Electric Power Outlook for Pennsylvania 2019-2024

August 2020

Pennsylvania Public Utility Commission

ELECTRIC POWER OUTLOOK FOR PENNSYLVANIA 2019–2024

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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.[1] 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.[2] Section 524(b) of the Code requires the Commission to prepare an annual report summarizing and discussing the data provided, on or before Sept. 1. This report is to be submitted to the General Assembly, the Governor, the Office of Consumer Advocate and each affected public utility.[3]

Since the enactment of the *Electricity Generation Customer Choice and Competition Act*,[4] 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.

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 2029, 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 2020, the PJM reserve margin requirement is 15.9% with an anticipated available reserve of 39.43%, as compared to a reserve margin requirement of 16.0% and anticipated available reserve of 28.2% in 2019. NERC also projects PJM will have enough generation capacity to meet its reserve margin requirements through 2029.[5]

Pennsylvania's aggregate electrical energy usage (residential, commercial, industrial, sales for resale, and other) in 2019 was 145,090 gigawatt hours (GWh) as compared to: 148,333 GWh in 2018; 142,740 GWh in 2017; and 145,022 GWh in 2016. Year-over-year electric usage decreased by 2.2%.

Over the next five years, total Pennsylvania electric energy usage is projected to increase at an overall average annual rate of 0.19%. This includes an average residential growth rate decrease of 0.04%, a commercial growth rate decrease of 0.19%, and an industrial growth rate increase of 0.70% for the entire 5-year projected period.

[1] *See* 66 Pa. C.S. § 524(a).
[2] *See* 52 Pa. Code §§ 57.141—57.154.
[3] *See* 66 Pa.C.S. § 524(b).
[4] 66 Pa.C.S. §§ 2801—2812.
[5] https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC_LTRA_2019.pdf.

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Section 1 – Regional Electric Outlook

Purpose

The *Electric Power Outlook for Pennsylvania 2019-2024* 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.[6]

The information contained in this report includes highlights of the past year, as well as EDCs' projections of energy demand and peak load for 2019-2024. The state's seven largest EDCs[7] 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.[8] 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).

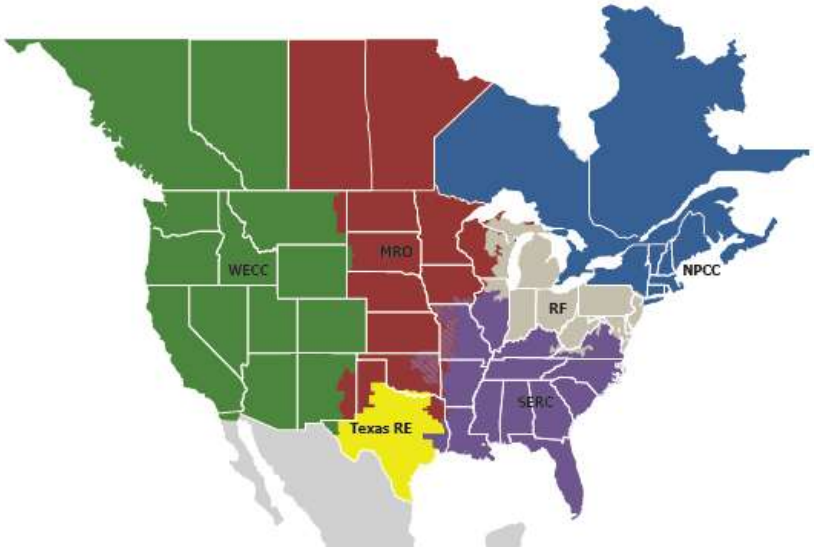
[6] Reports are available at http://www.puc.pa.gov/utility_industry/electricity/electric_reports.aspx.
[7] Those EDCs with at least 100,000 customers.
[8] *See* 52 Pa. Code §§ 57.141—57.154.

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.

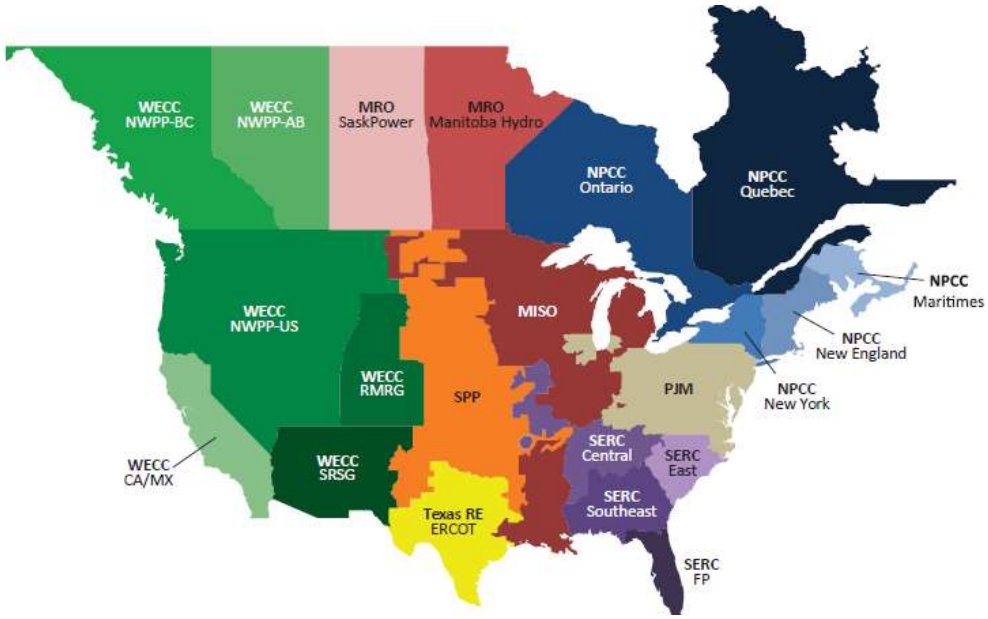
North American Electric Reliability Corporation

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 21 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 *2019 Long-Term Reliability Assessment*[9] 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 2019 assessment, NERC highlighted several key findings and recommendations regarding issues that are emerging and have the potential to increase risks to reliability.

NERC also prepared a special report on potential impacts of COVID-19 on the BPS. NERC in its special report found that it had not identified any specific threat or degradation to the reliable operation of the BPS due to the COVID-19 pandemic. NERC noted the electric power industry in North America is rising to the challenges presented by the pandemic and coordinating effectively with government partners and taking aggressive steps to confront the elevated threats to reliability and security of the BPS in an uncertain environment. However, NERC noted as pandemic mitigation and containment strategies continue, prolonged periods of operator sequestration and

[9] *See* NERC, *2019 Long-Term Reliability Assessment*, Dec. 2019, available at https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC_LTRA_2019.pdf.

deferred maintenance on equipment increases the industry's risk profile and could exacerbate impacts to the BPS during the summer months and potentially over the longer-term horizon.[10]

NERC noted that the *2019 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 this assessment, NERC has identified the following 4 key findings:

NERC Key Findings

- Projected reserves fall below the Reference Margin Level in the TRE-ERCOT and NPCC-Ontario assessment areas, but there is sufficient generation supply in all other areas:
    - The Anticipated Reserve Margin (ARM) in TRE-ERCOT is projected below the Reference Margin Level (RML) in most of the first 5-year period, but if additional Tier 2 resources in development come into service, they are more than sufficient to exceed the RML.
    - NPCC-Ontario projects a shortfall beginning in 2023 that is driven by nuclear retirements and refurbishments; however, market mechanisms that secure incremental capacity are expected to begin addressing the shortfall in future capacity auctions.
    - The emerging risk of energy deficiencies is being identified during off-peak conditions in the Midcontinent Independent System Operator (MISO) area and the Western Electricity Coordinating Council (WECC) Region.
    - Sufficient resources are planned to be available throughout the assessment period in all other areas.
- Resource mix changes are driven by the addition of large amounts of new wind, solar, and natural gas resources:
    - Some areas of North America have and continue to see more rapid resource mix changes with North America as a whole having a diverse fuel mix.
    - Over 330 GW of installed capacity from solar and wind are planned through 2029.
    - To accommodate large amounts of solar and wind generation, additional flexible resources are needed to offset ramping and variability.

[10] *See* NERC, *Special Report Pandemic Preparedness and Operational Assessment: Spring 2020*, available at: https://www.nerc.com/pa/rrm/bpsa/Alerts%20DL/NERC_Pandemic_Preparedness_and_Op_Assessment_Spring_2020.pdf.

- Solutions to inverter-based resource interconnection challenges are being implemented to reliably accommodate more resources.

- The growth in natural gas generation requires continued and coordinated planning to maintain appropriate fuel assurance; guidance is currently being developed by the Electric Gas Working Group (EGWG).

- Large amounts of storage and distributed energy resources require coordinated interconnection and a robust transmission system:

  - A total of eight GW of BPS-connected electric storage is expected by 2024.

  - A total of 35 GW of distributed solar photo-voltaic (PV) generation is expected by 2024.

  - Increasing installations of distributed energy resources (DERs) modify how distribution and transmission systems interact with each other.

  - Transmission Planners and Operators may not have complete visibility and control of DERs, but information and data are needed for system planning, forecasting, and modeling as growth becomes considerable.

- Transmission planning and infrastructure development need to keep pace with an increasing amount of utility scale wind and solar resources:

  - Under 15,000 circuit miles of new transmission is expected over the next six years; this is considerably less than the nearly 40,000 circuit miles planned earlier this decade.

  - Many new VERs will be located in areas remote from demand centers and existing transmission infrastructure. In some areas, such as SPP and ERCOT, the level of VERs are reaching full subscription of the transmission network and exhaust current as well as planned transmission capacity.

NERC Recommendations

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

- NERC should enhance the reliability assessment process by incorporating energy adequacy metrics and evaluating scenarios posing the greatest risk NERC recognizes that the changing resource mix, shifting demands, and other factors can have a significant effect on resource adequacy. As a result, NERC is incorporating more probabilistic methods and other analysis approaches.

- NERC should increase its communication and outreach with state and provincial policymakers on resource adequacy risks and challenges. As more resources are located on the distribution system, it is important that NERC effectively communicates resource adequacy risk to its state and provincial stakeholders.

- NERC should publish reliability guidelines, develop requisite tools, and validate models to establish common industry practices for planning and operating the BPS with increasing energy limitations and disruption risks. Given the increased reliance on resources that have a higher level of fuel uncertainty than the previous fleet, system planners should identify potential system risks that could occur under extreme but realistic contingencies and under various future supply portfolios.

- Industry should identify, design, and commit flexible resources needed to meet increasing ramping and variability requirements. Presently, concerns associated with ramping are largely confined to California. However, as solar generation increases in California and various parts of North America, system planners will need to ensure that sufficient flexibility is available to operators to offset variability and fuel uncertainty.

- NERC and industry need to work together to ensure system studies incorporate DER impacts. As the penetration of DERs continues to increase across the North American BPS, it is necessary to account for DERs in the planning, operation, and design of the BPS. System operators and planners should gather data as early as possible about the aggregate technical specifications of DERs connected to local distribution grids to ensure accurate and valid system planning device and simulation models, load forecasting, coordinated system protection, and real-time situation awareness.

- NERC should assess the implications of electricity storage on BPS planning and operations. Electricity storage has the potential to offer much needed capabilities to the grid of the future. Before this storage is built and integrated into the BPS, NERC should identify, assess, and report on the risks and potential mitigation approaches to accommodate large amounts of energy storage on BPS reliability.

- In future assessments, NERC should review challenges in transmission development and reliability risks due to the changing resource mix. To accommodate large amounts of variable generation and to meet policy objectives associated with renewables in a reliable and economic manner, more transmission may be needed. NERC should assess and evaluate if the decreasing amount of transmission projects presents any future reliability risks or concerns.

ReliabilityFirst Corporation

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)[11], RTOs, suppliers and transmission companies.

[11] 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).

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.

RFC is responsible for resolving and enforcing noncompliance using a risk-based approach. RFC notes that this involves: 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 2019, RFC continued to focus its efforts on improving the efficiency of risk-based enforcement practices, including processing lower risk noncompliance through streamlined enforcement processes and otherwise creating efficiencies where possible.

In 2019, RFC processed 418 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 72% of noncompliances and RFC notes that this is a decrease in self-reports from prior years, most likely due to increased audits and a change in the audit approach that resulted in audit findings for issues that were self-reported within the audit period..[12]

Regional Transmission Organizations

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

PJM Interconnection

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 186,788 megawatts (MW) of generating capacity with 165,563 MW of available peak demand and more than 84,236 miles of transmission lines.[13] 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

[12] *See*: https://rfirst.org/about/publicreports/Public%20Reports/2019%20Annual%20Report.pdf. .
[13] *See* PJM, *Summer 2019 PJM Reliability Assessment*, available at http://www.puc.pa.gov/Electric/pdf/Reliability/Summer_Reliability_2019-PJM.pdf.

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:[14]

- 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 2019 was 1,047 members. In 2019, the PJM market amount billed decreased to $39.2 billion as compared to $49.8 billion in 2018, and $41.17 billion in 2017. PJM's 2019 transmission volumes were 787.3 terawatt hours (TWhs) as compared to: 806.5 TWhs in 2018; 807 TWhs in 2017; and 792.3 TWhs in 2016. [15]

PJM's annual growth for net energy load is expected to average 0.7% over the next 10 years and 0.6% over the next 15 years.[16] PJM received deactivation notifications throughout 2019, totaling 7,650 MW as compared to: 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 15,298 MW of new generating resources under construction as of Dec. 31, 2019, with an additional 60,134 MW actively under study.[17]

Coal-fired generators are facing deactivation due to several factors, including: old age of the unit, with many more than 40 years old; the cost of operation; environmental public policy, particularly emissions standards; state mandates for renewable energy; and low natural gas prices. Some

[14] http://www.pjm.com/about-pjm/who-we-are.aspx.
[15] *See* PJM, *PJM 2019 Annual Report*, available at https://services.pjm.com/annualreport2019/.
[16] *See* PJM, *PJM Load Forecast Report January 2020*, available at https://www.pjm.com/-/media/library/reports-notices/load-forecast/2020-load-report.ashx?la=en.
[17] *See* PJM, *PJM 2019 Regional Transmission Expansion Plan Report*, Book 1, available at https://www.pjm.com/library/reports-notices/rtep-documents.aspx.

generator owners are transitioning their fleets to become cleaner and leaner to meet emission standards and to improve the planet.

PJM Bulk Power System Status – Winter Performance[18]

PJM noted the electrical grid provided reliable service through the 2019–20 winter and noted the following aspects of the grid and generator performance in the 2019-20 winter:

- Temperatures were well above normal across the RTO for the duration of the winter.
- Only one Cold Weather Alert was issued this winter.
- The total energy and heating degree days are almost identical to those experienced in 2015-16 and 2016-17, other mild winters. However, both of those years experienced higher peaks.
- Locational Marginal Prices (LMPs) were very low all winter. Only three hours over the course of the entire winter, considering all hours, exceeded $100.
- Since the winter of 2016-17, natural gas has overtaken nuclear as the most utilized online fuel across all hours of the winter.
- Since the winter of 2016-17, coal and natural gas have swapped places as the most utilized online fuel during winter daily peak hours, with nuclear and renewables generally maintaining their share of the online fuel mix.

PJM Pennsylvania State Infrastructure

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.

[18] *See* PJM, *Winter Operations of the PJM Grid: December 1, 2019 – February 29, 2020*, available at: https://www.pjm.com/-/media/committees-groups/committees/oc/2020/20200416/20200416-item-08-winter-operations-review.ashx.

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 Pennsylvania are provided in Appendices B and C of this report.

PJM Pennsylvania State Infrastructure Summary: [19]

- Existing Capacity: Natural gas represents approximately 41.6% of the total installed capacity in Pennsylvania while coal represents 22.5%. In the PJM RTO area, natural gas and coal are at 42.4% and 28.7% of total installed capacity, respectively.

- Interconnection Requests: Natural gas represents approximately 56.4% of new interconnection requests in Pennsylvania, while solar represents approximately 35.5% of new requests.

- Deactivations: 976.2 MW of capacity gave notification of deactivation within Pennsylvania in 2019.

- Regional Transmission Expansion Plan (RTEP) 2019: Pennsylvania's RTEP 2019 projects more than $957 million in investment. Approximately 73.4% of that total is represented by supplemental projects.[20] 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.[21] 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.[22]

- Load Forecast: Pennsylvania load growth is expected to range between -0.1% and 0.7% annually over the next 10 years. The overall PJM RTO projected load growth rate is 0.7% over the next 10 years.

- 2022-23 Capacity Market: No Base Residual Auction was conducted in 2019. For the most recent auction results, please see the 2018 Pennsylvania State Infrastructure Report.[23]

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[19] *See* PJM, *PJM Pennsylvania State Report 2019*, available at: https://www.pjm.com/-/media/library/reports-notices/state-specific-reports/2019/2019-pennsylvania-state-infrastructure-report.ashx?la=en.

[20] 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* the *PJM 2019 Regional Transmission Expansion Plan* at https://www.pjm.com/-/media/library/reports-notices/2019-rtep/2019-rtep-book-1.ashx?la=en.

[21] *Id.*, Pennsylvania-specific information begins on page 179.

[22] https://www.pjm.com/planning/project-construction.

[23] https://www.pjm.com/-/media/library/reports-notices/state-specific-reports/2018/2018-pennsylvania-state-data.ashx?la=en.

- Calendar Year 2019 Market Performance: Pennsylvania's average hourly LMPs were below PJM's average hourly LMPs.

- Emissions: 2019 carbon dioxide, nitrogen oxides, and sulfur dioxide emissions are all slightly down from 2018 levels.

- The existing generating capacity in Pennsylvania totals 44,705 MW in 2019 as compared to 44,660 MW in 2018; 42,257 MW in 2017; and 45,700 MW in 2016.

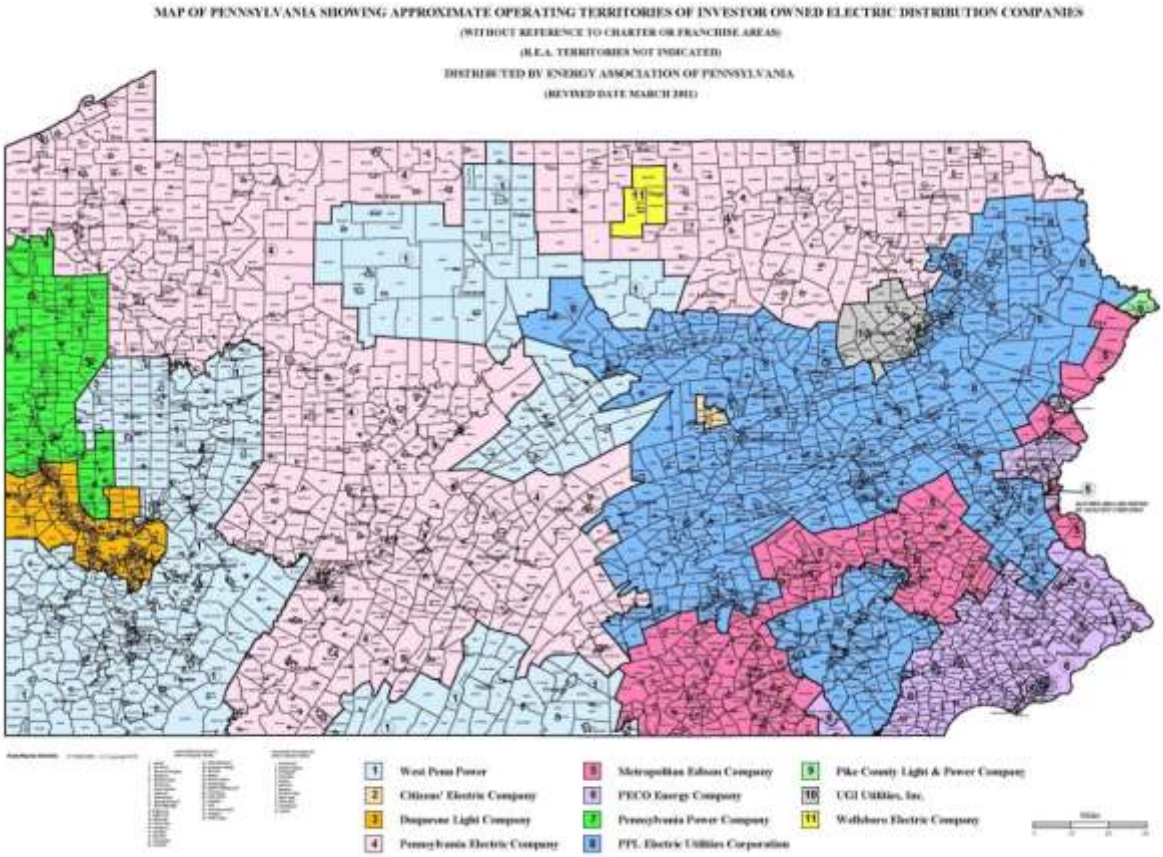
Section 2 – Pennsylvania Electric Outlook

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)[24] 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.[25]

   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.[26]

[24] 66 Pa. C.S. § 2803
[25] http://www.papowerswitch.com.
[26] 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).[27] 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 increases to a total of 18% by 2021. In 2008, the Commission adopted regulations pertaining to the AEPS obligations of EDCs and EGSs.[28] AEPS resources must be located in PJM.

