Electric Power Outlook for Pennsylvania 2016-2021

August 2017

PENNSYLVANIA PUC PUBLIC UTILITY COMMISSION

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ELECTRIC POWER OUTLOOK FOR PENNSYLVANIA 2016–2021

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Technical Utility Services

Paul T. Diskin, Director

Prepared by:

David M. Washko - Reliability Engineer

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 2026, 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 2016, the reserve margin requirement was 16.4 percent with an actual available reserve of 28.8 percent. In 2017, the reserve margin requirement is 16.6 percent with an actual available reserve of 29.1 percent. NERC also projects that PJM will meet its reserve margin requirements through 2026.

Pennsylvania's aggregate electrical energy usage (residential, commercial, industrial, sales for resale, and other) in 2016 was 145,022 gigawatt hours (GWh) versus 146,229 GWh for 2015, which is a 0.83 percent decrease in electrical usage. Over the next five years, total Pennsylvania electric energy usage is projected to decrease at an average annual rate of 0.18 percent. This includes a decrease of 0.55 percent average annual residential usage, a decrease of 0.34 percent average annual commercial usage, and an increase of 0.37 percent average annual industrial usage.

[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.

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Section 1 – Regional Electric Outlook

Purpose

The *Electric Power Outlook for Pennsylvania 2016-2021* 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.[5]

The information contained in this report includes highlights of the past year, as well as EDCs' projections of energy demand and peak load for 2017-2021. The state's seven largest EDCs[6] represent over 95 percent of jurisdictional electricity usage in Pennsylvania. Accordingly, information regarding the 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 5 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.

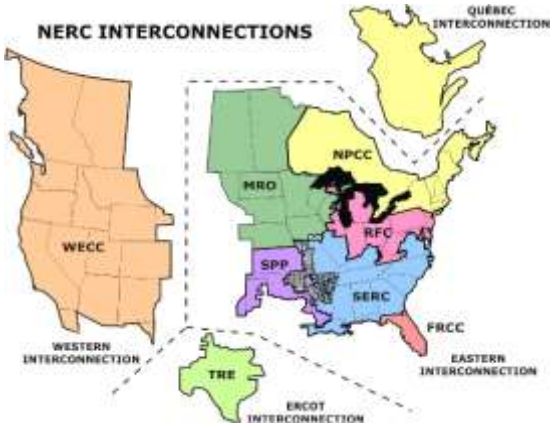
The Commission relies on reports and analyses of regional entities, including the ReliabilityFirst Corporation (RFC) and PJM, to obtain a more complete assessment of the current and future status of the electric power supply within the region. Also, data for the report is submitted annually by EDCs, pursuant to the Commission's regulations.[7] 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).

[5] This report is available at http://www.puc.pa.gov/utility_industry/electricity/electric_reports.aspx.
[6] Those EDCs with at least 100,000 customers.
[7] *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 councils 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.

NERC's members operate in eight 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).

NERC establishes criteria, standards and requirements for its members and all control areas. All control 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 *2016 Long-Term Reliability Assessment*[8] 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 2016 assessment, NERC highlighted several issues that are emerging and have the potential to increase risks to reliability:

- ***Resource Adequacy:*** Factors that are included when NERC performs a resource adequacy assessment include a reserve margin analysis and the study of emerging reliability issues that can impact generation and demand projections. NERC concluded that PJM shall achieve and exceed their 5-year and ten-year Anticipated Reserve Margins. PJM's Reference Reserve margin is set at 16.6 percent for the next 10 years. PJM's Anticipated Reserve Margins for the next five years are 31.1 percent, 33.5 percent, 33.8 percent, 28.5 percent, and 28.1 percent, respectively.

- ***Single-Fuel Dependency:*** NERC has identified that reliance on a single fuel increases vulnerabilities, particularly during extreme weather conditions. Over the past decade, several areas have significantly increased their dependence on natural gas. This trend has continued amidst historically low natural gas prices and regulatory rulings that continue to promote increased natural gas generation. NERC did not identify any single fuel dependencies in the PJM region since it appears the current mix is more balanced than other regional reliability entities that are more dependent on a single-fuel type.

- ***Nuclear Uncertainty:*** Low natural gas prices continue to affect the competitiveness of nuclear generation and are a key contributing factor to nuclear generation's difficulty in remaining economic with competing fuel sources. While new nuclear facilities are being built in Georgia, Tennessee, and South Carolina, potential retirements have been announced for nuclear facilities in Illinois, California, Nebraska, Massachusetts, New York, and Pennsylvania. This creates longer-term uncertainty for system operators and planners. While replacement capacity may be advanced to mitigate resource adequacy concerns, unconfirmed nuclear retirements create uncertainty around local transmission adequacy and the ability to plan for future resource and demand needs due to their large baseload contribution.

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[8] *See* NERC, *2016 Long-Term Reliability Assessment*, Dec. 2016, available at http://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/2016%20Long-Term%20Reliability%20Assessment.pdf.

- ***Essential Reliability Services:*** The addition of large amounts of variable energy resources (VERs), such as wind and solar, onto the BPS has resulted in the need for operational flexibility to accommodate demand, while also effectively managing the resource portfolio. As VERs are becoming more significant, NERC is developing sufficiency guidelines in order to establish requisite levels of Essential Reliability Services (ERS). ERS are comprised of primary frequency response (PFR), voltage support, and ramping capability. These factors are needed for the continued reliable operation of the BPS. Significant ramping capabilities are needed to address the challenges presented from VER operational impacts. Ramping issues requiring increased operational flexibility have been most notable in California, where they occurred four years earlier than originally projected.

- ***Distributed Energy Resources:*** Increasing installations of distributed energy resources (DER) modify how distribution and transmission systems interact with each other. Many utilities currently lack sufficient visibility and operational control of these resources, which increases the risk to BPS reliability. This visibility is a crucial aspect of power system planning, forecasting, and modeling that requires adequate data and information exchanges across the transmission and distribution interface. The PJM Capacity Performance initiative – a PJM program to incentivize better generator performance – has recently had a negative effect on load-side Demand Response (DR) resources. This is because PJM will no longer allow seasonal DR resources to participate in the wholesale markets unless they can provide resources for the entire year. This has reduced by more than half the megawatts (MW) that DR programs contribute to PJM because seasonal DR resources, such as reducing air conditioning load, are not necessary in the winter season. A PJM committee is investigating a seasonal aspect to capacity that may influence the amount of DR accepted by PJM in the future.

NERC has developed the following recommendations through its stakeholder process to alleviate the potential impacts of future reliability issues:

- NERC recommends that regulators and legislators evaluate the changes occurring on the BPS irrespective of the final rulings on pending regulation, such as the Clean Power Plan (CPP). While there is uncertainty around the ultimate validity and timing of the CPP, NERC has determined that many of the changes are occurring regardless of the final ruling. As the resource mix continues to change, the need for more investments in transmission and natural gas infrastructure is currently projected. The lengthy schedule involved in acquiring, siting, and permitting adequate properties for this infrastructure should also be considered when assessing reliability impacts.

- As natural-gas-fired generation resources continue to increase, NERC recommends that system planners and operators evaluate the potential effects of an increased reliance on natural gas on BPS reliability. Natural gas provides "just-in time" fuel. NERC notes that firm transportation and maintaining dual-fuel capability can significantly reduce the risk of common-mode failure and wider-spread reliability challenges. As part of future transmission and resource planning studies, NERC notes that planning entities will need

to more fully understand how impacts to the natural gas transportation system can affect electric reliability.

- NERC recommends regulators and legislators consider the uncertainties in resource retirements and resource mix changes projected by resource planners as well as the interconnection-wide impacts, including generation retirements, curtailments, and transmission constraints that can manifest if ERS are not maintained. The implementation of a regulatory framework to provide an adequate level of ERS could help to address these uncertainties. Planning Coordinators and Transmission Planners should consider supplementing planning processes with additional measures that support maintaining sufficient ERS. In 2017, NERC will draft sufficiency guidelines for ERS to support planning evaluations and assessments of how the resource mix can impact BPS reliability. NERC recommends incorporating sufficiency measures within planning processes.

ReliabilityFirst Corporation

ReliabilityFirst Corporation (RFC), headquartered in Fairlawn, Ohio, is one of 8 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)[9], RTOs, suppliers and transmission companies.

The RFC controls reliability standards and enforcement by entering into delegation agreements with regional entities to ensure adequate generating capacity and transmission. Some performance factors considered in establishing acceptable reliability levels include: load characteristics; load forecast error; scheduled maintenance requirements; and forced outage rates of generating units. The RFC reliability standards require sufficient generating capacity to be installed to ensure the probability of the system load exceeding available capacity is no greater than one day in 10 years. LSEs that are members of RFC have a capacity obligation determined by evaluating individual system load characteristics, unit size and operating characteristics.

[9] 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).

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 243,417 square miles. PJM coordinates the operation of 185,800 megawatts (MW) of generating capacity with 165,492 MW peak demand and more than 82,546 miles of transmission lines.[10] The PJM RTO coordinates the movement of electricity for over 65 million people through all or parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia and the District of Columbia. PJM manages a sophisticated regional planning process for generation and transmission expansion to ensure the continued reliability of the electric system. PJM is responsible for maintaining the integrity of the regional power grid and for managing changes and additions to the grid to accommodate deactivating and new generating plants, substations, and transmission lines. In addition, PJM analyzes and forecasts future electricity needs of the region. Its planning process ensures that the electric system growth is efficient and takes place in an orderly fashion. PJM supports market innovation through its active support for demand response markets for energy, capacity and ancillary services, and helps ensure that appropriate infrastructure and operational capabilities are in place to support newly installed renewable energy facilities. PJM's mission can be described as below:[11]

- Acting 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."

[10] *See* PJM, *Summer 2017 PJM Reliability Assessment*, available at http://www.puc.pa.gov/Electric/pdf/Reliability/Summer_Reliability_2017-PJM.pdf.
[11] http://www.pjm.com/about-pjm/who-we-are.aspx.

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 2016, the PJM market amount billed decreased to $39 billion as compared to $42.6 billion in 2015, and $50 billion in 2014. Membership increased 3 percent from 960 members in 2015 to 990 members in 2016.[12] PJM's 2016 transmission volumes were 792.3 terawatt hours (TWhs), as compared to 793 TWhs for 2015.

PJM's annual net energy load for growth is expected to average 0.2 percent over the next 10 years and 0.3 percent over the next 15 years.[13] PJM received deactivation notifications throughout 2016, totaling 5,605 MW versus 1,626 MW in 2015, 4,291 MW in 2014, 7,745 MW in 2013, and 14,444 MW in 2012. To replace retiring generators, there are over 23,900 MW of new generating resources under construction as of December 31, 2016, with an additional 71,600 MW actively under study.[14]

A majority of the deactivations since 2012 were attributed to the retirement of older (50-60-year-old) coal fired power plants. The five primary factors coal fired power plants are being deactivated by generating company owners are: low natural gas prices along with new gas generation coming on-line; lack of electric demand growth; EPA pollution regulations; state mandates for renewable energy; and some generation owners transitioning their fleets to become more clean and lean to improve the planet.

PJM Bulk Power System Status – Winter Performance[15]

Temperatures and Peaks

PJM experienced a mild 2015-2016 winter season as compared to the previous two winters in terms of temperatures and peak load. The previous 2 winter seasons had extremely cold temperatures for long periods. December 2015 temperatures were above average making the month the warmest on record for the entire eastern U.S. January 2016 was much closer to normal temperatures, on average, but had both warmer and colder than normal weather periods. With the strong El Niño, the preseason forecast was for a warmer-than-average season, with some periods of colder weather, but not as severe as February 2015.

Generator Performance

There were 9,992 MW of forced outages during the winter peak on January 19, 2016, and approximately 3,163 MW, or 25 percent, resulted from natural gas interruptions. By comparison, during the winter peak on February 20, 2015, there were 7,420 MW of forced outages resulting from natural gas interruptions.

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[12] *See* PJM, *PJM 2016 Annual Report*, available at http://www.pjm.com/~/media/about-pjm/newsroom/annual-reports/2016-annual-report.ashx.

[13] *See* PJM, *PJM Load Forecast Report January 2017*, available at http://pjm.com/~/media/library/reports-notices/load-forecast/2017-load-forecast-report.ashx.

[14] *See* PJM, *PJM 2016 Regional Transmission Expansion Plan Report*, Book 2, available at http://www.pjm.com/~/media/library/reports-notices/2016-rtep/2016-rtep-book-2.ashx.

[15] *See* PJM, *2016 Winter Report*, available at http://www.pjm.com/~/media/committees-groups/committees/oc/20160607/20160607-item-15-2015-16-winter-report.ashx.

Forced outage rates for January and February 2016 averaged 4.0 percent. Average forced outage rates for the same time period in both 2015 and 2014, were 6.5 percent and 10.05 percent, respectively. During the winter peak in 2016, the forced outage rate was 5.1 percent, lower than historical norm of about 7 percent. Performance improvements initiated after winter 2013-14 continued with testing efforts for dual-fuel and infrequently run units. Before winter 2015-16, 137 units totaling 10,141 MW performed the cold weather generation exercise and achieved a participation rate of 94 percent as compared to 91 percent in 2014-2015. The total make-whole cost for winter reliability testing was $3.4 million.

Operations

The average load-forecasting error for the January 19, 2016, peak was 1.64 percent, slightly better than the daily average of 1.77 percent. PJM met the January 19, 2016, peak without the need for emergency demand response, shortage pricing, emergency energy purchases or emergency procedures beyond a cold weather alert. PJM also maintained its reserve requirements throughout.

Gas/Electric Coordination

PJM continued to build on the gas-electric coordination efforts established after the 2014 Polar Vortex. The Gas Electric Coordination Team continued to hone and improve generator risk assessment tools and reports to assist with dispatching efforts. The team also ramped up communication protocol and informational sharing with interstate pipelines as well as critical Local Distribution Companies ((companies that directly serve retail customers and are regulated by the PUC) across the PJM footprint. PJM noted that winter 2015-16 presented much less of a challenge from a gas-supply perspective than the prior 2 winters due to the warmer-than normal conditions and, consequently, a greater level of pipeline capacity availability.

Transmission Outage Scheduling

PJM prepared for winter 2015-16 peak operations by analyzing winter transmission outage requests to understand impacts to reliability and congestion. The PJM Peak Period Outage Scheduling Guidelines caution transmission owners to avoid scheduling transmission outages that may result in increased risk to system reliability during the winter peak periods.

PJM noted it analyzed each outage request in detail, and under winter peak system conditions, to ensure system reliability would be maintained. The detailed analysis included an assessment of congestion impacts. If PJM identified a significant congestion impact, it would suggest the outage to be rescheduled.

PJM Pennsylvania Regional Transmission Expansion Plan Overview

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

All new generation that anticipates interconnecting and operating in parallel with the PJM transmission grid and participating in the PJM capacity and/or energy markets must submit an interconnection request to PJM for technical evaluation and approval.

Proposed new generating plants and increased capacity of existing plants in Pennsylvania total 15,670 MW as of December 2016, as compared to 23,772 MW at the end of 2015. These facilities are under active study by PJM. Natural gas projects make up more than 15,140 MW of this queued capacity as compared to 21,906 MW last year. This additional capacity may be used to serve Pennsylvania or out-of-state customers.[16] Appendix B lists the current PJM interconnection requests for new generating resources in Pennsylvania. The existing generating capacity in Pennsylvania totals 45,700 MW in 2016, as compared to 42,628 MW in 2015.[17] Appendix C lists existing generation facilities in Pennsylvania.

Table 1, below provides a summary of approved PJM Regional Transmission Expansion Plan (RTEP) projects, by status, as of December 31, 2016. The numbers provide a snapshot at one point in time, as with an end-of-year balance sheet. The $29.3 billion total reflects a net $1.0 billion increase over December 31, 2015, as reflected in the year-over-year differentials detailed in Table 2, below. During 2016, the PJM Board approved 50 new baseline projects totaling $712 million and 284 new network transmission projects totaling $985 million. These cost estimates were offset by existing project cost changes and by the removal of previously approved RTEP projects, which included 29 baseline projects totaling $170 million, and 106 network projects totaling $911 million caused by the withdrawal of 210 interconnection requests totaling 23,482 MW.[18]

[16] *PJM Pennsylvania State Report 2017*, provided to PUC Staff in July, 2017.
[17] Data reported to SNL and received by PUC staff.
[18] See PJM, *PJM 2016 Regional Transmission Expansion Plan Report*, Book 2, available at http://www.pjm.com/~/media/library/reports-notices/2016-rtep/2016-rtep-book-2.ashx.

Table 1 Approved RTEP Projects as of Dec 31, 2016

$ Millions	Active	In Service	Under Construction	Total
Baseline Projects	6,129.6	16,113.3	2,255.2	24,498.1
Network Projects	3,693.4	1,103.6	26.7	4,823.7
Total	9,823	17,216.9	2,281.9	29,321.8

Table 2 RTEP Project Cost Differentials – Dec 31, 2016 as compared to Dec 31, 2015

	Baseline Project Differentials ($M)	Network Project Differentials ($M)
Cost of New Projects	711.68	985.29
Cost of Cancelled Projects	(169.67)	(911.93)
Cost Increase to Existing Projects	490.44	18.05
Cost Decrease to Existing Projects	(42.88)	(37.44)
Net Difference	989.58	53.97

Transmission Project Highlights [19]

During 2016, PJM continued to evaluate two groups of projects solicited through the 2014/2015 RTEP Long-Term RTEP Proposal Window. The first group included projects submitted to address certain congestion. The second group included projects that addressed certain increased capacity costs. Based on its evaluation, PJM recommended 3 market efficiency projects in addition to the 11 approved in 2015. The 3 projects identified in 2016, address energy market and capacity market congestion and have an estimated cost of $340.67 million. The projects are expected to mitigate at least $922 million in energy market congestion over the next 15 years, and provide Reliability Pricing Model (RPM) capacity load payment savings totaling $118 million. The 3 projects are described below:

- ***New Capacitors in Southern PJM (Virginia):*** PJM has several proposed installations that provide area reactive support with capacitor installations in Southern PJM. PJM noted that analysis revealed combining these installations with elements from other projects could create a hybrid with a high benefit-to-cost ratio. Capacitors help support voltage under heavy cross-system power transfers. New shunt capacitor installations will be installed at the existing Brambleton, Ashburn, Shelhorn, and Liberty substations. These system additions have been designated to Dominion, the incumbent transmission

[19] *Id.*

owner. The PJM Board approved the project in February 2016. PJM notes that the project is expected to cost $8.98 million and be in service by June 1, 2019. PJM estimates that the capacitors will mitigate market congestion totaling approximately $300 million over a 15-year period.

- ***AP-South Congestion Relief – Project 9A (South Central Pennsylvania and Maryland):*** PJM's recommended AP-South congestion relief solution included both a reactive component – the new capacitors discussed, above – as well as a nonreactive component. Following the February 2016 PJM Board meeting, PJM continued to assess the non-reactive transmission solution components from among the 41 original proposals. PJM determined that Project 9A provided the greatest congestion benefits and highest benefit-to-cost ratio. Project 9A includes a western component – the Rice-Ringgold 230 kilovolt (kV) line – and an eastern component – the Furnace Run-Conastone-Northwest 230 kV line. PJM noted that these components provide additional paths from the area 500 kV system to load on transmission at lower voltage levels and that the combination of both components provides the greatest benefits. The project was approved by the PJM Board in August 2016, with an estimated cost of $320.19 million and a required in-service date by June 1, 2020. Expected 15-year congestion and load payment savings are $622 million and $269 million, respectively.

- ***Loretto-Wilton Center Congestion (Illinois):*** PJM reviewed 9 proposals originally submitted to address congestion on the ComEd Loretto-Wilton Center 345 kV line. PJM recommended Project 10D to eliminate sag limitations on the line and to replace conductor at Wilton Center substation. The PJM Board approved the project in February 2016, at an estimated $11.5 million cost, with a required June 1, 2019, in-service date. The project will provide an estimate annual $118 million in capacity payment benefits when the ComEd locational deliverability area is limiting. PJM noted that given that this project comprises upgrades to existing equipment, it was designated to the incumbent transmission owner, ComEd.

Status of PJM Backbone Transmission Lines

The specific status of approved active projects for backbone transmission lines (Transmission lines that are 345kV or higher) is summarized below.[20]

- ***Cloverdale-Lexington 500 kV Line (Virginia):*** In October 2013, the PJM Board approved PJM's recommendation to re-conductor the AEP portion of the Cloverdale-Lexington 500 kV line, including replacement of eleven tower structures. This follows the December 2011, PJM Board approval to re-conductor the Dominion portion of the Cloverdale-Lexington 500 kV circuit to resolve NERC criteria Category C N-1-1 violations. AEP and Dominion have coordinated plans underway to rebuild their respective portions of the 44-mile line to increase its operational limit. The Virginia State Corporate Commission

[20] *See* PJM, *PJM 2016 RTEP*, Book 1, available at http://www.pjm.com/library/reports-notices/rtep-documents/2016-rtep.aspx.

(VSCC) released its final order approving Dominion's 7.4-mile portion of the line on September 7, 2012. Dominion began construction in late spring of 2013 with completion in December 2013. AEP filed its application to re-conductor their 37.1-mile portion of the line in late 2013. AEP completed line re-conductoring in June, 2016.

- ***Dooms-Lexington 500 kV Line (Virginia):*** Dominion filed an application with the VSCC on November 19, 2012. On May 16, 2013, the VSCC granted a Certificate of Public Convenience and Necessity (CPCN) authorizing the rebuild project. The line rebuild was completed in January, 2016.

- ***Carson-Rodgers 500 kV Line and Chesterfield-Messer Road 230 kV Line (Virginia):*** PJM conducted a window in 2016 to address 2 generator deliverability analysis reliability criteria violations identified in 2015. These are associated with the Chesterfield-Messer Road 230 kV line and the Carson-Rodgers Road 500 kV line. PJM RTEP Proposal Window No. 1 in 2016 yielded 25 proposals from seven entities to solve the identified reliability criteria violations. Once the Window closed, PJM staff conducted analytical, constructability and company evaluations to identify a solution that most effectively solved all reliability criteria violations and did not introduce new ones. Those evaluations revealed that rebuilding the Carson-Rodgers Road 500 kV Line and the Chesterfield-Messer Road 230 kV Line was the most effective solution at a combined estimated cost of $70 million, with a June 1, 2020 expected in-service date. The PJM Board approved the solution in August 2016.

- ***Surry-Skiffes Creek 500 kV Line (Virginia):*** The PJM Board approved plans to build a new 7.7-mile Surry to Skiffes Creek 500 kV line and a 20.25-mile Skiffes Creek to Whealton 230 kV line in April 2012. June 1, 2015, was identified as the required in-service date for the 500 kV portion of the project and June 1, 2016, was identified as the required in-service date for the 230 kV portion of the project. The VSCC approved Dominion's request to build the project on Nov. 26, 2013. Construction activities have been delayed due to transmission permitting issues. The expected in-service date has been revised to December, 2017, based on these permitting issues. PJM will work with Dominion to ensure that necessary operational guidelines are in place until the line is in service.

