SIERRA CLUB'S RESPONSE TO JOINT DATA REQUESTS OF KENTUCKY UTILITIES COMPANY AND LOUISVILLE GAS AND ELECTRIC COMPANY PROPOUNDED TO SIERRA CLUB

Data Request 1.4 Exhibits

Case No. 2025-00045

Filed July 3, 2025

Introduction

In September 2024, American Electric Power (AEP) submitted a request for adjustments to the PJM 2025 Load Forecast. The request was presented publicly to stakeholders at the PJM Load Analysis Subcommittee (LAS) meeting in October. This document serves as a summary of the request and public presentation. It includes an overview of the methodology for large load adjustments, a summary of the overall adjustment request for 2025, and insights into the future project pipeline at AEP.

Load Addition Criteria and Methodology at AEP

AEP's forecasting methodology for load additions can be broken into two parts. Near-term, or up to 2029 in this instance, additions are based on contracts in place at the time the forecast is submitted. Within the first five years of the forecast, a project must, at a minimum, have a signed Letter of Agreement (LOA) and an Electric Service Agreement (ESA) in progress. Of the approximately 8.1 GW of adjustments submitted within the first 5 years of AEP's request, over 7 GW of the adjustments currently have a signed ESA in place, while the remainder have a signed LOA with ESAs currently being negotiated.

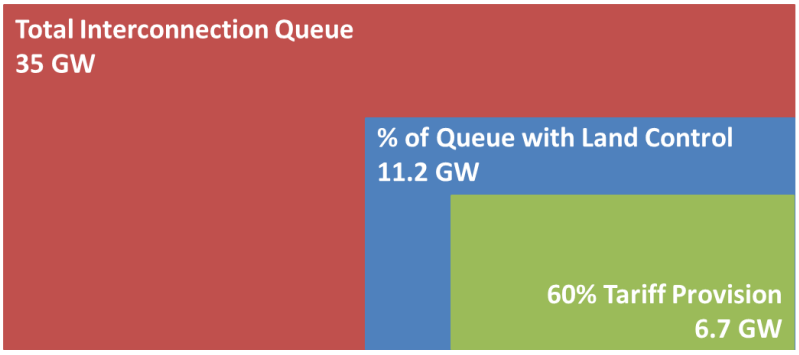
Both an LOA and ESA are legally binding contracts that include financial commitments from the customer. However, an ESA generally takes the form of a take-or-pay contract in which a customer is required to purchase a minimum amount of energy over several years. An LOA only covers the customer interconnect, including any engineering or infrastructure costs associated with connecting the customer to the system.

These arrangements serve to protect other customers from absorbing these costs if a project does not proceed as contracted. This approach helps to mitigate uncertainty around large loads, allowing AEP to align its capacity planning with actual expected demand in the near to intermediate term.

Beyond five years, 2030 and beyond in this instance, two AEP jurisdictions (AEP Ohio and Indiana & Michigan Power zones) have become capacity constrained despite substantial demand from customers awaiting sufficient transmission capacity for service. In these instances, capacity constraints have prevented AEP companies from signing agreements with customers, while the lack of signed agreements has prevented AEP from adding the necessary capacity to serve those customers. Including this unsigned load in the planning process allows AEP to end this circular reference, ultimately increasing the accuracy of the forecast and PJM's overall planning process.

As a way to conservatively and responsibly estimate this load, AEP started with actual customer demand via interconnection queues at its capacity constrained areas. At AEP Ohio alone, for example, the sum of customer requests looking to connect to the system is roughly 35 GW. AEP then narrowed those queues down further by looking only at those customers who possess land control and are prepared to sign interconnection agreements. Demand is then further reduced to reflect the current minimum tariff provisions in the affected states. In the cases of Ohio and Indiana, that is 60%.

Here's a visual example of the calculations done for AEP Ohio:



The lack of sufficient transmission capacity prevents these customers from a.) signing contracts and b.) being allocated to specific years in the adjustment request. To account for their immediate need for transmission capacity and readiness to sign agreements, AEP has assigned their loads to 2030. PJM staff then asked to further spread this load out over a three-year span to better replicate the potential pace of transmission build out.

Since the submission of this forecast, the interconnection queues across AEP's PJM jurisdictions have grown even larger. The robust size of the overall queue and project pipeline in these jurisdictions provides protection against new loads not materializing as expected.

