PJM Interconnection Queue Progress

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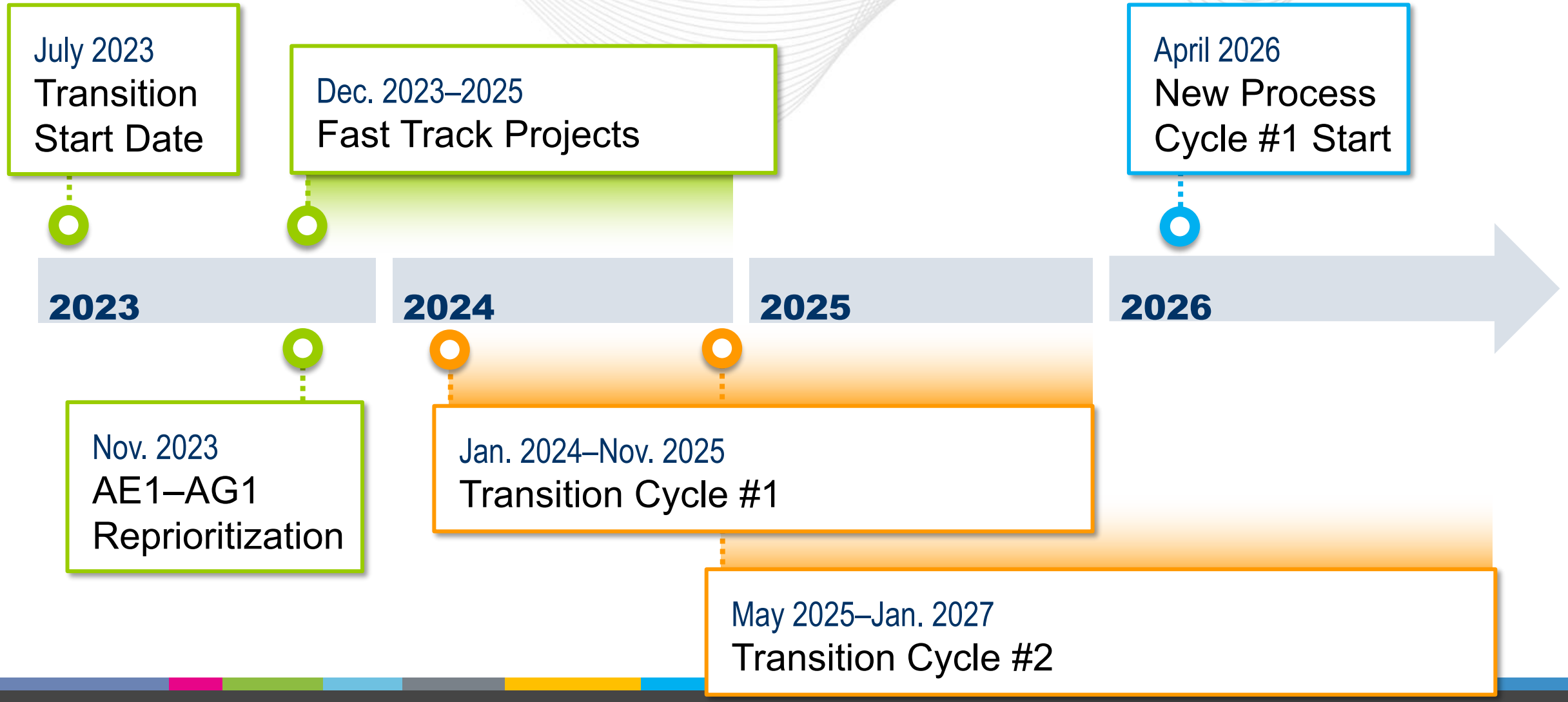
Highlights

- PJM's reformed queue process began in December 2023 with 171 GW of backlog projects to process through two Transition Cycles and an Expedited Process
- PJM has kept Transition Cycle milestone commitments resulting in 63 GW remaining in backlog (63% reduction) through July 2025
- A total of 44 GW are through the study process with interconnection agreements with balance of Transition Cycle backlog agreements to be issued in 2025 and 2026
  - 29 GW of projects with signed agreements since 2015 have since withdrawn
- PJM made significant investments in innovative tools & automation, staffing, and process development to achieve this progress
- PJM is on schedule to begin the normal interconnection cycle process for new resources in early 2026

Transition Timeline



The PJM Approach

PJM emphasizes increasing quality while also reducing completion time.	PJM emphasizes adding automation to enrich the full pipeline needed to interconnect generation (not just the interconnection study step).

