	Wind	37.8	10/2008	10/2008
MATS Wind	Electric City Wind Power Corp.	Electric City Wind Power Corp.	Wind	0.6	2008	2008
Mehoopany Wind	BP Wind Energy North America	BP p.l.c.	Wind	140.8	12/2012	12/2012
Meyersdale Wind Project	GlidePath Power Solutions	Quinbrook Infrastructure Ptnrs	Wind	30.0	12/2003	12/2003
Mill Run Wind Farm	GlidePath Power Solutions	Quinbrook Infrastructure Ptnrs	Wind	15.0	12/2001	12/2001
North Allegheny Wind	Duke Energy Generation Service	Duke Energy Corp	Wind	70.0	9/2009	9/2009
Patton Wind Farm	BlackRock Inc.	BlackRock Inc.	Wind	30.0	12/2012	12/2012
Ringer Hill Wind Farm	Skyline Renewables LLC	Skyline Renewables LLC	Wind	38.3	12/2016	12/2016
Sandy Ridge Wind Farm	Gamesa Wind US LLC	Gamesa Corporacion Tecnologica	Wind	48.2	2/2012	2/2012
Somerset Wind Project	GlidePath Power Solutions	Quinbrook Infrastructure Ptnrs	Wind	9.0	12/2001	12/2001
South Chestnut Wind Project	Avangrid Renewables LLC	Iberdrola SA	Wind	50.4	4/2012	4/2012
Stony Creek Wind Farm	E.ON Climate & Renewables Nort	RWE Aktiengesellschaft	Wind	52.5	11/2009	11/2009
Turkey Point Wind Project (Frey Farm Wind)	Talen Renewable Energy	Energy Power Partners LLC	Wind	3.2	1/2011	1/2011
Twin Ridges Wind Farm	Senvion SE	Suzlon Energy Ltd.	Wind	139.4	12/2012	12/2012
Waymart Wind Farm	GlidePath Power Solutions	Quinbrook Infrastructure Ptnrs	Wind	64.5	10/2003	10/2003
Wind Park Bear Creek Project	Wind Park Bear Creek LLC	JPMorgan Chase & Co.	Wind	24.0	3/2006	3/2006





Pennsylvania Public Utility Commission  
400 North Street  
Harrisburg, PA 17120  
[puc.pa.gov](http://puc.pa.gov)