Alternative energy resources are categorized as Tier I and Tier II resources. 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)[29] 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.

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

[27] Alternative Energy Portfolio Standards Act, effective Feb. 28, 2005; 73 P.S. §§ 1648.1—1648.8.
[28] *See* Docket No. L-00060180; 52 Pa. Code §§ 75.61-75.70.
[29] *See* 66 Pa.C.S. § 2814(b).

Table 1 – Alternative Energy Portfolio Standards

Year	Period	Tier I (incl. Solar)	Tier II	Solar PV
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. AECs are separate from the electricity that is 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.[30]

AECs are earned when a qualified facility generates 1,000 kilowatt-hours (kWh) of electricity through either estimated or actual metered production. An AEC is a tradable certificate that represents all the renewable energy benefits 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. 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 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.[31] The regulations also provide for required metering capabilities and a compensation mechanism that

[30] *See* 52 Pa. Code §§ 75.61—75.70.

[31] 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.

reimburses customer-generators for surplus energy supplied to the electric grid.[32] 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.[33]

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.[34]

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.[35] On April 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.[36] 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.

As of May 31, 2020, Pennsylvania had certified 32,178[37] alternate energy facilities, of which 25,567 are located within the state. For additional information on Alternative Energy in Pennsylvania, please visit the Commission's website.[38]

Energy Efficiency and Conservation (Act 129)

Act 129 of 2008[39] required the seven Pennsylvania EDCs[40] with at least 100,000 customers[41] to establish an energy efficiency and conservation (EE&C) plan. The Act is being implemented in phases; Phases I and II are complete. Phase III of Act 129, the current 5-year phase, began on June 1, 2016, and will end on May 31, 2021.

The Commission directed the Statewide Evaluator (SWE)[42] to perform a Demand Response (DR) Potential Study using residential direct load control and commercial and industrial load curtailment models provided by the Commission.[43] This study was to provide the Commission with the information necessary to determine whether Act 129 Phase III peak demand reduction programs

[32] *See* Docket No. L-00050174; 52 Pa. Code §§ 75.11-75.15.
[33] *Id.*
[34] *See* Docket No. L-00050175; 52 Pa. Code §§ 75.21-75.40.
[35] *See* Docket No. L-2014-2404361; 52 Pa. Code §§ 75.1-75.72.
[36] *See* Docket No. M-2017-2631527.
[37] See http://pennaeps.com/app7/publiccontroller.
[38] http://www.puc.pa.gov/consumer_info/electricity/alternative_energy.aspx.
[39] Act 129 of 2008, effective November 14, 2008; 66 Pa. C.S. §§2806.1-2806.2.
[40] The seven 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.
[41] *See* 66 Pa. C.S. § 2806.1.
[42] The Act 129 Statewide Evaluator monitors and verifies data collection, quality assurance and the results of each EDC's EE&C Plan and the EE&C program as a whole.
[43] *See* Energy Efficiency and Conservation Program Final Order, Docket No. M-2012-2289411, entered February 20, 2014.

would be cost-effective. The SWE submitted its final version of the DR Potential Study to the Commission on February 25, 2015.[44]

The SWE also performed an Energy Efficiency (EE) Potential Study to determine the cost-effective consumption reduction potential in Pennsylvania.[45] The SWE submitted its final EE Potential Study to the Commission on Feb. 25, 2015.[46] Following a review of the SWE's EE and DR Potential Studies, the Commission found that additional consumption and peak demand reduction targets were cost-effective.[47] On June 11, 2015, the Commission adopted a Final Implementation Order prescribing targets for a Phase III of the Act 129 EE&C Program.[48] Phase III began on June 1, 2016, and will end on May 31, 2021. The EDCs' consumption[49] and peak demand reduction[50] 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.[51]

Additionally, using the design and budgetary allocation information provided by the Commission, the SWE 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.

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

[44] *See* Demand Response Potential for Pennsylvania – Final Report, submitted by GDS Associates, Inc., et al., February 25, 2015 (hereinafter DR Potential Study).
[45] *See* Proposal to Pennsylvania Public Utility Commission – Statewide Evaluator RFP, submitted by GDS Associates, Inc., et. al., January 11, 2013.
[46] *See* Energy Efficiency Potential for Pennsylvania – Final Report, submitted by GDS Associates, Inc., et. al., February 2015 (hereinafter EE Potential Study).
[47] *See* Energy Efficiency and Conservation Program Implementation Order, Docket No. M-2014-2424864, entered June 19, 2015, at 10-12.
[48] *Id.* at 14-15.
[49] *Id.* at 57.
[50] *Id.* at 35.
[51] *Id.* at 35.

The Commission requires 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 preliminary annual reports for the fourth year of Phase III, Program Year 11 (PY 11).[52] The SWE monitors and verifies data collection, quality assurance and the results of each EDCs EE&C Plan. Table 3 summarizes unverified Phase III electric consumption savings reported by the EDCs, through PY 11, and the SWE verified electric consumption and peak demand savings through PY 10.

Table 3 - Phase III Electric Consumption and Peak Demand Savings since June 1, 2016

EDC	Phase III – PY8, PY9 and PY10 Verified Electric Consumption Savings (MWh)	% of Verified Phase III Target	Phase III to date Unverified Electric Consumption Savings (MWh)	Phase III – PY9 and PY10 Verified Peak Demand Savings (MW)
Duquesne	368,684	84	456,995	54.8
Met-Ed	531,102	89	671,281	51.3
PECO	1,029,235	52	1,490,128	173.0
Penelec	527,376	93	659,105	0 *
Penn Power	166,067	106	210,512	41.9
PPL	1,129,648	78	1,514,207	116.6
West Penn	492,908	91	622,231	119.6

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

PY 8: June 1, 2016 – May 31, 2017
PY 9: June 1, 2017 – May 31, 2018
PY 10: June 1, 2018 – May 31, 2019
PY 11: June 1, 2019 – May 31, 2020

It appears that the EDCs are on their way to meet their 5-year electric consumption and peak demand reduction requirements. Final annual reports for PY 11 are due to the Commission by Feb. 15, 2021 (90-day delay from the original Nov. 15, 2020, reporting deadline).[53] In its planning for a potential 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.[54]

Furthermore, the Commission 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

[52] *See* EDCs Preliminary Annual Reports for Program Year 11 available at: http://www.puc.pa.gov/filing_resources/issues_laws_regulations/act_129_information/electric_distribution_company_act_129_reporting_requirements.aspx

[53] *See* Secretarial Letter issued May 26, 2020, Docket No. M-2014-2424864

[54] *See 2018 Pennsylvania Residential and Non-Residential Baseline Studies*, Docket No. M-2019-3006866, submitted by NMR Group, Inc., February 2019

and conservation consumption reduction targets for a potential Phase IV. The SWE submitted the final EEPDR potential study to the Commission on Feb. 28, 2020.[55]

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.[56] The EEPDR and DDR Potential Studies were released publicly via Secretarial Letter served March 2, 2020.[57] 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.[58] 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. [59]

Phase IV, a 5-year phase, will begin on June 1, 2021, and end on May 31, 2026. The EDCs' Phase IV electric consumption and peak demand reduction requirements are provided in Table 4 below.

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

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

[55] *See Pennsylvania Act 129 Phase IV Energy Efficiency and Peak Demand Reduction Market Potential Study Report*, Docket No. M-2020-3015229, submitted by NMR Group, Inc., February 28, 2020

[56] *See Pennsylvania Act 129 Phase IV Demand Response Potential Study*, Docket No. M-2020-3015229, submitted by NMR Group, Inc., February 28, 2020

[57] *See* Release of the Act 129 Statewide Evaluator Energy Efficiency and Peak Demand Reduction Market Potential and Demand Response Potential Studies Secretarial Letter, at Docket No. M-2020-3015229, served March 2, 2020

[58] *See* Energy Efficiency and Conservation Program Implementation Order, Docket No. M-2020-3015228, entered June 18, 2020, at 7-8.

[59] *Id.* at 62.

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 2019, was 145,090 gigawatt hours (GWh) as compared to 148,334 in 2018, which is a year-over-year (YOY) decrease of 2.2**%** in electric usage. In general, Industrial customer usage increased 4.8% YOY while residential and commercial decreased 2.8% and 9.1% respectively. Pennsylvania's gross domestic product (GDP) for 2019 saw a 3.9% increase over 2018.[60]

Also, in 2019, the total number of electrical customers were 5,843,061 as compared to 5,814,037 in 2018, which is a year-over-year increase of 29,024 customers, or 0.50%.

Table 5 – 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
Penelec	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
Total	**5,843,061**	**51,577,647**	**37,593,629**	**50,780,288**	**968,164**	**4,170,179**	**145,089,907**	**9,540,615**	**128,024**	**154,758,546**	**28,933**
% of Total		35.55%	25.91%	35.00%	0.67%	2.87%	100%				
2019 VS 2018	0.50%	-2.77%	-9.12%	4.79%	-21.32%	-1.53%	-2.19%	-2.71%	1.36%	-2.22%	-0.93%

Table 6 – PA EDC customers served, energy usage, and peak load (2018)

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	599,716	4,257,666	6,218,237	2,623,317	54,303	24,526	13,178,049	838,099	31,367	14,047,515	2,795
Met-Ed	571,563	5,739,983	2,971,617	5,685,009	28,021	549,748	14,974,378	1,179,905	0	16,154,283	3,026
Penelec	587,330	4,424,065	3,609,790	5,797,151	36,188	2,732,970	16,600,164	1,352,741	0	17,952,905	2,993
Penn Power	166,670	1,712,880	1,355,828	1,825,637	3,290	176,192	5,073,827	244,362	0	5,318,189	950
PPL	1,440,505	14,810,769	14,104,756	8,143,618	311,824	0	37,370,967	2,694,977	59,262	40,125,206	7,729
PECO	1,640,278	14,004,677	8,176,582	15,516,391	767,339	3,484	38,468,473	2,080,970	33,861	40,583,304	8,608
West Penn	727,408	7,357,622	4,499,678	8,667,371	25,633	748,023	21,298,327	1,323,018	0	22,621,345	3,879
UGI	62,309	571,067	320,494	114,671	2,687	109	1,009,028	80,760	1,403	1,091,191	215
Citizens'	7,057	90,568	31,359	55,546	533	0	178,006	4,140	171	182,317	45
Pike County	4,768	30,698	45,278	0	385	0	76,361	0	26	76,387	18
Wellsboro	6,433	44,775	32,920	28,120	238	108	106,161	7,019	213	113,393	20
Total	**5,814,037**	**53,044,770**	**41,366,539**	**48,456,831**	**1,230,441**	**4,235,160**	**148,333,741**	**9,805,991**	**126,303**	**158,266,035**	**29,204**
% of Total		35.76%	27.89%	32.67%	0.83%	2.86%	100%				

[60] https://www.statista.com/statistics/306785/pennsylvania-gdp-growth/

As shown on Table 7, below, the total average annual aggregate 5-year energy usage growth projection for the residential, commercial, and industrial classes is projected to increase 0.19% per year. This includes an average residential growth rate decrease of 0.04 %, a commercial growth rate decrease of 0.19%, and an industrial growth rate increase of 0.70% for the entire 5-year projected period.

Table 7 – Average Aggregate 5-year Electrical Energy Projection

Energy Usage Projection (GWh)				
Year	Residential	Commercial	Industrial	Total
2020	50,697	37,558	50,074	138,329
2021	50,434	37,441	50,282	138,157
2022	50,404	37,310	50,480	138,194
2023	50,389	37,195	50,676	138,260
2024	50,608	37,274	51,500	139,382
average annual growth (%)	-0.04	-0.19	0.70	0.19

Figure 2 below represents, in Gigawatt-hours, the Pennsylvania historic usage for residential, commercial, and industrial retail from 1972 through 2019 and forecasted Gigawatt-hours usage from 2019 through 2024.

Figure 2 – Pennsylvania Retail Energy Usage and 5-year Forecast (GWh)

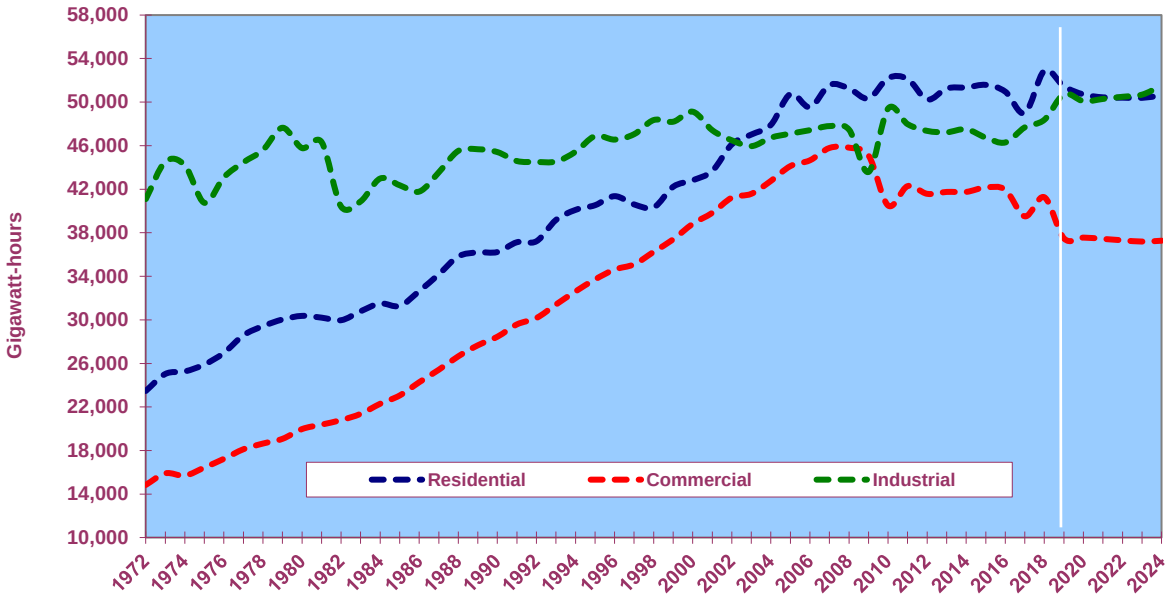


Figure 3, below, shows average residential usage and nominal cost from 1940 to 2019. Between 1970 and 2010, average residential yearly usage in Pennsylvania increased 1.4% each year, while average yearly cost increased 4.1% each year during this period.

During the last 10 years, average residential yearly usage decreased 0.054% each year, while average yearly cost increased 0.8% a year.

In 2019, the average Pennsylvania customer used 10.05 MWh as compared to 10.43 MWh in 2018, and 9.70 MWh in 2017. In 2019, the average Pennsylvania customer paid 11.43 cents per kWh as compared to 11.25 cents per kWh in 2018, and 11.48 cents in 2017.

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

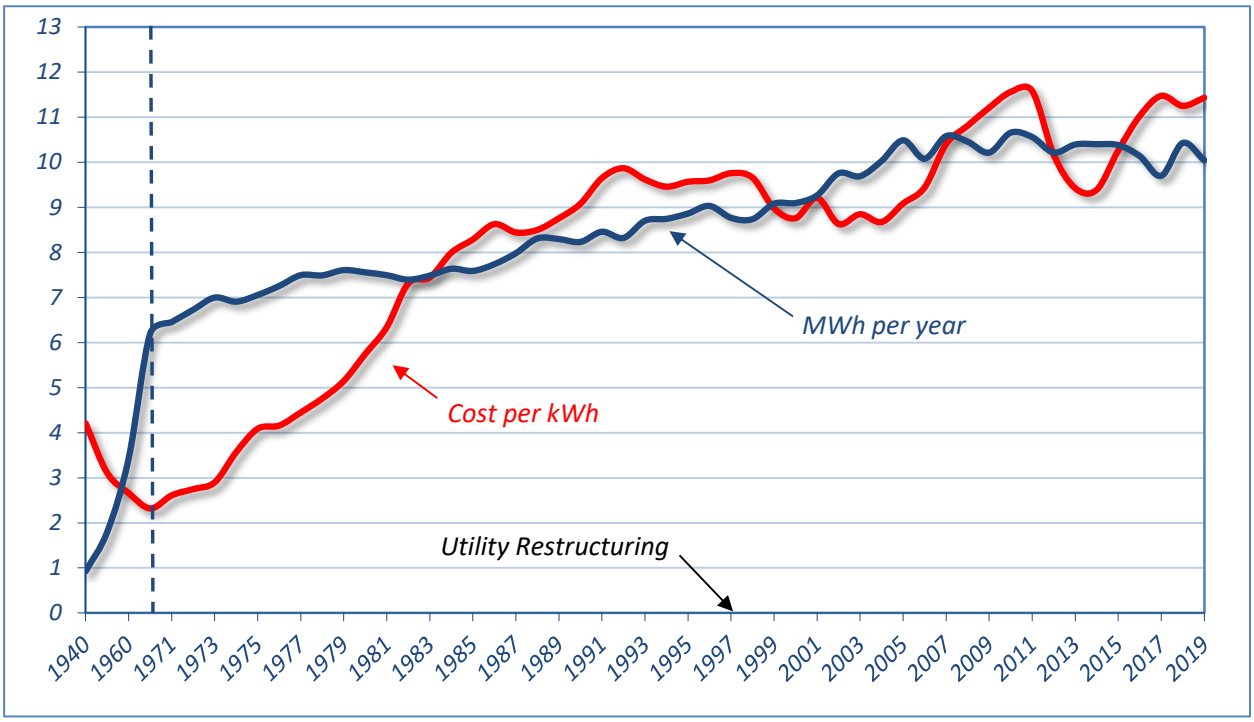


Figure 4, below, shows Pennsylvania's aggregate non-coincidental peak load demand from 2010 through 2019 and the associated 5-year projections estimated during the last 3 years.

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

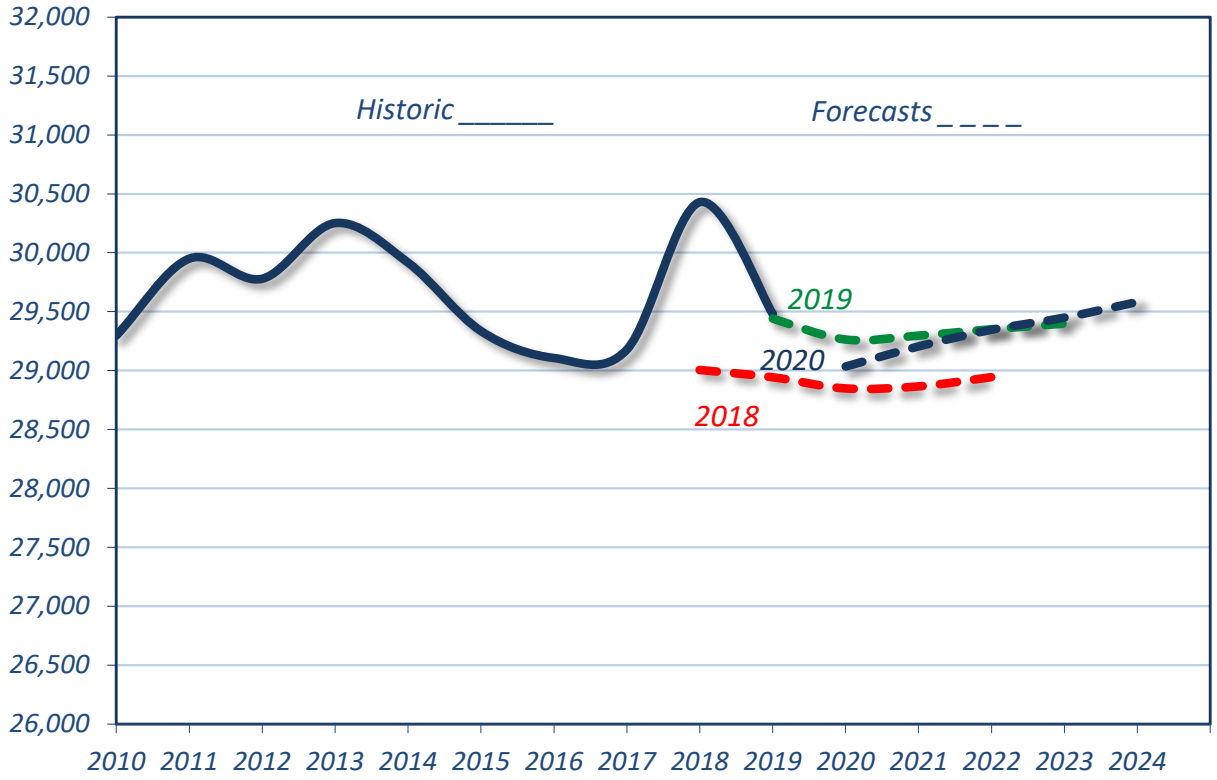
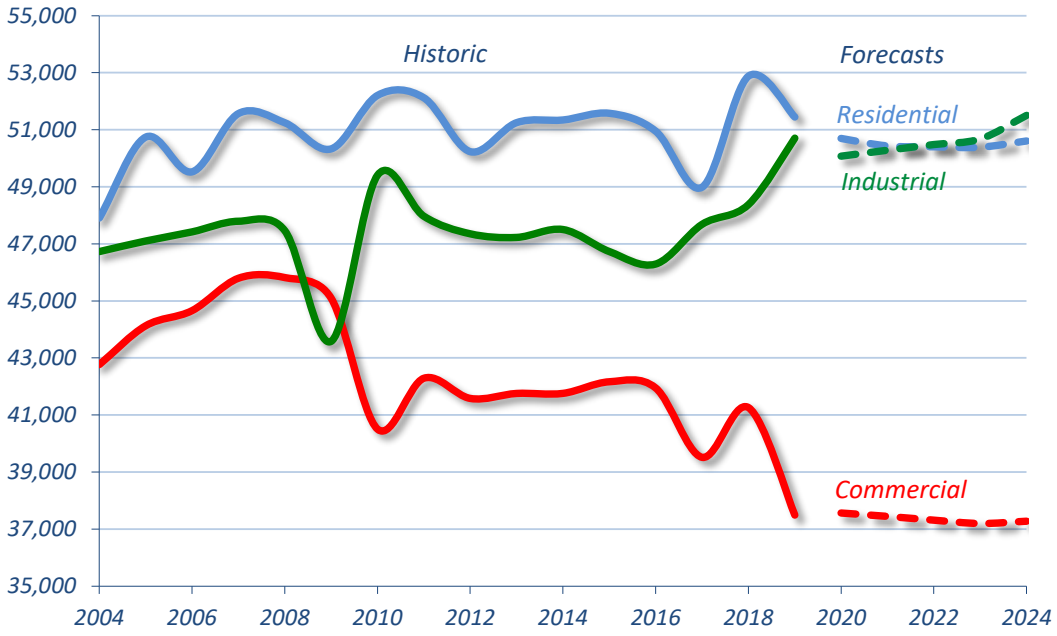


Figure 5, below, shows Pennsylvania's aggregate energy demand from 2004 through 2019 and the associated 5-year projections.