Combined Benefit of PJM Automation and Staffing Increases of 100% Has Reduced Processing Time by 60% while Increasing Quality, Allowing PJM To Achieve Queue Reform Goals

Interconnection Process

Overview of PJM Automation Efforts

Application Submission

- **Queue Scope** – Preliminary analysis to guide prospecting — 2022
- **Queue Point Enhancements** – Retrofit to support Fast Lane and TC1 — 2023
- **NextGen** – New interconnection customer portal — 2025+
- **AI Enhancements** – Deficiency review automation — 2025

Interconnection Study

- **PowerGEM TARA** – GenDeliv Enhancements — 2024
- **Queue Destination** – Build model, process GenDeliv results, automate cost allocation and reports. — 2022

Reinforcement Development

- **Queue Destination for TOs** – Expedite result processing and upgrade scoping — 2025

Final Agreement Negotiation

- **PowerTemplate** – Automation to help draft GIA and other legal documents — 2025

Post Agreement

- **InfraTrack** – Milestone tracking, invoice cost allocation, task tracking — 2024

More details in Appendix I

Quality Improvements

Cost Allocation to Projects in Cycle

- Challenge
  - Complex calculation done manually - error prone and time consuming
- Solution
  - Automated cost allocation calculations for majority of cases

Transmission Owner Collaboration

- Challenge
  - Manual TO word document per project with risk of conflicting TO reinforcements on different project reports
- Solution
  - Improved user interface links data across multiple TO reinforcements together to avoid conflict

Project Modeling Details

- Challenge
  - Must manually manage project data changes with risk that changes not always reflected in case
- Solution
  - Queue Destination centralizes all project data and checks cases for correct data

Post-GIA Project Completion Tracking

- Challenge
  - 50+ tasks tracked manually without consistent approach making it difficult to manage
- Solution
  - InfraTrack added common tracking and better reporting of tasks needing to be completed

Time Savings

Task	Before Automation	After Automation	TC1 Time Savings	TC2 Projected Time Savings
Cost Allocation	1–4 hours per report	Seconds (fully automated)	1500 hours	2500 hours
Report Generation	2–4 hours per report	30 minutes per report	1500 hours	3000 hours
Validation of Upgrades	1–2 days per report	3–6 days per cycle	1000 hours	2000 hours
Case Building	2–4 months	2–4 weeks	700 hours	800 hours

PJM Results

In 19 months since beginning the Transition Cycles, PJM has relieved the interconnection backlog by 63%, has almost 44 GW of projects ready to construct, and placed over 6 GW of new generation into service

July 2023	December 2023		July 2025	
FERC Approval	Expedited	26 GW applied	Expedited	0 GW remaining
	Transition Cycle 1	45 GW applied	Transition Cycle 1	17 GW under Phase III study
	Transition Cycle 2	100 GW eligible	Transition Cycle 2* *Includes RRI	46 GW under Phase I study
	Total in Queue	**171 GW**	**Total in Queue**	**63 GW remaining**

Summary

Backlog has been reduced significantly (63%) in the past 19 months

Automation and staffing have played a key role in accelerating process while improving quality