Regardless of the year, AEP uses the same criteria for its own internal financial forecasts. This means the additions submitted to PJM for use in this forecast are the same additions that are incorporated into the AEP internal financial forecast for budgeting purposes.

Summary of Request by Year and Zone

In total, AEP requested 8,122 MW of load additions by 2029 and 17,890 MW by 2030. These represent values for the month of September to reflect expectations for the summer peak. These details can be found in the documents submitted to PJM in September, which are publicly available on the PJM LAS website.

As mentioned in the methodology section, the large jump in 2030 is concentrated at AEP Ohio and I&M and reflects very strong interest in customers wanting to sign contracts to connect, but currently cannot due to capacity constraints.

Table 1: AEP Cumulative Summer Load Addition Request by Zone

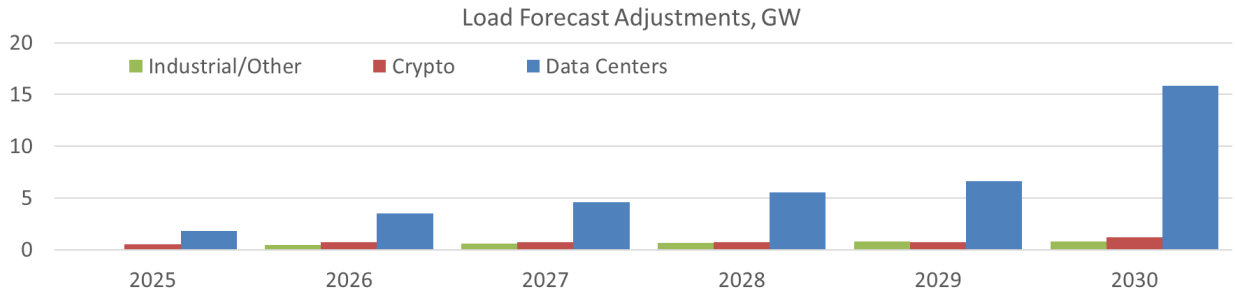
Cumulative Additions (MW)	2025	2026	2027	2028	2029	2030
Appalachian Power	41	421	421	421	421	421
Indiana & Michigan Power	721	1,489	2,076	2,565	3,265	6,045
Kentucky Power	3	3	3	3	3	3
AEP Ohio	1,509	2,726	3,423	3,969	4,443	11,421
Total AEP	2,274	4,639	5,924	6,958	8,122	17,890

Footnote nos. 40, 41

Summary of Request by Customer Type

The overall adjustment request reflects a mixture of customer types but is largely driven by data centers. This is particularly true at AEP Ohio and I&M which have contracts with several data center customers, most of which are large hyperscalers. AEP Ohio also has industrial additions, totaling over 300 MW by the end of the request period. Appalachian Power (APCo) and Kentucky Power additions are almost entirely industrial, primarily by primary metal manufacturing additions in APCo. Figure 1 below summarizes the additions by customer type.

Figure 1: AEP Forecast Adjustments by Customer Type



Summary of Request by Agreement Type

For load additions through 2029, all projects across the AEP system have some type of signed customer agreement in place. Furthermore, over 7 GW of the 8.1 GW of load additions have a signed Electric Service Agreement (ESA) in place alongside an LOA.

For load additions in 2030 and beyond, AEP has a mix of signed agreements and planned agreements once capacity should become available. Specifically, in Ohio, 6.7 GW are planned additions with land control but are awaiting transmission capacity to enable AEP Ohio to enter into agreements. In Indiana, 1.8 GW are planned load additions with land control awaiting capacity.

Load Behavior

AEP works closely with its customers to obtain the most accurate load ramp specifications for each project, which are typically provided once the customer agreement with financial commitments is signed. This collaborative approach ensures that AEP's adjustment requests align with the needs and expectations of our customers.

Once fully ramped, customer behavior is generally differentiated by type. However, similar to load ramps, AEP works closely with individual customers to estimate future load factors based on the type of customer and ultimate end usage. As such, there can be variability across projects.

Data centers typically run at the highest load factors. We have historical usage data showing them running at load factors of more than 80% on average, with large hyperscale data centers running as high as 95%.

Industrial customers typically run at lower load factors than data centers, though some can run as high as 80% depending on the underlying industry. Most industrial customers are expected to run at roughly 60% based on historical usage patterns.

Footnote nos. 40, 41

Conclusion

AEP has a great deal of confidence in its load adjustment submission for the 2025 PJM Forecast due to its reliance on signed customer financial commitments. This reliance on actual customer demand, combined with AEP's robust demand pipeline across multiple load zones helps reinforce these projections as a reasonable, and responsible basis for future planning.