- ***Loudoun-Brambleton Area (Maryland):*** PJM's RTEP includes two 500 kV projects in this area. First, a project that encompasses a rebuild of the Mosby-Brambleton-Pleasant View-Goose Creek portion of the Loudoun-Doubs 500 kV line was approved by the PJM Board in October 2011. The rebuild was completed by Dominion in May, 2016. PJM's RTEP also includes a new, second 500 kV line from Loudoun to Brambleton, as approved by the PJM Board in December 2013. This new line is expected to be in service by June 1, 2018.

- ***Northern New Jersey 345 kV Upgrades (New Jersey):*** The Bergen to Linden Corridor project was approved by the PJM Board in December 2013, with a required in-service date of June 2015. The project is comprised of a series of transmission facility line upgrades from 138 kV to 345 kV in northern New Jersey. Phase 1 of the project will focus on work

to be performed within the Hudson-Bergen/Marion-Bergen 230 kV and 138 kV overhead transmission corridor, and at the Bergen, North Bergen, Homestead, Penhorn and Marion stations. Construction of Phase 1 began during the third quarter of 2015, with an in-service date of April 2016. Phase 2 will focus upon work to be performed within the PSE&G Linden-Bayway 138 kV overhead transmission corridor, and the Linden and Bayway stations. Phase 3 will focus on work to be performed on facilities interconnected by underground cable, looping together the Marion stations. The underground system will serve to loop together the facilities upgraded in Phase 1 and Phase 2 of the project. The remainder of facilities under construction are expected to be completed in 2018.

- ***Byron-Wayne 345 kV Line (Illinois):*** The Byron-Wayne 345 kV line (Grand Prairie Gateway) was approved by the PJM Board in October 2012, with a requested June 1, 2017 in-service date. Construction began in the second quarter of 2015 and is expected to be completed in 2017.

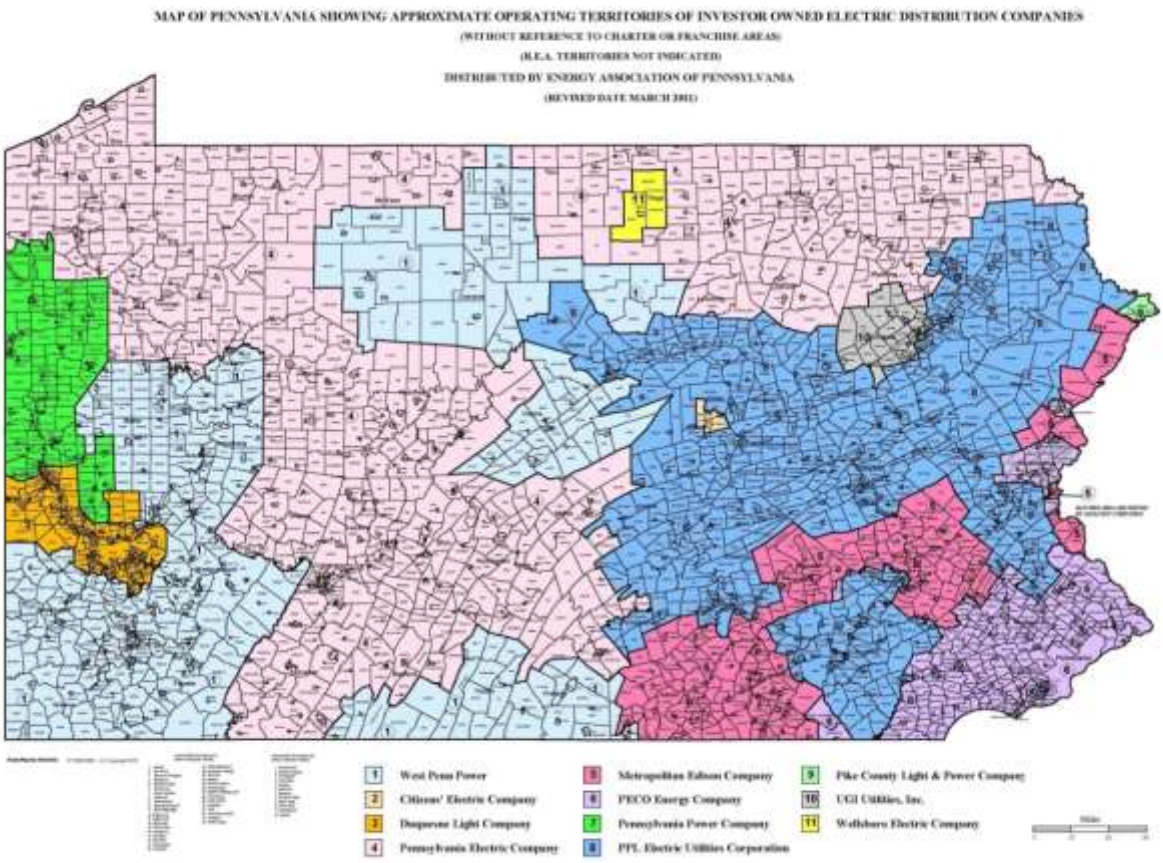
Section 2 – Pennsylvania Electric Outlook

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 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)[21] must acquire electricity, pursuant to a Commission approved competitive procurement process, for customers who:

1. Contract with a DSP. Contracting with a DSP allows customers to choose an electric provider in the competitive retail market. The Commission provides a website that provides a one source comparison of DSP electric offers and allows electric customer to directly link into a DSP website to switch electric services. [22]

   or,

[21] 66 Pa. C.S. § 2803
[22] http://www.papowerswitch.com.

2. Stay with the local EDC. 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.[23]

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).[24] 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 percent by 2021. In 2008, the Commission adopted regulations pertaining to the AEPS obligations of EDCs and EGSs.[25] AEPS resources must be located within 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)[26] and coal mine methane. Tier II resources include waste coal, demand side management, distributed generation, large-scale hydropower, by-products of wood pulping and wood manufacturing, municipal solid waste, and integrated combined coal gasification technology.

Act 213 requires that by 2021, 8 percent 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 percent. Act 213 sets forth a 15-year schedule for complying with its mandates, as shown in Table 3, below. Since January 1, 2011, all EDCs and EGSs have been required to comply.

[23] *See id.* § 2807(e)(3).
[24] Alternative Energy Portfolio Standards Act, effective Feb. 28, 2005; 73 P.S. §§ 1648.1—1648.8.
[25] *See* Docket No. L-00060180; 52 Pa. Code §§ 75.61-75.70.
[26] *See* 66 Pa.C.S. § 2814(b).

Table 3 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.[27]

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.

InClime has served as the Pennsylvania AEC program administrator since January 1, 2016, and is under contract through December 31, 2018, with two options for one year extensions. The 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.

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

Under Act 213, the Commission adopted regulations promoting onsite generation by customer-generators using renewable resources and eliminated previously existing barriers to net metering.[28] The regulations also provide for required metering capabilities and a compensation mechanism that reimburses customer-generators for surplus energy supplied to the electric grid.[29] 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.[30]

The Commission also adopted regulations that govern interconnection for customer-generators. The regulations strive to eliminate barriers which may have previously existed regarding interconnection, while ensuring that interconnection by customer-generators will not pose unnecessary risks to the Commonwealth's electric distribution systems.[31]

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.[32]

As of May 31, 2017, Pennsylvania had certified 19,021[33] alternate energy facilities, of which 13,524 are located within the state. The statewide cost for AEPS compliance by 2021 for all LSEs in Pennsylvania is estimated to be $158.5 million as of the reporting year 2015.[34] The compliance cost for the reporting year 2016 is not published or available now.

For additional information on Alternative Energy in Pennsylvania, please visit the Commission's website (http://www.puc.pa.gov/consumer_info/electricity/alternative_energy.aspx).

Energy Efficiency and Conservation (Act 129)

Act 129 of 2008[35] required the seven Pennsylvania EDCs[36] with at least 100,000 customers[37] to establish an energy efficiency and conservation (EE&C) plan. The Act is being implemented in phases; Phases I and II are now complete. Phase III of Act 129, the current 5-year phase, began on June 1, 2016 and will end on May 31, 2021.

[28] 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 the customer-generator's requirements for electricity. *See* 52 Pa. Code § 75.12.
[29] *See* Docket No. L-00050174; 52 Pa. Code §§ 75.11-75.15.
[30] *Id.*
[31] *See* Docket No. L-00050175; 52 Pa. Code §§ 75.21-75.40.
[32] *See* Docket No. L-2014-2404361; 52 Pa. Code §§ 75.1-75.72.
[33] *See* http://www.pennaeps.com/reports/.
[34] *See* http://www.puc.pa.gov/Electric/pdf/AEPS/AEPS_Ann_Rpt_2015.pdf.
[35] Act 129 of 2008, effective November 14, 2008; 66 Pa. C.S. §§2806.1-2806.2.
[36] 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.
[37] *See* 66 Pa.C.S. § 2806.1.

Phase I began on June 1, 2009, and ended on May 31, 2013. The Commission-approved plans were to reduce energy demand and consumption by 1 percent by May 31, 2011, and 3 percent by May 31, 2013. Peak demand was to be reduced by 4.5 percent by May 31, 2013. Consumption reduction goals totaled 1,467 GWh in 2011, and 4,400 GWh in 2013; peak demand reduction goals were projected to total 1,193 MW for 2013.[38] The Commission determined, except for West Penn Power, the EDCs achieved the 1 percent energy consumption reduction target by May 31, 2011. The Commission also determined that all 7 EDCs achieved both the consumption reduction target of 3 percent, and the peak demand reduction target of 4.5 percent, by May 31, 2013.[39]

Under Act 129, the Commission was also required to evaluate the costs and benefits of the EE&C programs by November 31, 2013, and every five years thereafter.[40] The Commission determined the benefits of consumption reduction requirements outweighed the costs. Based on the Act 129 Statewide Evaluator's (SWE)[41] Electric Energy Efficiency Potential for Pennsylvania Final Report,[42] the Commission set new consumption reduction targets to be attained in Phase II for the EDCs subject to the Act 129 EE&C requirements.[43]

Phase II began on June 1, 2013, and ended on May 31, 2016. While the Commission determined that energy efficiency (EE) programs were cost-effective, it did not have enough information regarding the cost-effectiveness of Act 129 demand response programs in order to set additional peak demand reduction targets for Phase II of Act 129.[44] However, assuming an EDC would be able to meet its Phase II consumption reduction targets under its Act 129 budget, the Commission provided the opportunity for EDCs to propose, either in the EE&C plans or otherwise, voluntary residential demand response programs.[45]

The Commission reviewed the results provided by all the EDCs in their Final Annual Reports[46] and the SWE's Phase II Final Annual Report [47] and determined that all seven EDCs were in compliance with the May 31, 2016 electric consumption reduction requirements.[48] The Phase II electric consumption reduction targets and total savings achieved are outlined in Table 4, below.

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[38] *See Energy Consumption and Peak Demand Reduction Targets*, Docket No. M-2008-2069887, Order entered March 30, 2009.

[39] *See Energy Efficiency and Conservation Program*, Docket No. M-2008-2069887, Order entered March 20, 2014.

[40] *See* 66 Pa.C.S. §§ 2806.1(c) and (d).

[41] Public Meeting of June 25, 2009. The Commission selected GDS Associates, Inc. Engineers and Consultants as the statewide evaluator for Phase I.

[42] *See Electric Energy Efficiency Potential for Pennsylvania Final Report*, available at http://www.puc.pa.gov/filing_resources/issues_laws_regulations/act_129_information/act_129_statewide_evaluator_swe_.aspx.

[43] *See Energy Efficiency and Conservation Program Implementation Order*, Docket No. M-2012-2289411, entered August 3, 2012.

[44] *Id.* at 38-42.

[45] *Id.* at 42 and 43.

[46] *See* EDCs' Final Annual Reports available at: http://www.puc.pa.gov/filing_resources/issues_laws_regulations/act_129_information/electric_distribution_company_act_129_reporting_requirements.aspx.

[47] *See SWE Phase II Final Annual Report*, available at: http://www.puc.pa.gov/filing_resources/issues_laws_regulations/act_129_information/act_129_statewide_evaluator_swe_.aspx.

[48] See Energy Efficiency and Conservation Program Compliance Order, Docket No. M-2012-2289411, entered April 6, 2017.

Table 4 - Phase II Electric Consumption Reduction Targets and Total Verified Savings

EDC	Phase II Reduction Targets (MWh)	Carryover Savings from Phase I (MWh)	Phase II Savings Achieved (MWh)	Phase II Total Verified Savings (MWh)
Duquesne	276,722	133,717	377,248	510,965
Met-Ed	337,753	47,187	368,235	415,422
PECO	1,125,851	242,793	1,090,505	1,333,298
Penelec	318,813	26,805	368,508	395,313
Penn Power	95,502	22,580	109,368	131,948
PPL	821,072	495,636	698,736	1,194,372
West Penn	337,533	59,929	358,073	418,002

The Commission directed the SWE to perform a Demand Response (DR) Potential Study using residential direct load control and commercial and industrial load curtailment models provided by the Commission.[49] This study was to provide the Commission with the information necessary to determine whether Act 129 Phase III peak demand reduction programs would be cost-effective. The SWE submitted its final version of the DR Potential Study to the Commission on February 25, 2015.[50]

The SWE also performed an Energy Efficiency (EE) Potential Study to determine the cost-effective consumption reduction potential in Pennsylvania.[51] The SWE submitted its final EE Potential Study to the Commission on February 25, 2015.[52] 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.[53] On June 11, 2015, the Commission adopted a Final Implementation Order prescribing targets for a Phase III of the Act 129 EE&C Program.[54]

[49] *See Energy Efficiency and Conservation Program*, Docket No. M-2012-2289411, Order entered February 20, 2014.
[50] *See Demand Response Potential for Pennsylvania – Final Report*, submitted by GDS Associates, Inc., et al., February 25, 2015 (hereinafter DR Potential Study), available at http://www.puc.pa.gov/filing_resources/issues_laws_regulations/act_129_information/act_129_statewide_evaluator_swe_.aspx.
[51] *See Proposal to Pennsylvania Public Utility Commission – Statewide Evaluator RFP*, submitted by GDS Associates, Inc., et. al., January 11, 2013 available at http://www.puc.pa.gov/filing_resources/issues_laws_regulations/act_129_information/act_129_statewide_evaluator_swe_.aspx.
[52] *See Energy Efficiency Potential for Pennsylvania – Final Report*, submitted by GDS Associates, Inc., et. al., February 2015 (hereinafter EE Potential Study), available at http://www.puc.pa.gov/filing_resources/issues_laws_regulations/act_129_information/act_129_statewide_evaluator_swe_.aspx.
[53] *See Energy Efficiency and Conservation Program Implementation Order*, Docket No. M-2014-2424864, entered June 19, 2015, at 10-12.
[54] *Id.* at 14-15.

Phase III, the current five-year phase, began on June 1, 2016, and will end on May 31, 2021. The EDCs' consumption[55] and peak demand reduction[56] requirements are provided in Table 5, below. While the EDCs must implement energy efficiency programs all five years of the 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.[57] 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. Therefore, the Commission did not prescribe a peak demand reduction requirement for Penelec.

Table 5 - 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

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 just recently filed their preliminary annual reports for the first year of Phase III (Program Year 8). [58] It appears that all EDCs are well on their way to meet their 5-year electric consumption reduction requirements. Final annual reports for Program Year 8 are due to the Commission by November 15, 2017.

Statewide Review of Electrical Energy Usage

Pennsylvania's aggregate electrical energy usage (residential, commercial, industrial, sales for resale, and other) in 2016, was 145,022 gigawatt hours (GWh) versus 146,229 GWh for 2015, which is a 0.83 percent decrease in electrical usage. The number of electrical energy customers increased by 26,143, or 0.46 percent.

[55] *Id.* at 57.
[56] *Id.* at 35.
[57] *Id.* at 35.
[58] The EDCs' Preliminary and Final Annual Reports for Program Year 8 will be made available at http://www.puc.pa.gov/filing_resources/issues_laws_regulations/act_129_information/act_129_statewide_evaluator_swe_.aspx.

As shown on Table 6, below, the total average annual aggregate 5-year energy usage growth projection for the residential, commercial, and industrial classes is projected to decrease 0.18 percent per year. This includes an average residential growth rate decrease of 0.55 percent, a commercial growth rate decrease of 0.34 percent, and an industrial growth rate increase of 0.37 percent for the entire 5-year period.

Table 6 Average Aggregate 5-year Electrical Energy Projection

Energy Usage Projection (GWh)				
Year	Residential	Commercial	Industrial	Total
2017	49,937	41,894	46,583	138,414
2018	49,821	41,840	47,192	138,853
2019	49,571	41,762	47,180	138,513
2020	49,192	41,606	47,236	138,034
2021	48,847	41,330	47,268	137,445
average annual growth (%)	-0.55	-0.34	0.37	-0.18

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 Pennsylvania EDC territories. Tables 7 and 8, below, provide metrics for 2016 and 2015, respectively.

Table 7 PA EDC customers served, energy usage, and peak load (2016)

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*	591,620	4,197,290	6,334,654	2,565,611	55,986	19,053	13,172,594	828,571	36,528	12,307,495	2,797
Met-Ed	564,764	5,527,901	3,042,610	5,304,243	29,215	537,014	14,440,983	1,179,233	0	13,261,750	2,947
Penelec	587,624	4,328,262	3,586,987	5,668,449	37,738	2,623,343	16,244,778	1,214,710	0	15,030,068	2,909
Penn Power	164,787	1,685,833	1,355,032	1,569,262	4,954	245,466	4,860,547	219,306	0	4,641,241	931
PPL	1,425,508	13,810,148	14,159,912	8,128,143	212,987	0	36,311,189	2,618,791	60,910	33,631,488	7,216
PECO	1,613,041	13,664,168	8,098,558	15,262,974	893,202	21,718	37,940,620	2,288,175	39,489	35,612,956	8,364
West Penn	724,422	7,185,771	5,050,570	7,684,390	45,225	735,741	20,701,698	1,290,500	0	19,411,198	3,954
UGI	62,045	551,190	314,300	106,003	5,504	121	977,118	77,925	1,773	897,420	200
Citizens'	6,981	83,010	29,877	58,390	587	0	171,864	8,346	174	163,344	43
Pike County	4,699	31,228	46,841	0	391	0	78,069	0	100	77,969	19
Wellsboro	6,300	42,662	32,525	46,534	213	115	122,049	9,764	220	112,065	23
Total	**5,751,791**	**51,107,463**	**42,051,866**	**46,393,999**	**1,286,002**	**4,182,571**	**145,021,509**	**9,735,321**	**139,194**	**135,146,994**	**29,403**
% of Total		35.24%	29.00%	31.99%	0.89%	2.88%	100.00%				
2016 VS 2015	0.46%	-1.07%	-0.52%	-0.92%	2.88%	-0.12%	-0.83%	-4.55%	-0.53%	-0.55%	0.18%

Table 8 PA EDC customers served, energy usage, and peak load (2015)

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	586,149	4,108,765	6,398,676	2,897,651	78,017	20,755	13,503,864	828,571	36,528	12,638,765	2,804
Met-Ed	561,426	5,514,991	2,994,882	5,308,797	28,518	540,883	14,388,070	1,216,111	0	13,171,959	2,791
Penelec	587,832	4,350,462	3,557,621	5,646,723	37,557	2,524,195	16,116,558	1,534,460	0	14,582,098	2,819
Penn Power	163,807	1,703,245	1,320,785	1,495,920	6,210	229,663	4,755,822	223,077	0	4,532,745	910
PPL	1,422,730	14,461,533	14,335,845	8,268,558	156,524	0	37,222,460	2,684,616	63,875	34,473,969	7,842
PECO	1,601,219	13,629,811	8,118,412	15,365,066	888,775	122,781	38,124,845	2,268,368	36,996	35,819,481	8,094
West Penn	722,615	7,254,613	5,112,059	7,634,863	47,610	749,243	20,755,967	1,349,408	0	19,406,559	3,814
UGI	61,931	554,166	324,382	106,076	5,629	132	990,384	76,153	2,039	912,192	193
Citizens'	6,945	8,688	30,019	57,224	593	0	174,724	8,642	180	165,902	43
Pike County	4,694	29,614	45,998	0	391	0	76,003	0	94	75,909	19
Wellsboro	6,300	43,905	32,636	43,734	218	115	120,608	9,649	220	110,739	22
Total	**5,725,648**	**51,659,793**	**42,271,315**	**46,824,612**	**1,250,042**	**4,187,767**	**146,229,305**	**10,199,055**	**139,932**	**135,890,318**	**29,351**
% of Total		35.33%	28.91%	32.02%	0.85%	2.86%	100.00%				

Figure 2, below, shows Pennsylvania historic and forecast energy usage for residential, commercial and industrial retail from 1972 to 2016 and forecasted usage from 2017 to 2021.

Figure 2 Pennsylvania retail energy usage and 5-year forecast (GWh)

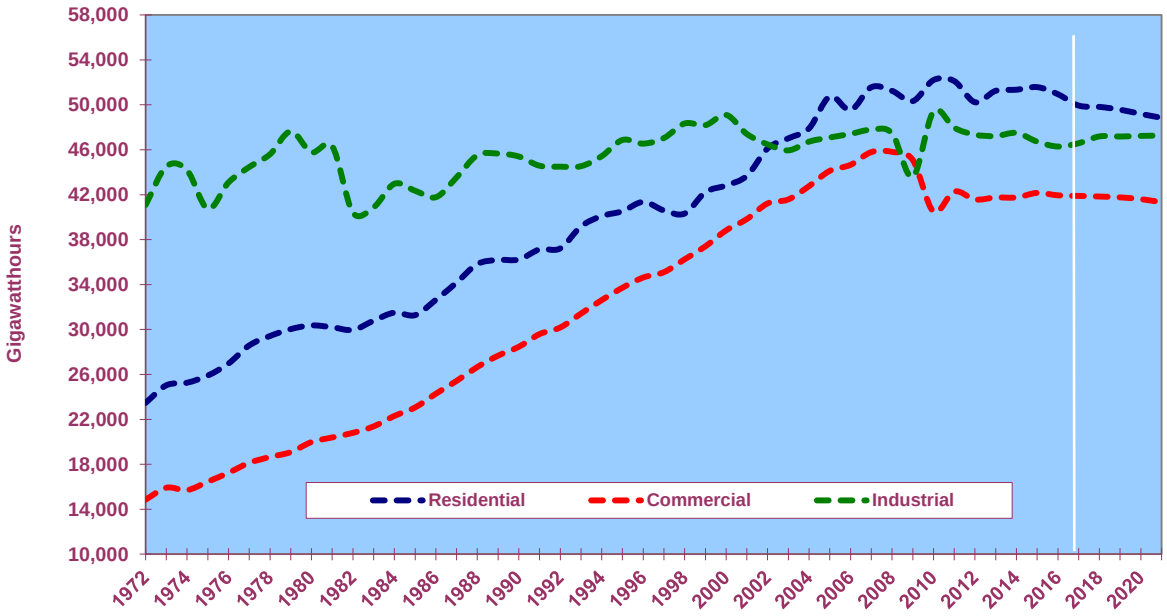


Figure 3, below, shows average residential cost and average usage from 1940 to 2016. Between 1970 and 2010, average residential usage in Pennsylvania increased 1.4 percent each year, while average cost increased 4.1 percent each year. During the last 10 years, average residential usage decreased 0.21 percent each year, while average cost increased 2.5 percent a year.