PJM is on track to process new applications in early 2026

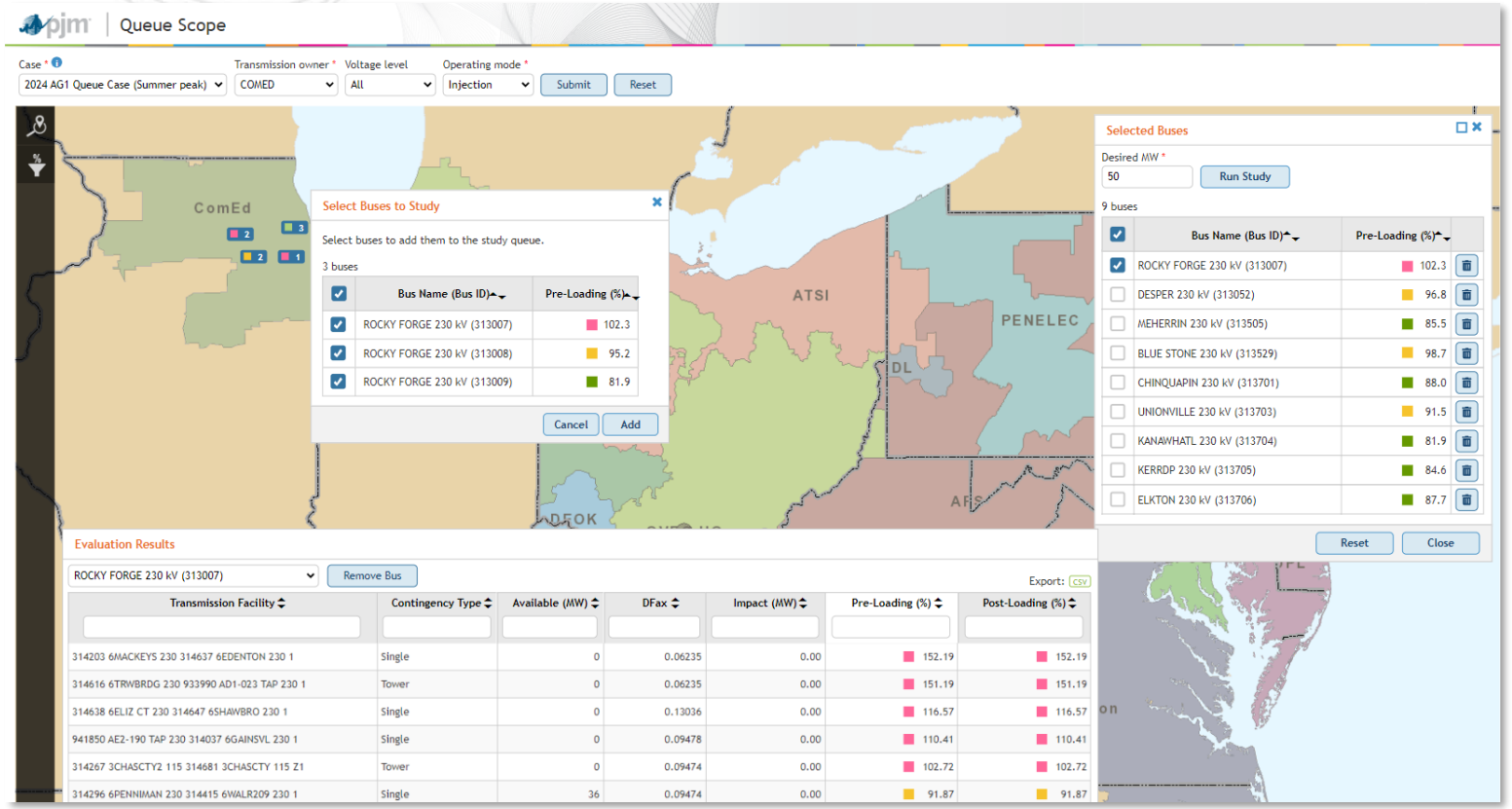
PJM continues to invest in automation and tools to improve efficiency and quality of the interconnection process

Appendix I: PJM Tools

Pre-Application Prospecting

- Queue Scope
  - Inform on locations with available transmission system overhead
  - Visual geographic and tabular interface