Figure 5 – Pennsylvania Aggregate Energy Demand (GWh)

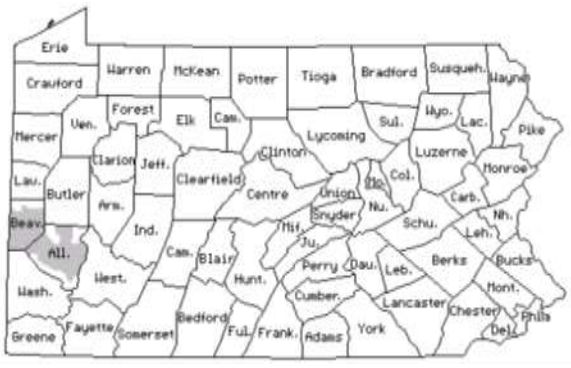


Summary of Data for the Seven Largest EDCs

Individual EDC forecasts are more specific to customers and geographical areas. Each EDC bases its forecasts on financial forecasts of its choosing. The EDC's 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 602,224 customers in the City of Pittsburgh and portions of Allegheny and Beaver counties in Southwestern Pennsylvania. Duquesne's 2019 energy usage total was 12,654 GWh as compared to: 13,178 GWh in 2018; 12,673 GWh in 2017; 13,173 GWh in 2016; and 13,504 GWh in 2015. Year-over-year (YOY) energy usage decreased 4%. Duquesne's total usage mix consisted of residential (32.0%), commercial (47.8%), industrial (19.5%), other (0.42%) and sales for resale (0.23%).

Over the next five years, total energy usage is projected to decrease at an average annual rate of 0.9%. This includes a residential usage average annual decrease in of 1.3%, commercial usage decrease of 1%, and industrial usage increase by 0.1%. See Figure 6.

Duquesne's highest summer peak load in 2019 was 2,662 MW. This represents a YOY decrease of 4.8% from the previous year's peak of 2,795 MW. The 5-year peak load forecast is projected to increase by an average of 1.15% 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 2010 through 2019.

Figure 6 Duquesne energy usage (GWh)

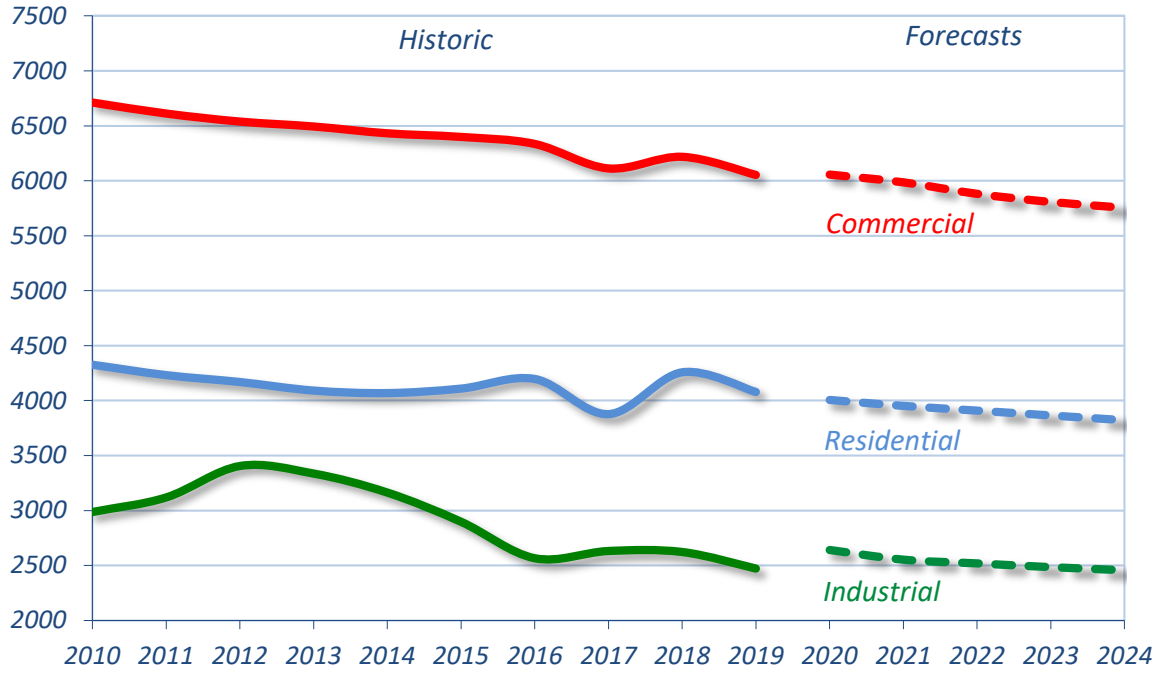
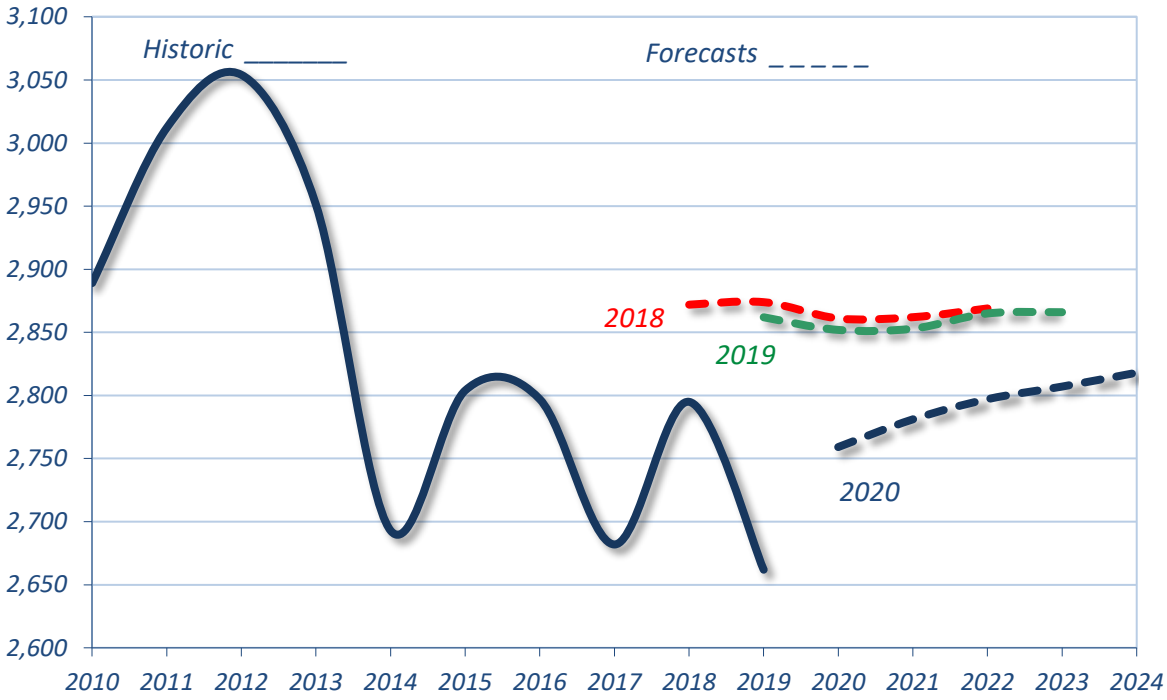


Figure 7 Duquesne peak load (MW)



Metropolitan Edison Company (Met-Ed)

Met-Ed provides electric service to about 572,912 customers in all or portions of 14 counties in Eastern and Southcentral Pennsylvania. Met-Ed's 2019 energy usage total was 14,787 GWh as compared to: 14,974 GWh in 2018; 14,297 GWh in 2017; 14,441 GWh in 2016; and 14,388 GWh in 2015. Year-over-year (YOY) energy usage decreased 1.3%. Met-Ed's total usage mix consisted of residential (38.2%), commercial (14.4%), industrial (43.7 %) and sales for resale (3.6%).

Over the next five years, total energy usage is projected to decrease at an average annual rate of 1%. This includes a residential usage average annual decrease in of 1.9%, commercial usage decrease of 0.6%, and industrial usage increase by 0.1%. See Figure 8.

Met-Ed's highest summer peak load in 2019 was 2,974 MW. This represents a YOY decrease of 1.7% from the previous year's peak of 3,026 MW. The 5-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 2010 through 2019.

Figure 8 Met-Ed energy usage (GWh)

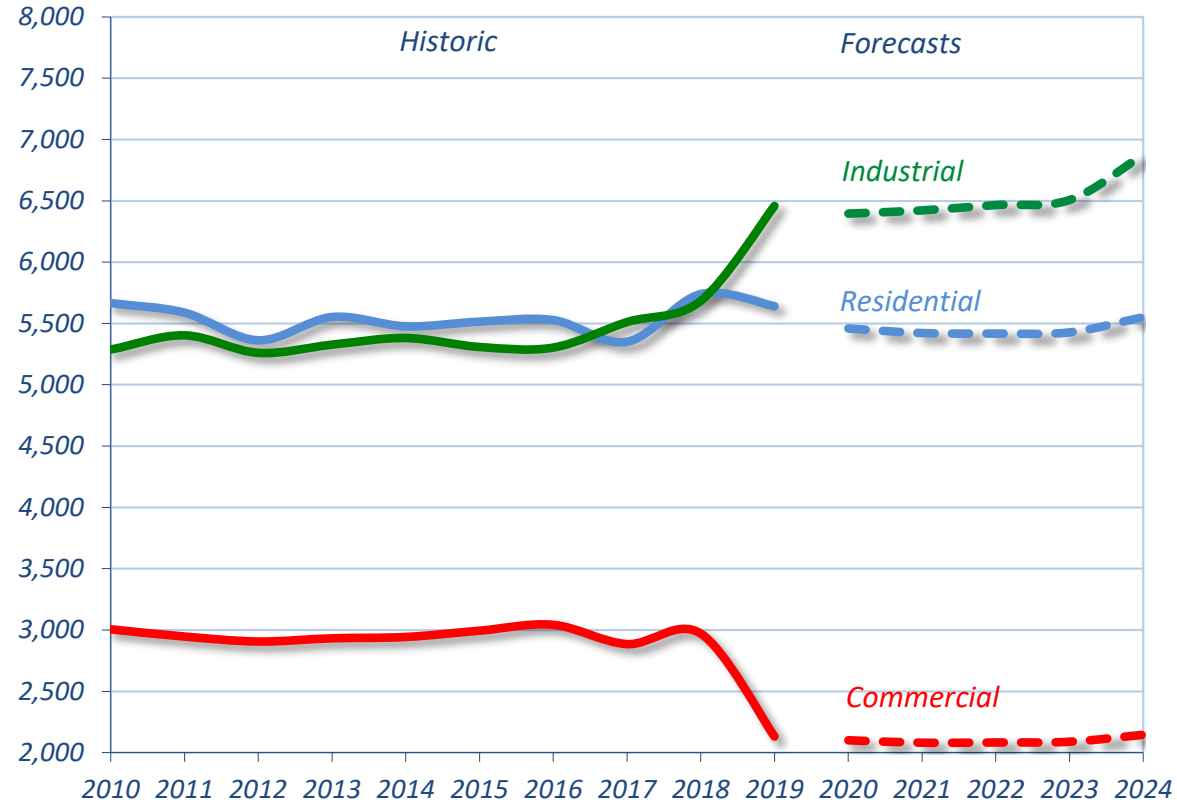
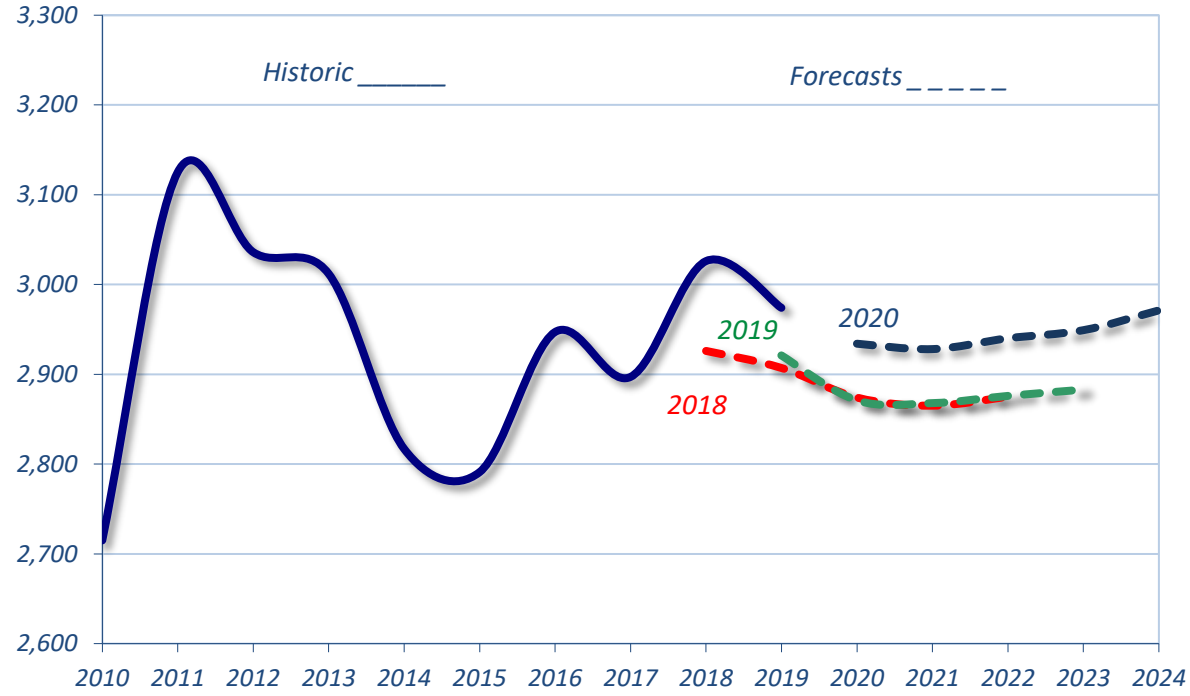
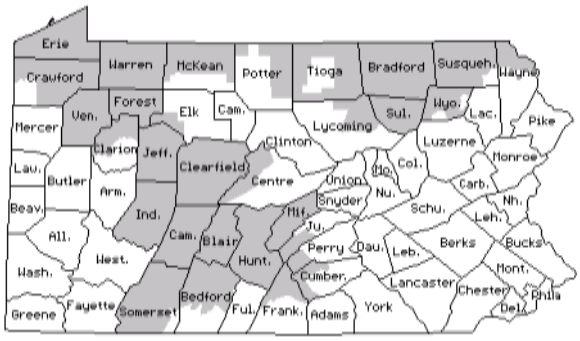


Figure 9 Met-Ed peak load (MW)



Pennsylvania Electric Company (Penelec)

Penelec provides electric service to about 586,517 customers in all or portions of 29 counties in Western and Northern Pennsylvania. Penelec's 2019 energy usage total was 16,182 GWh as compared to: 16,600 GWh in 2018; 16,054 GWh in 2017; 16,245 GWh in 2016; and 16,117 GWh in 2015. Year-over-year (YOY) energy usage decreased 2.5%. Penelec's total usage mix consisted of residential (26.4%), commercial (15.1%), industrial (41.7%), and sales for resale (16.7%).



Over the next five years, total energy usage is projected to decrease at an average annual rate of 0.9%. This includes a residential usage average annual decrease in of 0.7%, commercial usage remaining about the same, and industrial usage decrease by 1.3%. See Figure 10.

Penelec's highest summer peak load in 2019 was 2,866 MW. This represents a YOY decrease of 5.1% from the previous year's peak of 3,020 MW. The 5-year peak load forecast is projected to stay about the same over the next five years. 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 2010 through 2019.

Figure 10 Penelec energy usage (GWh)

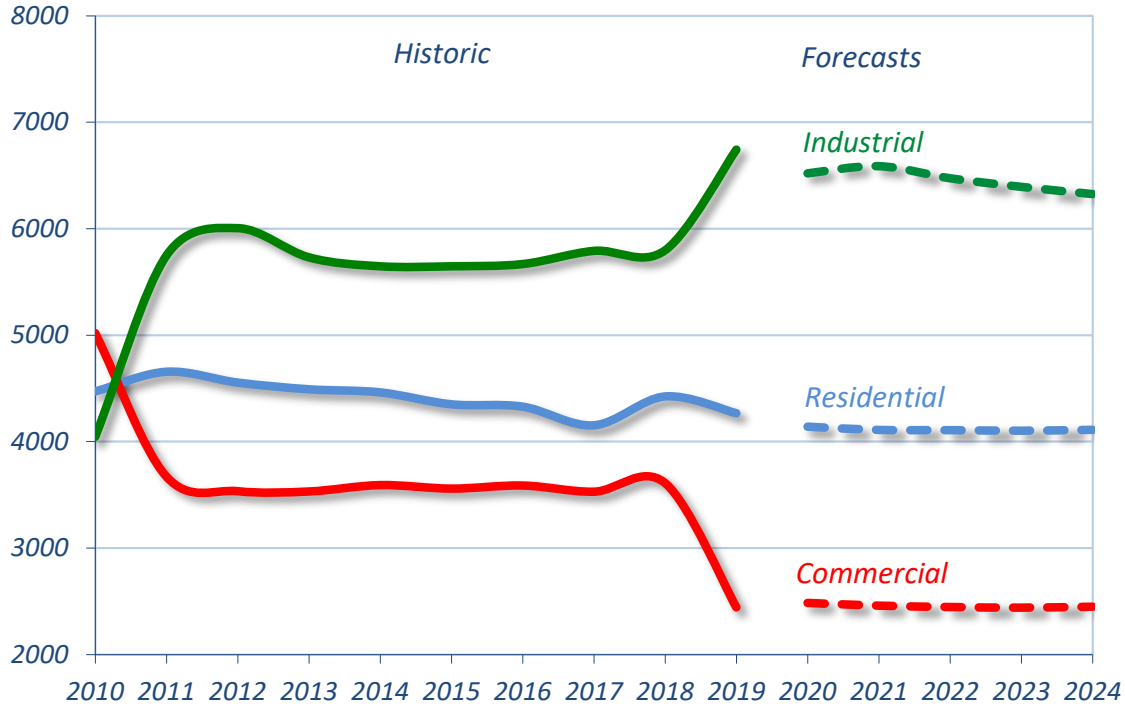
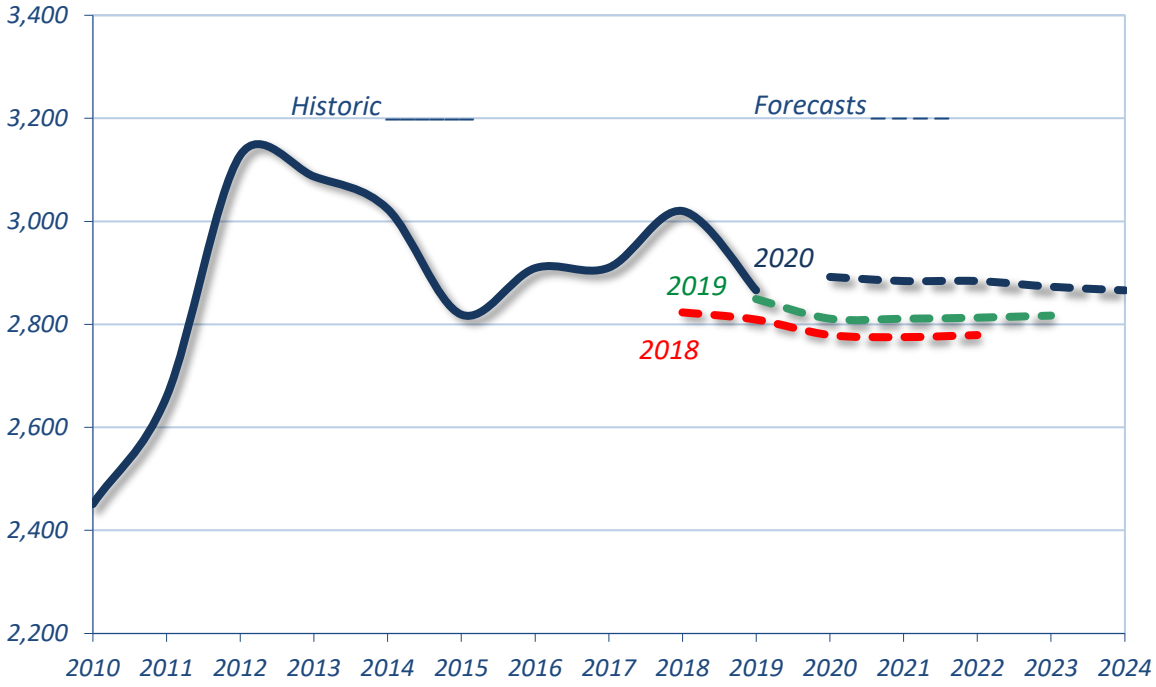
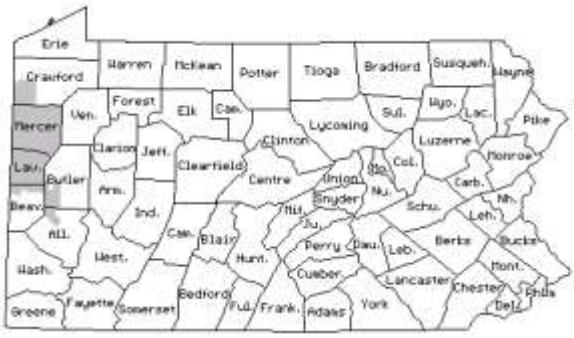


Figure 11 Penelec peak load (MW)



Pennsylvania Power Company (Penn Power)



Penn Power provides electric service to about 167,058 customers in all or portions of six counties in Western Pennsylvania. Penn Power's 2019 energy usage total was 4,833 GWh as compared to: 5,074 GWh in 2018; 4,875 GWh in 2017; 4,861 GWh in 2016; and 4,756 GWh in 2015. Year-over-year (YOY) energy usage decreased 4.7%. Penn Power's total usage mix consisted of residential (33.9%), commercial (19.8%), industrial (42.7%), and sales for resale (3.5%).