Figure 3 Average residential cost (cents/kWh) and usage (MWh/year)

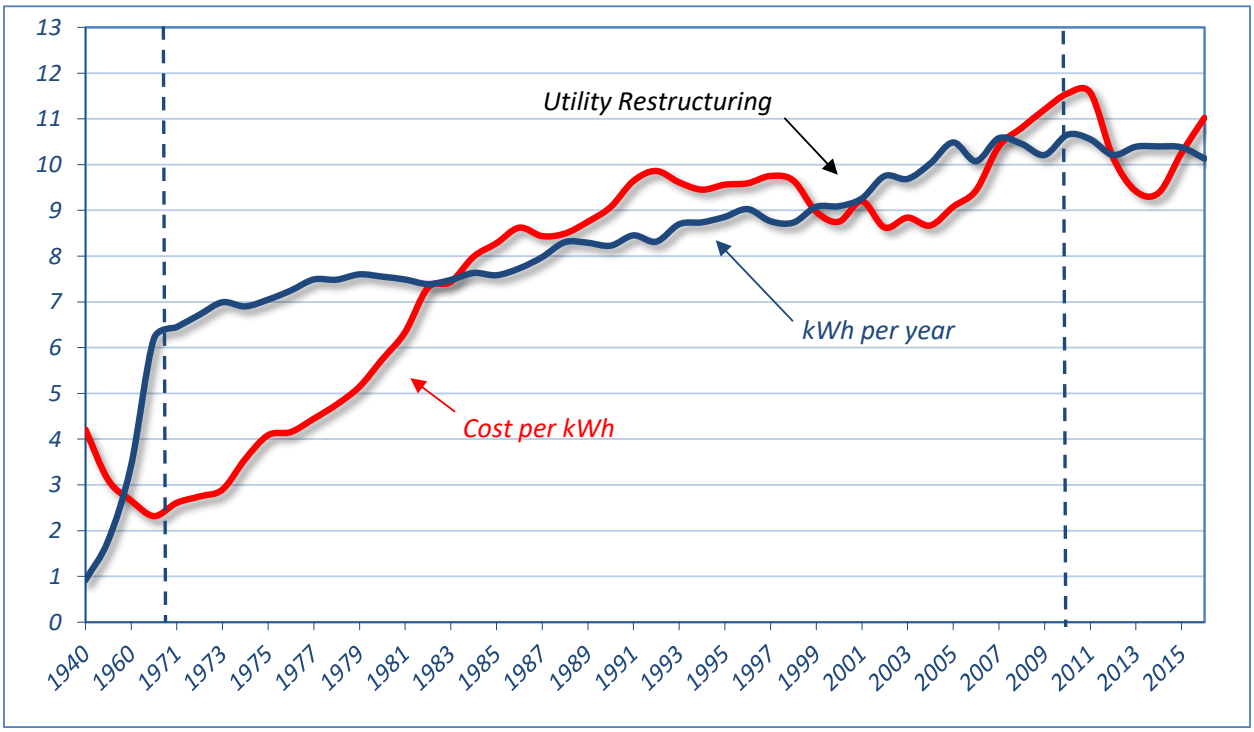
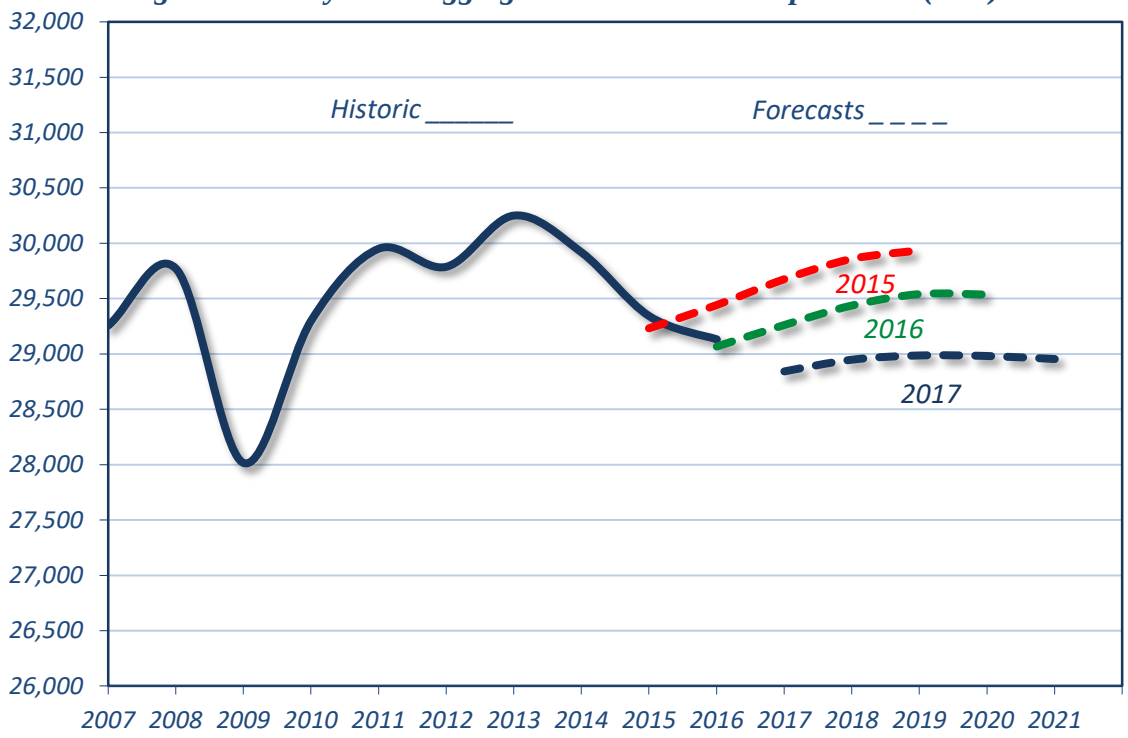


Figure 4, below, shows Pennsylvania's aggregate non-coincidental peak load demand from 2007 to 2016 and the associated 5-year projections estimated during the last 3 years.

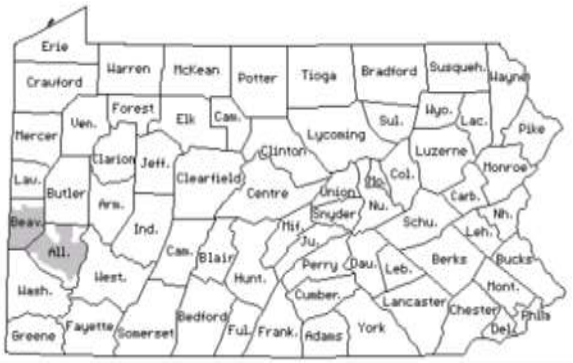
Figure 4 Pennsylvania aggregate non-coincidental peak load (MW)



Summary of Data for the Seven Largest EDCs

The following sections provide historic and projected energy usage and peak load demand statistics, purchases from cogeneration and small power production projects, planned transmission line additions, and conservation activities for Pennsylvania's seven largest EDCs.

Duquesne Light Company (Duquesne)



Duquesne provides electric service to 591,620 customers in the City of Pittsburgh and portions of Allegheny and Beaver counties in Southwestern Pennsylvania. Duquesne's 2016 energy usage total was 13,173 GWh, while in 2015 it was 13,504 GWh (a decrease of 2.5 percent from the previous year). Duquesne's total usage mix consisted of commercial (48 percent), residential (32 percent), industrial (19 percent), and sales for resale (less than 1 percent).

Over the next five years, total energy usage is projected to decrease at an average annual rate of 0.8 percent. This includes an average annual decrease in residential usage of 1.6 percent, annual commercial usage decrease of 0.8 percent, and an increase in average annual of industrial usage by 0.4 percent. See Figure 5.

Duquesne's highest peak load of 2,797 MW occurred on August 11, 2016. This represents a decrease of 0.3 percent from the previous year's peak of 2,804 MW. Summer peak load is projected to increase from 2,797 MW in summer 2016 to 2,882 MW by summer 2021, or by an average annual growth rate increase of 0.6 percent. See Figure 6.

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 2007 through 2017.

Figure 5 Duquesne energy usage (GWh)

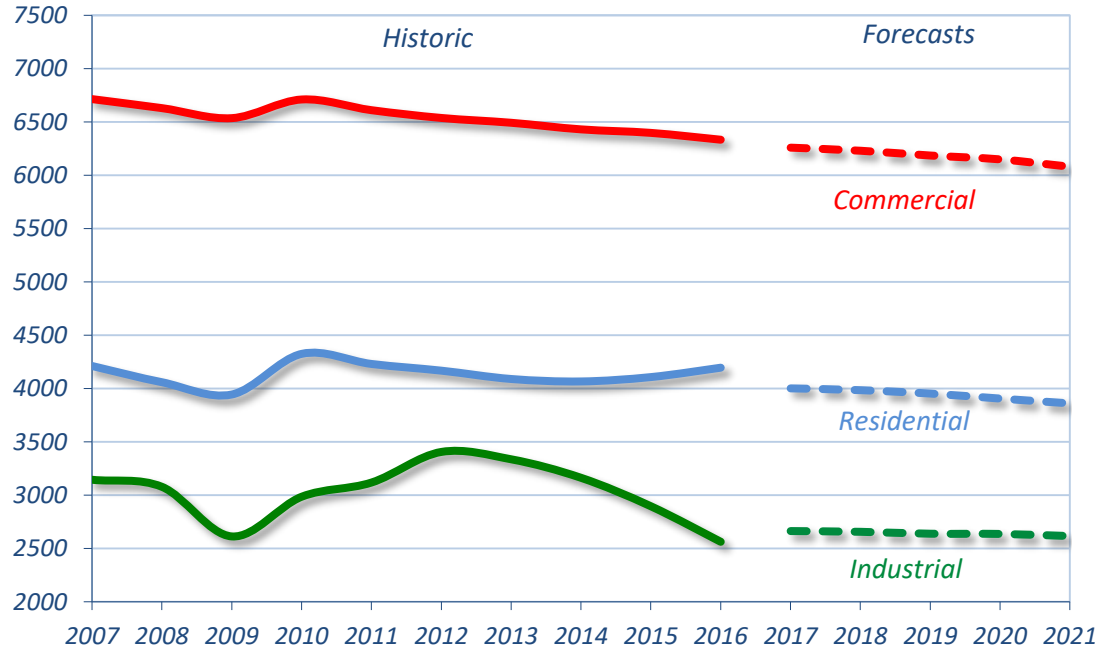
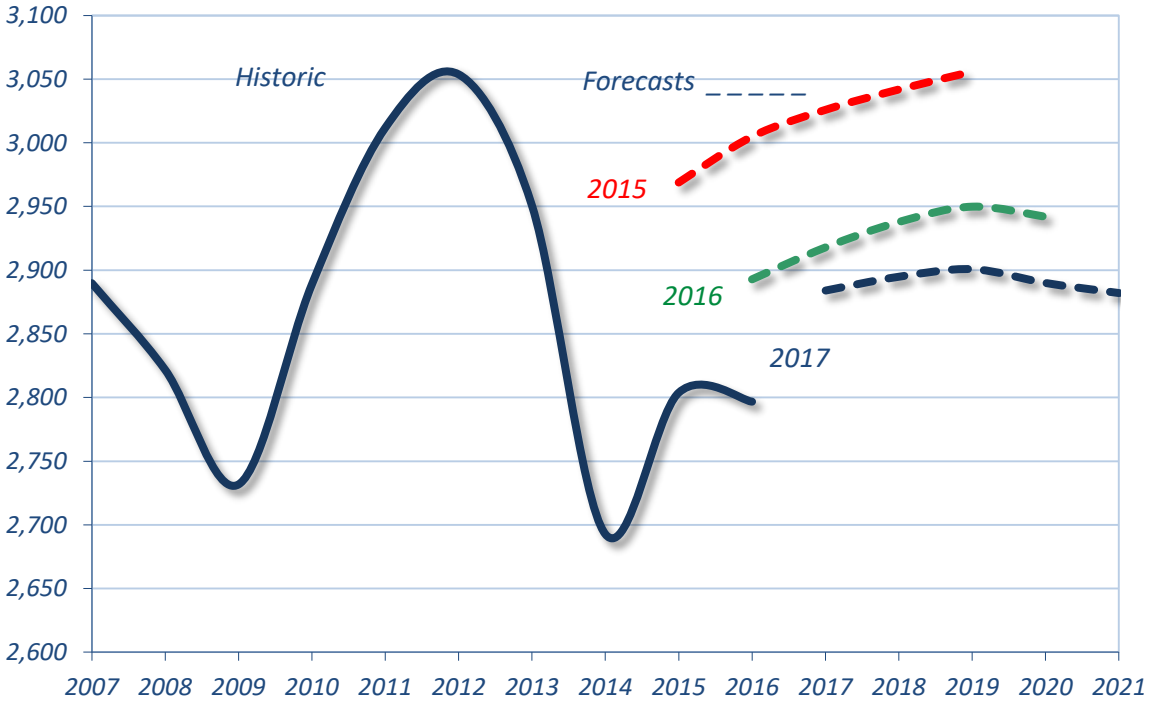


Figure 6 Duquesne peak load (MW)



Metropolitan Edison Company (Met-Ed)

Met-Ed provides service to 564,764 customers in all or portions of 14 counties in Eastern and Southcentral Pennsylvania. Met-Ed's 2016 energy usage total was 14,441 GWh, while in 2015 it was 14,388 GWh (an increase of 0.4 percent from the previous year). Met-Ed's total sales mix consisted of residential (38 percent), industrial (37 percent), commercial (21 percent), and sales for resale (3.7 percent).

Over the next five years, total energy usage is projected to decrease at an average annual rate of 0.7 percent. This includes a decrease in average annual residential usage of 1.8 percent, a decrease in average annual commercial usage by 0.8 percent, and an increase in average annual industrial usage by 0.6 percent. See Figure 7.

Met-Ed's highest peak load of 2,947 MW occurred on July 25, 2016. This represents an increase of 5.6 percent from previous year's peak of 2,791 MW. Summer peak load is projected to decrease from 2,947 MW in summer 2016 to 2,856 MW by summer 2021, or by an average annual growth rate decrease of 0.6 percent. See Figure 8.

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 2007 through 2017.

Figure 7 Met-Ed energy usage (GWh)

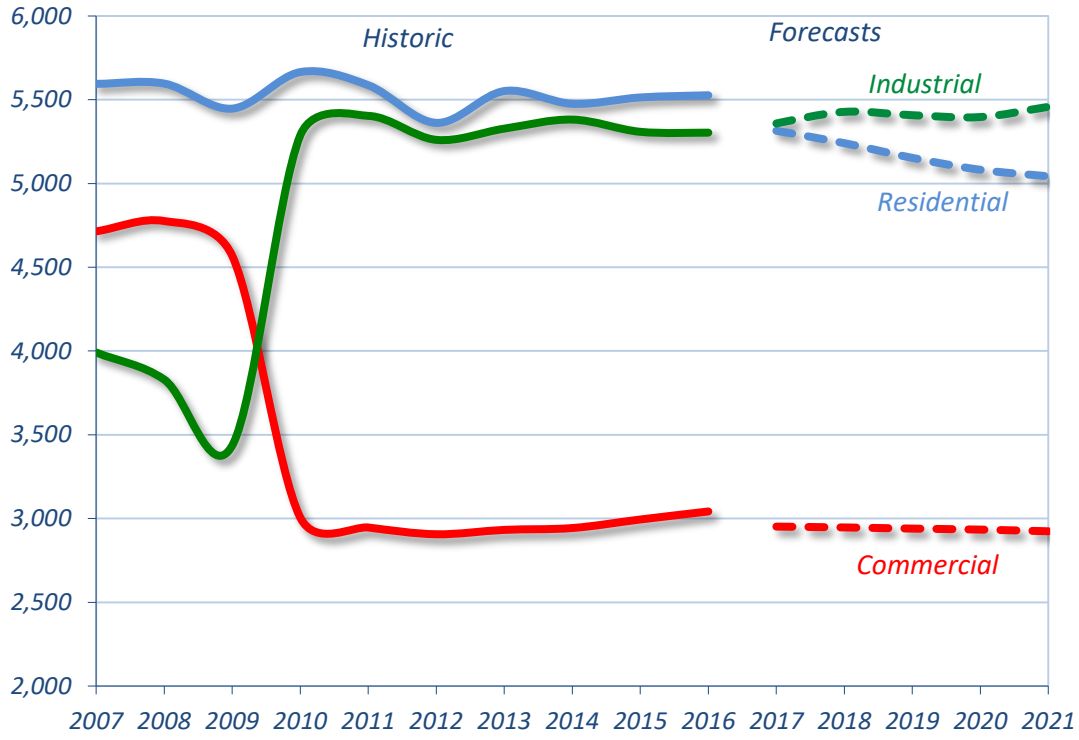
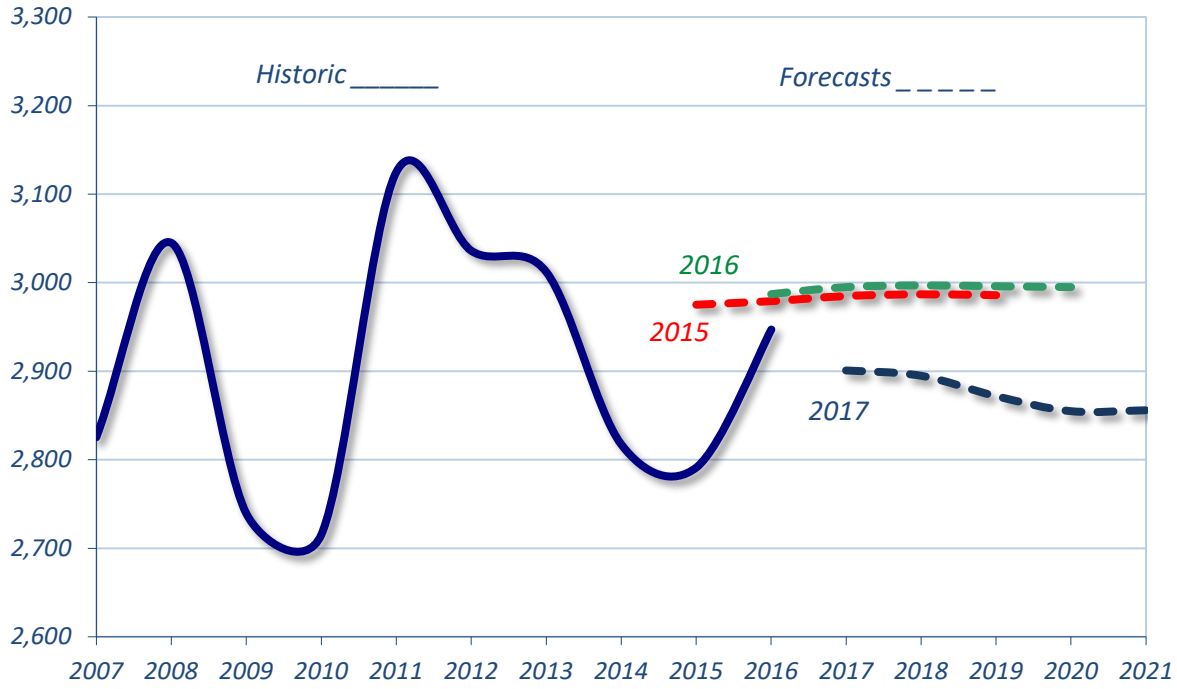
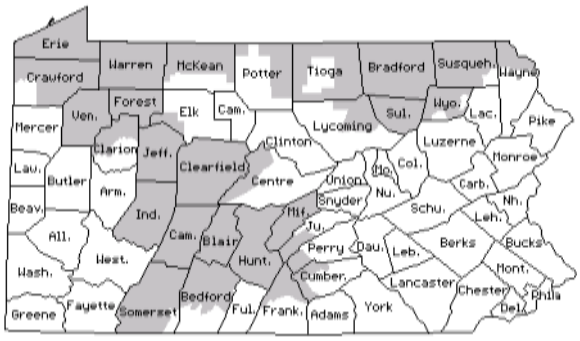


Figure 8 Met-Ed peak load (MW)



Pennsylvania Electric Company (Penelec)



Penelec provides service to 587,624 customers in all or portions of 29 counties in Western and Northern Pennsylvania. Penelec's 2016 energy usage total was 16,245 GWh, while in 2015 it was 16,117 GWh (an increase of 0.8 percent from the previous year). Penelec's total sales mix consisted of residential (27 percent), commercial (22 percent), industrial (35 percent), and sales for resale (16 percent).

Over the next five years, total energy usage is projected to decrease at an average annual rate of 0.9 percent. This includes a decrease in average annual residential usage of 1.0 percent, decrease of 1.3 percent commercial usage, and a decrease in average annual industrial usage by 0.4 percent. See Figure 9.

Penelec's highest peak load of 2,909 MW occurred on Aug. 11, 2016. This represents an increase of 3.1 percent from previous year's peak of 2,819 MW. Summer peak load is projected to decrease from 2,909 MW in summer 2016 to 2,739 MW by summer 2021, or by an average annual growth rate decrease of 1.2 percent. See Figure 10.

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 2007 through 2017.