Dominion Energy Virginia

Retail Service Territory (LSE)

Load Adjustment Request Detail

Submission request by year and type (if multiple).

See page 3 for the forecast by year.

Summary of expected load behavior by type (if multiple).

The metered load is expected to grow as forecast.

How the requester is treating these loads in their own financial/planning forecast.

Dominion Energy uses this same forecast to prepare both its Integrated Resource Plan and financial plans.

Summary of agreements or other supporting information that speaks to the certainty of the submission.

Dominion Energy does not prepare its forecast using signed contracts. Rather it uses signed firm contracts to validate its forecast. The Company uses two different signed firm contracts to validate its forecast.

- Construction Letter of Authorization – This is a contract that authorizes the Company to construct transmission and distribution facilities to serve a customer request. This contract obligates the customer to: 1) reimburse the Company for any investments made if the project is canceled and 2) execute an Electric Service Agreement within a fixed period of time after the facilities are in place.
- Electric Service Agreement – This is a contract for service. It is required prior to meter set and outlines how the Company will serve the customer. The guiding terms are outline in the Company's Terms & Conditions and the appropriate electric tariff.

In the case of agreements, please provide summary of what the agreement entails.

See the response above and the top of page 4 for a comparison of the billed demand forecast to the signed firm contracts.

Description/summary of any methods, screening, or scoring criteria that was used in developing the submission.

See the bottom of page 4 and page 5 for both a description and a graphic highlighting the Company's forecasting process. The foundation of this process is over ten years of monthly metered information.

Narrative on pipeline of future projects (e.g. projects that were not submitted, inquiries, etc.).

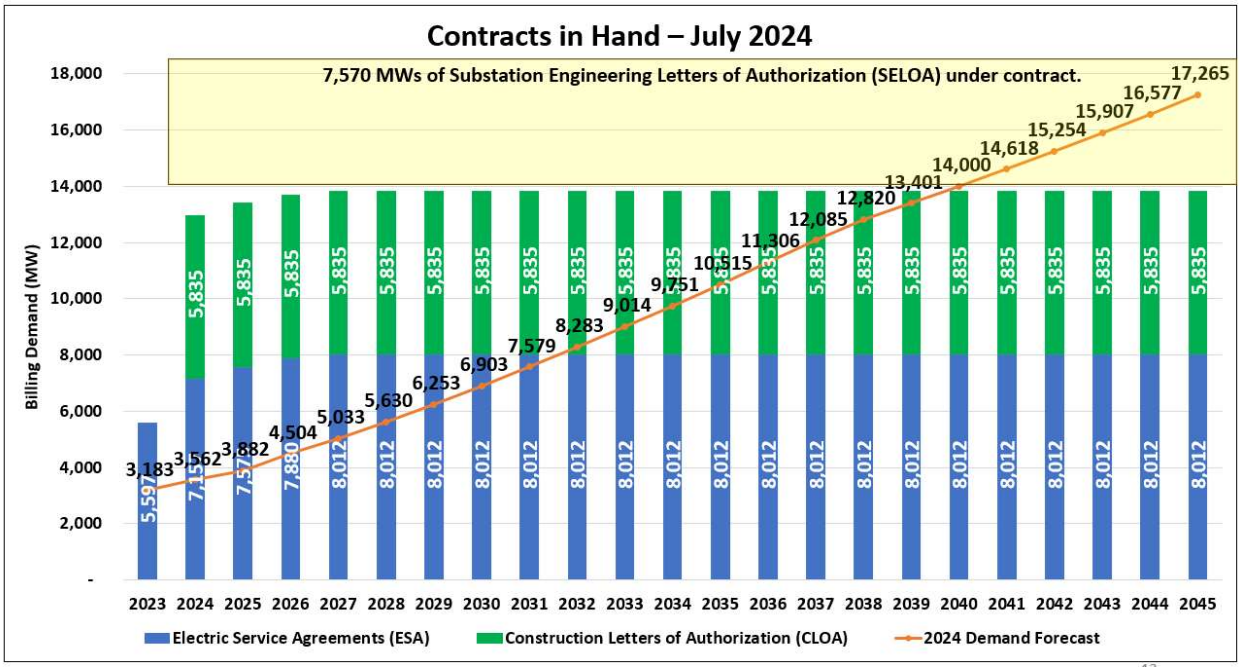
See the top of page 4. This graph shows how the firm contracts grow into the demand forecast over time. The contract values are as of July 2024. The Company has contractual support for its forecast through 2040. The Company executed 6 GW of new firm contracts from July 2023 to July 2024. The Company continuously executes new contracts, both Construction Letters of Authorization and Electric Service Agreements and expects to continue to do so in support of future demand.