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 0.2%, commercial usage increase of 1.3%, and industrial usage increase by 2.2%. See Figure 12.

Penn Power's highest summer peak load in 2019 was 915 MW. This represents a YOY decrease of 3.7% from the previous year's peak of 950 MW. The 5-year peak load forecast is projected to increase by an average of 0.6% 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 2010 through 2019.

Figure 12 Penn Power energy usage (GWh)

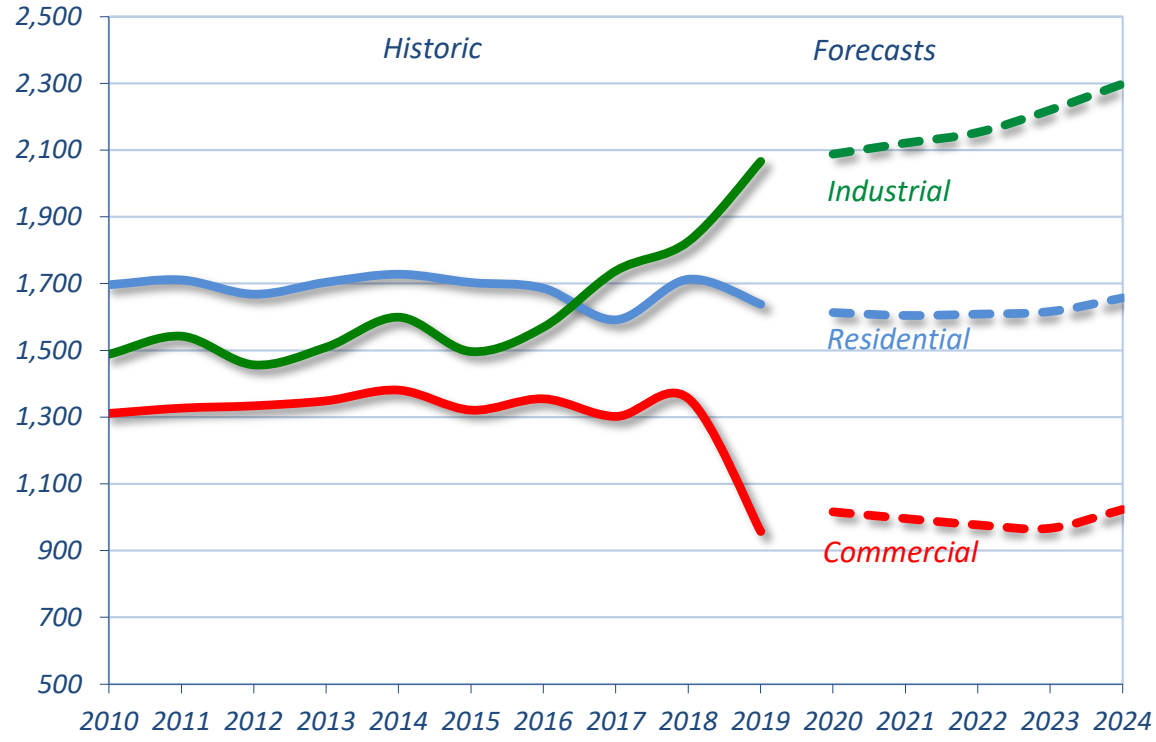
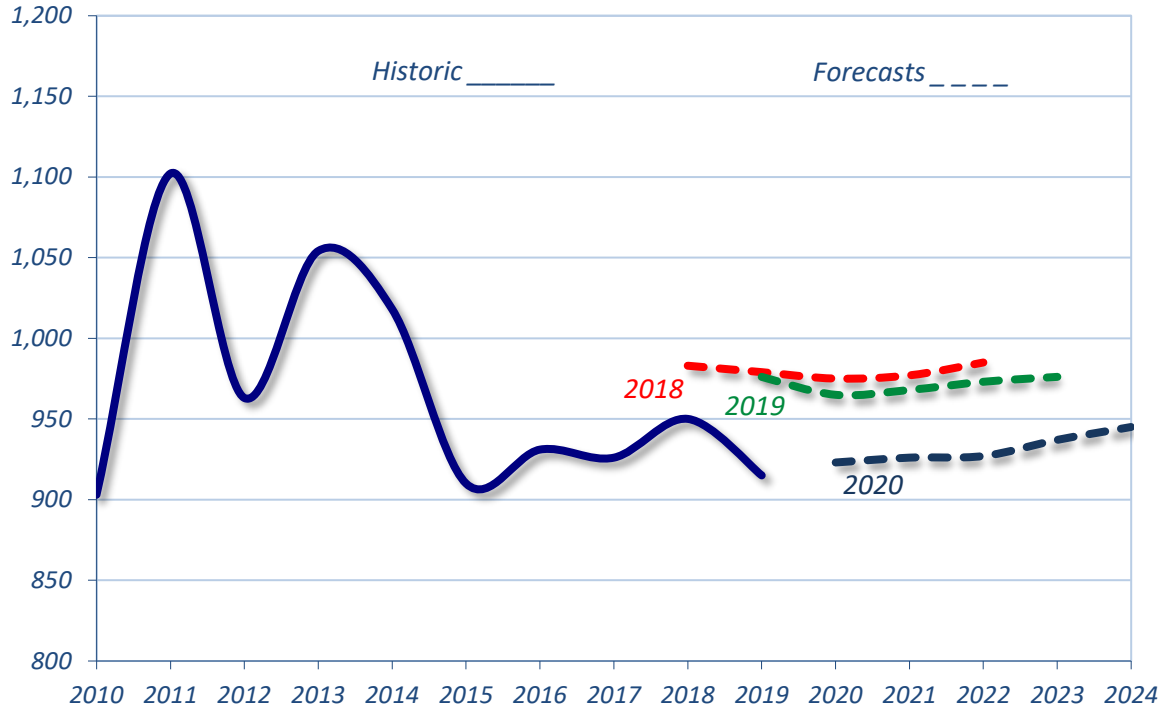
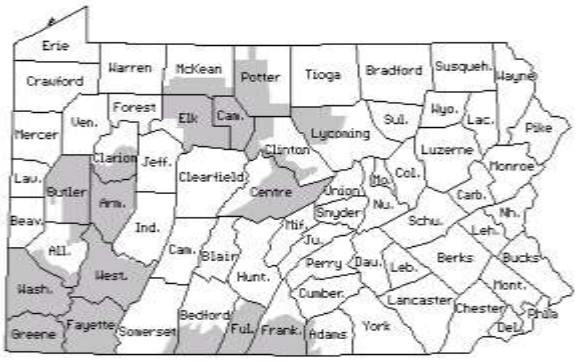


Figure 13 Penn Power peak load (MW)



West Penn Power Company (West Penn)



West Penn provides electric service to 727,552 customers in all or portions of 24 counties in Western, North and South-Central Pennsylvania. West Penn's 2019 energy usage total was 20,809 as compared to: 21,298 GWh in 2018; 20,299 GWh in 2017; 20,702 GWh in 2016; and 20,798 GWh in 2015. Year-over-year (YOY) energy usage decreased 2.3%. West Penn's total usage mix consisted of residential (34.4%), commercial (13.8%), industrial (48.1%), and sales for resale (3.6%).

Over the next five years, total energy usage is projected to increase at an average annual rate of 0.5%. This includes a residential usage average annual decrease in of 0.8%, commercial usage decrease of 0.1%, and industrial usage increase by 1.7%. See Figure 14.

West Penn's highest summer peak load in 2019 was 3,740 MW. This represents a YOY decrease of 6.8% from the previous year's peak of 4012 MW. The 5-year peak load forecast is projected to increase by an average of 0.9% 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 2010 through 2019.

Figure 14 West Penn energy usage (GWh)

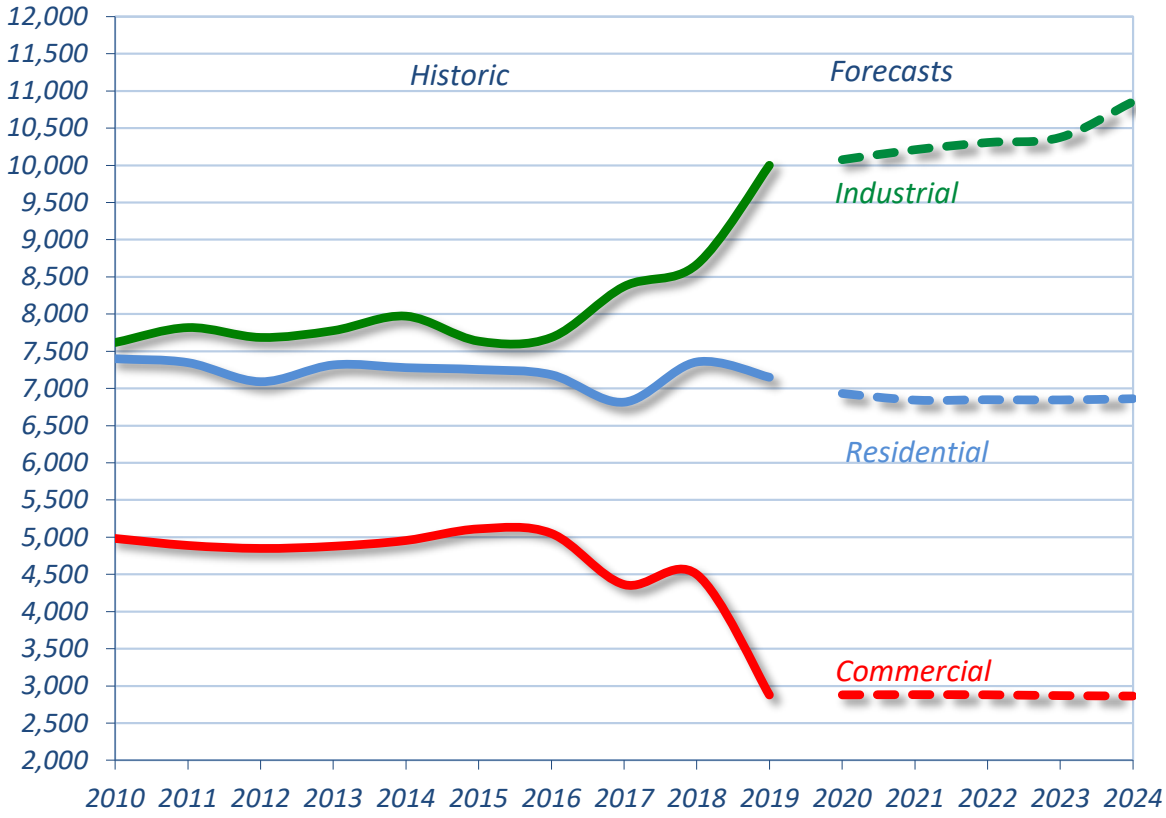
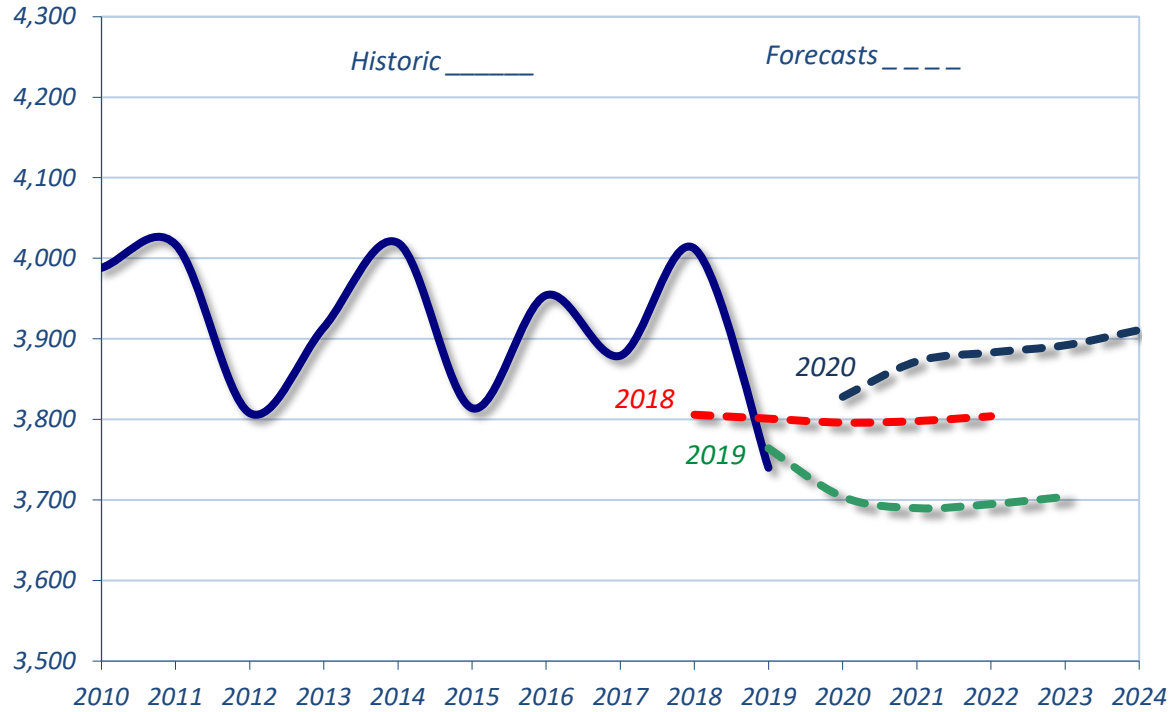
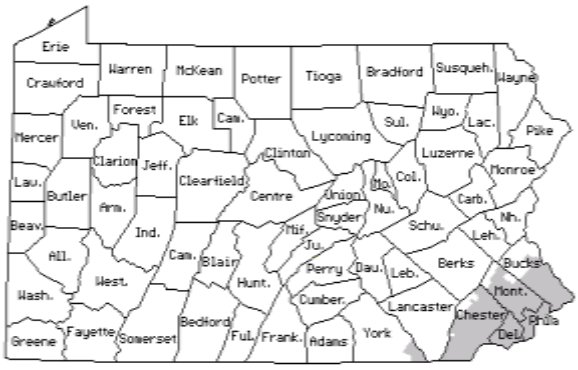


Figure 15 West Penn peak load (MW)



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 6 counties in Southeastern Pennsylvania. PECO's 2019 energy usage total was 37,327 GWh as compared to: 38,468 GWh in 2018; 37,234 GWh in 2017; 37,940 GWh in 2016; and 38,125 GWh in 2015. Year-over-year (YOY) energy usage decreased 3%. PECO's total usage mix consisted of residential (36.6%), commercial (21.4%), industrial (40.1%), other (2.0%) and sales for resale (less than 1%).

Over the next five years, total energy usage is projected to decrease at an average annual rate of 0.2%. This includes a residential usage average annual decrease of 0.3%, commercial usage average annual decrease of 0.3% and industrial usage decrease by 0.4%. See Figure 16.

PECO's highest summer peak load in 2019 was 8,428 MW. This represents a YOY decrease of 2.1% from the previous year's peak of 8,608 MW. The 5-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 2010 through 2019.

Figure 16 PECO energy usage (GWh)

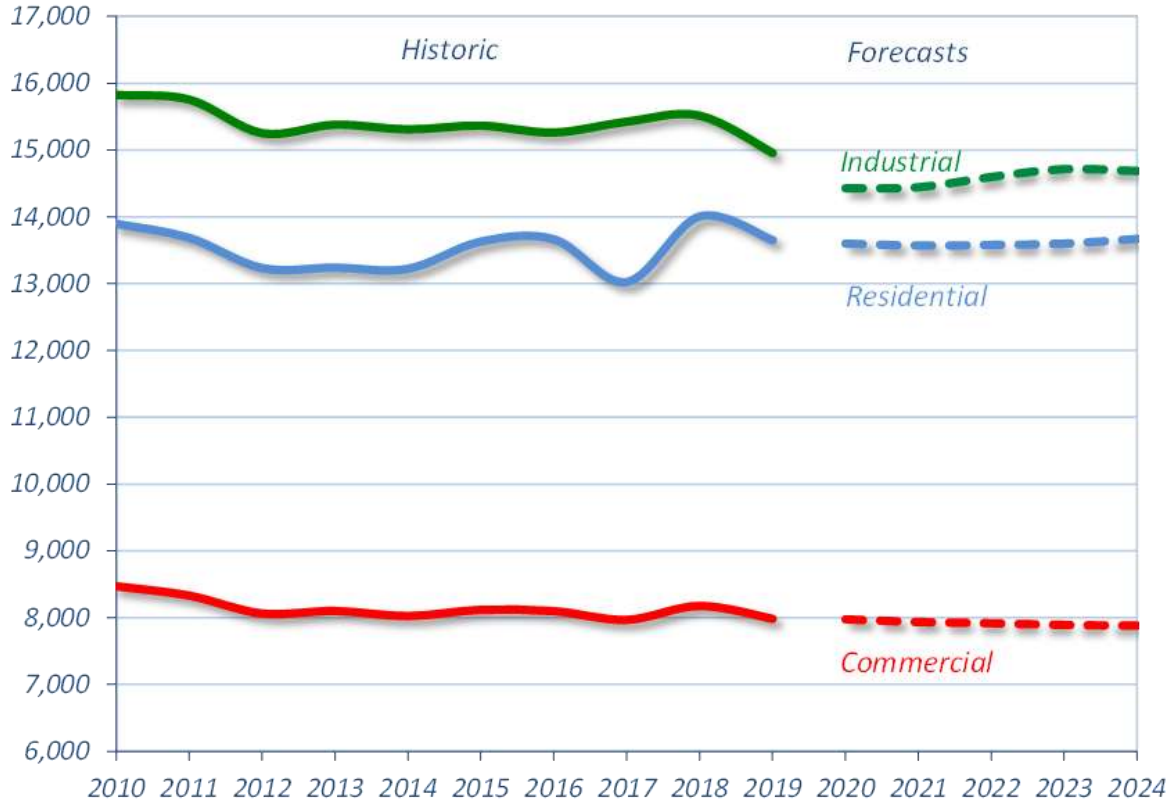
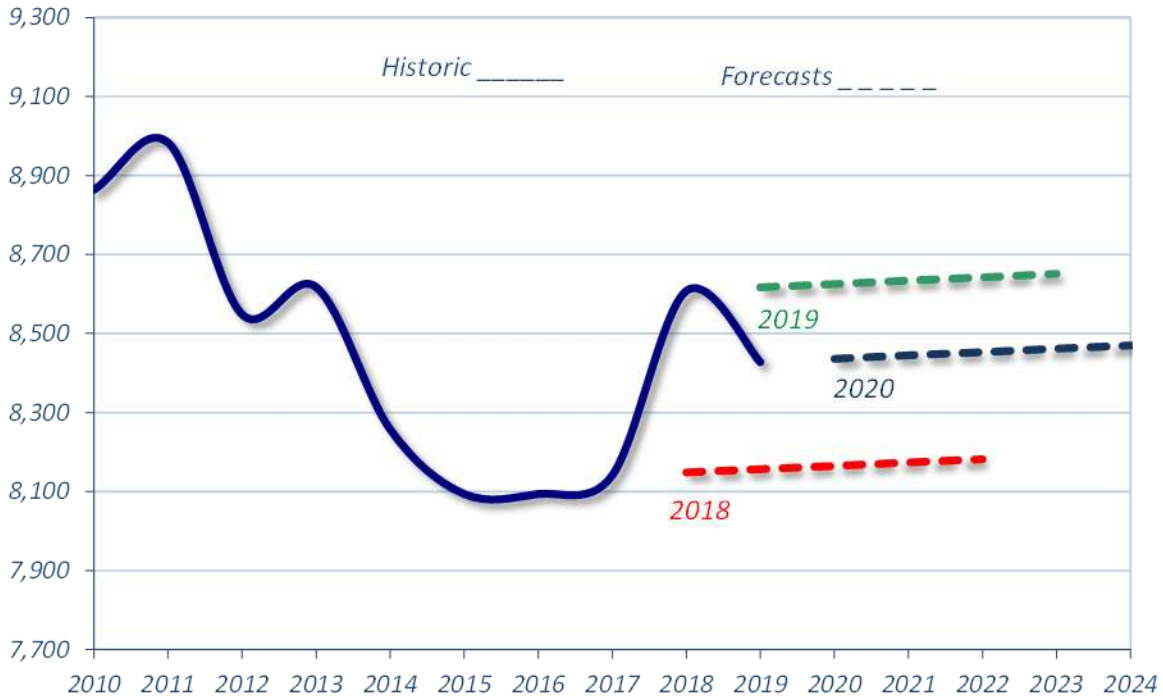
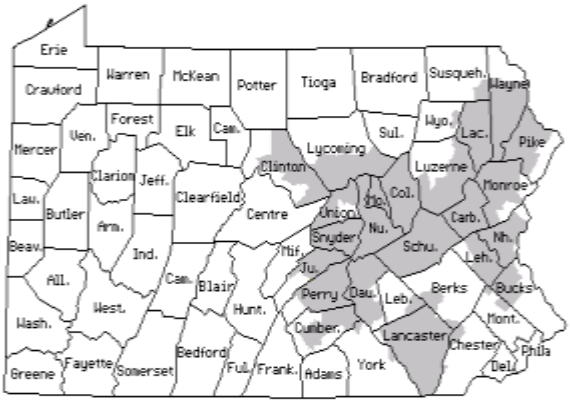