Figure 9 Penelec energy usage (GWh)

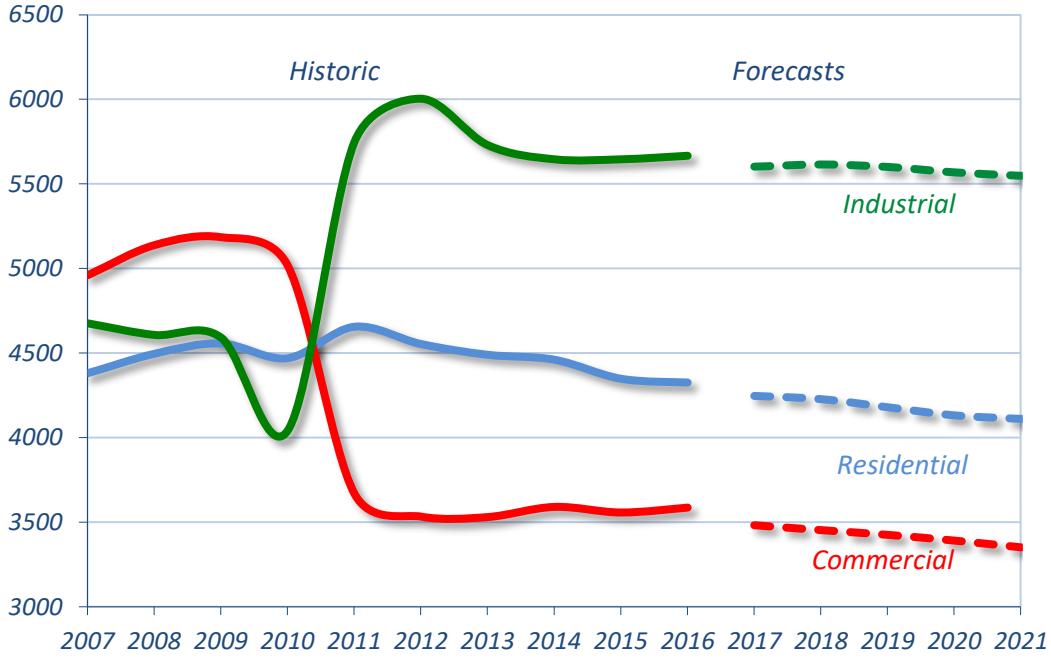
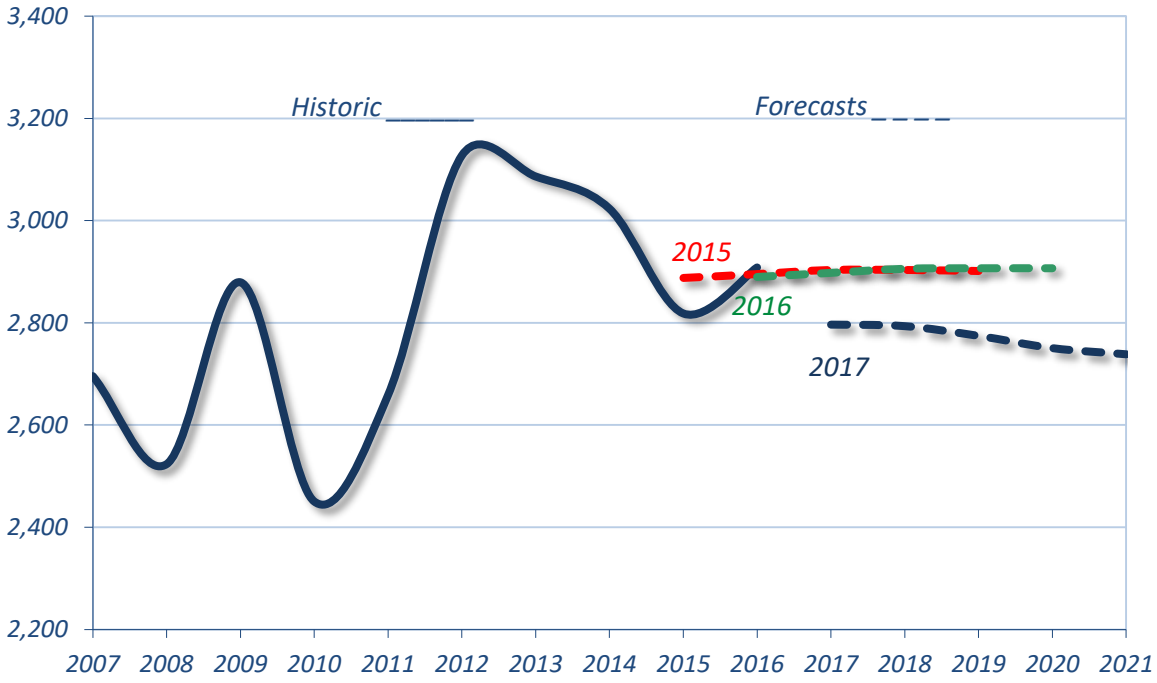
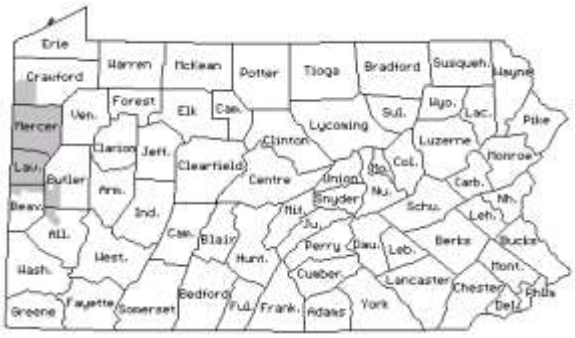


Figure 10 Penelec peak load (MW)



Pennsylvania Power Company (Penn Power)



Penn Power provides service to 164,787 customers in all or portions of six counties in Western Pennsylvania. Penn Power's 2016 energy usage total was 4,861 GWh, while in 2015 it was 4,756 GWh (an increase of 2.2 percent from the previous year). Penn Power's total usage mix consisted of residential (35 percent), commercial (28 percent), industrial (32 percent), and sales for resale (5 percent).

Over the next five years, total energy usage is projected to decrease at an average annual rate of 1.2 percent. This includes a decrease in average annual residential usage of 1.2 percent, decrease of 1.0 percent commercial usage, and a decrease in average annual industrial usage of 1.4 percent. See Figure 11.

Penn Power's highest peak load of 931 MW occurred on August 12, 2016. This represents an increase of 2.3 percent from the previous year's peak of 910 MW. Summer peak load is projected to increase from 931 MW in summer 2016 to 945 MW by summer 2021, or by an average annual growth rate increase of 0.3 percent. See Figure 12.

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 2007 through 2017.

Figure 11 Penn Power energy usage (GWh)

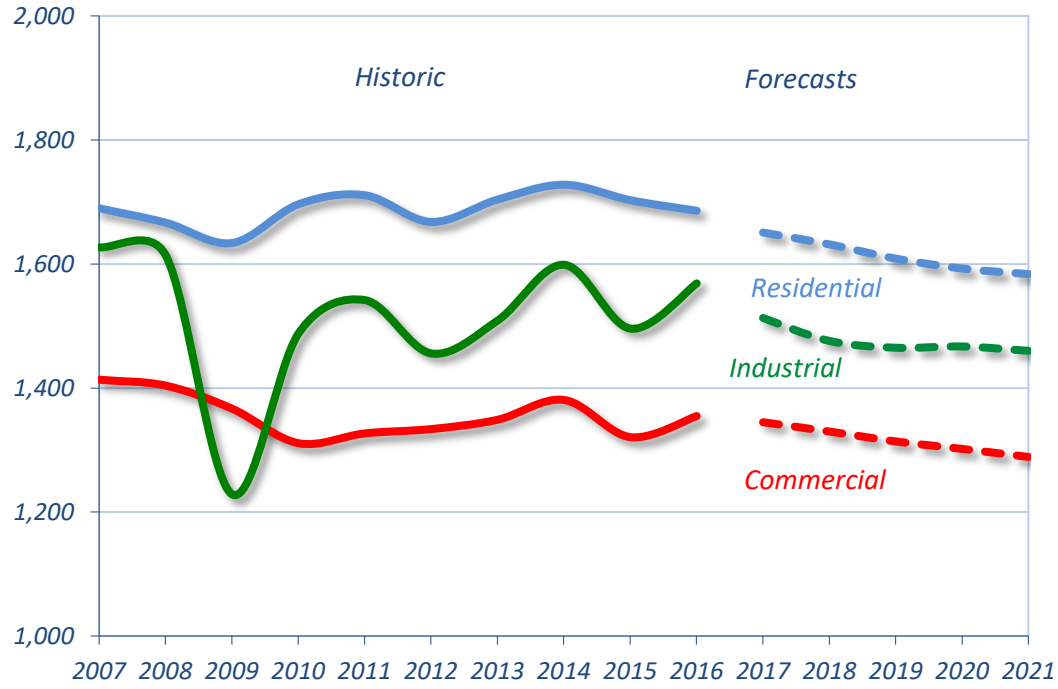
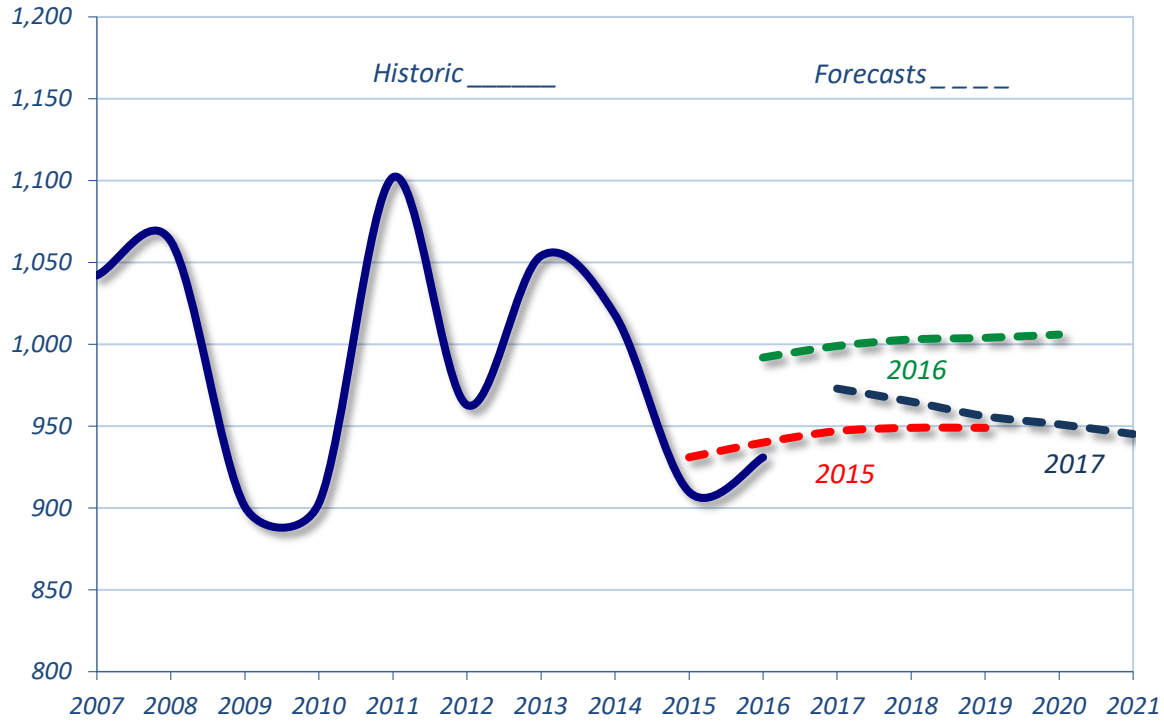
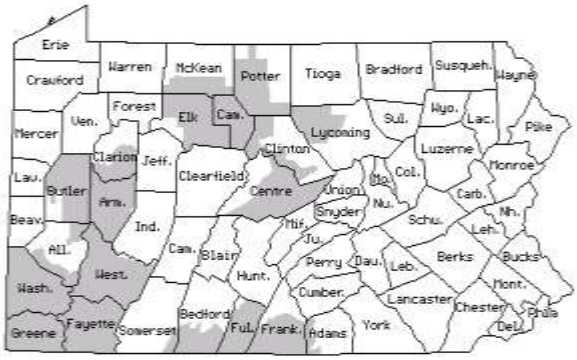


Figure 12 Penn Power peak load (MW)



West Penn Power Company (West Penn)



West Penn provides service to 724,422 customers in all or portions of 24 counties in Western, North and South Central Pennsylvania. West Penn's 2016 energy usage total was 20,702 GWh, while in 2015 it was 20,798 GWh (a decrease of 0.5 percent from the previous year). West Penn's total usage mix consisted of residential (35 percent), commercial (24 percent), industrial (37 percent), and sales for resale (less than 4 percent).

Over the next five years, total energy usage is projected to decrease at an average annual rate of 0.3 percent. This includes a decrease in average annual residential usage of 1.6 percent, a decrease in average annual commercial usage of 0.8 percent, and an increase in average annual industrial usage of 1.3 percent. See Figure 13.

West Penn's highest peak load of 3,954 MW occurred on July 25, 2016. This represents an increase of 3.5 percent from the previous year's peak of 3,814 MW. Summer peak load is projected to decrease from 3,954 MW in 2016 to 3,762 MW by the year 2021, or by an average annual growth rate decrease of 5 percent. See Figure 14.

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 2007 through 2017.

Figure 13 West Penn energy usage (GWh)

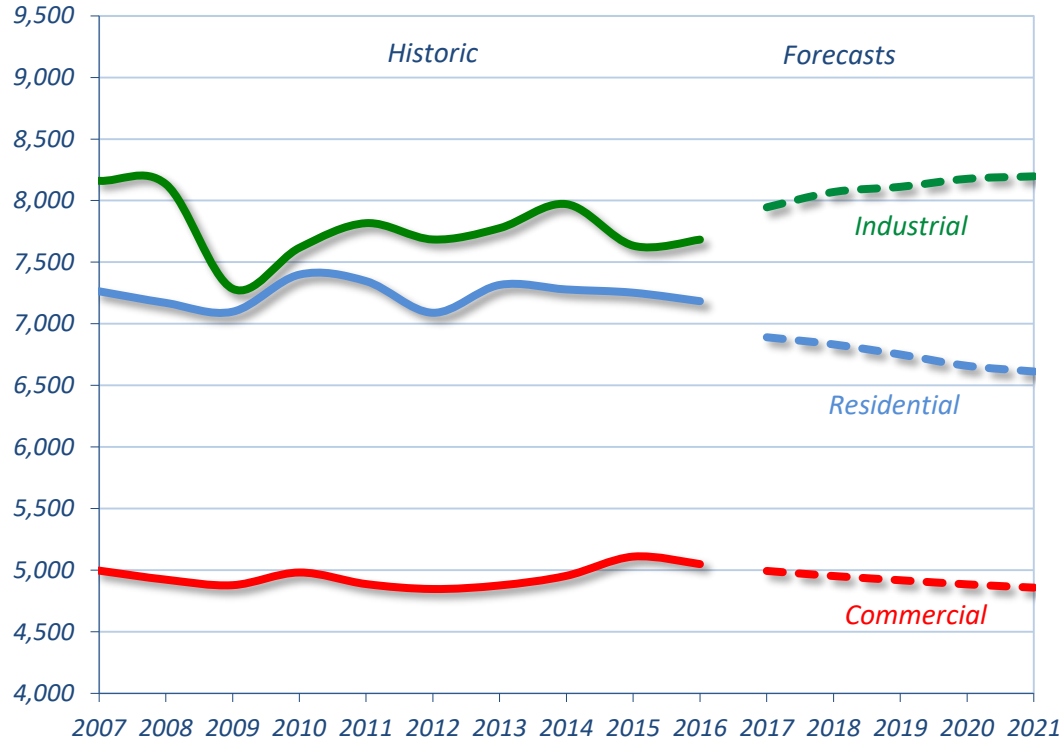
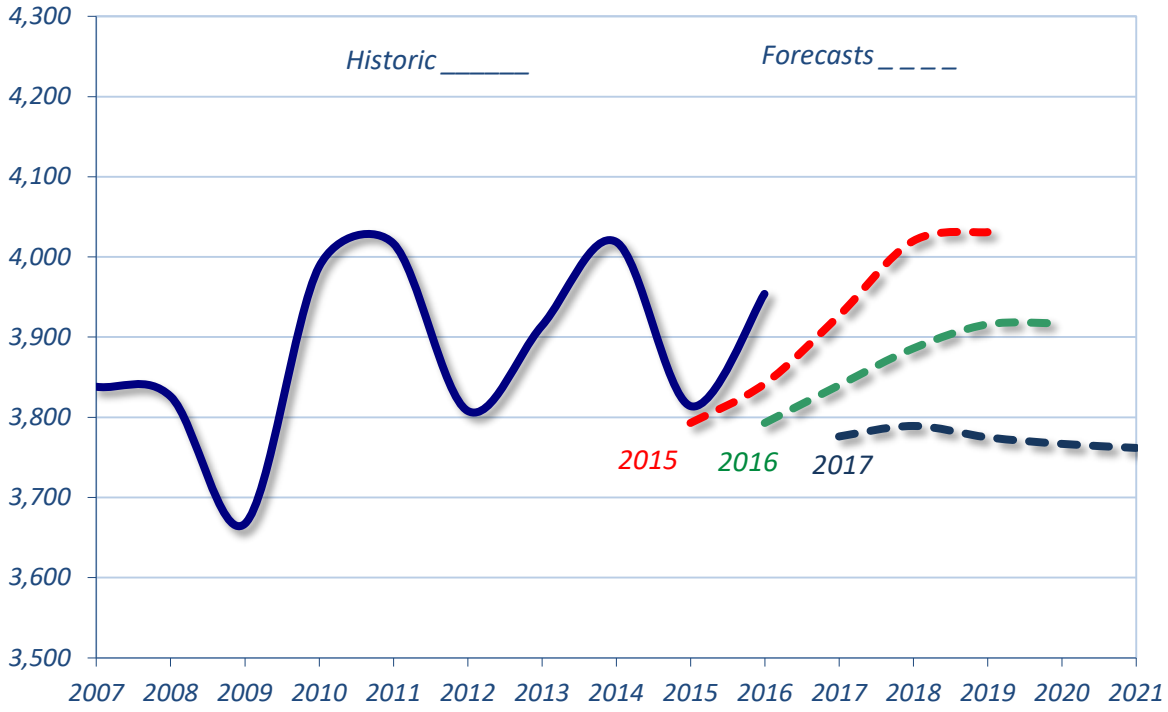
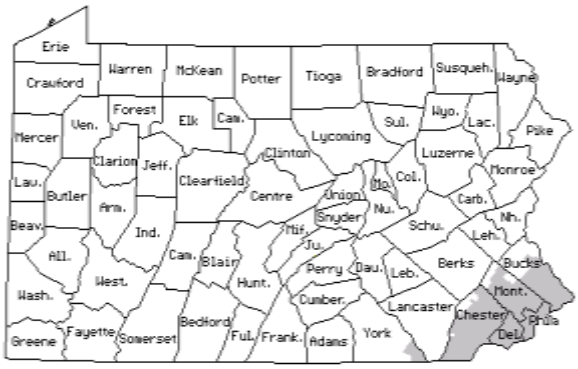


Figure 14 West Penn peak load (MW)



PECO Energy Company (PECO)

PECO is the largest electric utility in Pennsylvania, providing service to 1,613,041 customers in the City of Philadelphia and all or portions of six counties in Southeastern Pennsylvania. PECO's 2016 energy usage total was 37,940 GWh, while in 2015 it was 38,125 GWh (a decrease of 0.5 percent from the previous year). PECO's total usage mix consisted of residential (36 percent), commercial (21 percent), industrial (40 percent), and other (2.3 percent). [59]



Over the next five years, total energy usage is projected to decrease at an average annual rate of 0.2 percent. This includes a decrease in average annual residential usage of 0.5 percent, a decrease in average annual commercial growth usage by 0.3, and an increase in average annual industrial usage by 0.1 percent. See Figure 15.

PECO's highest peak load of 8,364 MW occurred on August 12, 2016. This represents an increase of 2 percent from the previous year's peak of 8,094 MW. Summer peak load is projected to increase from 8,364 MW in summer 2016 to 8,406 MW by summer 2021, or by an average annual growth rate increase of 0.1 percent. See Figure 16.

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 2007 through 2017.

[59] Sales in the "other" category include public streetlights, highway lighting, other public authorities, railroads, railways, and interdepartmental.

Figure 15 PECO energy usage (GWh)

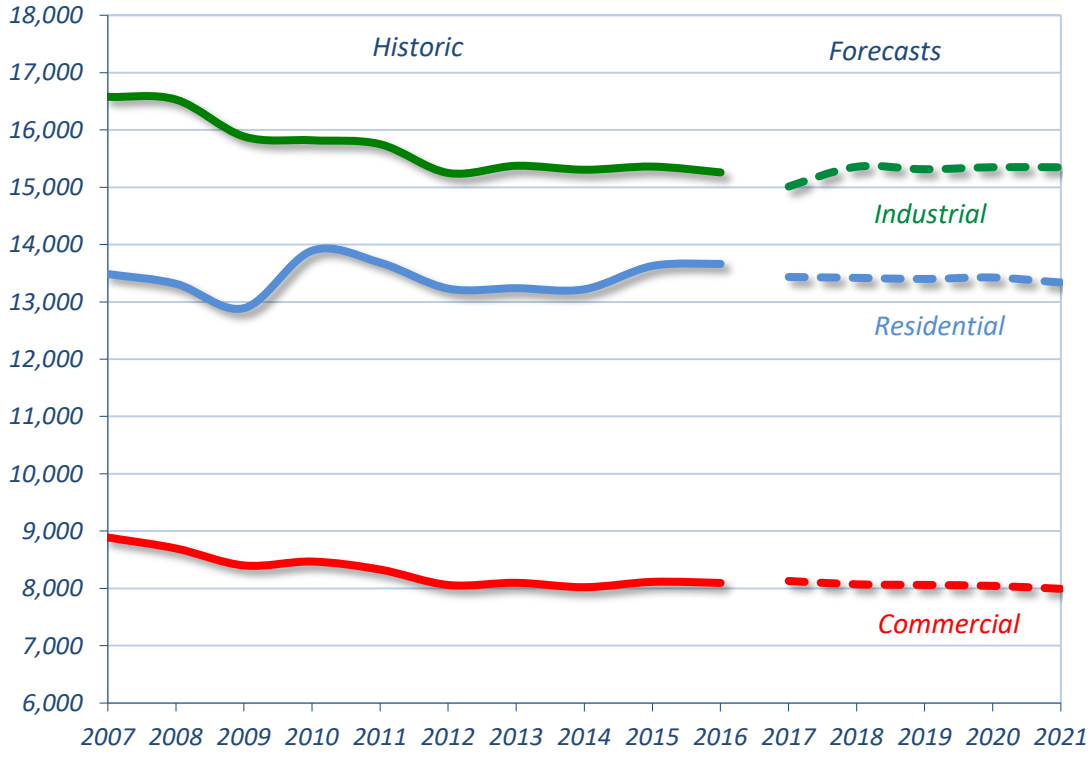
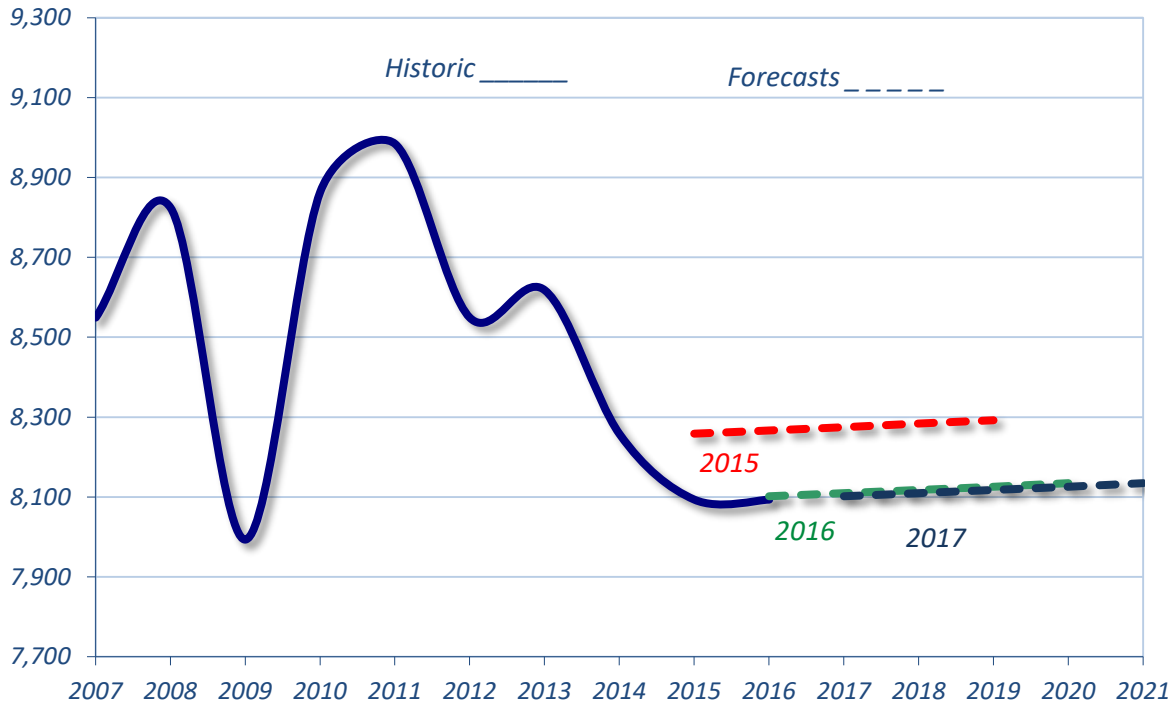
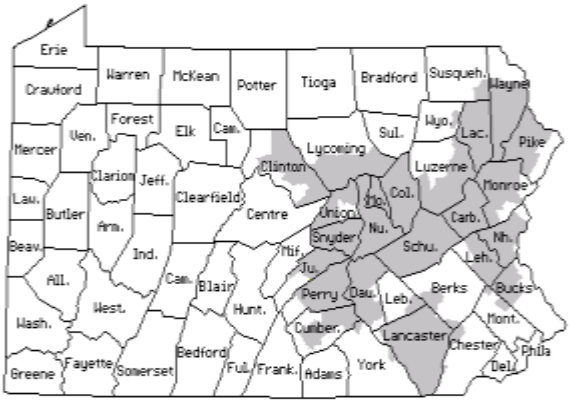


Figure 16 PECO Energy Company peak load (MW)



PPL Electric Utilities Corporation (PPL)

PPL provides service to 1,425,508 customers over a 10,000-square-mile area in all or portions of 29 counties in Central Eastern Pennsylvania. PPL's 2016 energy usage total was 36,311 GWh, while in 2015 it was 37,222 GWh (a decrease of 2.5 percent from the previous year). PPL's total usage mix consisted of residential (38 percent), commercial (39 percent), industrial (22 percent), and other (0.6 percent).