Geographic Interface for Queue Scope

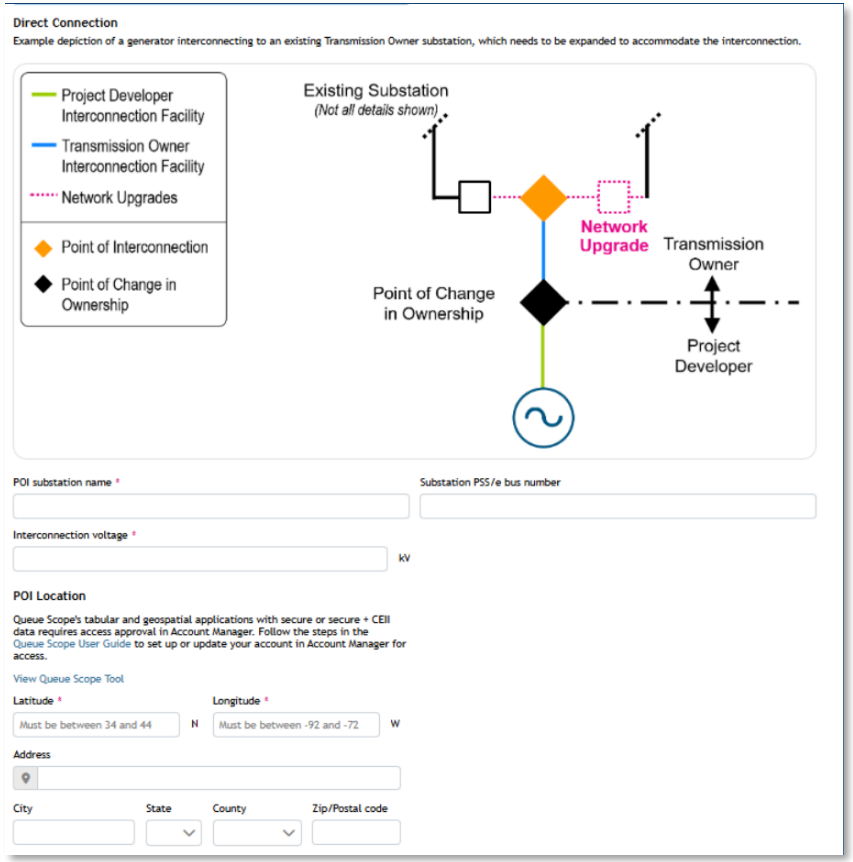


Application Submission and Queue Administration

Queue Point & NextGen

- Queue Point Enhancements to support Fast Lane and TC1
- NextGen to support Cycle 1 applications and TC2 DPI and further forward
- Future
  - AI to automatically review applications
  - Find deficiency in Site Control, acreage requirements, alignment between submission and engineering drawings, etc.
  - Anticipated by January 2026

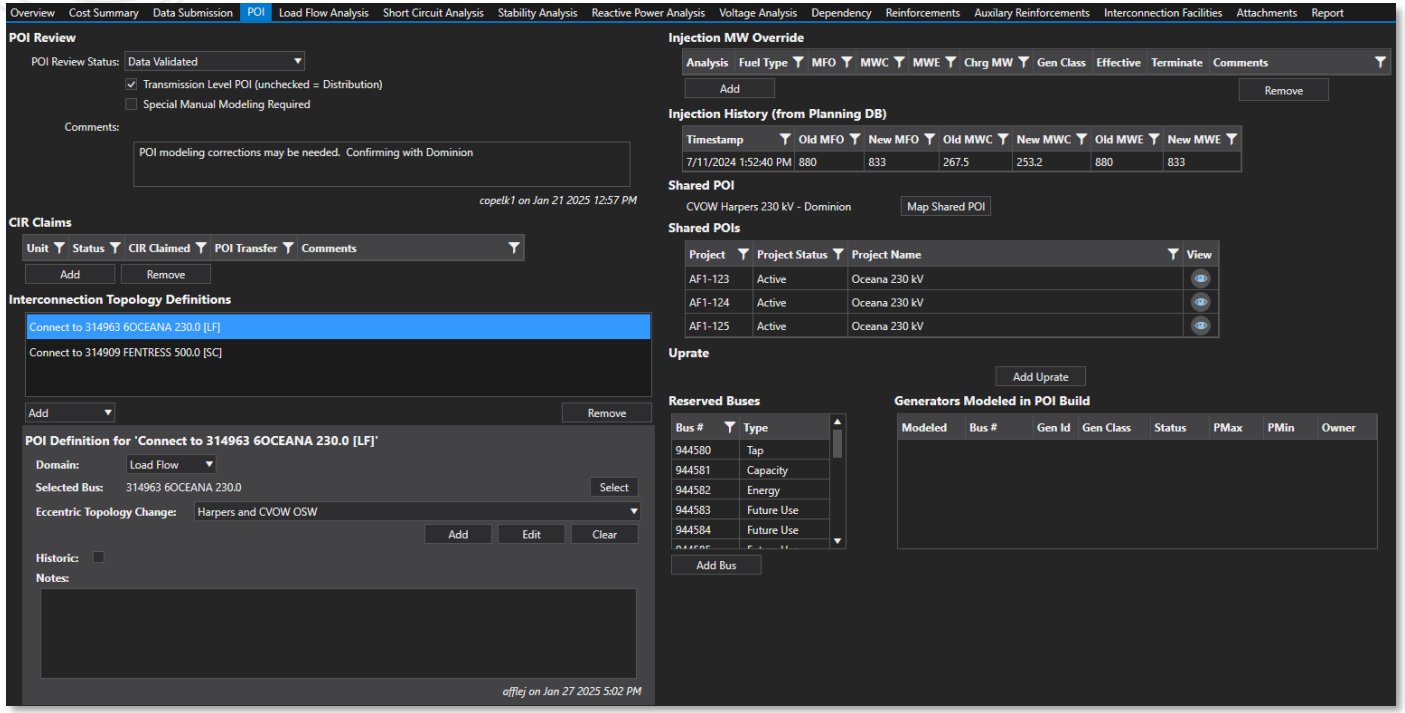
Section of NextGen Interconnection Application