Dominion Energy

Retail Service Territory (LSE)

Data Center Industry

Coincident Peak	
Year	MW
2025	3,474
2026	3,954
2027	4,458
2028	4,987
2029	5,538
2030	6,114
2031	6,713
2032	7,337
2033	7,984
2034	8,637
2035	9,313
2036	10,014
2037	10,704
2038	11,355
2039	11,870
2040	12,400
2041	12,948
2042	13,511
2043	14,089
2044	14,683
2045	15,293

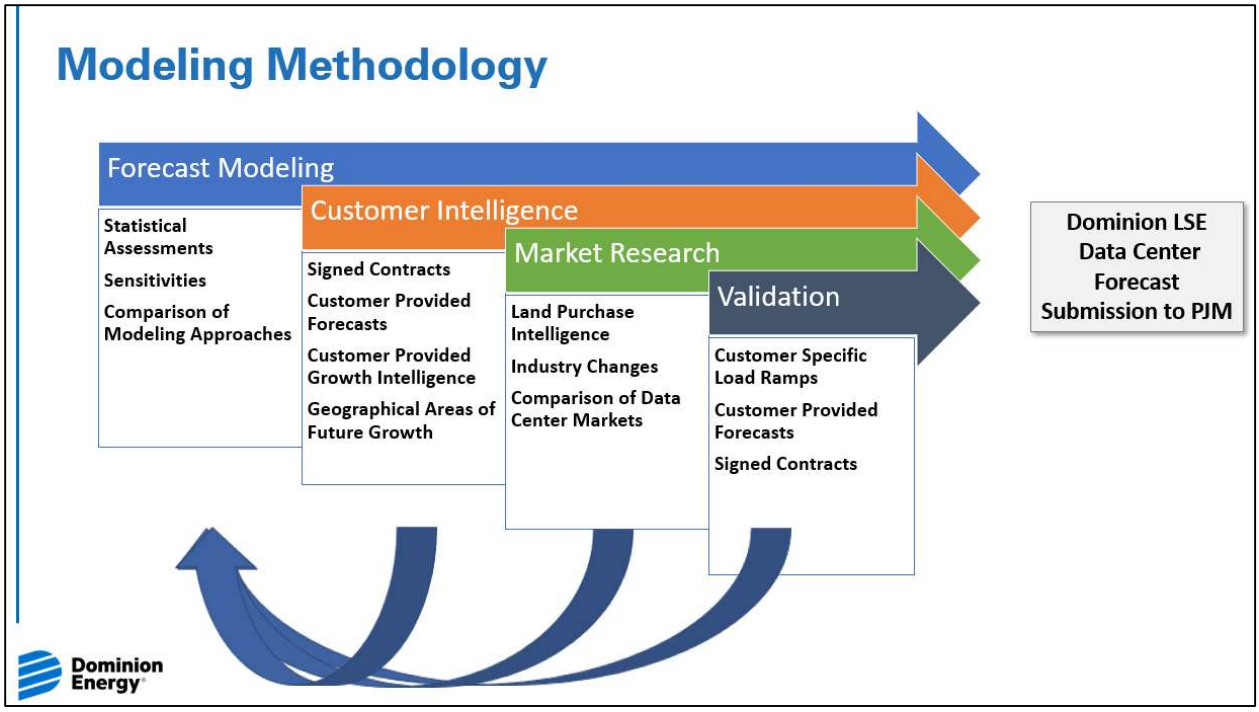


Modeling Process

Forecast is based on 10+ years of metered data center customer information

1. Statistically modeled 7 largest or fastest growing customers and an 8th model of all remaining customers combined into one segment
2. Statistically model high billing demand forecast three ways for each customer segment (24 models)
   a) Approach 1: linear regression of billing demand
   b) Approach 2: polynomial regression of billing demand
   c) Approach 3: custom fit based on market/customer information
   Note: One of these three approaches is selected for each of the 8 customer segments
3. Validate/adjust statistical forecasts based on customer provided long-term forecasts (4 cloud customers)
4. Develop low billing demand forecast using industry aggregate statistical models (4 models)
5. Average high and low forecasts to derive the official billing demand forecast
6. Use load factor to model MWH sales based on high, official, and low forecast scenarios
7. Based on historical ratios, calculate coincident demand forecast from billing demand forecast