Over the next five years, total energy usage is projected to increase at an average annual rate of 0.4 percent. This includes a decrease in average annual residential usage of 0.1 percent, increase average annual commercial usage of 0.5 percent, and an increase in average annual industrial usage of 0.9 percent. See Figure 17.

PPL's highest peak load of 7,216 MW occurred on February 15, 2016. This represents a decrease of 8 percent from the previous year's peak of 7,842 MW. Winter peak load is projected to increase from 7,216 MW in 2016 to 7,427 MW by the year 2021, or by an average annual growth rate increase of 0.6 percent. See Figure 18.

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 2007 through 2017.

Figure 17 PPL Electric Utilities Corporation energy usage (GWh)

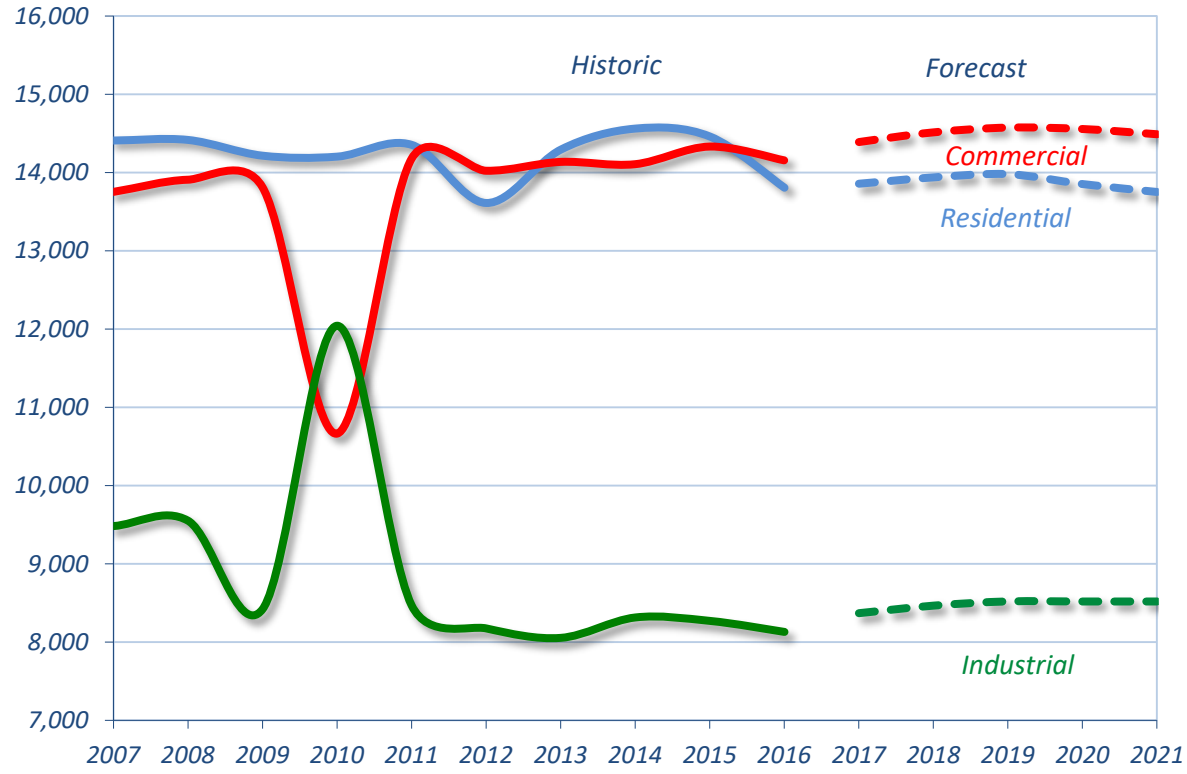
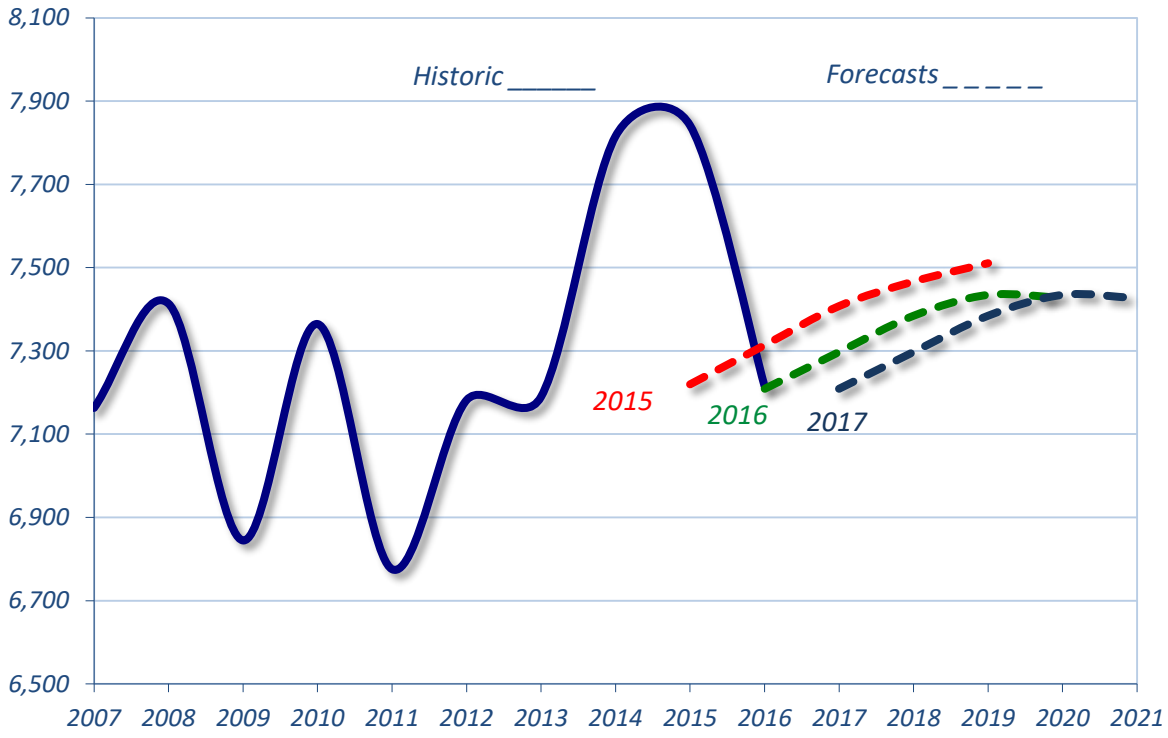
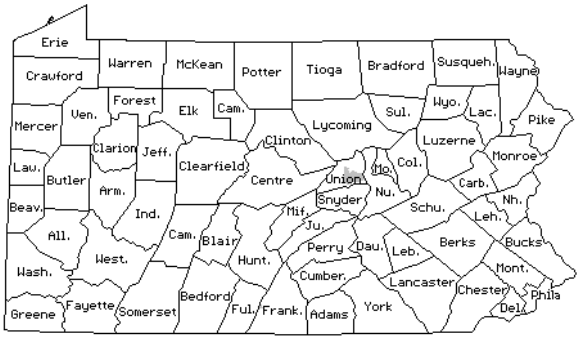


Figure 18 PPL Electric Utilities Corporation peak load (MW)



Summary of Data for the Four Smallest EDCs

Citizens' Electric Company (Citizens')

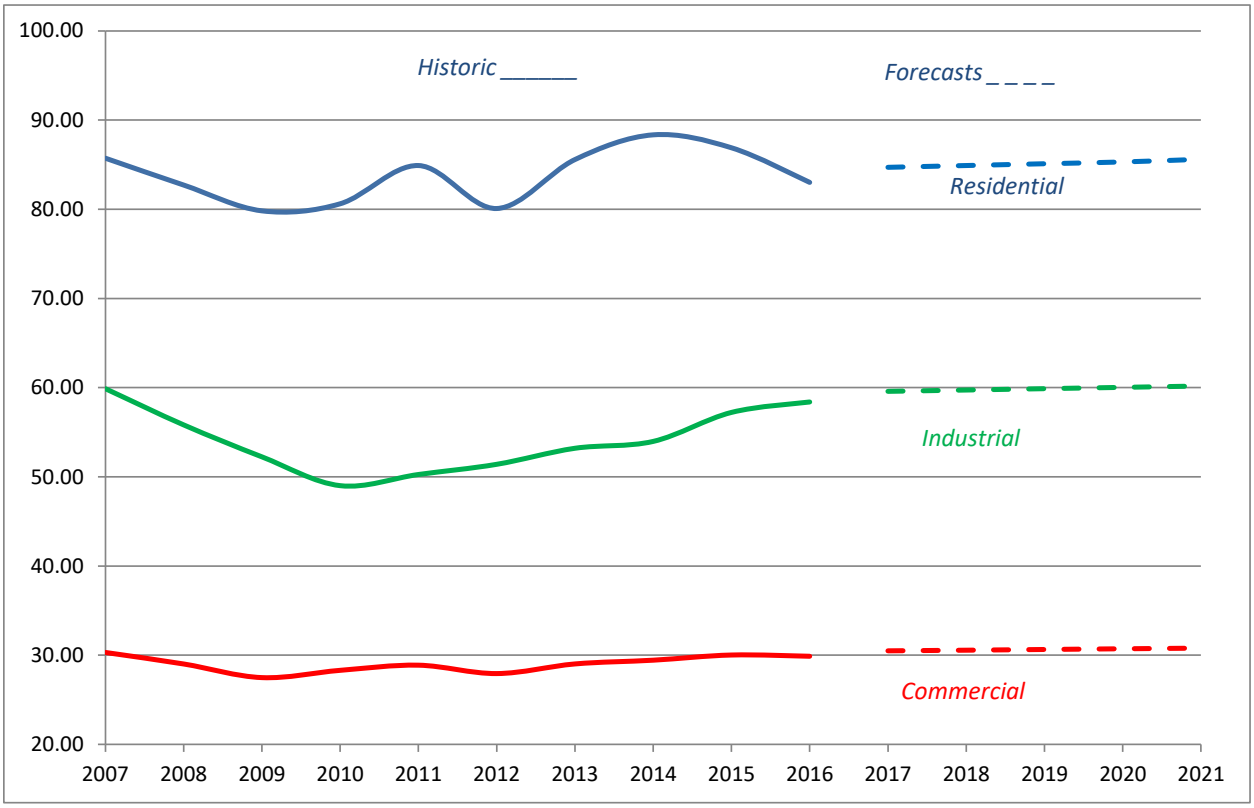


Citizens' provides service to 6,981 customers in Union County, Pennsylvania. Citizens' 2016 energy usage total was 172 GWh, while in 2015 it was 175 GWh (a decrease of 1.7 percent from previous year). Citizens' total usage mix consisted of residential (48 percent), commercial (17 percent), industrial (34 percent), and other (< 1 percent).

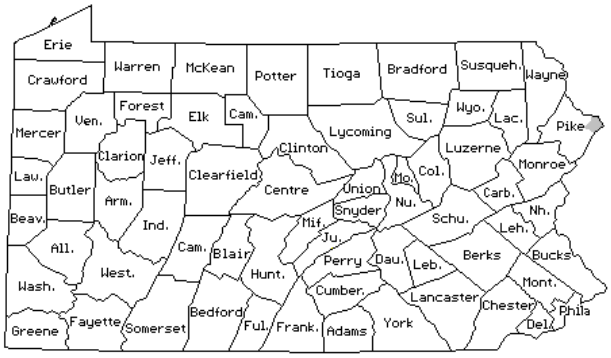
Over the next five years, total energy usage is projected to increase at an average annual rate of 0.6 percent. This includes an increase in average annual residential usage of 0.6 percent, an increase in average annual commercial usage of 0.6 percent, and an increase in average annual industrial usage of 0.4 percent. See Figure 19 below.

Citizens' highest peak load of 43.2 MW occurred on January 19, 2016. This represents the exact same peak load as the previous year's peak of 43.2 MW. Winter peak load is projected to grow from 43.2 MW in 2016 to 46.9 MW by the year 2021, or by an average annual growth rate increase of 1.7 percent.

Figure 19 Citizens' energy usage (GWh)



Pike County Light & Power Company (Pike)

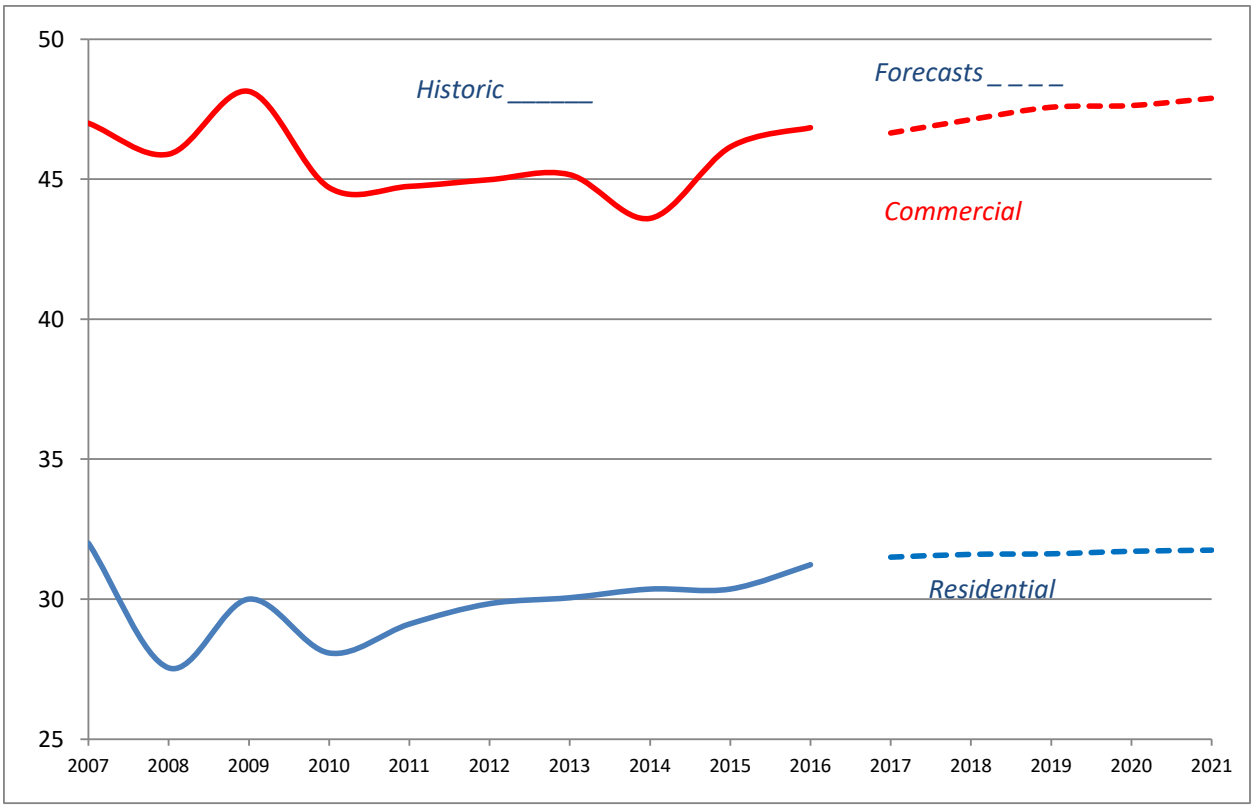


Pike provides service to 4,699 customers in Eastern Pike County, Northeastern Pennsylvania. Pike's 2016 energy usage total was 78 GWh, while in 2015 it was 76 GWh (an increase of 2.6 percent from previous year). Pike's total usage mix consisted of residential (40 percent) and commercial (60 percent). Pike has no industrial customers or sales for resale.

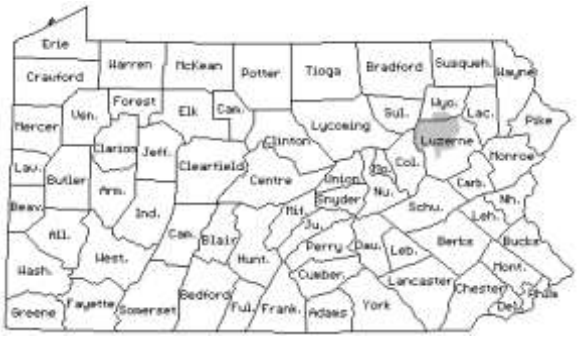
Over the next five years, total energy usage is projected to increase at an average annual rate of 0.4 percent, which includes an increase in average annual residential growth rate of 0.3 percent and an increase in average annual commercial growth rate of 0.4 percent. See Figure 20.

Pike's highest peak load of 18.67 MW occurred on July 20, 2016. This represents an increase of 0.9 percent from the previous year's peak of 18.5 MW. Summer peak load is projected to increase to 18.82 MW by summer 2021, or by an average annual growth rate of 0.16 percent.

Figure 20 Pike County Light & Power energy usage (GWh)



UGI Utilities Inc.—Electric Division (UGI)

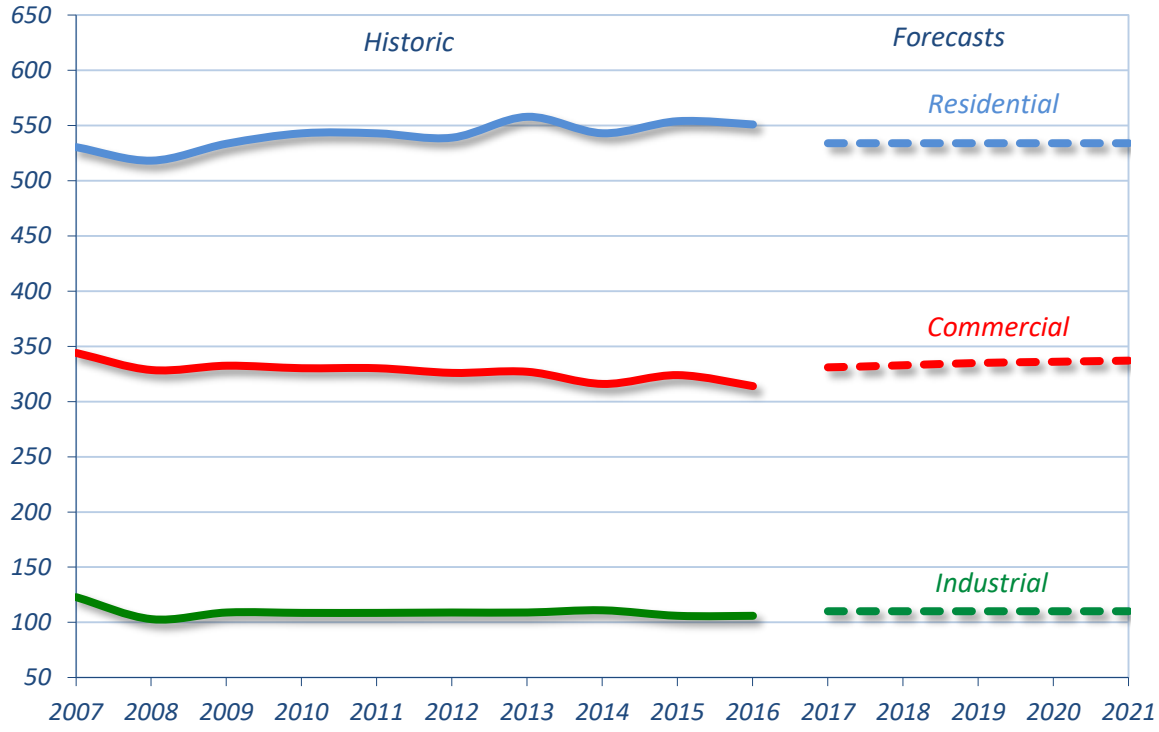


UGI provides electric service to 62,045 customers in Northwestern Luzerne and Southern Wyoming counties in Pennsylvania. UGI's 2016 energy usage total was 977 GWh, while in 2015 it was 990 GWh (a decrease of 1.3 percent from the previous year). UGI's total usage mix consisted of residential (56 percent), commercial (32 percent), industrial (11 percent), and sales for resale (0.01 percent).