Model Building

- POI tool built into Queue Destination
  - Automatically add modeling
  - Point engineers to specific trouble spots.
- Modeling automation
  - Automatically bridge modeling data from NextGen into POI tool
  - Anticipated by December 2025

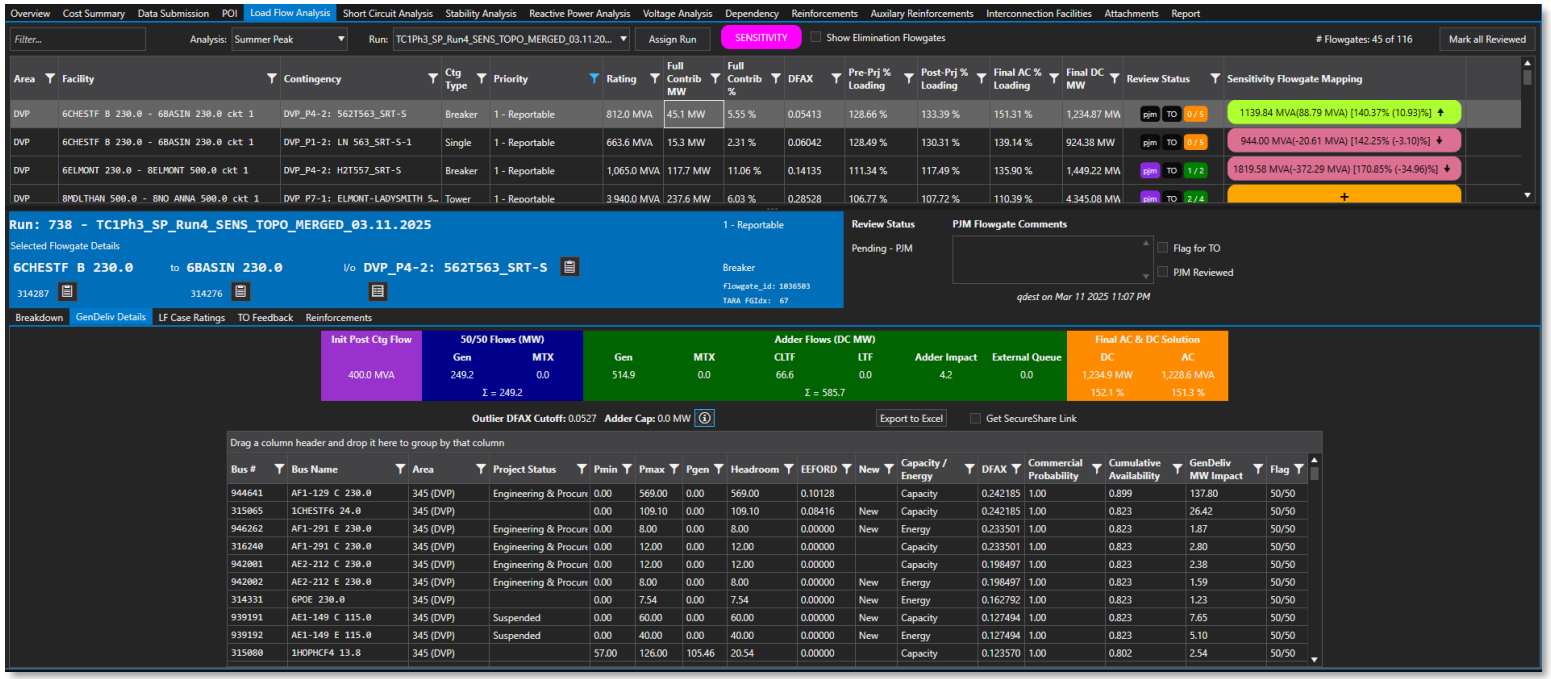
Queue Destination POI Tool



Load Flow Analysis

- Partnered with PowerGEM to create recently enhanced GenDeliv test
- Queue Destination provides interface for PJM and TO engineers to review results