Dominion Energy


Modeling Methodology
Forecast Modeling
Statistical Assessments
Sensitivities
Comparison of Modeling Approaches
Customer Intelligence
Signed Contracts
Customer Provided Forecasts
Customer Provided Growth Intelligence
Geographical Areas of Future Growth
Market Research
Land Purchase Intelligence
Industry Changes
Comparison of Data Center Markets
Validation
Customer Specific Load Ramps
Customer Provided Forecasts
Signed Contracts
Dominion LSE Data Center Forecast Submission to PJM
Dominion Energy

Exelon Large Load Forecast Adjustment Methodology

Exelon submitted large load adjustment requests with PJM in September 2024 to be considered for the upcoming 2025 Load Forecast. Following the recent rapid growth in AI, cloud computing, and other emerging technologies, Exelon is experiencing a significant uptick in high-density load interconnection requests and faster load growth from in-service data center customers. These dynamics have driven the need for explicit adjustments to our internal forecasts and corresponding forecast adjustment requests to PJM. Exelon's large load adjustment requests consider both new and in-service data center projects (BGE, ComEd, PECO) and electric vehicle battery manufacturing projects (ComEd).

Forecast development utilizes a methodology beginning with the gathering of intelligence and key data points from internal stakeholders in economic development and transmission planning. Leveraging multiple internal and external sources, Exelon developed key criteria and assumptions that take the data collected and turn it into an actionable forecast.

Forecast Criteria and Assumption Summary

- **Forecast Certainty Criteria**: Threshold/requirement for including data center/high-density load projects in load forecast and adjustment proposal
  - Forecast includes projects with signed engineering agreements/financial deposits
- **M-3 Status**: All transmission projects were submitted through the local plan or are anticipated to be submitted by year-end
- **Ramp Assumption**: Incremental load increases to final capacity
  - 8-year ramp for new projects from in-service date based on historical experience with large load customer ramps
- **Utilization Rate Assumption**: % of requested customer capacity assumed to be realized after ramp period
  - Varies by zone reflecting project specific detail

Forecast Development and Results

The Exelon Large load forecast process starting point is a comprehensive list ranging from large load projects with very early-stage interest in locating to the service territory to customers that have begun construction. For our forecast methodology we include projects that have signed engineering agreements with financial deposits. The engineering agreement is a signed contract to begin planning and technical review including ordering of long lead materials. This approach establishes a certainty criterion that "draws a line" and excludes more prospective large load projects ("Prospects") which have expressed interest in coming to our service territories but have not made firm commitments. Another key criterion we utilize is whether the customer request has been processed at PJM through the FERC-approved M-3 procedure or is expected to be by end of year.

Of the projects included, customer capacity requests are translated into a reasonable forecast using key assumption around customer load ramps and a utilization rate. Exelon assumes load will ramp linearly over an 8-year period from each project's estimated in-service date. After the 8-year ramp, new projects are assumed to reach their final forecasted demand calculated as the customer capacity request adjusted for a capacity utilization rate. In the majority of cases this rate is 70%, except where there are known project expansion plans which provide for a higher assumed utilization. Capacity requests total 0.5 GW at BGE, 7.0 GW at ComEd, and 0.4 GW at PECO resulting in 8 GW of requested capacity across Exelon. After applying the estimated ramp period and applicable utilization rate, Exelon's large load adjustment requests for annual summer peak are approximately 0.6 GW in 2025, 3.0 GW in 2030, and 5.6 GW in 2035.

Exelon Load Additions for Data Centers in PJM 2025 Load Forecast (MW)

EDC	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045
BGE	12	20	27	36	80	124	169	210	247	284	321	357	358	358	358	358	358	358	358	358	358
ComEd	550	729	1,027	1,454	1,945	2,480	3,019	3,541	4,025	4,419	4,682	4,805	4,856	4,858	4,859	4,859	4,859	4,859	4,859	4,859	4,859
PECO	0.5	19	71	125	179	233	286	340	393	429	430	430	430	430	430	430	430	430	430	430	430

Exelon Load Additions for EV Battery Manufacturing in PJM 2025 Load Forecast (MW)

EDC	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045
ComEd	-	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113

note: data reflects summer peak MW

PPL – Large Load

From August 2023 to August 2024, PPL has received several requests from developers for data center interconnections, marking a significant shift in its historical load profile. Prior to 2024, there were no large data centers within PPL's territory. To ensure an accurate representation of this emerging load, only data center projects with a Signed Agreement (SA) are included in PPL's 2025 Load Forecast. The overall process is described below.