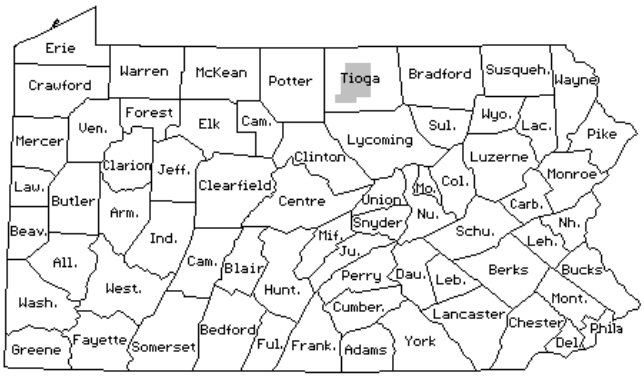
Over the next five years, total energy usage is projected to increase at an average annual rate of 0.2 percent, which includes a decrease in average annual residential growth rate of 0.6 percent, an increase in average annual commercial growth rate of 1.4 percent, and an increase in average annual industrial growth rate of 0.7 percent. See Figure 21.

UGI's highest peak load of 200 MW occurred on December 15, 2016. This represents an increase of 3.5 percent from the previous year's peak of 193 MW. Winter peak load is projected to decrease from 200 MW in winter 2016 to 191 MW by the year 2021, or by an average annual growth rate decrease of 0.9 percent.

Figure 21 UGI Utilities Inc. energy usage (GWh)



Wellsboro Electric Company (Wellsboro)

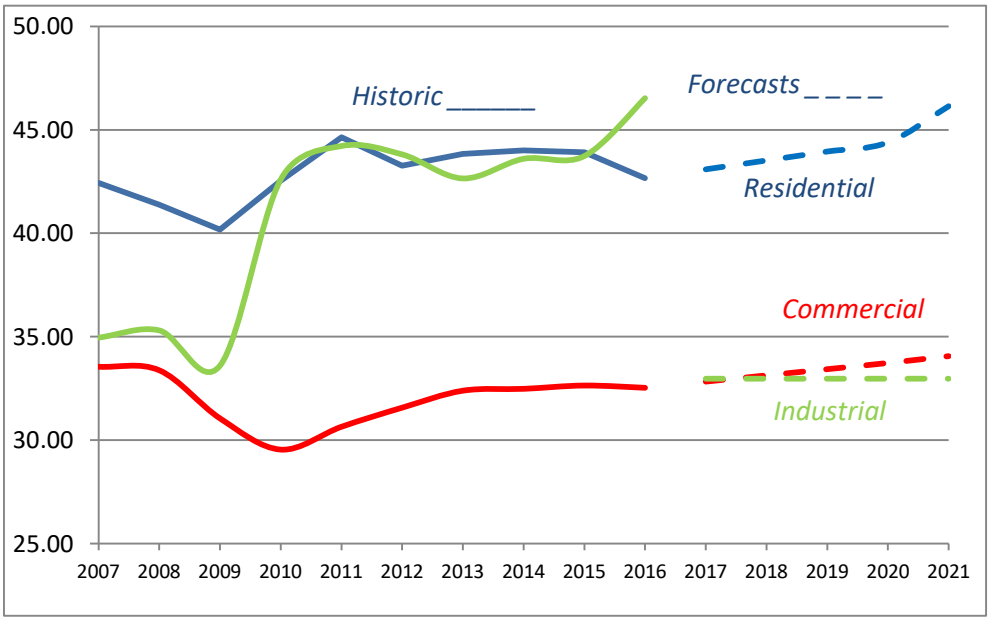


Wellsboro provides electric service to 6,300 customers in Tioga County, North Central Pennsylvania. Wellsboro's 2016 energy usage total was 122.1 GWh, while in 2015 it was 120.6 GWh (an increase of 1.2 percent from the previous year). Wellsboro's total usage mix consisted of residential (35 percent), commercial (27 percent), and industrial (38 percent.

Over the next five years, total energy usage is projected to decrease at an average annual rate of 1.4 percent. This includes an increase in average annual residential growth rate of 1.6 percent, an increase in average annual commercial growth rate of 0.9 percent, and a decrease in average annual industrial growth rate of 6 percent. See Figure 22. **Note:** the dramatic drop in Industrial usage is due to two large industrial customers leaving region in 2016 and 2017.

Wellsboro's highest peak load of 23 MW occurred on August 11, 2016. This represents an increase of 4.5 percent from the previous year's peak of 22 MW. Summer peak load growth is projected to decrease from 23 MW in 2016 to 20 MW by the year 2021, or by an average annual growth rate decrease of 2.6 percent.

Figure 22 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 2007 through 2016, and is 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 2017 through 2021.

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

		Projected Peak Load Requirments (Year Forecast Was Filed)										
Year	**Actual**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
2007	2890	3039										
2008	2822	3086	2948									
2009	2732	3141	3007	2862								
2010	2889	3194	3067	2836	2854							
2011	3012	3242	3128	2857	2863	2944						
2012	3054		3191	2850	2860	3000	2935					
2013	2951			2890	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								3167	3118	3026	2918	2884
2018									3143	3042	2938	2895
2019										3056	2950	2901
2020											2942	2890
2021												2882

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

		Projected Residential Energy Demand (Year Forecast Was Filed)										
Year	**Actual**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
2007	4211	4141										
2008	4060	4214	4216									
2009	3946	4293	4293	4177								
2010	4327	4372	4371	4188	4117							
2011	4232	4453	4444	4181	4184	4213						
2012	4169		4527	4171	4267	4275	4350					
2013	4091			4197	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								4306	4266	4184	4068	4004
2018									4272	4172	4067	3987
2019										4164	4053	3955
2020											4012	3908
2021												3863

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

		Projected Commercial Energy Demand (Year Forecast Was Filed)										
Year	**Actual**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
2007	6715	6784										
2008	6631	6942	6731									
2009	6537	7127	6768	6648								
2010	6712	7302	6815	6627	6428							
2011	6612	7457	6878	6583	6501	6681						
2012	6539		6952	6533	6585	6782	6682					
2013	6494			6527	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								6641	6643	6472	6327	6261
2018									6654	6455	6299	6232
2019										6430	6254	6187
2020											6210	6151
2021												6082

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

		Projected Industrial Energy Demand (Year Forecast Was Filed)										
Year	**Actual**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
2007	3145	3271										
2008	3079	3315	3098									
2009	2616	3369	3102	3002								
2010	2987	3420	3084	2933	2440							
2011	3120	3467	3140	2851	2407	2865						
2012	3406		3141	2777	2395	2846	3185					
2013	3337			2726	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								3031	2734	2873	2852	2665
2018									2711	2851	2837	2658
2019										2826	2819	2640
2020											2803	2638
2021												2618

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

		Projected Peak Load Requirements (Year Forecast Was Filed)										
Year	Actual	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
2007	2825	2740										
2008	3045	2801	2801									
2009	2739	2857	2857	2829								
2010	2715	2915	2915	2932	2687							
2011	3125	2972	2972	3017	2640	2869						
2012	3036		3032	3085	2630	2775	2911					
2013	3012			3158	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								2932	2996	2985	2995	2901
2018									3017	2987	2997	2895
2019										2986	2996	2872
2020											2995	2855
2021												2856

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

		Projected Residential Energy Demand (Year Forecast Was Filed)										
Year	Actual	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
2007	5595	5516										
2008	5598	5699	5699									
2009	5448	5872	5872	5771								
2010	5666	6037	6037	5836	5587							
2011	5588	6187	6187	5969	5552	5424						
2012	5363		6341	6109	5577	5226	5201					
2013	5553			6232	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								4993	5457	5392	5042	5316
2018									5476	5382	4925	5242
2019										5351	4840	5154
2020											4760	5083
2021												5044

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

		Projected Commercial Energy Demand (Year Forecast Was Filed)										
Year	Actual	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
2007	4715	4664										
2008	4777	4818	4818									
2009	4568	4969	4969	4853								
2010	3006	5108	5108	5020	4671							
2011	2947	5244	5244	5152	4706	2955						
2012	2907		5375	5291	4783	2959	2871					
2013	2933			5421	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								2956	2984	2938	2923	2953
2018									2989	2938	2927	2948
2019										2923	2925	2941
2020											2921	2935
2021												2925

* 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	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
2007	3992	4123										
2008	3831	4156	4156									
2009	3439	4181	4181	3620								
2010	5288	4193	4193	3842	3538							
2011	5404	4201	4201	4035	3497	5443						
2012	5261		4209	4047	3528	5545	5434					
2013	5328			4048	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								5612	5508	5507	5372	5360
2018									5524	5523	5467	5428
2019										5532	5474	5408
2020											5467	5397
2021												5458

* 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	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
2007	2696	2554										
2008	2524	2598	2598									
2009	2880	2637	2637	2637								
2010	2451	2674	2674	2674	2603							
2011	2659	2711	2711	2711	2630	2465						
2012	3128		2750	2750	2661	2452	2515					
2013	3087			2789	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								3081	2962	2904	2898	2797
2018									2968	2904	2906	2794
2019										2902	2907	2775
2020											2907	2751
2021												2739

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

		Projected Residential Energy Demand (Year Forecast Was Filed)										
Year	Actual	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
2007	4381	4420										
2008	4497	4438	4469									
2009	4558	4496	4533	4533								
2010	4471	4554	4598	4598	4611							
2011	4656	4614	4662	4662	4614	4569						
2012	4554		4727	4727	4662	4489	4460					
2013	4491			4793	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								4156	4554	4393	4011	4248
2018									4583	4394	3923	4229
2019										4377	3856	4181
2020											3791	4133
2021												4112

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

		Projected Commercial Energy Demand (Year Forecast Was Filed)										
Year	Actual	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
2007	4961	5049										
2008	5139	5099	5045									
2009	5186	5188	5122	5122								
2010	5019	5277	5199	5199	5159							
2011	3671	5367	5277	5277	5213	5196						
2012	3534		5356	5356	5265	5215	3562					
2013	3531			5436	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								3503	3604	3614	3545	3483
2018									3608	3619	3551	3454
2019										3607	3553	3426
2020											3552	3392
2021												3352

* 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	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
2007	4678	4807										
2008	4610	4828	4809									
2009	4594	4881	4881	4881								
2010	4044	4905	4954	4954	4203							
2011	5748	4930	4983	4983	4538	4126						
2012	6005		5013	5013	4859	4222	6026					
2013	5731			5043	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								6130	5894	5931	5746	5602
2018									5896	6017	5721	5617
2019										5998	5675	5602
2020											5623	5569
2021												5548

* 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	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
2007	1042	921										
2008	1063	936	936									
2009	901	951	951	984								
2010	903	965	965	941	896							
2011	1102	980	980	963	890	944						
2012	963		994	981	899	947	1010					
2013	1054			995	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								980	885	947	999	973
2018									889	949	1003	965
2019										949	1004	956
2020											1006	951
2021												945

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

		Projected Residential Energy Demand (Year Forecast Was Filed)										
Year	Actual	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
2007	1690	1659										
2008	1667	1693	1693									
2009	1634	1724	1724	1780								
2010	1696	1758	1758	1761	1701							
2011	1711	1789	1789	1806	1708	1664						
2012	1668		1821	1860	1721	1624	1590					
2013	1704			1904	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								1649	1699	1703	1563	1651
2018									1705	1713	1545	1632
2019										1714	1532	1609
2020											1520	1593
2021												1584

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

		Projected Commercial Energy Demand (Year Forecast Was Filed)										
Year	Actual	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
2007	1414	1394										
2008	1404	1427	1427									
2009	1367	1461	1461	1401								
2010	1311	1496	1496	1394	1428							
2011	1327	1532	1532	1424	1408	1300						
2012	1334		1569	1491	1449	1267	1291					
2013	1349			1535	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								1374	1332	1049	1315	1345
2018									1332	1047	1319	1330
2019										1040	1321	1314
2020											1321	1302
2021												1289

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

		Projected Industrial Energy Demand (Year Forecast Was Filed)										
Year	Actual	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
2007	1627	1720										
2008	1614	1727	1727									
2009	1229	1734	1734	1347								
2010	1488	1741	1741	1517	1226							
2011	1542	1748	1748	1687	1214	1527						
2012	1456		1755	1694	1238	1652	1513					
2013	1509			1700	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								1485	1729	2202	1696	1513
2018									1731	2256	1742	1476
2019										2278	1775	1465
2020											1790	1467
2021												1460

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

		Projected Peak Load Requirements (Year Forecast Was Filed)										
Year	Actual	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
2007	7163	7200										
2008	7414	7270	7410									
2009	6845	7340	7450	7180								
2010	7365	7400	7500	7250	7207							
2011	6776	7480	7580	7320	7227	7101						
2012	7182		7680	7360	7283	7138	7331					
2013	7190			7450	7366	7142	7400	7271				
2014	7816				7487	7216	7484	7403	7334			
2015	7842					7282	7622	7556	7477	7220		
2016	7216						7731	7691	7568	7314	7209	
2017								7785	7635	7408	7298	7209
2018									7686	7467	7385	7298
2019										7511	7435	7385
2020											7427	7435
2021												7427

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

		Projected Residential Energy Demand (Year Forecast Was Filed)										
Year	Actual	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
2007	14411	14180										
2008	14419	14422	14469									
2009	14218	14565	14584	14341								
2010	14206	14702	14562	14340	14384							
2011	14356	14828	14608	14246	14390	14142						
2012	13616		14770	14350	14226	14120	13848					
2013	14295			14443	14164	14005	13658	13607				
2014	14563				14325	14161	13667	13575	13588			
2015	14462					14335	13738	13602	13644	13647		
2016	13810						13896	13695	13769	13720	13721	
2017								13678	13814	13732	13750	13856
2018									13908	13781	13825	13940
2019										13790	13826	13982
2020											13679	13853
2021												13750

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

		Projected Commercial Energy Demand (Year Forecast Was Filed)										
Year	Actual	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
2007	13756	13184										
2008	13913	13476	13676									
2009	13818	13777	14028	14258								
2010	10667	14045	14253	14486	14098							
2011	14179	14290	14596	14631	14642	10756						
2012	14027		14907	14926	14907	10860	14217					
2013	14140			15228	15295	11022	14270	14354				
2014	14111				15827	11251	14411	14524	14414			
2015	14336					11499	14580	14740	14570	14235		
2016	14160						14754	14998	14741	14234	14214	
2017								15137	14859	14376	14257	14394
2018									14985	14440	14326	14517
2019										14484	14357	14578
2020											14357	14560
2021												14493

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

		Projected Industrial Energy Demand (Year Forecast Was Filed)										
Year	Actual	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
2007	9482	9965										
2008	9551	9999	9625									
2009	8418	10032	9570	9401								
2010	12045	10059	9228	9141	8506							
2011	8467	10084	9005	8879	8365	12151						
2012	8173		9009	8866	8211	12116	8475					
2013	8052			8864	8110	12269	8468	8133				
2014	8313				8054	12450	8501	8182	8092			
2015	8269					12686	8550	8281	8171	7966		
2016	8128						8603	8407	8260	8066	8283	
2017								8459	8324	8129	8354	8370
2018									8365	8168	8420	8467
2019										8189	8450	8521
2020											8450	8520
2021												8520

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

		Projected Peak Load Requirements (Year Forecast Was Filed)										
Year	Actual	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
2007	8549	9066										
2008	8824	9202	8677									
2009	7994	9340	8807	8956								
2010	8864	9480	8940	9091	8114							
2011	8984	9622	9074	9227	8236	8786						
2012	8549		9210	9365	8359	8770	8926					
2013	8618			9506	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								8735	8653	8275	8110	8102
2018									8661	8284	8118	8110
2019										8292	8126	8118
2020											8135	8126
2021												8135

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

		Projected Residential Energy Demand (Year Forecast Was Filed)										
Year	Actual	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
2007	13487	13053										
2008	13317	13314	13757									
2009	12893	13580	14032	13583								
2010	13896	13852	14313	13855	13151							
2011	13686	14129	14599	14132	13414	13912						
2012	13233		14891	14415	13683	14037	13669					
2013	13241			14703	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								14902	13351	13422	13341	13436
2018									13354	13489	13352	13423
2019										13556	13354	13404
2020											13360	13428
2021												13346

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

		Projected Commercial Energy Demand (Year Forecast Was Filed)										
Year	Actual	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
2007	8892	9034										
2008	8700	9215	9069									
2009	8404	9399	9251	8874								
2010	8472	9587	9436	9052	8572							
2011	8332	9779	9625	9233	8744	8589						
2012	8063		9817	9417	8918	8705	8360					
2013	8101			9606	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								8026	8096	8013	8020	8132
2018									8177	8009	8016	8073
2019										8005	8018	8063
2020											8019	8046
2021												7995

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

		Projected Industrial Energy Demand (Year Forecast Was Filed)										
Year	Actual	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
2007	16582	16137										
2008	16534	16460	16914									
2009	15889	16789	17252	16864								
2010	15824	17125	17597	17202	16207							
2011	15755	17467	17949	17546	16531	15991						
2012	15253		18308	17897	16861	16153	15755					
2013	15379			18254	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								16431	16322	15287	15515	15016
2018									16567	15279	15513	15364
2019										15271	15517	15320
2020											15529	15356
2021												15355

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

		Projected Peak Load Requirements (Year Forecast Was Filed)										
Year	Actual	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
2007	3838	3813										
2008	3826	3882	3871									
2009	3667	3965	3958	3910								
2010	3988	4028	4036	3990	3788							
2011	4017	4078	4083	4032	3755	3757						
2012	3808		4123	4084	3771	3754	3758					
2013	3914			4120	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								4015	4065	3927	3840	3776
2018									4077	4020	3886	3789
2019										4031	3916	3775
2020											3917	3767
2021												3762

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

		Projected Residential Energy Demand (Year Forecast Was Filed)										
Year	Actual	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
2007	7266	7319										
2008	7172	7484	7481									
2009	7101	7639	7654	7206								
2010	7401	7761	7774	7264	7147							
2011	7349	7869	7892	7233	7104	7139						
2012	7092		7965	7248	7085	7122	7121					
2013	7318			7102	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								7493	7319	7244	6634	6892
2018									7335	7298	6548	6834
2019										7303	6473	6752
2020											6407	6660
2021												6614

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

		Projected Commercial Energy Demand (Year Forecast Was Filed)										
Year	Actual	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
2007	4998	5083										
2008	4925	5179	5115									
2009	4880	5279	5235	5048								
2010	4983	5365	5327	5160	4966							
2011	4889	5452	5387	5275	4987	4909						
2012	4849		5462	5353	5059	4931	4819					
2013	4878			5450	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								5047	4962	5015	4915	4995
2018									4962	5029	4941	4953
2019										5006	4952	4918
2020											4954	4884
2021												4857

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

		Projected Industrial Energy Demand (Year Forecast Was Filed)										
Year	Actual	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
2007	8160	8282										
2008	8135	8411	8311									
2009	7286	8584	8476	8440								
2010	7617	8728	8699	8711	7612							
2011	7818	8766	8799	8906	7740	7833						
2012	7685		8844	9093	7936	8025	8029					
2013	7777			9246	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								8878	8466	8903	8641	7947
2018									8495	9321	8798	8072
2019										9700	8847	8114
2020											8852	8179
2021												8199

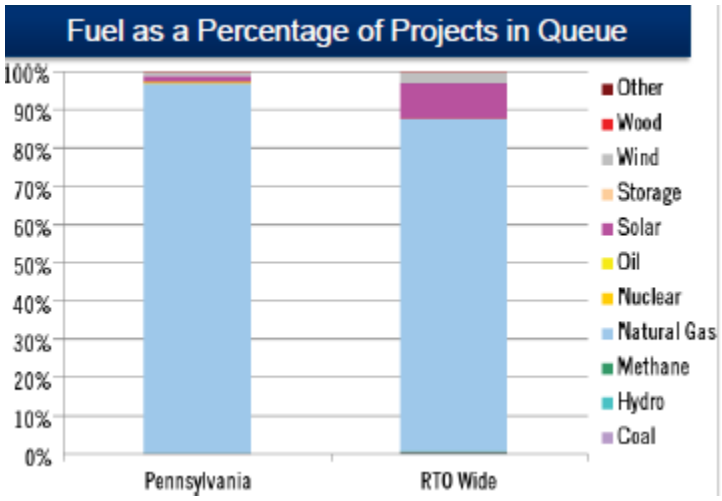
Appendix B – Plant Additions and Upgrades

Table B-1, Chart B-1, and Chart B-2 detail PJM interconnection requests for new generating resources located in Pennsylvania.[60] Currently Pennsylvania has 7,142 MW under construction as compared to 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 January 1, through December 31, 2016.

Table B-1, New Generation Queue for Pennsylvania – Interconnection Requests (Dec 31, 2016)

	Active		In Service		Suspended		Under Construction		Withdrawn		Total Sum	
	MW	# of Projects	MW	# of Projects	MW	# of Projects	MW	# of Projects	MW	# of Projects	MW	# of Projects
Biomass			31.4	3					36.5	4	67.9	7
Coal	10.0	1	229.0	17					14,354.6	28	14,593.6	46
Diesel	6.1	1	33.3	3					51.5	12	90.9	16
Hydro			463.8	11			17.0	1	188.6	15	669.4	27
Methane			134.6	26					197.2	36	331.8	62
Natural Gas	7,920.4	36	11,621.7	57	154.4	9	7,064.8	22	82,687.3	208	109,448.6	332
Nuclear	94.0	5	2,581.8	15					1,681.0	8	4,356.8	28
Oil			9.4	3					1,307.0	9	1,316.4	12
Solar	192.3	7	6.8	3	21.4	4			504.7	85	725.2	99
Storage	0.0	4	0.1	6			0.0	2	0.1	13	0.2	25
Other	1.1	1	326.5	3					344.0	6	671.6	10
Wind	71.8	7	240.4	37	40.0	3	60.4	4	1,568.3	122	1,980.9	173
Wood					16.0	1					16.0	1
Total	8,295.7	62	15,678.8	184	231.8	17	7,142.2	29	102,920.8	546	134,269.3	838

Chart B-1, Pennsylvania/PJM New Generation – Fuel as % of Projects in Queue (Dec 31, 2016)



[60] *PJM Pennsylvania State Report 2017*, provided to PUC Staff in July, 2017.