Queue Destination Flowgate Review



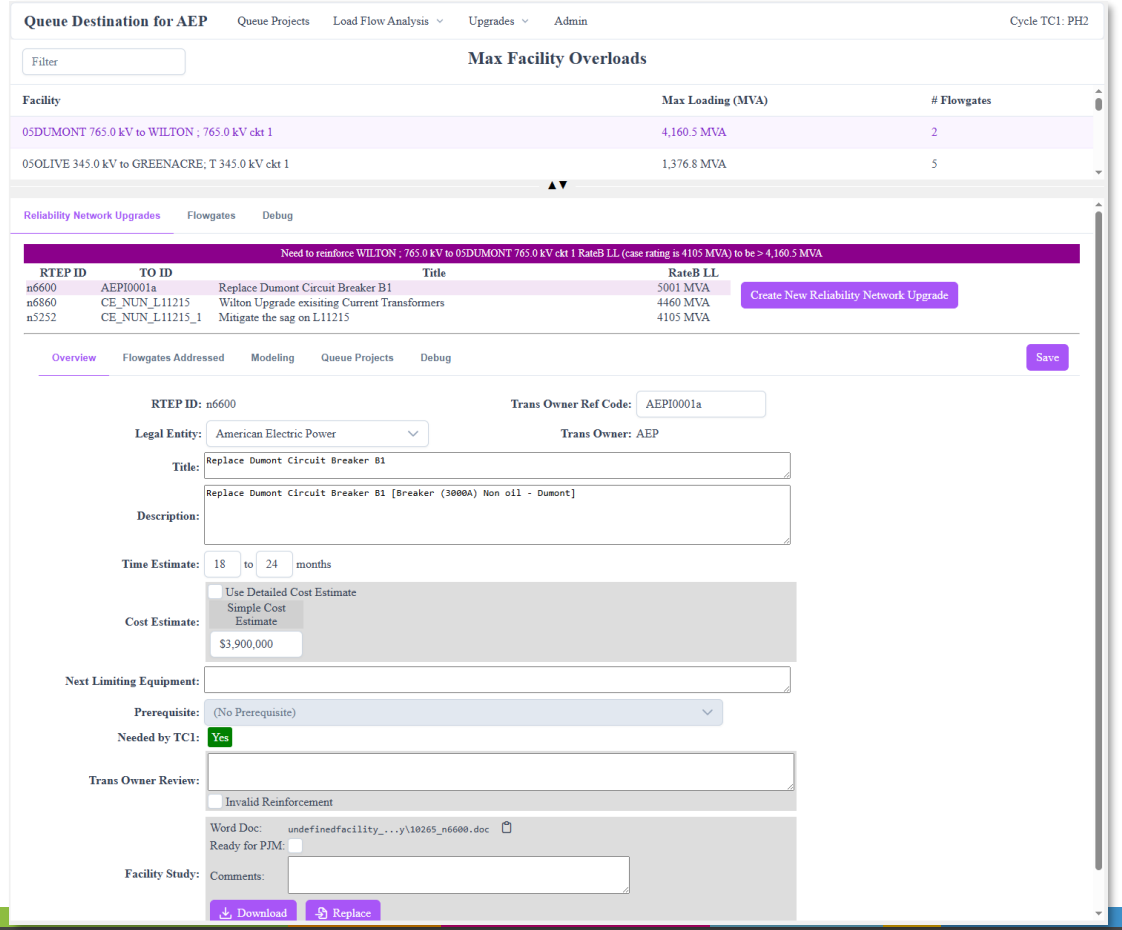
Short Circuit and Stability

- Partially automated short circuit POI tool
- Automated ingestion of short circuit results (expected June)
- Stability automation on road map for 2026+

Upgrade Development

- New Transmission Owner UI to aid in coordinated development of upgrades
- Database of previous upgrades that TOs can draw upon
- Automated cost allocation