As part of the established PPL process, PPL collaborates closely with developers and PJM to validate proposed data center projects. Developers begin by submitting their requests to PPL's Interconnection Affairs, detailing their project requirements. In response, PPL's Transmission Planning team conducts a high-level analysis to provide initial feasibility insights. The next phase in the process is the Signed Agreement (SA) phase. In this phase, PPL proceeds with detailed engineering analysis, offering developers precise estimates for cost, timeline, and preliminary engineering requirements.

Projects at the SA phase are considered likely to progress as scheduled. PPL has presented these projects to PJM and stakeholders through forums such as TEAC and SRRTEP. Additionally, PPL has shared its methodology and load forecasting at LAS meetings, ensuring transparency and alignment with stakeholders.

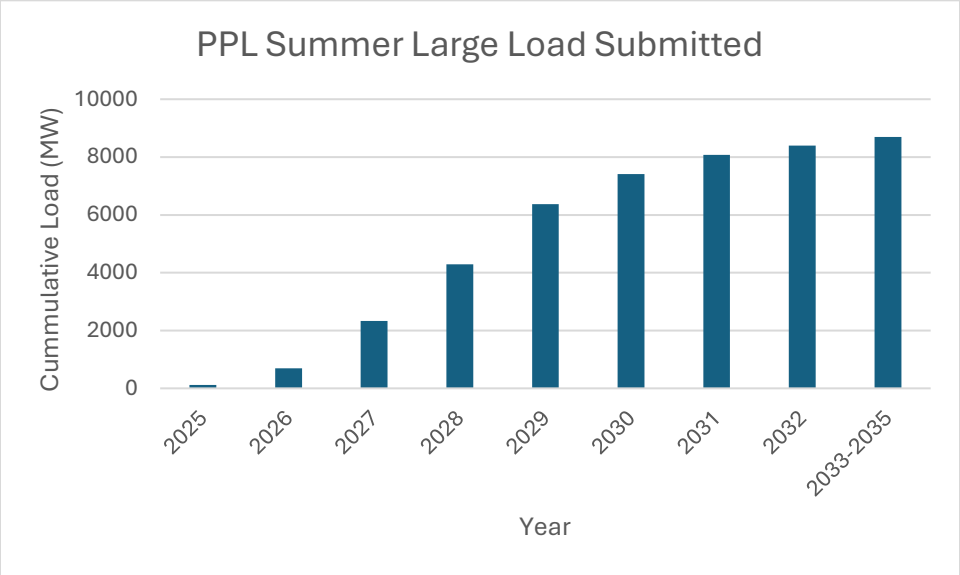
Before construction begins, developers must finalize a Construction Service Agreement (CSA), which outlines the project's costs, schedules, and additional pertinent details. Currently, all data center projects in PPL territory are undergoing detailed design engineering and some are near engineering completion.

In October 2024, PPL submitted forecasted large loads details to PJM. The table below summarizes the breakdown of the type of load and projected capacity expected. By 2030, PPL's summer load forecast projects an increase by approximately 7,409 MW. A complete ramp-up to 8,695 MW is expected by 2033. Notably, these facilities are expected to operate 24/7, fundamentally altering PPL's load profile. Based on information provided from the developers, PPL expects these facilities will have a 100% utilization factor and are all capacity requests.

The data below highlights the difference in load forecast due to the addition of forecasted load.

Year	Datacenter only	BTM Datacenter	Crypto Mining	Total Load
2025	0	120	0	120
2026	411	240	40	691
2027	1901	360	75	2336
2028	3480	660	150	4290
2029	5189	960	225	6374
2030	6199	960	250	7409
2031	6864	960	250	8074
2032	7185	960	250	8395
2033-2035	7485	960	250	8695

Breakdown of types of loads submitted to PJM



Furthermore, PPL continues to receive new inquiries for data center projects of varying sizes. As these inquiries progress to the SA phase, they will be incorporated into the forecast and presented to PJM and stakeholders.

PPL remains committed to facilitating the interconnection of data centers in its territory, ensuring rigorous planning, stakeholder engagement, and adherence to established processes to support this transformative evolution in its load profile.