Figure 17 PECO Energy Company peak load (MW)



PPL Electric Utilities Corporation (PPL)



PPL provides service to about 1,449,737 customers over a 10,000-square-mile area in all or portions of 29 counties in Central Eastern Pennsylvania. PPL's 2019 energy usage total was 37,196 compared to: 37,371 GWh in 2018; 35,996 GWh in 2017; 36,311 GWh in 2016; and 37,222 GWh in 2015. Year-over-year (YOY) energy usage decreased 0.5%. PPL's total usage mix consisted of residential (39.0%), commercial (39.6%), industrial (21.2%), and other (less than 1%).

Over the next five years, total energy usage is projected to remain constant. This includes a residential usage average annual decrease 0.2%, commercial usage decrease of 0.1%, and industrial usage remaining constant. See Figure 18.

PPL's highest summer peak load in 2019 was 7,609 MW. This represents a YOY decrease of 1.6% from the previous year's peak of 7,729 MW. The 5-year peak load forecast is projected to decrease by an average of 0.5% 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 2010 through 2019.

Figure 18 PPL Electric Utilities Corporation energy usage (GWh)

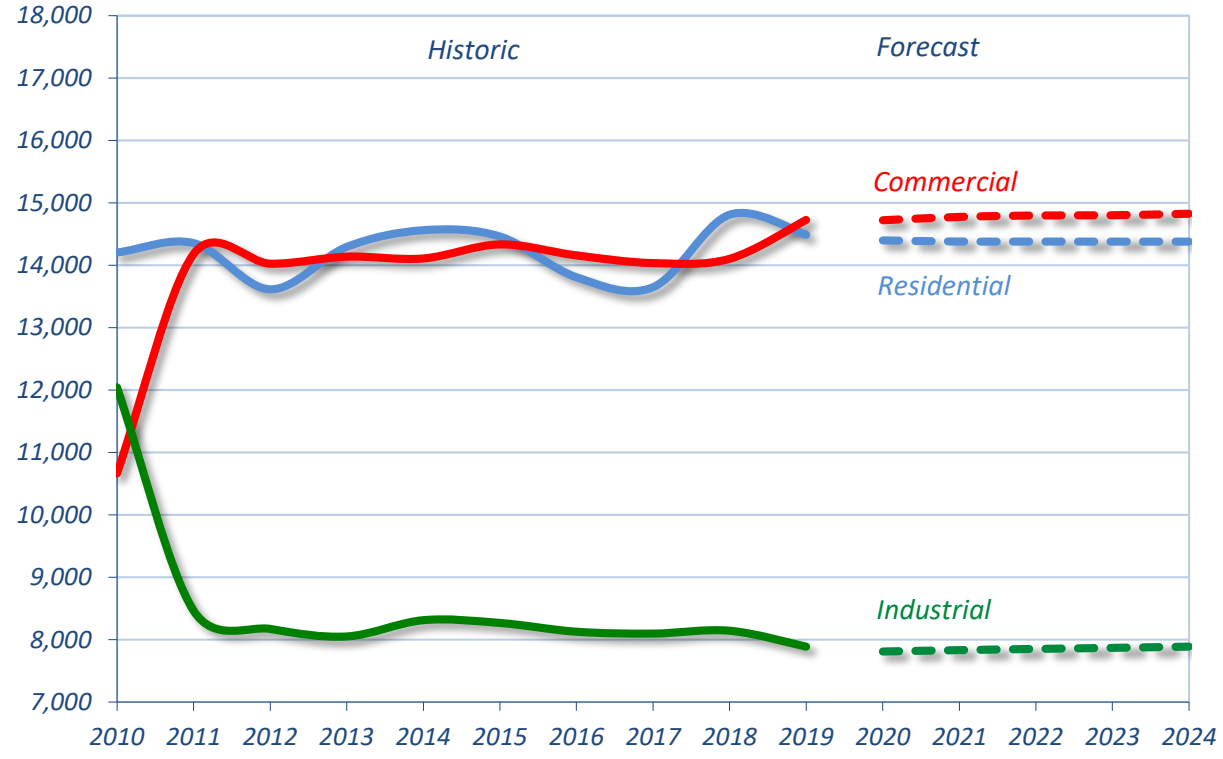
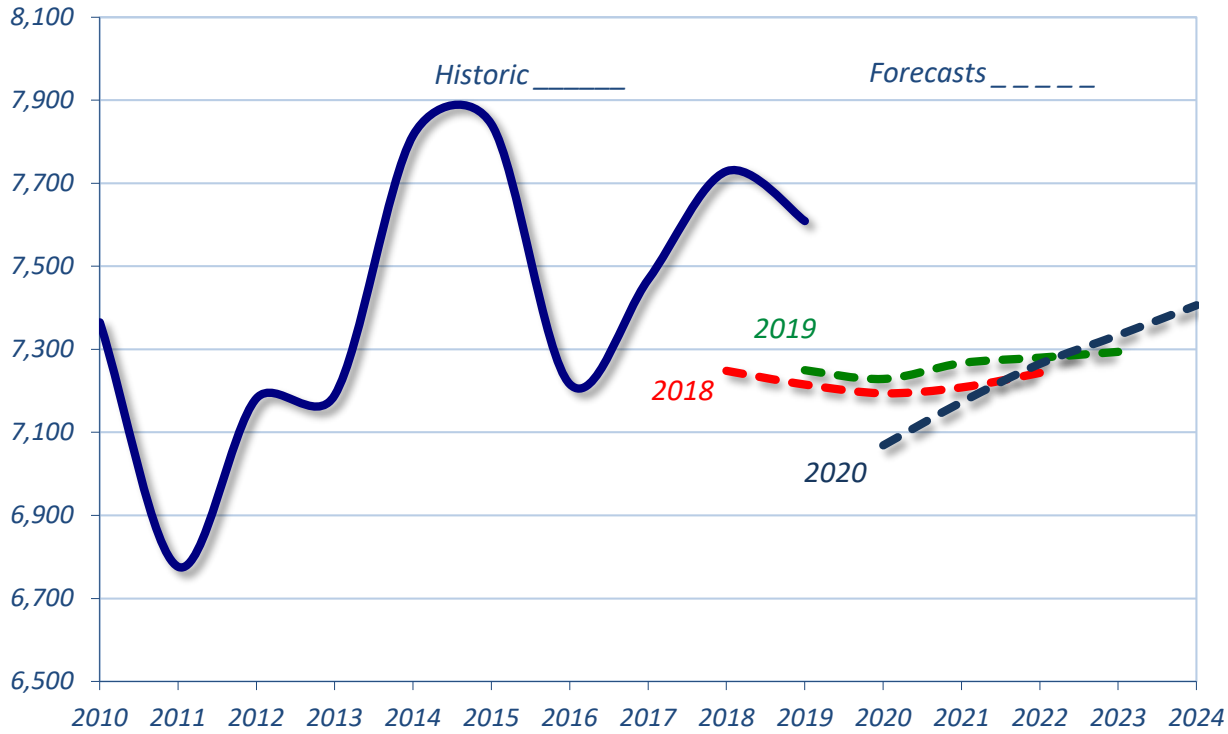
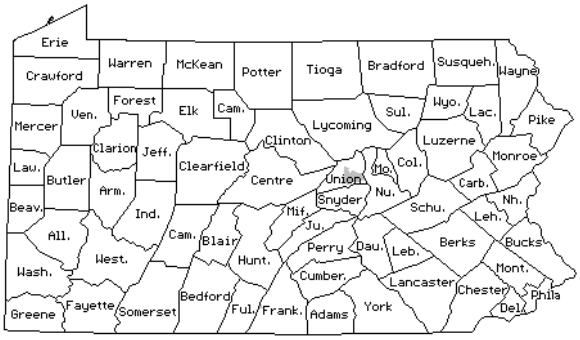


Figure 19 PPL Electric Utilities Corporation peak load (MW)



Summary of Data for the Four Smallest EDCs

Citizens' Electric Company (Citizens')

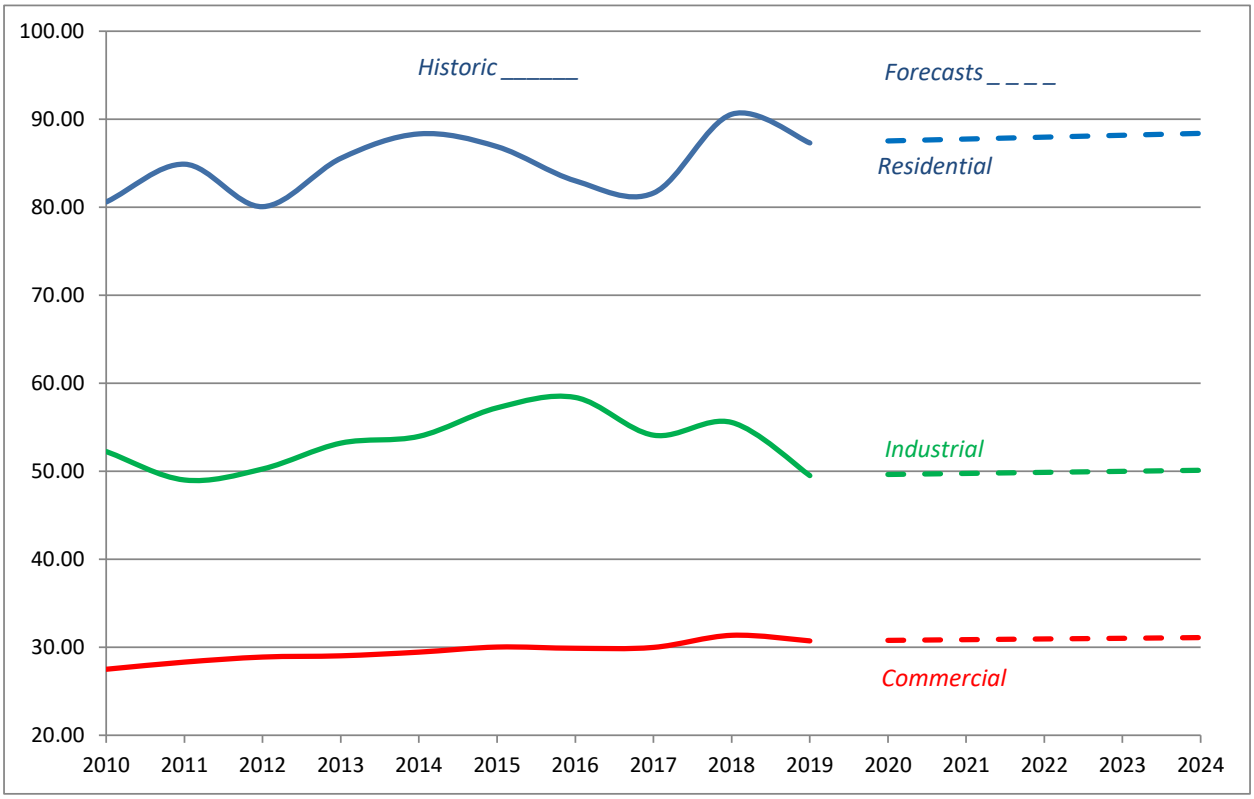


Citizens' provides service to about 7,046 customers in Union County, Pennsylvania. Citizens' 2019 energy usage total was 168 GWh as compared to: 178 GWh in 2018; 166 GWh in 2017; 172 GWh in 2016; and 175 GWh in 2015. Year-over-year (YOY) energy usage decreased 5.6%. Citizens' total usage mix consisted of residential (52.0%), commercial (18.3%), industrial (29.5%), and other (less than 1%).

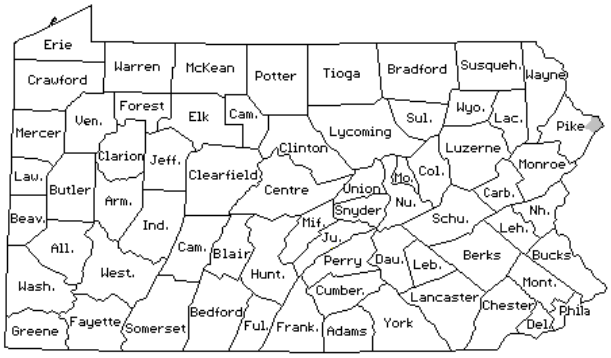
Over the next five years, total energy usage is projected to increase at an average annual rate of 0.3%. This includes a residential usage average annual increase 0.3 %, commercial usage increase of 0.2%, and industrial usage increase by 0.3%. See Figure 20.

Citizens' highest winter peak load in 2019 was 40 MW. This represents a YOY decrease of 9.8% from the previous year's peak of 44.8 MW. The 5-year peak load forecast is projected to increase by an average of 0.25% per year.

Figure 20 Citizens' energy usage (GWh)



Pike County Light & Power Company (Pike)

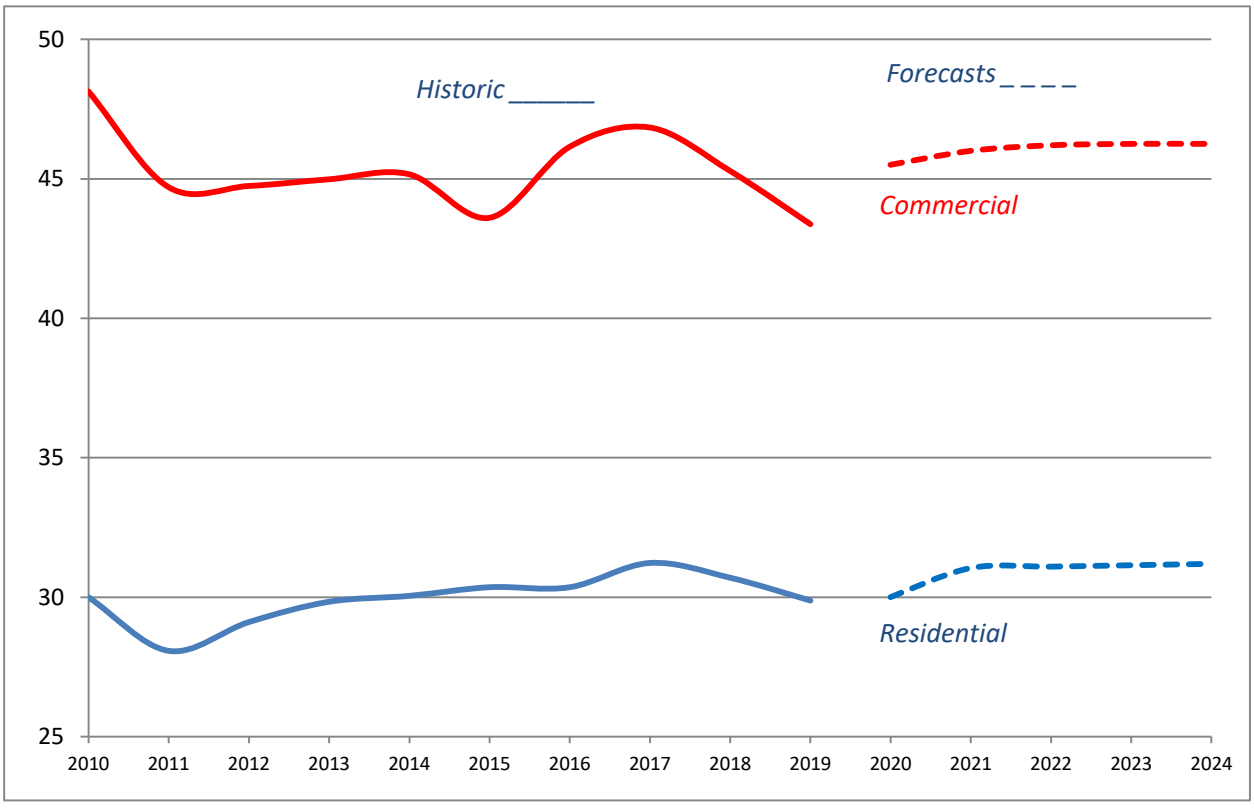


Pike provides service to about 4,819 customers in Eastern Pike County, Northeastern Pennsylvania. Pike's 2019 energy usage total was 73 GWh as compared to: 76 GWh in 2018; 78 GWh in 2017; 78 GWh in 2016; and 76 GWh in 2015. Year-over-year (YOY) energy usage decreased by 3.9%. Pike's total usage mix consisted of residential (40.7%), commercial (59.1%), and other (0.2%). Pike has no industrial customers or sales for resale.

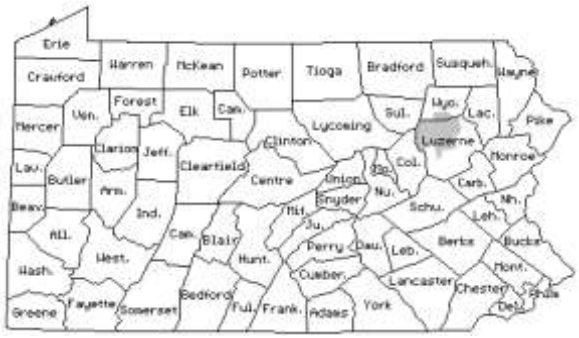
Over the next five years, total energy usage is projected to increase at an average annual rate of 1.2%. This includes a residential usage average annual increase of 0.9%, and a commercial usage increase of 1.3%. See Figure 21.

Pike's highest summer peak load in 2019 was 17.0 MW. This represents a YOY decrease of 4.5% from the previous year's peak of 17.80 MW. The 5-year peak load forecast is projected to remain constant for the next five years.