Queue Destination Transmission Owner Interface



Upgrade Sensitivity Run

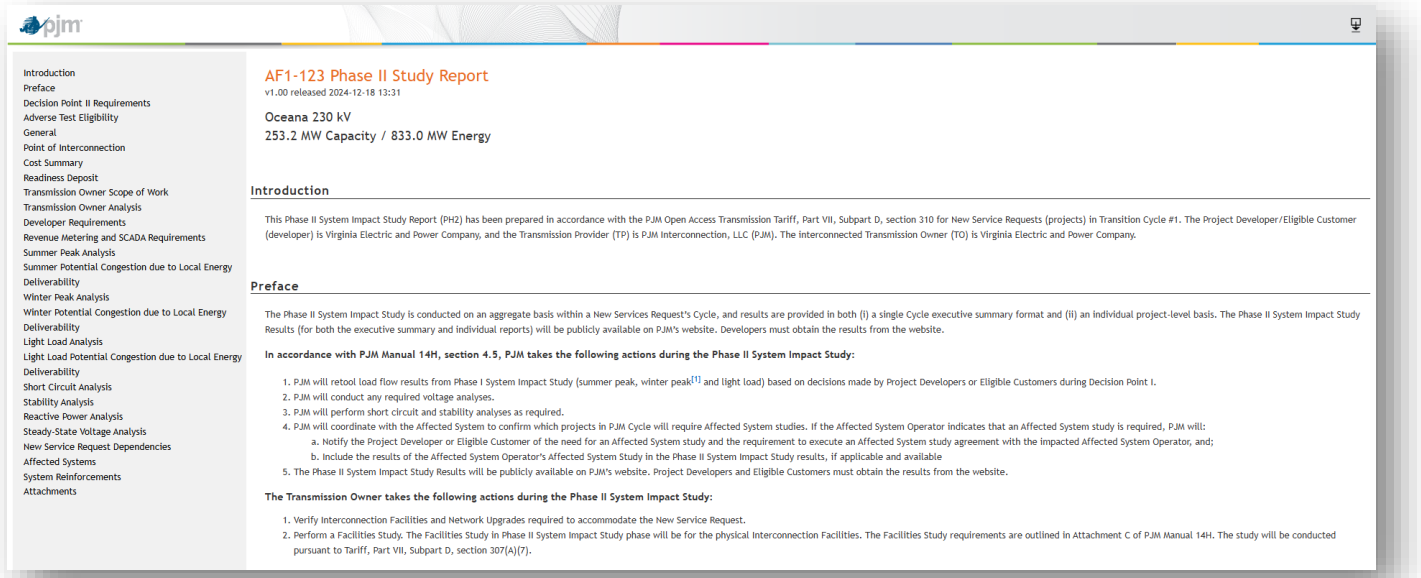
- Separate sensitivity run performed and results displayed alongside basecase results
- Provides solution verification and cost allocation of backbone solutions.

Area	Facility	Contingency	Ctg Type	Priority	Rating	Full Contrib MW	Full Contrib %	DFAX	Pre-Prj % Loading	Post-Prj % Loading	Final AC % Loading	Final DC MW	Review Status	Sensitivity Flowgate Mapping
DVP	6CHESTF B 230.0 - 6BASIN 230.0 ckt 1	DVP_P4-2: 562T563_SRT-S	Breaker	1 - Reportable	812.0 MVA	45.1 MW	5.55 %	0.05413	128.66 %	133.39 %	151.31 %	1,234.87 MW	pjm TO 0 / 5	1139.84 MVA(88.79 MVA) [140.37% (10.93)%]
DVP	6CHESTF B 230.0 - 6BASIN 230.0 ckt 1	DVP_P1-2: LN 563_SRT-S-1	Single	1 - Reportable	663.6 MVA	15.3 MW	2.31 %	0.06042	128.49 %	130.31 %	139.14 %	924.38 MW	pjm TO 0 / 5	944.00 MVA(-20.61 MVA) [142.25% (-3.10)%]
DVP	6ELMONT 230.0 - 8ELMONT 500.0 ckt 1	DVP_P4-2: H2T557_SRT-S	Breaker	1 - Reportable	1,065.0 MVA	117.7 MW	11.06 %	0.14135	111.34 %	117.49 %	135.90 %	1,449.22 MW	pjm TO 1 / 2	1819.58 MVA(-372.29 MVA) [170.85% (-34.96)%]
DVP	8MDLTHAN 500.0 - 8NO ANNA 500.0 ckt 1	DVP_P7-1: ELMONT-LADYSMITH_5...	Tower	1 - Reportable	3,940.0 MVA	237.6 MW	6.03 %	0.28528	106.77 %	107.72 %	110.39 %	4,345.08 MW	pjm TO 2 / 4	+
DVP	8MDLTHAN 500.0 - 8NO ANNA 500.0 ckt 1	DVP_P4-2: 557T574_SRT-S	Breaker	1 - Reportable	3,940.0 MVA	239.9 MW	6.09 %	0.28800	101.98 %	103.13 %	106.60 %	4,186.37 MW	pjm TO 2 / 4	4859.25 MVA(-659.22 MVA) [123.33% (-16.73)%]

Queue Destination Flowgate with Sensitivity Run

Report Generation

- Fully automated cycle report
- Fully automated individualized project report
- Quickly regenerate reports



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Winter Potential Congestion due to Local Energy Deliverability
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Stability Analysis
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Attachments

AF1-123 Phase II Study Report

v1.00 released 2024-12-18 13:31

Oceana 230 kV

253.2 MW Capacity / 833.0 MW Energy

Introduction

This Phase II System Impact Study Report (PH2) has been prepared in accordance with the PJM Open Access Transmission Tariff, Part VII, Subpart D, section 310 for New Service Requests (projects) in Transition Cycle #1. The Project Developer/Eligible Customer (developer) is Virginia Electric and Power Company, and the Transmission Provider (TP) is PJM Interconnection, LLC (PJM). The Interconnected Transmission Owner (TO) is Virginia Electric and Power Company.