Chart B-2, Pennsylvania New Generation Queue –Total MW Capacity by Fuel (Dec 31, 2016)

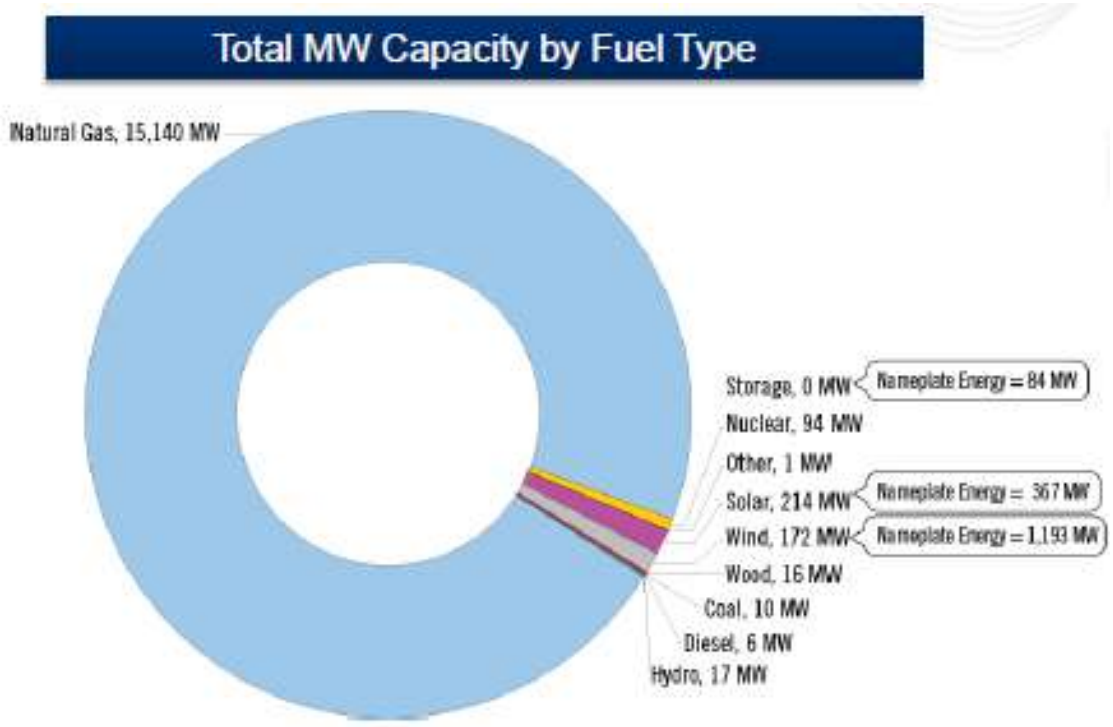


Table B-2, 2016 Pennsylvania Generation Deactivations

Unit	MW Capacity	TO Zone	Age	Actual Deactivation Date
Harrisburg 4 CT	14	PPL	49	11/17/2016
Rolling Hills Landfill Generator*	0	MetEd	10	12/7/2016

*Note: Rolling Hills landfill generator was 0 MW capacity and 6 MW energy.

In 2016, 14 MW of capacity retired in Pennsylvania as compared to 177 MW in 2015. In 2016, 392 MW of capacity retired in entire PJM territory as compared to 10,800 MW in 2015.

Appendix C – Existing Generating Facilities

Table C-1, represents the 2016/2015/2014 PJM region installed electrical capacity percentage and actual generation percentage by energy source.[61]
Chart C-1, represents the 2016 Pennsylvania installed capacity percentage by energy source.
Chart C-2, represents the 2016 Pennsylvania actual generation percentage by energy source.
Table C-2 represents existing generating facilities by County located in Pennsylvania and provides.[62]

Table C-1 Electrical Power Supply Mix

PJM Region Electricity Supply Mix 2016/2015/2014 (percent)						
Energy Source	2016 Capacity	2015 Capacity	2014 Capacity	2016 Generation	2015 Generation	2014 Generation
Coal	36.5	37.5	39.7	33.9	36.6	43.3
Nuclear	18.1	18.6	17.9	34.4	35.5	34.4
Natural Gas	35.7	34	30.7	26.7	23.4	17.8
Hydro,Wind, & Other	6	6	5.7	4.7	4.4	4.4
Oil	3.7	3.9	6	0.3	0.1	0.1

[61] *State of the Market Report for PJM*, reporting years 2016, 2015, and 2014, available at www.monitoringanalytics.com.
[62] Data reported to SNL and received by PUC staff.

Chart C-1 Electrical Power Capacity Mix

2016 Pennsylvania Installed Capacity

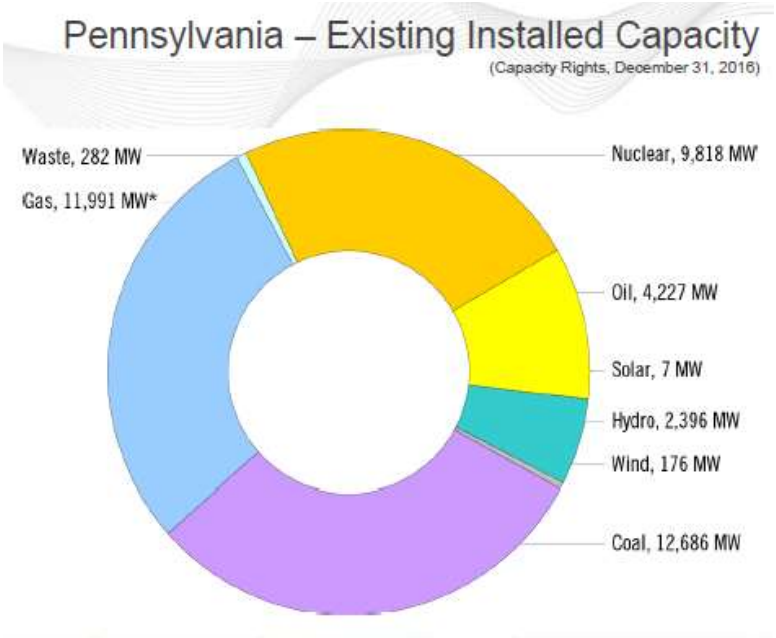


Chart C-2 Pennsylvania Electrical Power Generation Mix

2016 Actual Generation Production

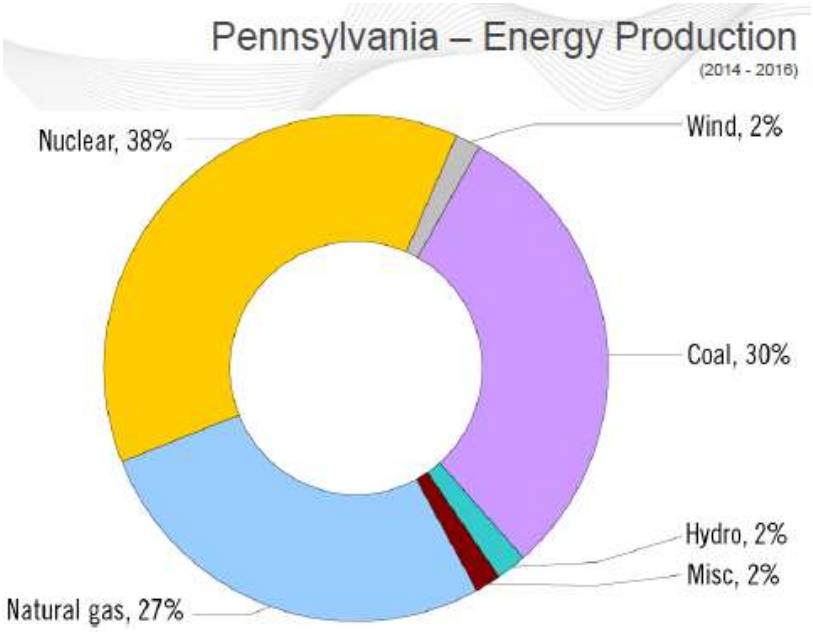


Table C-2 Electric Generating Facilities in Pennsylvania

County	Power Plant	Owner	Ultimate Parent	Ownership (%)	Operating Capacity (MW)	Year First Unit in Service	Age	Fuel Type
Adams	Gettysburg Energy & Nutrient Recovery Facility (GENRF)	EnergyWorks BioPower, Inc	EnergyWorks BioPower, Inc	100	2.7	2013	4	Biomass
	Hamilton	NRG REMA LLC	NRG Energy, Inc.	100	24	1971	46	Oil
	Hunterstown	NRG REMA LLC	NRG Energy, Inc.	100	75	1971	46	Oil
	Hunterstown CC	NRG Energy, Inc.	NRG Energy, Inc.	100	810	2003	14	Gas
	Orrtanna	NRG REMA LLC	NRG Energy, Inc.	100	26	1971	46	Oil
Allegheny	Allegheny Energy 3, 4 and 5 (Springdale)	Allegheny Energy Supply Company, LLC	FirstEnergy Corp.	100	550	2003	14	Gas
	Allegheny Energy Units 1 and 2 (Springdale)	Allegheny Energy Supply Company, LLC	FirstEnergy Corp.	100	88	1999	18	Gas
	Brunot Island	Orion Power Holdings, Inc.	NRG Energy, Inc.	100	15	1972	45	Oil
	Brunot Island CC	NRG Power Midwest LP.	NRG Energy, Inc.	100	269.4	1973	44	Gas
	Cheswick	NRG Power Midwest LP.	NRG Energy, Inc.	100	563	1970	47	Coal
	Clairton Works	United States Steel Corporation	United States Steel Corporation	100	27.4	1955	62	Other
	Mon Valley Works	United States Steel Corporation	United States Steel Corporation	100	31.9	1943	74	Other
	PPG Monroeville Chemicals Center	PPG Monroeville Chemicals Center	PPG Industries, Incorporated	100	1.1	1998	19	Oil
	PPG Place	PPG Industries, Incorporated	PPG Industries, Incorporated	100	2.3	1990	27	Oil
Armstrong	Allegheny 5	Enduring Hydro LLC	Enduring Hydro LLC	1	10	1988	29	Water
	Allegheny 5	I Squared Capital	I Squared Capital	99	10	1988	29	Water
	Allegheny 6	Enduring Hydro LLC	Enduring Hydro LLC	1	12	1988	29	Water
	Allegheny 6	I Squared Capital	I Squared Capital	99	12	1988	29	Water
	Allegheny 8 (Torrent Hydro)	BluEarth Renewables Inc.	BluEarth Renewables Inc.	49	13.6	1990	27	Water
	Allegheny 8 (Torrent Hydro)	Public Sector Pension Investment Board	Public Sector Pension Investment Board	51	13.6	1990	27	Water
	Allegheny 9 (Torrent Hydro)	BluEarth Renewables Inc.	BluEarth Renewables Inc.	49	17.8	1990	27	Water
	Allegheny 9 (Torrent Hydro)	Public Sector Pension Investment Board	Public Sector Pension Investment Board	51	17.8	1990	27	Water
	Armstrong County	Dynegy Inc.	Dynegy Inc.	100	676	2002	15	Gas
	Keystone	Talen Generation, LLC	Riverstone Holdings LLC	12	1,700	1967	50	Coal
	Keystone	NRG REMA LLC	NRG Energy, Inc.	20	1,700	1967	50	Coal
	Keystone	ArcLight Capital Partners, LLC	ArcLight Capital Holdings, LLC	44	1,700	1967	50	Coal
	Keystone	PSEG Fossil LLC	Public Service Enterprise Group Incorporated	23	1,700	1967	50	Coal
	Keystone IC	Talen Generation, LLC	Riverstone Holdings LLC	12	11.2	1968	49	Oil
	Keystone IC	ArcLight Capital Partners, LLC	ArcLight Capital Holdings, LLC	44	11.2	1968	49	Oil
	Keystone IC	NRG REMA LLC	NRG Energy, Inc.	20	11.2	1968	49	Oil
	Keystone IC	PSEG Fossil LLC	Public Service Enterprise Group Incorporated	23	11.2	1968	49	Oil
	Mahoning Creek	Enduring Hydro LLC	Enduring Hydro LLC	51	6.7	2013	4	Water
	Mahoning Creek	I Squared Capital	I Squared Capital	49	6.7	2013	4	Water
Beaver	Beaver Solar	Eaton Corporation	Eaton Corporation	100	1.3	2012	5	Solar
	Beaver Valley	FirstEnergy Nuclear Generation, LLC	FirstEnergy Corp.	100	1,872	1976	41	Nuclear
	Beaver Valley Patterson Dam	Enel Green Power North America, Inc.	Enel Green Power S.p.A	32	1.2	1982	35	Water
	Beaver Valley Patterson Dam	Enel Green Power North America, Inc.	Enel S.p.A.	68	1.2	1982	35	Water
	Bruce Mansfield	FirstEnergy Generation, LLC	FirstEnergy Corp.	100	2,510	1976	41	Coal
	Townsend Hydro	Beaver Falls Municipal Authority	Beaver Falls Municipal Authority	100	4.2	1987	30	Water
Berks	Altairnano PJM Li-ion Battery Storage Project	AES Energy Storage, LLC	AES Corporation	100	1	2009	8	Other
	Evergreen Community Power Plant	Evergreen Community Power LLC	Interstate Resources, Inc.	100	25	2009	8	Biomass
	Morgantown Generating Station	Granger Electric Co	Granger Electric Co	100	1.6	2016	1	Biomass
	Morgantown Solar Park	Hankin Group	Hankin Group	100	1.6	2011	6	Solar
	Ontelaunee Energy Center	Dynegy Power, LLC	Dynegy Inc.	100	639	2002	15	Gas
	Pioneer Crossing Landfill	Green Gas Americas, Inc.	Green Gas International B.V.	0	8	2008	9	Biomass
	Pioneer Crossing Landfill	Fortistar LLC	Fortistar LLC	100	8	2008	9	Biomass
	Titus CT	NRG REMA LLC	NRG Energy, Inc.	100	35	1967	50	Oil

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

County	Power Plant	Owner	Ultimate Parent	Ownership (%)	Operating Capacity (MW)	Year First Unit in Service	Age	Fuel Type
Blair	Allegheny Ridge Wind Farm	ArcLight Capital Partners, LLC	ArcLight Capital Holdings, LLC	100	80	2007	10	Wind
	Chestnut Flats Windfarm	EDF Renewable Energy, Inc.	EDF Group	100	38	2011	6	Wind
	Juniata Locomotive Shop	Norfolk Southern Corporation	Norfolk Southern Corporation	100	4	1955	62	Coal
	North Allegheny Wind	Duke Energy Renewables, Inc.	Duke Energy Corporation	100	70	2009	8	Wind
	Sandy Ridge Wind Farm	Algonquin Power Fund (America) Inc.	Algonquin Power & Utilities Corp.	100	48.2	2012	5	Wind
Bradford	Alpaca Gas Project	IMG Midstream LLC	COFRA Holding AG	100	21.2	2017	0	Gas
	Beaver Dam Gas Project	IMG Midstream LLC	COFRA Holding AG	100	19.9	2016	1	Gas
	Milan Gas Project	IMG Midstream LLC	COFRA Holding AG	100	21.2	2017	0	Gas
	Northern Tier Landfill	Talen Renewable Energy	Energy Power Partners	100	1.6	2009	8	Biomass
	Panda Liberty Generating Station (Moxie Liberty)	Panda Power Funds, LP	Panda Power Funds, LP	100	936	2016	1	Gas
Bucks	Croydon	Exelon Generation Company, LLC	Exelon Corporation	100	512	1974	43	Oil
	Exelon-Conergy Solar Energy Center	Conergy AG	Kawa Capital Management, Inc.	100	1.5	2008	9	Solar
	Fairless Hills Steam Generating Station	Exelon Generation Company, LLC	Exelon Corporation	100	60	1996	21	Biomass
	Fairless Works Energy Center	Dominion Energy, Inc.	Dominion Energy, Inc.	100	1,320.4	2004	13	Gas
	Falls	Exelon Generation Company, LLC	Exelon Corporation	100	60	1970	47	Oil
	Pennsbury Generating Station	Exelon Generation Company, LLC	Exelon Corporation	100	5.4	1996	21	Biomass
	Tullytown Landfill Gas Facility	WM Renewable Energy, LLC	Waste Management, Inc.	100	1.6	2013	4	Biomass
	Wheelabrator Falls Inc.	Wheelabrator Technologies, Inc.	Energy Capital Partners LLC	100	46	1994	23	Biomass
Cambria	Cambria Cogeneration	UBS Global Asset Management	UBS Group AG	50	88	1991	26	Coal
	Cambria Cogeneration	Harbert Power Fund V, LLC	Harbert Management Corporation	13	88	1991	26	Coal
	Cambria Cogeneration	Gulf Pacific Power LLC	Harbert Management Corporation	38	88	1991	26	Coal
	Colver Power Project	UBS Global Asset Management	UBS Group AG	38	110	1995	22	Coal
	Colver Power Project	Harbert Power Fund V, LLC	Harbert Management Corporation	9	110	1995	22	Coal
	Colver Power Project	Gulf Pacific Power LLC	Harbert Management Corporation	28	110	1995	22	Coal
	Colver Power Project	Constellation Power, Inc.	Exelon Corporation	25	110	1995	22	Coal
	Ebensburg Power Company	Revloc Reclamation Service, Inc.	Generation Holdings, LP	100	50	1991	26	Coal
	Highland North Wind Farm	Everpower Wind Holdings, Inc.	Terra Firma Capital Partners Ltd.	100	75	2012	5	Wind
	Highland Wind Project	Everpower Wind Holdings, Inc.	Terra Firma Capital Partners Ltd.	100	63	2009	8	Wind
	Patton Wind Farm	Everpower Wind Holdings, Inc.	Terra Firma Capital Partners Ltd.	100	30	2012	5	Wind
Carbon	PA Solar Park Project	Consolidated Edison Development, Inc.	Consolidated Edison, Inc.	100	10	2012	5	Solar
	Panther Creek	Olympus Power, LLC	Olympus Holdings, LLC	25	83	1992	25	Coal
	Panther Creek	ArcLight Energy Partners Fund IV, L. P.	ArcLight Capital Holdings, LLC	75	83	1992	25	Coal
Centre	East Campus Plant	Pennsylvania State University	Pennsylvania State University	100	8.4	2011	6	Gas
	West Campus Plant	Pennsylvania State University	Pennsylvania State University	100	5.2	1938	79	Gas
Chester	Andromeda One A Biomass Plant	Behrens Energy Agriculture & Robotics	Behrens Energy Agriculture & Robotics	100	4	2016	1	Biomass
	Aqua Ingrams Mill Solar	Aqua Pennsylvania Inc.	Aqua America Inc.	100	0.4	2009	8	Solar
	Longwood Gardens Solar Plant	Ecogy Pennsylvania Systems, LLC	Ecogy Pennsylvania Systems, LLC	100	1.3	2010	7	Solar
	Marlboro Mushrooms Solar Field	Marlborough Mushrooms	Marlborough Mushrooms	100	1	2011	6	Solar
	Pickering Solar	Aqua America Inc.	Aqua America Inc.	100	1.4	2012	5	Solar
	SECCRA Community Landfill	Southeastern Chester County Refuse Authority	Southeastern Chester County Refuse Authority	100	2.5	2007	10	Biomass
Clarion	Piney	Brookfield Renewable Partners L.P.	Brookfield Asset Management Inc.	61	33.2	1924	93	Water
	Piney	Brookfield Renewable Partners L.P.	Brookfield Renewable Partners L.P.	39	33.2	1924	93	Water

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

County	Power Plant	Owner	Ultimate Parent	Ownership (%)	Operating Capacity (MW)	Year First Unit in Service	Age	Fuel Type
Clearfield	Shawville	NRG REMA LLC	NRG Energy, Inc.	100	588	1954	63	Gas
	Shawville IC	NRG REMA LLC	NRG Energy, Inc.	100	6	1960	57	Oil
Clinton	Lock Haven	Talen Energy Supply, LLC	Riverstone Holdings LLC	100	15	1969	48	Oil
Cumberland	Carlisle Area School District	Carlisle Area School District	Carlisle Area School District	100	1.3	2010	7	Solar
	Knouse Foods Solar Plant	Knouse Foods Cooperative Inc	Knouse Foods Cooperative Inc	100	3	2010	7	Solar
	Mountain	NRG REMA LLC	NRG Energy, Inc.	100	50	1972	45	Oil
	PPG Industries Works 6 IC Facility	PPG Industries, Incorporated	PPG Industries, Incorporated	100	5	1972	45	Oil
	Shippensburg (Cumberland County) Landfill	Talen Renewable Energy	Energy Power Partners	100	6.4	2009	8	Biomass
	West Shore	Talen Energy Supply, LLC	Riverstone Holdings LLC	100	31	1969	48	Oil
Dauphin	Harrisburg	Talen Energy Supply, LLC	Riverstone Holdings LLC	100	43.5	1967	50	Oil
	Paxton Creek Cogeneration	NRG Yield, Inc.	NRG Energy, Inc.	55	12	1986	31	Gas
	Paxton Creek Cogeneration	NRG Yield, Inc.	NRG Yield, Inc.	45	12	1986	31	Gas
	Susquehanna Resource Management Complex (Harrisburg Facility Cogen)	Lancaster County Solid Waste Management Authority	Lancaster County Solid Waste Management Author	100	21.8	1986	31	Biomass
	Three Mile Island	Exelon Generation Company, LLC	Exelon Corporation	100	829	1974	43	Nuclear
Delaware	Chester	Exelon Generation Company, LLC	Exelon Corporation	100	54	1969	48	Oil
	Chester Operations	Kimberly-Clark Corp.	Kimberly-Clark Corp.	100	67	1986	31	Coal
	Delaware County Resource Recovery Facility	Covanta Energy Corporation	Covanta Holding Corporation	100	80	1991	26	Biomass
	Eddystone 3-4	Exelon Generation Company, LLC	Exelon Corporation	100	760	1974	43	Gas
	Eddystone CT	Exelon Generation Company, LLC	Exelon Corporation	100	76	1967	50	Oil
	Liberty Electric Power	Equipower Resources Corp.	Dynegy Inc.	100	541	2002	15	Gas
	Marcus Hook	Starwood Energy Group Global, LLC	Starwood Energy Group Global, LLC	100	846	2004	13	Gas
	Marcus Hook Cogeneration	Starwood Energy Group Global, LLC	Starwood Energy Group Global, LLC	100	50	1987	30	Gas
Elk	Johnsonburg Mill	Domtar Paper Company, LLC	Domtar Corp.	100	49	1993	24	Biomass
Erie	Erie Coke Corporation	Erie Coke Corporation	Erie Coke Corporation	100	1.3	1953	64	Other
	Lakeview Gas Recovery	WM Renewable Energy, LLC	Waste Management, Inc.	100	6	1997	20	Biomass
Fayette	Allegheny Energy Units 8 and 9 (Gans Plant)	Allegheny Energy Supply Company, LLC	FirstEnergy Corp.	100	88	2000	17	Gas
	Fayette Energy Facility	Dynegy Inc.	Dynegy Inc.	100	729	2003	14	Gas
	Mill Run Wind Farm	NextEra Energy Resources LLC	NextEra Energy, Inc.	100	15	2001	16	Wind
	South Chestnut Wind Project	Avangrid Renewables, LLC	Avangrid, Inc.	19	50.4	2012	5	Wind
	South Chestnut Wind Project	Avangrid Renewables, LLC	Iberdrola, S.A.	82	50.4	2012	5	Wind
Franklin	Allegheny Energy Units 12 & 13 (Chambersburg)	Allegheny Energy Supply Company, LLC	FirstEnergy Corp.	100	88	2001	16	Gas
	Falling Spring	Chambersburg Borough of	Chambersburg Borough of	100	7.1	1967	50	Gas
	IESI Blue Ridge Landfill	Talen Renewable Energy	Energy Power Partners	100	6.4	2013	4	Biomass
	Mountain View Landfill	CCI Power Holdings LLC	Castleton Commodities International, LLC	12	14.4	2003	14	Biomass
	Mountain View Landfill	CCI Power Holdings LLC	Energy Trading Innovations LLC	88	14.4	2003	14	Biomass
	Orchard Park	Chambersburg Borough of	Chambersburg Borough of	100	23.2	2003	14	Gas
Huntingdon	Warrior Ridge Hydroelectric	American Hydro Power Co.	American Hydro Power Co.	100	2.8	1985	32	Water
	Wm F Matson Generating Station	Allegheny Electric Cooperative Inc.	Allegheny Electric Cooperative Inc.	100	21.7	1988	29	Water