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



UGI Utilities Inc.—Electric Division (UGI)

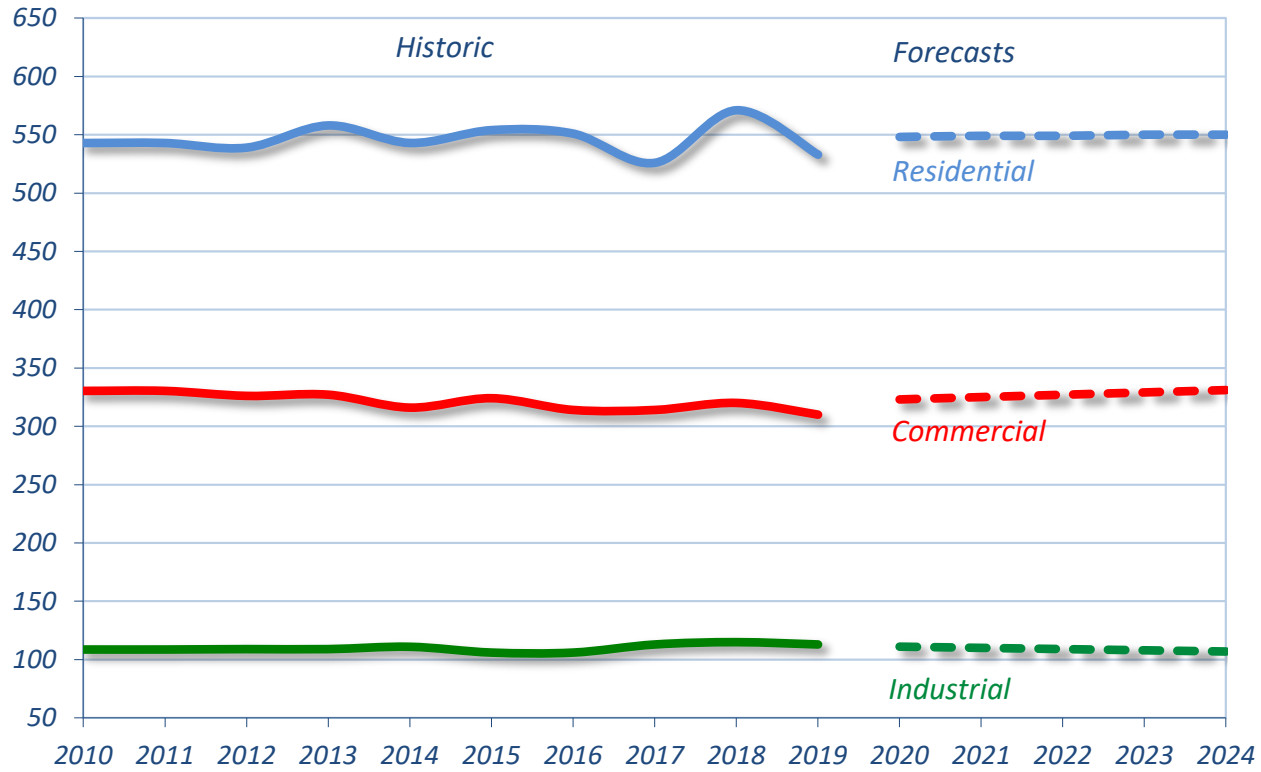


UGI provides electric service to about 62,336 customers in Northwestern Luzerne and Southern Wyoming counties in Pennsylvania. UGI's 2019 energy usage total was 958 GWh as compared to: 1,009 GWh in 2018; 957 GWh in 2017; 977 GWh in 2016; and 990 GWh in 2015. Year-over-year (YOY) energy usage decreased 5%. UGI's total usage mix consisted of residential (55.6%), commercial (32.3%), industrial (11.8%), and sales for resale (less than 1%).

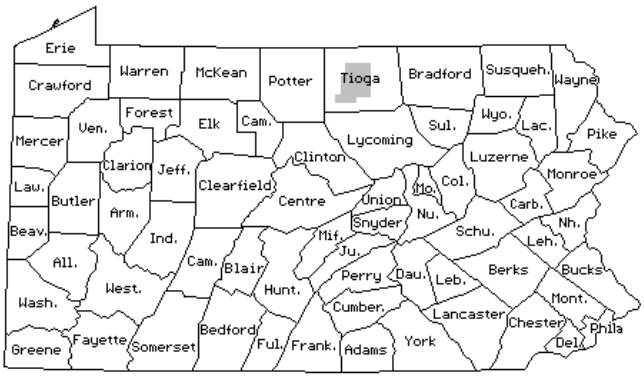
Over the next five years, total energy usage is projected to increase at an average annual rate of 0.7%. This includes a residential usage average annual increase 0.6% commercial usage increase of 1.3%, and industrial usage decrease by 1.1%. See Figure 22.

UGI highest summer peak load in 2019 was 202 MW. This represents a YOY decrease of 6% from the previous year's peak of 215 MW. The 5-year peak load forecast is projected to decrease an average of 1.6% per year.

Figure 22 UGI Utilities Inc. energy usage (GWh)



Wellsboro Electric Company (Wellsboro)



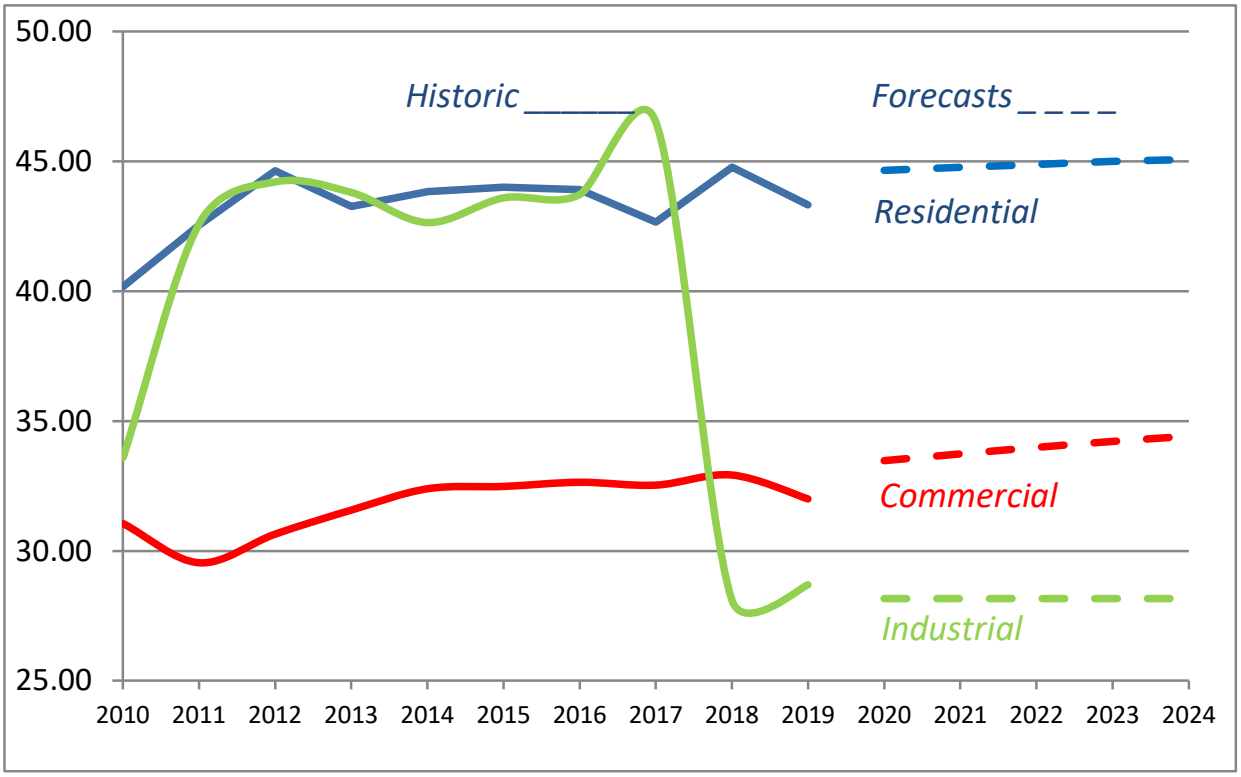
Wellsboro provides electric service to about 6,346 customers in Tioga County, North Central Pennsylvania. Wellsboro's 2019 energy usage total was 104 GWh as compared to: 106 GWh in 2018; 105 GWh in 2017; 122 GWh in 2016; and 121 GWh in 2015. Year-over-year (YOY) energy usage decreased 1.8%. Wellsboro total usage mix consisted of residential (41.5%), commercial (30.7%), industrial (27.5%), and other/sales for resale (0.3%).

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 increase 0.8%commercial usage increase of 1.5%, and industrial usage decrease of 0.4%. 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 2019 was 20 MW. This is the same as in 2018. The 5-year peak load forecast is projected to remain static over the next five years.

Figure 23 Wellsboro Electric Company energy usage (GWh)



Appendix A – Data Tables

The following tables provide actual and projected peak load as well as residential, commercial and industrial energy demand by EDC. The 5-year projections are filed each year by the large EDCs. Actual values are provided for years 2010 through 2019 and values are listed in the second column labeled "Actual." The lower-right-most-column in the body of the table is the latest 5-year projection for years 2020 through 2024.

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

		Projected Peak Load Requirments (Year Forecast Was Filed)										
Year	Actual	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
2010	2889	2854										
2011	3012	2863	2944									
2012	3054	2860	3000	2935								
2013	2951	2917	3053	2980	2966							
2014	2693	2960	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								2942	2890	2861	2852	2759
2021									2882	2862	2853	2781
2022										2869	2865	2797
2023											2866	2807
2024												2818

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

		Projected Residential Energy Demand (Year Forecast Was Filed)										
Year	Actual	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
2010	4327	4117										
2011	4232	4184	4213									
2012	4169	4267	4275	4350								
2013	4091	4352	4332	4436	4246							
2014	4068	4448	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								4012	3908	3856	3971	4005
2021									3863	3797	3913	3951
2022										3747	3862	3908
2023											3816	3864
2024												3821

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

		Projected Commercial Energy Demand (Year Forecast Was Filed)										
Year	Actual	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
2010	6712	6428										
2011	6612	6501	6681									
2012	6539	6585	6782	6682								
2013	6494	6666	6854	6749	6642							
2014	6432	6742	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								6210	6151	5980	6029	6057
2021									6082	5905	5973	5986
2022										5833	5896	5881
2023											5804	5807
2024												5754

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

		Projected Industrial Energy Demand (Year Forecast Was Filed)										
Year	Actual	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
2010	2987	2440										
2011	3120	2407	2865									
2012	3406	2395	2846	3185								
2013	3337	2385	2815	3226	3501							
2014	3164	2359	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								2803	2638	2650	2783	2641
2021									2618	2627	2733	2553
2022										2605	2712	2519
2023											2692	2485
2024												2457

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

		Projected Peak Load Requirements (Year Forecast Was Filed)										
Year	Actual	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
2010	2715	2687										
2011	3125	2640	2869									
2012	3036	2630	2775	2911								
2013	3012	2668	2815	2928	2881							
2014	2817	2731	2872	2962	2887	2958						
2015	2791		2952	2995	2898	2965	2975					
2016	2947			3028	2910	2974	2979	2987				
2017	2897				2932	2996	2985	2995	2901			
2018	3026					3017	2987	2997	2895	2926		
2019	2974						2986	2996	2872	2907	2921	
2020								2995	2855	2874	2871	2934
2021									2856	2865	2868	2928
2022										2875	2876	2940
2023											2883	2949
2024												2971

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

		Projected Residential Energy Demand (Year Forecast Was Filed)										
Year	Actual	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
2010	5666	5587										
2011	5588	5552	5424									
2012	5363	5577	5226	5201								
2013	5553	5682	5386	5184	5297							
2014	5477	5799	5547	5183	5159	5354						
2015	5515		5650	5212	5042	5421	5533					
2016	5528			5210	4979	5438	5378	5190				
2017	5351				4993	5457	5392	5042	5316			
2018	5740					5476	5382	4925	5242	5347		
2019	5641						5351	4840	5154	5265	5318	
2020								4760	5083	5201	5239	5460
2021									5044	5166	5201	5422
2022										5172	5198	5418
2023											5203	5428
2024												5553

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

		Projected Commercial Energy Demand (Year Forecast Was Filed)										
Year	Actual	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
2010	3006	4671										
2011	2947	4706	2955									
2012	2907	4783	2959	2871								
2013	2933	4887	3019	2909	2900							
2014	2944	4963	3090	2948	2930	2914						
2015	2995		3158	2997	2937	2931	2983					
2016	3043			2995	2940	2964	2929	2919				
2017	2886				2956	2984	2938	2923	2953			
2018	2972					2989	2938	2927	2948	2952		
2019	2133						2923	2925	2941	2948	2940	
2020								2921	2935	2924	2899	2101
2021									2925	2904	2873	2081
2022										2912	2875	2083
2023											2880	2089
2024												2146

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

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

		Projected Industrial Energy Demand (Year Forecast Was Filed)										
Year	Actual	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
2010	5288	3538										
2011	5404	3497	5443									
2012	5261	3528	5545	5434								
2013	5328	3731	5589	5652	5411							
2014	5382	4021	5610	5765	5521	5322						
2015	5309		5625	5851	5561	5381	5413					
2016	5304			5847	5587	5456	5472	5350				
2017	5512				5612	5508	5507	5372	5360			
2018	5685					5524	5523	5467	5428	5449		
2019	6459						5532	5474	5408	5443	5451	
2020								5467	5397	5396	5372	6396
2021									5458	5388	5409	6422
2022										5419	5450	6466
2023											5472	6507
2024												6876

* 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)

		Projected Peak Load Requirements (Year Forecast Was Filed)										
Year	Actual	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
2010	2451	2603										
2011	2659	2630	2465									
2012	3128	2661	2452	2515								
2013	3087	2688	2458	2544	2938							
2014	3024	2715	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								2907	2751	2779	2811	2892
2021									2739	2775	2811	2884
2022										2779	2813	2884
2023											2817	2873
2024												2866

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

		Projected Residential Energy Demand (Year Forecast Was Filed)										
Year	Actual	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
2010	4471	4611										
2011	4656	4614	4569									
2012	4554	4662	4489	4460								
2013	4491	4721	4443	4304	4257							
2014	4462	4776	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								3791	4133	4090	4134	4141
2021									4112	4056	4104	4111
2022										4057	4104	4109
2023											4112	4104
2024												4112

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

		Projected Commercial Energy Demand (Year Forecast Was Filed)										
Year	Actual	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
2010	5019	5159										
2011	3671	5213	5196									
2012	3534	5265	5215	3562								
2013	3531	5320	5257	3526	3512							
2014	3591	5364	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								3552	3392	3499	3459	2485
2021									3352	3473	3424	2459
2022										3472	3406	2446
2023											3397	2440
2024												2449

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

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

		Projected Industrial Energy Demand (Year Forecast Was Filed)										
Year	Actual	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
2010	4044	4203										
2011	5748	4538	4126									
2012	6005	4859	4222	6026								
2013	5731	4889	4370	6175	5883							
2014	5647	4922	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								5623	5569	5757	5720	6520
2021									5548	5751	5770	6587
2022										5790	5819	6474
2023											5854	6394
2024												6327

* 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)

		Projected Peak Load Requirements (Year Forecast Was Filed)										
Year	Actual	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
2010	903	896										
2011	1102	890	944									
2012	963	899	947	1010								
2013	1054	930	983	1001	929							
2014	1018	977	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								1006	951	975	965	923
2021									945	977	968	926
2022										985	973	927
2023											976	937
2024												945

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

		Projected Residential Energy Demand (Year Forecast Was Filed)										
Year	Actual	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
2010	1696	1701										
2011	1711	1708	1664									
2012	1668	1721	1624	1590								
2013	1704	1714	1638	1588	1645							
2014	1728	1739	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								1520	1593	1604	1612	1613
2021									1584	1595	1604	1604
2022										1598	1606	1608
2023											1614	1616
2024												1657

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

		Projected Commercial Energy Demand (Year Forecast Was Filed)										
Year	Actual	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
2010	1311	1428										
2011	1327	1408	1300									
2012	1334	1449	1267	1291								
2013	1349	1500	1272	1297	1337							
2014	1381	1535	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								1321	1302	1303	1287	1016
2021									1289	1295	1262	996
2022										1293	1237	977
2023											1221	967
2024												1023

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

		Projected Industrial Energy Demand (Year Forecast Was Filed)										
Year	Actual	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
2010	1488	1226										
2011	1542	1214	1527									
2012	1456	1238	1652	1513								
2013	1509	1370	1705	1483	1473							
2014	1599	1596	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								1790	1467	1726	1728	2088
2021									1460	1757	1781	2121
2022										1794	1833	2153
2023											1866	2220
2024												2298

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

		Projected Peak Load Requirements (Year Forecast Was Filed)										
Year	Actual	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
2010	8864	8114										
2011	8984	8236	8786									
2012	8549	8359	8770	8926								
2013	8618	8485	8842	8956	8529							
2014	8258	8612	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								8135	8126	8165	8625	8436
2021									8135	8174	8634	8445
2022										8182	8642	8453
2023											8651	8462
2024												8470

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

		Projected Residential Energy Demand (Year Forecast Was Filed)										
Year	Actual	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
2010	13896	13151										
2011	13686	13414	13912									
2012	13233	13683	14037	13669								
2013	13241	13956	14317	13806	13392							
2014	13222	14235	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								13360	13428	13182	13661	13600
2021									13346	13104	13718	13570
2022										13009	13741	13580
2023											13762	13599
2024												13671

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

		Projected Commercial Energy Demand (Year Forecast Was Filed)										
Year	Actual	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
2010	8472	8572										
2011	8332	8744	8589									
2012	8063	8918	8705	8360								
2013	8101	9097	8879	8443	7821							
2014	8025	9279	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								8019	8046	8049	8156	7976
2021									7995	8038	8163	7936
2022										8042	8163	7917
2023											8163	7892
2024												7882

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

		Projected Industrial Energy Demand (Year Forecast Was Filed)										
Year	Actual	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
2010	15824	16207										
2011	15755	16531	15991									
2012	15253	16861	16153	15755								
2013	15379	17199	16476	15912	15481							
2014	15310	17543	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								15529	15356	15306	15415	14430
2021									15355	15247	15431	14444
2022										15217	15431	14598
2023											15431	14715
2024												14687

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

		Projected Peak Load Requirements (Year Forecast Was Filed)										
Year	Actual	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
2010	3988	3788										
2011	4017	3755	3757									
2012	3808	3771	3754	3758								
2013	3914	3809	3786	3771	3784							
2014	4019	3951	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								3917	3767	3796	3704	3828
2021									3762	3798	3690	3872
2022										3804	3695	3883
2023											3704	3892
2024												3911

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

		Projected Residential Energy Demand (Year Forecast Was Filed)										
Year	Actual	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
2010	7401	7147										
2011	7349	7104	7139									
2012	7092	7085	7122	7121								
2013	7318	6952	7047	7149	7146							
2014	7281	7008	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								6407	6660	6819	6901	6931
2021									6614	6756	6851	6844
2022										6756	6858	6849
2023											6864	6846
2024												6862

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

		Projected Commercial Energy Demand (Year Forecast Was Filed)										
Year	Actual	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
2010	4983	4966										
2011	4889	4987	4909									
2012	4849	5059	4931	4819								
2013	4878	5169	4979	4930	4845							
2014	4956	5307	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								4954	4884	4208	4260	2879
2021									4857	4184	4266	2882
2022										4184	4273	2880
2023											4279	2868
2024												2862

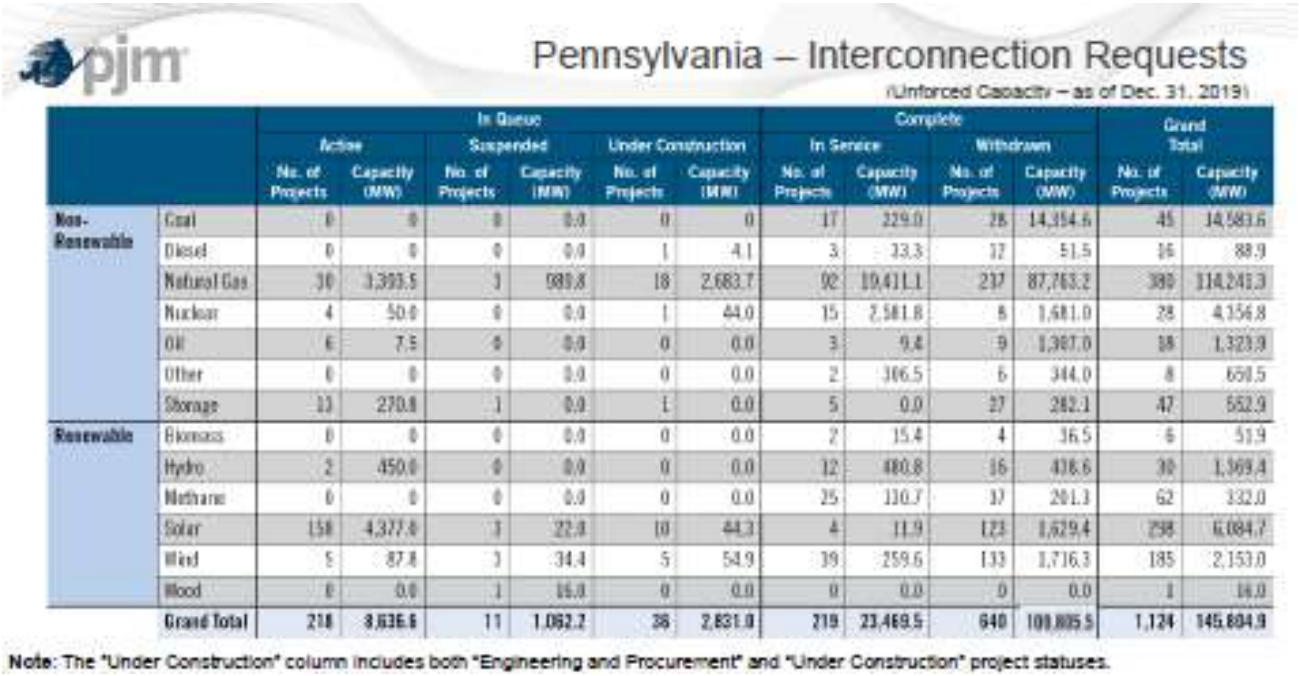
Table A28 West Penn Power Company
Actual and Projected Industrial Energy Demand (GWh)

		Projected Industrial Energy Demand (Year Forecast Was Filed)										
Year	Actual	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
2010	7617	7612										
2011	7818	7740	7833									
2012	7685	7936	8025	8029								
2013	7777	8105	8146	8172	8087							
2014	7972	8214	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								8852	8179	8865	8540	10074
2021									8199	8920	8651	10209
2022										8920	8760	10306
2023											8813	10375
2024												10857

Appendix B – Plant Additions and Upgrades

Table B-1, provides detail of PJM interconnection requests for new generating resources located in Pennsylvania.[61] Currently Pennsylvania has 2,831 MW under construction as compared to: 6,600 MW in 2018; 9,636 MW in 2017; 7,142 MW in 2016; 8,202 MW in 2015; 4,629 MW in 2014; and 2,134 MW in 2013. Table B-2 details the generation deactivations for Pennsylvania from Jan. 1, 2019 through Dec. 31, 2019.

Table B-1, New Generation Queue for Pennsylvania – Interconnection Requests (Dec 31, 2019)



Pennsylvania – Interconnection Requests

(Unforced Capacity – as of Dec. 31, 2019)

		In Queue						Complete				Grand Total	
		Active		Suspended		Under Construction		In Service		Withdrawn			
		No. of Projects	Capacity (MW)	No. of Projects	Capacity (MW)	No. of Projects	Capacity (MW)	No. of Projects	Capacity (MW)	No. of Projects	Capacity (MW)	No. of Projects	Capacity (MW)
Non-Renewable	Coal	0	0	0	0.0	0	0	17	229.0	28	14,354.6	45	14,583.6
	Diesel	0	0	0	0.0	1	4.1	3	33.3	12	51.5	16	88.9
	Natural Gas	30	3,393.5	3	989.8	18	2,683.7	92	19,411.1	237	87,763.2	380	114,241.3
	Nuclear	4	50.0	0	0.0	1	44.0	15	2,581.8	8	1,681.0	28	4,156.8
	Oil	6	7.5	0	0.0	0	0.0	3	9.4	9	1,307.0	18	1,323.9
	Other	0	0	0	0.0	0	0.0	2	306.5	6	344.0	8	650.5
	Storage	33	270.8	1	0.0	1	0.0	5	0.0	27	282.1	47	552.9
Renewable	Biomass	0	0	0	0.0	0	0.0	2	15.4	4	36.5	6	51.9
	Hydro	2	450.0	0	0.0	0	0.0	12	480.8	16	438.6	30	1,369.4
	Methane	0	0	0	0.0	0	0.0	25	110.7	37	201.3	62	332.0
	Solar	158	4,377.6	3	22.8	10	44.3	4	11.9	123	1,629.4	298	6,084.7
	Wind	5	87.8	3	34.4	5	54.9	39	259.6	133	1,716.3	185	2,153.0
	Wood	0	0.0	1	16.0	0	0.0	0	0.0	0	0.0	1	16.0
	Grand Total	238	8,636.6	11	1,062.2	36	2,831.0	219	23,469.5	640	109,805.5	1,124	145,804.9

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

[61] https://www.pjm.com/-/media/library/reports-notices/state-specific-reports/2019/2019-pennsylvania-state-infrastructure-report.ashx?la=en.

Table B-2, 2019 Pennsylvania Actual Generation Deactivations and Deactivation Notifications Received in 2019

Unit	TO Zone	Fuel Type	Request Received to Deactivate	Pending/Actual Deactivation Date	Age (Years)	Capacity (MW)
Frackville Wheelabrator 1	PPL	Coal	9/3/2019	3/1/2020	31	45.1
Cambria CoGen	MAIT	Coal	3/7/2019	9/17/2019	28	88
Bethlehem Renewable Energy Generator (Landfill)	PPL	Methane	2/25/2019	8/31/2019	10	3.7
Kimberly Clark Generator	PECO	Coal	8/28/2019	9/4/2019	32	9.4
Mansfield 3	ATSI	Coal	8/9/2019	11/7/2019	38	830

In 2019, there were 931.1 MW of actual Pennsylvania generation retirements as compared to 76.1 MW in 2018, 14 MW in 2017, and 177 MW in 2016. PJM received 5 new Pennsylvania Deactivation Notices in 2019 with projected deactivation dates as shown in Table B-2, totaling 976.2 MW, as compared to 12 notices in 2018 totaling 4,391.5 MW.

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 2015 through 2019.[62] Chart C-1, represents the 2019 and 2018 Pennsylvania installed capacity percentage by energy source.[63] Chart C-2, represents the 2018 Pennsylvania actual generation percentage by energy source. 2019 information is not available as PJM is no longer producing the actual generation percentage by energy source on a per-state basis. Table C-2 represents existing generating facilities by County located in Pennsylvania.[64]

Table C-1 PJM Region Electrical Power Supply Mix

PJM Region Electricity Supply Mix 2019/2018/2017/2016/2015 (percent)

Energy Source	Capacity					Generation				
	2019	2018	2017	2016	2015	2019	2018	2017	2016	2015
Coal	30.5	32.7	35.4	36.5	37.5	23.8	28.6	31.8	33.9	36.6
Nuclear	17.5	17.6	18	18.1	18.6	33.6	34.2	35.6	34.4	35.5
Natural Gas	42.3	40.2	36.8	35.7	34	36.2	30.9	27.1	26.7	23.4
Hydro,Wind, Solar & Other	6.3	6.1	6	6	6	5.9	5.9	5.7	4.7	4.4
Oil	3.4	3.4	3.6	3.7	3.9	0.2	0.4	0.3	0.3	0.1

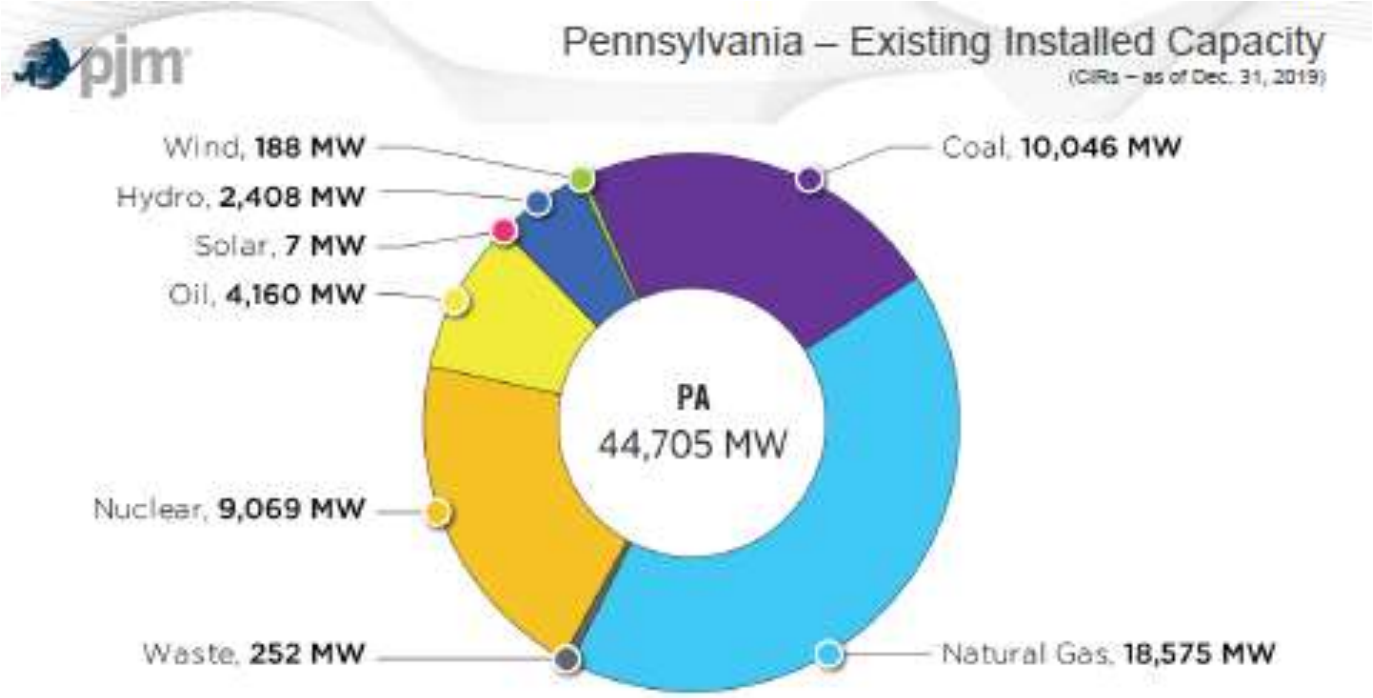
[62] *State of the Market Report for PJM*, Volume II, Sections 3 & 5 reporting years 2019, 2018, 2017, 2016, and 2015. Available at: www.monitoringanalytics.com.

[63] *PJM Pennsylvania State Report 2019*, available at: https://www.pjm.com/-/media/library/reports-notices/state-specific-reports/2019/2019-pennsylvania-state-infrastructure-report.ashx?la=en.

[64] Data reported to SNL and received by PUC staff.

Chart C-1Electrical Power Capacity Mix

2019 Pennsylvania Installed Capacity



2018 Pennsylvania Installed Capacity

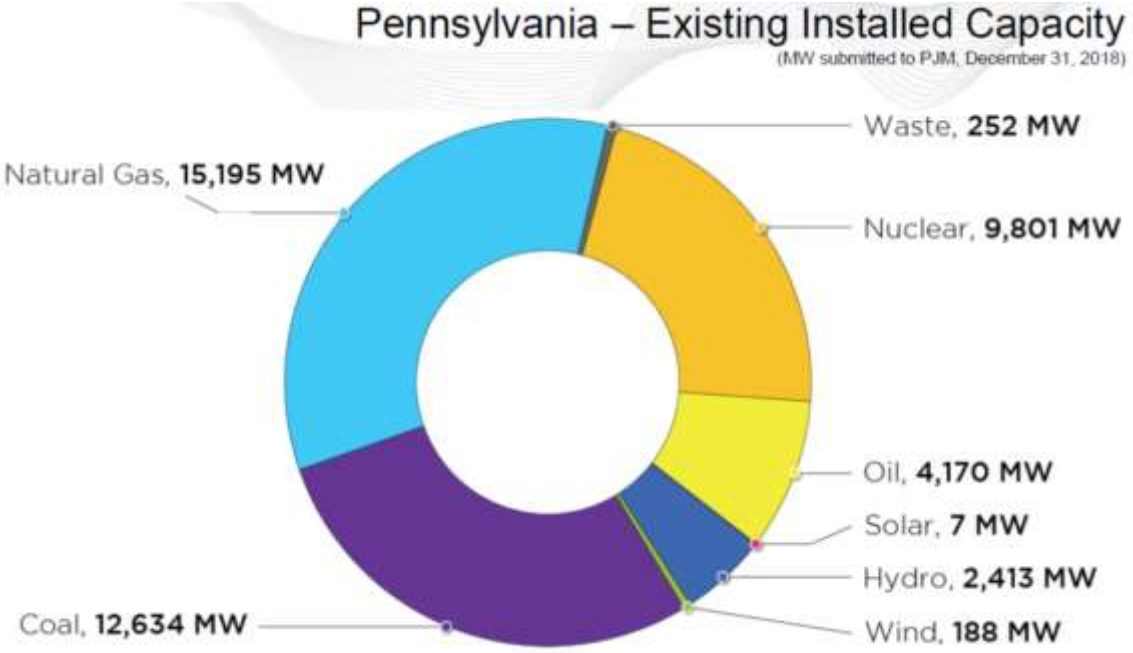


Chart C-2 Pennsylvania Electrical Power Generation Mix

2018 Actual Generation Production in Pennsylvania

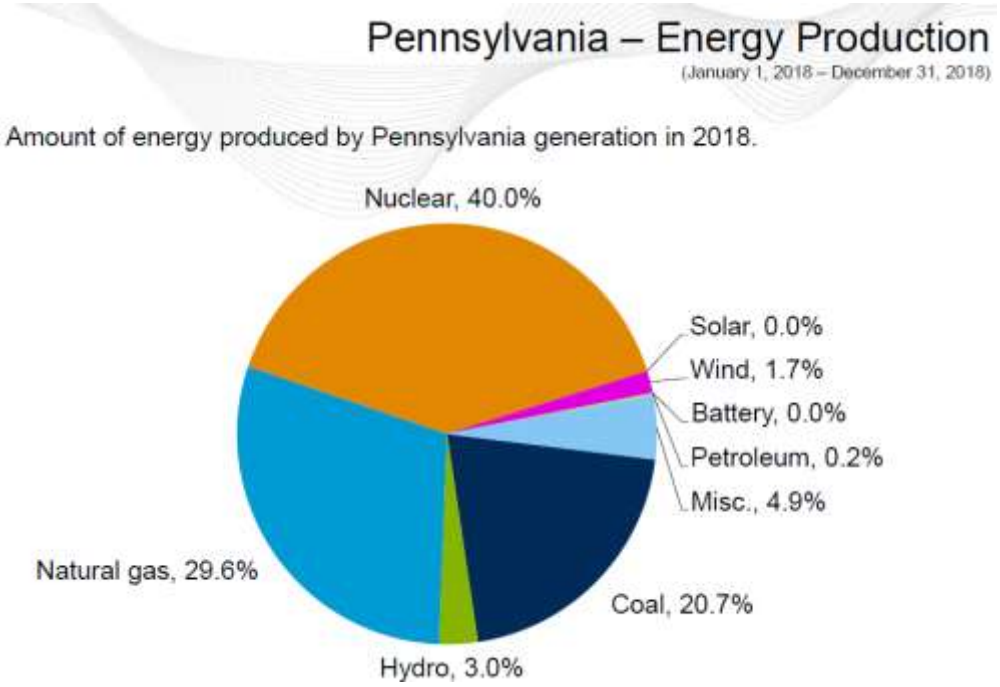


Table C-2 Electric Generating Facilities in Pennsylvania

County	Plant	Owner	Ultimate Parent	Operating Capacity (MW)	Age	Fuel Type
Adams	Gettysburg Energy & Nutrient Recovery Facility (C	EnergyWorks BioPower, Inc	EnergyWorks BioPower, Inc	2.7	7	Biomass
	Hamilton	NRG REMA , LLC	GenOn Holdings, Inc.	24.0	49	Oil
	Hunterstown	NRG REMA , LLC	GenOn Holdings, Inc.	75.0	49	Oil
	Hunterstown CC	Platinum Equity Advisors, LLC	Platinum Equity, LLC	810.0	17	Gas
	Orrtanna	NRG REMA , LLC	GenOn Holdings, Inc.	26.0	49	Oil
Allegheny	Allegheny Energy 3, 4 and 5 (Springdale)	Aspen Generating, LLC	LS Power Group	550.0	17	Gas
	Allegheny Energy Units 1 and 2 (Springdale)	Aspen Generating, LLC	LS Power Group	88.0	21	Gas
	Brunot Island	NRG Power Midwest LP.	GenOn Holdings, Inc.	15.0	48	Oil
	Brunot Island CC	NRG Power Midwest LP.	GenOn Holdings, Inc.	269.4	47	Gas
	Cheswick	NRG Power Midwest LP.	GenOn Holdings, Inc.	565.0	50	Coal
	Clairton Works	United States Steel Corporation	United States Steel Corporation	26.0	65	Other
	Mon Valley Works	United States Steel Corporation	United States Steel Corporation	67.9	77	Other
	PPG Monroeville Chemicals Center	PPG Monroeville Chemicals Center	PPG Industries, Incorporated	1.1	22	Oil
	PPG Place	PPG Industries, Incorporated	PPG Industries, Incorporated	2.3	30	Oil
Armstrong	Allegheny 5	Ontario Power Generation Inc.	Ontario Power Generation Inc.	10.0	32	Water
	Allegheny 6	Ontario Power Generation Inc.	Ontario Power Generation Inc.	12.0	32	Water
	Allegheny 8 (Torrent Hydro)	Multi-Owned	Multi-Owned	13.6	30	Water
	Allegheny 9 (Torrent Hydro)	Multi-Owned	Multi-Owned	17.8	30	Water
	Armstrong County	LS Power Development, LLC	LS Power Group	829.7	18	Gas
	Keystone	Multi-Owned	Multi-Owned	1,700.0	53	Coal
	Keystone IC	Multi-Owned	Multi-Owned	11.2	52	Oil
	Mahoning Creek	Ontario Power Generation Inc.	Ontario Power Generation Inc.	6.7	7	Water
Beaver	Beaver Solar	Eaton Corporation	Eaton Corporation plc	1.3	8	Solar
	Beaver Valley	Energy Harbor Nuclear Generation LLC	Energy Harbor Corporation	1,872.0	44	Nuclear
	Beaver Valley Patterson Dam	Enel Green Power North America, Inc.	Enel S.p.A.	1.2	38	Water
	Townsend Hydro	Beaver Falls Municipal Authority	Beaver Falls Municipal Authority	4.2	33	Water
Berks	Altairnano PJM Li-ion Battery Storage Project	AES Energy Storage, LLC	AES Corporation	1.0	11	Other
	Birdsboro Combined Cycle Plant	Multi-Owned	Multi-Owned	488.0	1	Gas
	Morgantown Generating Station	Granger Electric Co	Granger Electric Co	1.6	4	Biomass
	Morgantown Solar Park	Hankin Group	Hankin Group	1.6	9	Solar
	Ontelaunee Energy Center	Dynegy Power, LLC	Vistra Energy Corp.	591.1	18	Gas
	Pioneer Crossing Landfill	Fortistar LLC	Fortistar LLC	8.0	12	Biomass
	Temple Solar Arrays Project	UGI Energy Services, Inc.	UGI Corporation	2.2	9	Solar
	Titus CT	NRG REMA , LLC	GenOn Holdings, Inc.	35.0	53	Oil

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

County	Plant	Owner	Ultimate Parent	Operating Capacity (MW)	Age	Fuel Type
Blair	Allegheny Ridge Wind Farm	Leeward Renewable Energy, LLC	OMERS Administration Corporation	80.0	13	Wind
	Chestnut Flats Windfarm	EDF Renewables Inc.	EDF Group	38.0	9	Wind
	Juniata Locomotive Shop GT Project	Norfolk Southern Corporation	Norfolk Southern Corporation	1.5	5	Gas
	North Allegheny Wind	Multi-Owned	Multi-Owned	70.0	11	Wind
	Sandy Ridge Wind Farm	Algonquin Power Fund (America) Inc.	Algonquin Power & Utilities Corp.	48.2	8	Wind
Bradford	Alpaca Gas Project	IMG Midstream LLC	COFRA Holding AG	20.4	3	Gas
	Beaver Dam Gas Project	IMG Midstream LLC	COFRA Holding AG	21.0	4	Gas
	Milan Gas Project	IMG Midstream LLC	COFRA Holding AG	20.4	3	Gas
	Northern Tier Landfill	Talen Renewable Energy	Energy Power Partners, LLC	1.6	11	Biomass
Berks	Altairnano PJM Li-ion Battery Storage Project	AES Energy Storage, LLC	AES Corporation	(27.1)	8	Other
	Birdsboro Combined Cycle Plant	Multi-Owned	Multi-Owned	(39.5)	8	Gas
Bucks	Croydon	Exelon Generation Company, LLC	Exelon Corporation	512.0	46	Oil
	Exelon-Conergy Solar Energy Center	Conergy Ag	Kawa Capital Management, Inc.	1.5	12	Solar
	Fairless Hills Steam Generating Station	Exelon Generation Company, LLC	Exelon Corporation	60.0	24	Biomass
	Fairless Works Energy Center	Starwood Energy Group Global, LLC	Starwood Energy Group Global, LLC	1,334.4	16	Gas
	Falls	Exelon Generation Company, LLC	Exelon Corporation	60.0	50	Oil
	Tullytown Landfill Gas Facility	WM Renewable Energy, LLC	Waste Management, Inc.	1.6	7	Biomass
	Wheelabrator Falls	Wheelabrator Technologies Holdings Inc.	Macquarie Group Ltd.	43.9	26	Biomass
Cambia	CPV Fairview Energy Center	Multi-Owned	Multi-Owned	1,050.0	1	Gas
	Ebensburg Power Company	Revloc Reclamation Service, Inc.	Generation Holdings, LP	50.0	29	Coal
	Highland North Wind Farm	BlackRock, Inc.	BlackRock, Inc.	75.0	8	Wind
	Highland Wind Project (Krayn Wind)	Multi-Owned	Multi-Owned	62.5	11	Wind
	Patton Wind Farm	BlackRock, Inc.	BlackRock, Inc.	30.0	8	Wind
Carbon	PA Solar Park Project	Consolidated Edison Development, Inc.	Consolidated Edison, Inc.	10.0	8	Solar
	Panther Creek	Multi-Owned	Multi-Owned	83.0	28	Coal
Centre	East Campus Plant	The Pennsylvania State University	The Pennsylvania State University	8.4	9	Gas
	University Park Solar Project	SS Pa II PSU LLC	SS Pa II PSU LLC	1.5	2	Solar
	West Campus Plant	The Pennsylvania State University	The Pennsylvania State University	5.0	82	Gas
Chester	Andromeda One A Biomass Plant	Behrens Energy Agriculture & Robotics	Behrens Energy Agriculture & Robotics	4.0	4	Biomass
	Aqua Ingrams Mill Solar	Aqua Pennsylvania, Inc.	Essential Utilities, Inc.	0.9	11	Solar
	Longwood Gardens Solar Plant	Ecogy Pennsylvania Systems, Llc	Ecogy Pennsylvania Systems, Llc	1.3	10	Solar
	Marlboro Mushrooms Solar Field	Marlborough Mushrooms	Marlborough Mushrooms	1.0	9	Solar
	Pickering Solar	Essential Utilities, Inc.	Essential Utilities, Inc.	1.4	8	Solar
	SECCRA Community Landfill	Southeastern Chester County Refuse Authority	Southeastern Chester County Refuse Authority	2.5	13	Biomass
Clarion	Piney	Multi-Owned	Multi-Owned	33.2	96	Water