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

County	Power Plant	Owner	Ultimate Parent	Ownership (%)	Operating Capacity (MW)	Year First Unit in Service	Age	Fuel Type
Indiana	Conemaugh	Talen Generation, LLC	Riverstone Holdings LLC	16	1,700	1970	47	Coal
	Conemaugh	NRG REMA LLC	NRG Energy, Inc.	16	1,700	1970	47	Coal
	Conemaugh	NRG Northeast Generating LLC	NRG Energy, Inc.	4	1,700	1970	47	Coal
	Conemaugh	ArcLight Capital Partners, LLC	ArcLight Capital Holdings, LLC	35	1,700	1970	47	Coal
	Conemaugh	PSEG Fossil LLC	Public Service Enterprise Group Incorporated	23	1,700	1970	47	Coal
	Conemaugh	UGI Development Company	UGI Corporation	6	1,700	1970	47	Coal
	Conemaugh IC	Talen Generation, LLC	Riverstone Holdings LLC	16	11.2	1970	47	Oil
	Conemaugh IC	ArcLight Capital Partners, LLC	ArcLight Capital Holdings, LLC	35	11.2	1970	47	Oil
	Conemaugh IC	NRG REMA LLC	NRG Energy, Inc.	16	11.2	1970	47	Oil
	Conemaugh IC	NRG Northeast Generating LLC	NRG Energy, Inc.	4	11.2	1970	47	Oil
	Conemaugh IC	PSEG Fossil LLC	Public Service Enterprise Group Incorporated	23	11.2	1970	47	Oil
	Conemaugh IC	UGI Development Company	UGI Corporation	6	11.2	1970	47	Oil
	Homer City	Elliott Associates, L.P.	Elliot Group	3	1,901.1	1969	48	Coal
	Homer City	Preston Securities LLC	Preston Securities LLC	6	1,901.1	1969	48	Coal
	Homer City	Homer City Generation LLC	Homer City Generation LLC	80	1,901.1	1969	48	Coal
	Homer City	GE Capital US Holdings, Inc.	General Electric Company	11	1,901.1	1969	48	Coal
	Indiana University of Pennsylvania	Indiana University of Pennsylvania	Indiana University of Pennsylvania	100	24	1988	29	Gas
	Seward Waste Coal	Seward Generation, LLC	Robindale Energy Services, Inc.	100	521	2004	13	Coal
Lackawanna	Archbald Cogeneration	PEI Power Corporation	Energy Transfer Partners, L.P.	100	20	1988	29	Biomass
	Archbald Power Station	PEI Power Corporation	Energy Transfer Partners, L.P.	100	59.2	2001	16	Gas
	Keystone Landfill	Keystone Recovery Inc	Keystone Recovery Inc	100	4.9	1995	22	Biomass
Lancaster	Dart Container Corp Cogen	Dart Container Corp.	Dart Container Corp.	100	10.4	2012	5	Biomass
	Frey Farm Landfill	Talen Renewable Energy	Energy Power Partners	100	3.2	2006	11	Biomass
	Holtwood Hydroelectric Plant	Brookfield Renewable Partners L.P.	Brookfield Renewable Partners L.P.	39	249	1910	107	Water
	Holtwood Hydroelectric Plant	Brookfield Renewable Partners L.P.	Brookfield Asset Management Inc.	61	249	1910	107	Water
	Holtwood Hydroelectric Plant	Talen Generation, LLC	Talen Energy Corporation	0	249	1910	107	Water
	Honey Brook Generating Station (Granger)	Granger Energy of Honey Brook, L.L.C.	Granger Electric Co	100	3.2	2006	11	Biomass
	Keystone Solar Project	D. E. Shaw Renewable Investments, LLC	D. E. Shaw & Co., L.P.	50	5	2012	5	Solar
	Keystone Solar Project	Bright Plain Renewable Energy, LLC	Bright Plain Renewable Energy, LLC	50	5	2012	5	Solar
	Lancaster County Resource Recovery	Lancaster County Solid Waste Management Authority	Lancaster County Solid Waste Management Autho	100	32.4	1991	26	Biomass
	Martin Limestone Solar Array Plant	Sunstream Energy LLC	Sunstream Energy LLC	100	1.0	2012	5	Solar
	Muddy Run Pumped Storage Facility	Exelon Generation Company, LLC	Exelon Corporation	100	1,070	1967	50	Water
	Safe Harbor	Brookfield Renewable Partners L.P.	Brookfield Renewable Partners L.P.	39	417.5	1931	86	Water
	Safe Harbor	Brookfield Renewable Partners L.P.	Brookfield Asset Management Inc.	61	417.5	1931	86	Water
	Turkey Point Wind Project (Frey Farm Wind)	Talen Renewable Energy	Energy Power Partners	100	3.2	2011	6	Wind
	Zook Generating Station (L&S Sweetners)	Granger Electric Co	Granger Electric Co	100	3.2	2013	4	Biomass
Lawrence	New Castle	NRG Power Midwest LP.	NRG Energy, Inc.	100	320	1939	78	Gas
	New Castle IC	Orion Power Holdings, Inc.	NRG Energy, Inc.	100	2.5	1968	49	Oil

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

County	Power Plant	Owner	Ultimate Parent	Ownership (%)	Operating Capacity (MW)	Year First Unit in Service	Age	Fuel Type
Lebanon	Greater Lebanon Refuse Authority Landfill	Talen Renewable Energy	Energy Power Partners	100	3.2	2007	10	Biomass
	PPL Ironwood	Helix Generation, LLC	LS Power Group	100	735.4	2001	16	Gas
Lehigh	Air Products Solar (Trexlertown Solar)	Air Products Energy Enterprises, L.P.	Air Products and Chemicals, Inc.	100	1.9	2011	6	Solar
	Allentown	Talen Energy Supply, LLC	Riverstone Holdings LLC	100	62	1967	50	Oil
Luzerne	AE Hunlock 4	Allegheny Energy Supply Company, LLC	FirstEnergy Corp.	100	45	2000	17	Gas
	Bear Creek Wind Project	ArcLight Capital Partners, LLC	ArcLight Capital Holdings, LLC	26	24	2006	11	Wind
	Bear Creek Wind Project	Community Energy, Inc.	Community Energy, Inc.	9	24	2006	11	Wind
	Bear Creek Wind Project	Central Hudson Enterprises Corporation	Fortis Inc.	9	24	2006	11	Wind
	Bear Creek Wind Project	JPMorgan Chase & Co.	JPMorgan Chase & Co.	56	24	2006	11	Wind
	Harwood	Talen Energy Supply, LLC	Riverstone Holdings LLC	100	30	1967	50	Oil
	Hazle Township Flywheel Energy Storage	Beacon Power LLC	Rockland Capital, LLC	100	20	2013	4	Other
	Hazleton Cogeneration	Starwood Energy Group Global, LLC	Starwood Energy Group Global, LLC	100	150.9	1989	28	Gas
	Hunlock Repowering	UGI Development Company	UGI Corporation	100	129.9	2011	6	Gas
	Jenkins	Talen Energy Supply, LLC	Riverstone Holdings LLC	100	31.0	1969	48	Oil
	MATS Wind	Electric City Wind Power Corporation	Electric City Wind Power Corporation	100	0.6	2008	9	Wind
	Romark PA Solar	Romark Logistics of PA Inc	Romark Logistics of PA Inc	100	1.8	2011	6	Solar
	Susquehanna Nuclear	Talen Generation, LLC	Talen Energy Corporation	0	2,620	1983	34	Nuclear
	Susquehanna Nuclear	Talen Generation, LLC	Riverstone Holdings LLC	90	2,620	1983	34	Nuclear
	Susquehanna Nuclear	Allegheny Electric Cooperative Inc.	Allegheny Electric Cooperative Inc.	10	2,620	1983	34	Nuclear
Lycoming	Allenwood (PPLRE Lycoming County Landfill Project)	Talen Renewable Energy	Energy Power Partners	100	3.2	2012	5	Biomass
	Laurel Hill	Duke Energy Renewables, Inc.	Duke Energy Corporation	100	69	2012	5	Wind
	Lycoming County Landfill Project (PPL Renewable)	Talen Renewable Energy	Energy Power Partners	100	3	2012	5	Biomass
	Patriot Power Generation Plant (Moxie Patriot)	Panda Power Funds, LP	Panda Power Funds, LP	100	829	2016	1	Gas
	Williamsport	Talen Energy Supply, LLC	Riverstone Holdings LLC	100	28.8	1967	50	Oil
Mercer	General Electric Company	General Electric Company	General Electric Company	100	4.3	1984	33	Oil
Monroe	Pocono Raceway Solar Project	Pocono International Raceway, Inc.	Pocono International Raceway, Inc.	100	3	2010	7	Solar
	Shawnee CT	NRG REMA LLC	NRG Energy, Inc.	100	24	1972	45	Oil
Montgomery	500 Virginia Solar	500 Virginia Solar, LP	500 Virginia Solar, LP	100	1	2011	6	Solar
	Conshohocken -Solar	Sun Power Electric	Conservation Services Group	100	0.1	1999	18	Solar
	Covanta Plymouth (Montenay Montgomery)	Covanta Plymouth Renewable Energy L.P.	Covanta Holding Corporation	100	28	1991	26	Biomass
	Hill at Whitemarsh	Talen Renewable Energy	Energy Power Partners	100	1.6	2007	10	Gas
	Limerick	Exelon Generation Company, LLC	Exelon Corporation	100	2,386	1986	31	Nuclear
	Moser	Exelon Generation Company, LLC	Exelon Corporation	100	60	1970	47	Oil
	Spring House IC Plant	Janssen Pharmaceuticals, Inc.	Johnson & Johnson	100	3.8	2013	4	Gas
	West Point Facility	Merck & Company, Inc.	Merck & Company, Inc.	100	66	1989	28	Gas
	West Point Facility IC	Merck & Company, Inc.	Merck & Company, Inc.	100	10.6	1972	45	Oil
Montour	Montour	Talen Generation, LLC	Riverstone Holdings LLC	100	1,548.5	1971	46	Coal

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

County	Power Plant	Owner	Ultimate Parent	Ownership (%)	Operating Capacity (MW)	Year First Unit in Service	Age	Fuel Type
Northampton	Bethlehem CC	Conectiv Bethlehem LLC	Calpine Corporation	100	1,134	2003	14	Gas
	Bethlehem Landfill	Pepco Energy Services, Inc.	Exelon Corporation	80	5.4	2008	9	Biomass
	Bethlehem Landfill	Commonwealth Landfill Gas	Commonwealth Landfill Gas	20	5.4	2008	9	Biomass
	Crayola Solar Park	Talen Renewable Energy	Energy Power Partners	50	2.8	2010	7	Solar
	Crayola Solar Park	UGI Development Company	UGI Corporation	50	2.8	2010	7	Solar
	Glendon Plant	Talen Renewable Energy	Energy Power Partners	100	3.2	2011	6	Biomass
	Green Knight Energy Center	Waste Management, Inc.	Waste Management, Inc.	100	8.7	2001	16	Biomass
	Lower Mount Bethel	Talen Energy Corporation	Riverstone Holdings LLC	100	627.5	2004	13	Gas
	Martins Creek 3 and 4	Talen Generation, LLC	Riverstone Holdings LLC	100	1,729.7	1975	42	Gas
	Martins Creek CT	Talen Generation, LLC	Riverstone Holdings LLC	100	78.8	1971	46	Gas
	Northampton	EIF Northampton LLC	EIF Northampton LLC	9	112	1995	22	Coal
	Northampton	EIF Northampton LLC	Ares Owners Holdings, L.P.	91	112	1995	22	Coal
	Portland CT	NRG REMA LLC	NRG Energy, Inc.	100	191	1967	50	Oil
Northumberland	Mount Carmel Cogeneration	Mt Carmel Co-Gen, Inc.	Private investors-Kenneth M. Pollock & Connie J.Pollock Rado	100	43	1990	27	Coal
Philadelphia	Delaware CT	Exelon Generation Company, LLC	Exelon Corporation	100	74	1969	48	Oil
	Grays Ferry Cogeneration	Grays Ferry Cogeneration Partners	Veolia Environnement SA	100	170	1997	20	Gas
	Lincoln Financial Field Solar Plant	NRG Renew LLC	NRG Energy, Inc.	100	2.9	2013	4	Solar
	Newman & Company Inc.	Newman & Co Inc	Newman & Co Inc	100	1.8	1964	53	Gas
	Philadelphia Refinery	Sunoco, Inc.	Energy Transfer Partners, L.P.	33	20.6	1952	65	Other Nonrenew
	Philadelphia Refinery	Carlyle Group L.P.	Carlyle Group L.P.	67	20.6	1952	65	Other Nonrenew
	PWD Northeast WPCP Biogas Cogen	Philadelphia Water Department	Philadelphia Water Department	100	5.6	2013	4	Biomass
	Richmond CT	Exelon Generation Company, LLC	Exelon Corporation	100	132	1973	44	Oil
	Schuylkill CT	Exelon Generation Company, LLC	Exelon Corporation	100	38	1969	48	Oil
	Southwark	Exelon Generation Company, LLC	Exelon Corporation	100	72	1967	50	Oil
	Temple SEGF Cogen Plant	Temple University	Temple University	100	16	1993	24	Gas
Pike	Wallenpaupack	Brookfield Renewable Partners L.P.	Brookfield Renewable Partners L.P.	39	44	1926	91	Water
	Wallenpaupack	Brookfield Renewable Partners L.P.	Brookfield Asset Management Inc.	61	44	1926	91	Water
Schuylkill	Broad Mountain Landfill Facility	UGI Development Company	UGI Corporation	100	9	2009	8	Biomass
	Fishbach	Talen Energy Supply, LLC	Riverstone Holdings LLC	100	36	1969	48	Oil
	John B Rich Memorial Power Station	UBS Global Asset Management	UBS Group AG	13	80	1988	29	Coal
	John B Rich Memorial Power Station	Cogentrix Energy Power Management LLC	Carlyle Group L.P.	20	80	1988	29	Coal
	John B Rich Memorial Power Station	Ontario Teachers' Pension Plan Board	Ontario Teachers' Pension Plan Board	13	80	1988	29	Coal
	John B Rich Memorial Power Station	RI-CORP Development Inc.	RI-CORP Development Inc.	50	80	1988	29	Coal
	John B Rich Memorial Power Station	NextEra Energy Resources LLC	NextEra Energy, Inc.	5	80	1988	29	Coal
	Locust Ridge II	Avangrid Renewables, LLC	Avangrid, Inc.	19	102	2009	8	Wind
	Locust Ridge II	Avangrid Renewables, LLC	Iberdrola, S.A.	82	102	2009	8	Wind
	Locust Ridge Wind Farm	Avangrid Renewables, LLC	Avangrid, Inc.	19	26	2007	10	Wind
	Locust Ridge Wind Farm	Avangrid Renewables, LLC	Iberdrola, S.A.	82	26	2007	10	Wind
	Masser Farms Realty Solar	Masser Farms Realty Ltd	Masser Farms Realty Ltd	100	1	2011	6	Solar
	Northeastern Power Cogeneration Facility	Dynegy Inc.	Dynegy Inc.	100	52	1989	28	Coal
	Pine Grove Landfill	CCI Power Holdings LLC	Castleton Commodities International, LLC	12	5.4	2008	9	Biomass
	Pine Grove Landfill	CCI Power Holdings LLC	Energy Trading Innovations LLC	88	5.4	2008	9	Biomass
	St. Nicholas Cogeneration	Schuylkill Energy Resource Inc	Schuylkill Energy Resource Inc	100	87.8	1990	27	Coal
	Westwood Generating Station	Treemont Funding, LLC	ArcLight Capital Holdings, LLC	25	30	1987	30	Coal
	Westwood Generating Station	Olympus Westwood Funding, LLC	Olympus Holdings, LLC	75	30	1987	30	Coal
	Wheelabrator Frackville Energy Company	Wheelabrator Technologies, Inc.	Energy Capital Partners LLC	100	42.5	1988	29	Coal
Snyder	Sunbury CT	Corona Power, LLC	Corona Power, LLC	100	47.2	1971	46	Oil
	Sunbury IC	Corona Power, LLC	Corona Power, LLC	100	5	1967	50	Oil

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

County	Power Plant	Owner	Ultimate Parent	Ownership (%)	Operating Capacity (MW)	Year First Unit in Service	Age	Fuel Type
Somerset	Casselman Wind	Avangrid Renewables, LLC	Avangrid, Inc.	19	34.5	2007	10	Wind
	Casselman Wind	Avangrid Renewables, LLC	Iberdrola, S.A.	82	34.5	2007	10	Wind
	Forward WindPower LLC	NRG Energy, Inc.	NRG Energy, Inc.	25	29.4	2008	9	Wind
	Forward WindPower LLC	NRG Yield, Inc.	NRG Yield, Inc.	34	29.4	2008	9	Wind
	Forward WindPower LLC	NRG Yield, Inc.	NRG Energy, Inc.	41	29.4	2008	9	Wind
	Glades Pike Cogeneration Plant (CT)	State Correctional Institution – Laurel Highlands	State Correctional Institution – Laurel Highlands	100	2.5	2011	6	Biomass
	Glades Pike Cogeneration Plant IC	State Correctional Institution – Laurel Highlands	State Correctional Institution – Laurel Highlands	100	2.8	2011	6	Biomass
	Green Mountain Battery Storage System	NextEra Energy Resources LLC	NextEra Energy, Inc.	100	10.4	2016	1	Other
	Lookout WindPower LLC	NRG Energy, Inc.	NRG Energy, Inc.	25	37.8	2008	9	Wind
	Lookout WindPower LLC	NRG Yield, Inc.	NRG Yield, Inc.	34	37.8	2008	9	Wind
	Lookout WindPower LLC	NRG Yield, Inc.	NRG Energy, Inc.	41	37.8	2008	9	Wind
	Meyersdale Wind Project	NextEra Energy Resources LLC	NextEra Energy, Inc.	100	30	2003	14	Wind
	Ringer Hill Wind Farm	NJR Clean Energy Ventures Corporation	New Jersey Resources Corporation	100	39.9	2016	1	Wind
	Somerset Wind Project	NextEra Energy Resources LLC	NextEra Energy, Inc.	100	9	2001	16	Wind
	Stony Creek Wind Farm	EC&R Investco Mgmt, LLC	E.ON SE	50	52.5	2009	8	Wind
	Stony Creek Wind Farm	PD Alternative Investments US Inc	PensionDanmark Holding AS	50	52.5	2009	8	Wind
	Twin Ridges Wind Farm	Everpower Wind Holdings, Inc.	Terra Firma Capital Partners Ltd.	100	139.4	2012	5	Wind
	Yough Hydro Power	D/R Hydro Co	D/R Hydro Co	100	12.2	1989	28	Water
Susquehanna	Roundtop	IMG Midstream LLC	COFRA Holding AG	100	21	2015	2	Gas
Tioga	Armenia Mountain Wind	ALLETE Clean Energy	ALLETE, Inc.	100	100.5	2009	8	Wind
	Blossburg	NRG REMA LLC	NRG Energy, Inc.	100	24	1971	46	Gas
Union	Bucknell University	Bucknell University	Bucknell University	100	6.7	1991	26	Gas
Venango	Handsome Lake Energy	Constellation Power, Inc.	Exelon Corporation	100	267.5	2001	16	Gas
	Scrubgrass	EIF United States Power Fund IV, L.P.	Ares Owners Holdings, L.P.	20	86.1	1993	24	Coal
	Scrubgrass	United States Power Fund III, L.P.	Ares Owners Holdings, L.P.	50	86.1	1993	24	Coal
	Scrubgrass	Olympus Power, LLC	Olympus Holdings, LLC	30	86.1	1993	24	Coal
Warren	Kinzua Pumped Storage Project (Seneca)	Harbor Hydro Holdings, LLC	LS Power Group	100	513	1970	47	Water
	Warren CT	NRG REMA LLC	NRG Energy, Inc.	100	57	1972	45	Oil
Washington	Arden Landfill	WM Renewable Energy, LLC	Waste Management, Inc.	100	4.8	2009	8	Biomass
Wayne	Waymart Wind Farm	NextEra Energy Resources LLC	NextEra Energy, Inc.	100	64.5	2003	14	Wind
Westmoreland	Conemaugh Hydroelectric	PSEG Global L.L.C.	Public Service Enterprise Group Incorporated	50	15	1989	28	Water
	Conemaugh Hydroelectric	Pennsylvania Renewable Resources	Pennsylvania Renewable Resources	50	15	1989	28	Water
Wyoming	Mehoopany	Procter & Gamble Co.	Procter & Gamble Co.	100	1.6	1984	33	Gas
	Mehoopany CT	Procter & Gamble Co.	Procter & Gamble Co.	100	123	1985	32	Gas
	Mehoopany Wind	Sempra U.S. Gas & Power, LLC	Sempra Energy	50	142.6	2012	5	Wind
	Mehoopany Wind	BP Wind Energy North America Inc.	BP plc	50	142.6	2012	5	Wind
York	Brunner Island	Talen Generation, LLC	Riverstone Holdings LLC	100	1,138.6	1961	56	Gas
	Brunner Island IC	Talen Generation, LLC	Riverstone Holdings LLC	100	7.4	1967	50	Oil
	P.H. Glatfelter Company - Pennsylvania	P H Glatfelter Co	P H Glatfelter Co	100	89.3	1948	69	Coal
	Peach Bottom	Exelon Generation Company, LLC	Exelon Corporation	50	2,584	1974	43	Nuclear
	Peach Bottom	PSEG Nuclear LLC	Public Service Enterprise Group Incorporated	50	2,584	1974	43	Nuclear
	Tolna	NRG REMA LLC	NRG Energy, Inc.	100	50	1972	45	Oil
	Turnkey Project - GlaxoSmith	GlaxoSmithKline	GlaxoSmithKline	100	1.6	2010	7	Solar
	York Cogeneration	Sapphire Power Generation Holdings LLC	Riverstone Holdings LLC	100	46.9	1989	28	Gas
	York County Resource Recovery Center	York County Solid W & R Authority	York County Solid W & R Authority	100	29.5	1989	28	Biomass
	York Energy Center (Delta Power Project)	Conectiv Mid Merit, LLC	Calpine Corporation	100	545	2011	6	Gas
	York Haven	Enduring Hydro LLC	Enduring Hydro LLC	1	19	1905	112	Water
	York Haven	I Squared Capital	I Squared Capital	99	19	1905	112	Water

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