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

County	Plant	Owner	Ultimate Parent	Operating Capacity (MW)	Age	Fuel Type
Clearfield	Shawville	NRG REMA , LLC	GenOn Holdings, Inc.	588.0	66	Gas
	Shawville IC	NRG REMA , LLC	GenOn Holdings, Inc.	6.0	60	Oil
Clinton	Lock Haven	Talen Energy Supply, LLC	Riverstone Holdings LLC	15.0	51	Oil
Cumberland	Carlisle Area School District	Carlisle Area School District	Carlisle Area School District	1.3	10	Solar
	Knouse Foods Solar Plant	Knouse Foods Cooperative Inc	Knouse Foods Cooperative Inc	3.0	10	Solar
	Mountain	NRG REMA , LLC	GenOn Holdings, Inc.	50.0	48	Oil
	PPG Industries Works 6 IC Facility	PPG Industries, Incorporated	PPG Industries, Incorporated	5.0	48	Oil
	Shippensburg (Cumberland County) Landfill	Talen Renewable Energy	Energy Power Partners, LLC	6.4	11	Biomass
	West Shore	Talen Energy Supply, LLC	Riverstone Holdings LLC	31.0	51	Oil
Dauphin	Harrisburg	Talen Energy Supply, LLC	Riverstone Holdings LLC	43.5	53	Oil
	Paxton Creek Cogeneration	Multi-Owned	Multi-Owned	12.0	34	Gas
	Phoenix Contact - CCHP Plant	Phoenix Contact USA, Inc.	Phoenix Contact USA, Inc.	1.0	6	Gas
	Susquehanna Resource Mgmt (Harrisburg)	Lancaster County Solid Waste Mgmt Auth.	Lancaster County Solid Waste Mgmt Auth.	16.7	34	Biomass
Delaware	Chester	Exelon Generation Company, LLC	Exelon Corporation	54.0	51	Oil
	Delaware County Resource Recovery Facility	Covanta Energy Corporation	Covanta Holding Corporation	80.0	29	Biomass
	Eddystone 3-4	Exelon Generation Company, LLC	Exelon Corporation	760.0	46	Gas
	Eddystone CT	Exelon Generation Company, LLC	Exelon Corporation	76.0	53	Oil
	Liberty Electric Power	EquiPower Resources Corp.	Vistra Energy Corp.	562.0	18	Gas
	Marcus Hook	Multi-Owned	Multi-Owned	847.0	16	Gas
Elk	Johnsonburg Mill	Domtar Paper Company, LLC	Domtar Corporation	49.0	27	Biomass
Erie	Erie Coke Corporation	Erie Coke Corporation	Erie Coke Corporation	1.3	67	Other
	Lakeview Gas Recovery	WM Renewable Energy, LLC	Waste Management, Inc.	6.0	23	Biomass
Fayette	Allegheny Energy Units 8 and 9 (Gans Plant)	Aspen Generating, LLC	LS Power Group	88.0	20	Gas
	Fayette Energy Facility	Vistra Energy Corp.	Vistra Energy Corp.	705.0	17	Gas
	Mill Run Wind Farm	GlidePath Power Solutions LLC	Quinbrook Infrastructure Partners Pty Ltd.	15.0	19	Wind
	South Chestnut Wind Project	Multi-Owned	Multi-Owned	50.4	8	Wind
Franklin	Allegheny Energy Units 12 & 13 (Chambersburg)	Aspen Generating, LLC	LS Power Group	88.0	19	Gas
	Falling Spring	Chambersburg Borough of	Chambersburg Borough of	7.1	53	Gas
	IESI Blue Ridge Landfill	Talen Renewable Energy	Energy Power Partners, LLC	6.4	7	Biomass
	Mountain View Landfill	Multi-Owned	Multi-Owned	14.4	17	Biomass
	Orchard Park	Chambersburg Borough of	Chambersburg Borough of	23.2	17	Gas
	Whitetail Solar 1	Multi-Owned	Multi-Owned	13.5	1	Solar
Huntingdon	Warrior Ridge Hydroelectric	American Hydro Power Co.	American Hydro Power Co.	2.8	35	Water
	Wm F Matson Generating Station	Allegheny Electric Cooperative, Inc.	Allegheny Electric Cooperative, Inc.	21.7	32	Water

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

County	Plant	Owner	Ultimate Parent	Operating Capacity (MW)	Age	Fuel Type
Indiana	Conemaugh	Multi-Owned	Multi-Owned	1,700.0	50	Coal
	Conemaugh IC	Multi-Owned	Multi-Owned	11.2	50	Oil
	Homer City	Multi-Owned	Multi-Owned	1,914.6	51	Coal
	Indiana University of Pennsylvania	Indiana University Of Pennsylvania	Indiana University Of Pennsylvania	24.0	32	Gas
	Seward Waste Coal	Seward Generation, LLC	Robindale Energy Services, Inc.	521.0	16	Coal
Lackawanna	Archbald Cogeneration	PEI Power Corporation	Energy Transfer LP	20.0	32	Biomass
	Archbald Power Station	PEI Power Corporation	Energy Transfer LP	59.2	19	Gas
	Keystone Landfill	Keystone Recovery Inc.	Keystone Recovery Inc.	5.6	25	Biomass
	Lackawanna Energy Center	Multi-Owned	Multi-Owned	1,479.0	2	Gas
Lancaster	Dart Container Corp Cogen	Dart Container Corporation	Dart Container Corporation	10.4	8	Biomass
	Elizabethtown Solar	Community Energy Solar LLC	Community Energy, Inc.	2.0	4	Solar
	Frey Farm Landfill	Talen Renewable Energy	Energy Power Partners, LLC	1.6	14	Biomass
	Holtwood Hydroelectric Plant	Multi-Owned	Multi-Owned	249.0	110	Water
	Honey Brook Generating Station (Granger)	Granger Energy of Honey Brook, L.L.C.	Granger Electric Co	3.2	14	Biomass
	Keystone Solar Project	Multi-Owned	Multi-Owned	5.0	8	Solar
	Lancaster County Resource Recovery	Lancaster County Solid Waste Mgmt Auth	Lancaster County Solid Waste Mgmt Auth.	32.4	29	Biomass
	Martin Limestone Solar Array Plant	Sunstream Energy Llc	Sunstream Energy Llc	1.0	8	Solar
	Mount Joy Wire	Mount Joy Wire Corporation	Mount Joy Wire Corporation	1.1	9	Gas
	Muddy Run Pumped Storage Facility	Exelon Generation Company, LLC	Exelon Corporation	1,070.0	53	Water
	PA4 Solar Farm	Alchemy Renewable Energy	Alchemy Renewable Energy	3.6	1	Solar
	Safe Harbor	Multi-Owned	Multi-Owned	417.5	89	Water
	TPE Pennsylvania Solar 1	Alchemy Renewable Energy	Alchemy Renewable Energy	3.5	1	Solar
	Turkey Point Wind Project (Frey Farm Wind)	Talen Renewable Energy	Energy Power Partners, LLC	3.2	9	Wind
	Zook Generating Station (L&S Sweetners)	Granger Electric Co	Granger Electric Co	3.2	7	Biomass
Lawrence	Hickory Run Energy Station	Multi-Owned	Multi-Owned	950.0	0	Gas
	New Castle	NRG Power Midwest LP.	GenOn Holdings, Inc.	320.0	81	Gas
	New Castle IC	NRG Power Midwest LP.	GenOn Holdings, Inc.	2.5	52	Oil
Lebanon	Fort Indiantown Gap Solar Project (FTIG)	Multi-Owned	Multi-Owned	3.0	1	Solar
	Greater Lebanon Refuse Authority Landfill	Talen Renewable Energy	Energy Power Partners, LLC	3.2	13	Biomass
	PPL Ironwood	Helix Generation, LLC	LS Power Group	775.4	19	Gas
Lehigh	Air Products Solar (Trexlertown Solar)	Air Products Energy Enterprises, L.P.	Air Products and Chemicals, Inc.	1.9	9	Solar
	Allentown	Talen Energy Supply, LLC	Riverstone Holdings LLC	62.0	53	Oil

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

County	Plant	Owner	Ultimate Parent	Operating Capacity (MW)	Age	Fuel Type
Luzerne	AE Hunlock 4	UGI Development Company	UGI Corporation	45.9	20	Gas
	Harwood	Talen Energy Supply, LLC	Riverstone Holdings LLC	30.0	53	Oil
	Hazle Township Flywheel Energy Storage	Convergent Energy and Power LP	Energy Capital Partners, LLC	20.0	7	Other
	Hazleton Cogeneration	Starwood Energy Group Global, LLC	Starwood Energy Group Global, LLC	150.9	31	Gas
	Hunlock Repowering	UGI Development Company	UGI Corporation	127.7	9	Gas
	Jenkins	Talen Energy Supply, LLC	Riverstone Holdings LLC	31.0	51	Oil
	MATS Wind	Electric City Wind Power Corporation	Electric City Wind Power Corporation	0.6	12	Wind
	Moxie Freedom Generating Plant	Multi-Owned	Multi-Owned	1,050.0	2	Gas
	Romark PA Solar	Romark Logistics Of Pa, Inc.	Romark Logistics Of Pa, Inc.	1.8	9	Solar
	Susquehanna Nuclear	Multi-Owned	Multi-Owned	2,620.0	37	Nuclear
	Wind Park Bear Creek Project	Multi-Owned	Multi-Owned	24.0	14	Wind
Lycoming	Allenwood (PPLRE Lycoming County Landfill)	Talen Renewable Energy	Energy Power Partners, LLC	3.2	8	Biomass
	Laurel Hill	Multi-Owned	Multi-Owned	69.0	8	Wind
	Lycoming County Landfill (PPL Renewable)	Talen Renewable Energy	Energy Power Partners, LLC	3.0	8	Biomass
	Patriot Power Generation Plant (Moxie Patriot)	Multi-Owned	Multi-Owned	850.0	4	Gas
	Williamsport	Talen Energy Supply, LLC	Riverstone Holdings LLC	28.8	53	Oil
Mercer	General Electric Company	General Electric Company	General Electric Company	4.3	36	Oil
Monroe	Pocono Raceway Solar Project	Pocono International Raceway Inc.	Pocono International Raceway Inc.	3.0	10	Solar
	Shawnee CT	NRG REMA , LLC	GenOn Holdings, Inc.	24.0	48	Oil
Montgomery	500 Virginia Solar	500 Virginia Solar, Lp	500 Virginia Solar, Lp	1.0	9	Solar
	Conshohocken -Solar	Sun Power Electric	Conservation Services Group, Inc.	0.1	21	Solar
	Covanta Plymouth (Montenay Montgomery)	Covanta Plymouth Renewable Energy L.P.	Covanta Holding Corporation	28.0	29	Biomass
	Hill at Whitemarsh	Talen Renewable Energy	Energy Power Partners, LLC	1.6	13	Gas
	IKEA Conshohocken Rooftop PV System	IKEA Energy US LLC	Stichting INGKA Foundation	1.0	8	Solar
	Limerick	Exelon Generation Company, LLC	Exelon Corporation	2,386.0	34	Nuclear
	Merck-Upper Gwynedd Solar Array	Merck & Co., Inc.	Merck & Co., Inc.	1.5	9	Solar
	Moser	Exelon Generation Company, LLC	Exelon Corporation	60.0	50	Oil
	Spring House IC Plant	Janssen Pharmaceuticals, Inc.	Johnson & Johnson	3.8	7	Gas
	West Point Facility	Merck & Co., Inc.	Merck & Co., Inc.	66.0	31	Gas
	West Point Facility IC	Merck & Co., Inc.	Merck & Co., Inc.	11.6	48	Gas
Montour	Montour	Talen Generation LLC	Talen Energy Corporation	1,534.5	48	Coal

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

County	Plant	Owner	Ultimate Parent	Operating Capacity (MW)	Age	Fuel Type
Northampton	Bethlehem CC	Multi-Owned	Multi-Owned	1,134.0	17	Gas
	Crayola Solar Park	Multi-Owned	Multi-Owned	2.8	10	Solar
	Glendon Plant	Talen Renewable Energy	Energy Power Partners, LLC	3.2	9	Biomass
	Green Knight Energy Center	Waste Management, Inc.	Waste Management, Inc.	8.7	19	Biomass
	Lower Mount Bethel	Talen Energy Corporation	Riverstone Holdings LLC	616.7	16	Gas
	Martins Creek 3 and 4	Talen Generation LLC	Talen Energy Corporation	1,723.9	45	Gas
	Martins Creek CT	Talen Generation LLC	Talen Energy Corporation	78.8	49	Gas
	Northampton	Multi-Owned	Multi-Owned	112.0	25	Coal
	Portland CT	NRG REMA , LLC	GenOn Holdings, Inc.	191.0	53	Oil
Northumberland	Mount Carmel Cogeneration	Mt Carmel Co-Gen, Inc.	Ken M. Pollock & Connie J. Pollock Rado	43.0	30	Coal
Philadelphia	Delaware CT	Exelon Generation Company, LLC	Exelon Corporation	74.0	51	Oil
	Grays Ferry Cogeneration	Grays Ferry Cogeneration Partnership	Veolia Environnement S.A.	183.6	23	Gas
	Lincoln Financial Field Solar Plant	Clearway Renew LLC	Global Infrastructure Mgmt Part. LLC	2.9	7	Solar
	Navy Yard Natural Gas Plant	PIDC Local Development Corporation	PIDC Local Development Corporation	8.0	2	Gas
	Newman & Company Inc.	Newman & Co Inc	Newman & Co Inc	1.8	56	Gas
	Philadelphia Refinery	Multi-Owned	Multi-Owned	15.1	68	Other
	PWD Northeast WPCP Biogas Cogen	Philadelphia Water Department	Philadelphia Water Department	5.6	7	Biomass
	Richmond CT	Exelon Generation Company, LLC	Exelon Corporation	132.0	47	Oil
	Schuylkill CT	Exelon Generation Company, LLC	Exelon Corporation	38.0	51	Oil
	Southwark	Exelon Generation Company, LLC	Exelon Corporation	72.0	53	Oil
	Temple SEGF Cogen Plant	Temple University	Temple University	16.0	27	Gas
Pike	Wallenpaupack	Multi-Owned	Multi-Owned	44.0	94	Water
Potter	Big Level Wind Project (Cunningham)	TransAlta Renewables Inc.	TransAlta Renewables Inc.	90.0	1	Wind
Schuylkill	Broad Mountain Landfill Facility	UGI Development Company	UGI Corporation	9.8	11	Biomass
	Fishbach	Talen Energy Supply, LLC	Riverstone Holdings LLC	36.0	51	Oil
	John B Rich Memorial Power Station	Multi-Owned	Multi-Owned	80.0	32	Coal
	Locust Ridge II	Multi-Owned	Multi-Owned	102.0	11	Wind
	Locust Ridge Wind Farm	Multi-Owned	Multi-Owned	26.0	13	Wind
	Masser Farms Realty Solar	Masser Farms Realty, Ltd.	Masser Farms Realty, Ltd.	1.0	9	Solar
	Pine Grove Landfill	Multi-Owned	Multi-Owned	5.4	12	Biomass
	St. Nicholas Cogeneration	Schuylkill Energy Resources Inc	Schuylkill Energy Resources Inc	86.0	30	Coal
	Westwood Generating Station	Multi-Owned	Multi-Owned	30.0	33	Coal
Snyder	Panda Hummel Station (Sunbury Repower CC)	Multi-Owned	Multi-Owned	1,140.0	2	Gas
	Sunbury CT	Corona Power, LLC	Corona Power, LLC	36.0	49	Oil
	Sunbury IC	Corona Power, LLC	Corona Power, LLC	5.0	53	Oil
	Susquehanna University Solar Project	Multi-Owned	Multi-Owned	3.0	2	Solar

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

County	Plant	Owner	Ultimate Parent	Operating Capacity (MW)	Age	Fuel Type
Somerset	Casselman Wind	Multi-Owned	Multi-Owned	34.5	13	Wind
	Forward WindPower LLC	Multi-Owned	Multi-Owned	29.4	12	Wind
	Glades Pike Cogeneration Plant (CT)	State Correctional Inst (Laurel Highlands)	State Correctional Inst (Laurel Highlands)	2.5	9	Biomass
	Glades Pike Cogeneration Plant IC	State Correctional Inst (Laurel Highlands)	State Correctional Inst (Laurel Highlands)	2.8	9	Biomass
	Green Mountain Battery Storage System	NextEra Energy Resources LLC	NextEra Energy, Inc.	10.4	4	Other
	Lookout WindPower LLC	Multi-Owned	Multi-Owned	37.8	12	Wind
	Meyersdale Wind Project	GlidePath Power Solutions LLC	Quinbrook Infrastructure Partners Pty Ltd.	30.0	17	Wind
	Meyersdale Windpower Battery Storage	NextEra Energy, Inc.	NextEra Energy, Inc.	18.0	5	Other
	Ringer Hill Wind Farm	Multi-Owned	Multi-Owned	38.3	4	Wind
	Somerset Wind Project	GlidePath Power Solutions LLC	Quinbrook Infrastructure Partners Pty Ltd.	9.0	19	Wind
	Stony Creek Wind Farm	Multi-Owned	Multi-Owned	52.5	11	Wind
	Twin Ridges Wind Farm	BlackRock, Inc.	BlackRock, Inc.	139.4	8	Wind
	Yough Hydro Power	D/R Hydro Company	D/R Hydro Company	12.2	31	Water
Susquehanna	Roundtop	IMG Midstream LLC	COFRA Holding AG	21.0	5	Gas
Tioga	Armenia Mountain Wind	ALLETE Clean Energy, Inc.	ALLETE, Inc.	100.5	11	Wind
	Blossburg	NRG REMA , LLC	GenOn Holdings, Inc.	24.0	49	Gas
Union	Bucknell University	Bucknell University	Bucknell University	6.7	29	Gas
Venango	Handsome Lake Energy	Constellation Power, Inc.	Exelon Corporation	267.5	19	Gas
	Scrubgrass	Multi-Owned	Multi-Owned	87.3	27	Coal
Warren	Kinzua Pumped Storage Project (Seneca)	Harbor Hydro Holdings, LLC	LS Power Group	513.0	50	Water
	Warren CT	NRG REMA , LLC	GenOn Holdings, Inc.	57.0	48	Gas
Washington	Arden Landfill	WM Renewable Energy, LLC	Waste Management, Inc.	4.8	11	Biomass
Wayne	Waymart Wind Farm	GlidePath Power Solutions LLC	Quinbrook Infrastructure Partners Pty Ltd.	64.5	17	Wind
Westmoreland	Conemaugh Hydroelectric	Multi-Owned	Multi-Owned	15.0	31	Water
	Tenaska Westmoreland Generating Station	Multi-Owned	Multi-Owned	1,055.2	2	Gas
Wyoming	Mehoopany	The Procter & Gamble Company	The Procter & Gamble Company	1.6	36	Gas
	Mehoopany CT	The Procter & Gamble Company	The Procter & Gamble Company	123.0	35	Gas
	Mehoopany Wind	Multi-Owned	Multi-Owned	140.8	8	Wind
	Oxbow Creek Energy	IMG Midstream LLC	COFRA Holding AG	22.0	1	Gas
York	Brunner Island	Talen Generation LLC	Talen Energy Corporation	1,470.2	59	Gas
	P.H. Glatfelter Company - Pennsylvania	P H Glatfelter Co	P H Glatfelter Co	85.3	72	Gas
	Peach Bottom	Multi-Owned	Multi-Owned	2,626.9	46	Nuclear
	Tolna	NRG REMA , LLC	GenOn Holdings, Inc.	50.0	48	Oil
	Turnkey Project - GlaxoSmith	GlaxoSmithKline	GlaxoSmithKline	1.6	10	Solar
	York 2 Energy Center	Multi-Owned	Multi-Owned	874	1	Gas
	York Cogeneration	Sapphire Power Generation Holdings LLC	Riverstone Holdings LLC	46.92	31	Gas
	York County Resource Recovery Center	York County Solid W & R Authority	York County Solid W & R Authority	29.5	31	Biomass
	York Energy Center (Delta Power Project)	Multi-Owned	Multi-Owned	545	9	Gas
	York Haven	Ontario Power Generation Inc.	Ontario Power Generation Inc.	19	115	Water

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