Preface

The Phase II System Impact Study is conducted on an aggregate basis within a New Services Request's Cycle, and results are provided in both (i) a single Cycle executive summary format and (ii) an individual project-level basis. The Phase II System Impact Study Results (for both the executive summary and individual reports) will be publicly available on PJM's website. Developers must obtain the results from the website.

In accordance with PJM Manual 14H, section 4.5, PJM takes the following actions during the Phase II System Impact Study:

1. PJM will retool load flow results from Phase I System Impact Study (summer peak, winter peak[1] and light load) based on decisions made by Project Developers or Eligible Customers during Decision Point I.
2. PJM will conduct any required voltage analyses.
3. PJM will perform short circuit and stability analyses as required.
4. PJM will coordinate with the Affected System to confirm which projects in PJM Cycle will require Affected System studies. If the Affected System Operator indicates that an Affected System study is required, PJM will:
   a. Notify the Project Developer or Eligible Customer of the need for an Affected System study and the requirement to execute an Affected System study agreement with the impacted Affected System Operator, and;
   b. Include the results of the Affected System Operator's Affected System Study in the Phase II System Impact Study results, if applicable and available
5. The Phase II System Impact Study Results will be publicly available on PJM's website. Project Developers and Eligible Customers must obtain the results from the website.

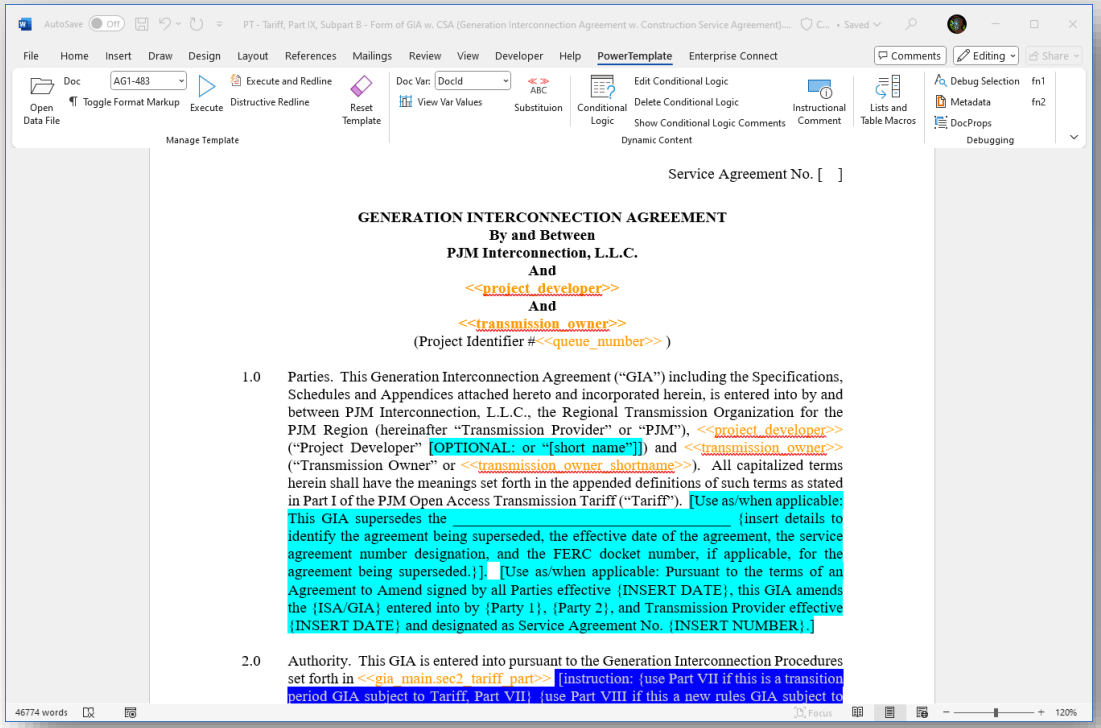
The Transmission Owner takes the following actions during the Phase II System Impact Study:

1. Verify Interconnection Facilities and Network Upgrades required to accommodate the New Service Request.
2. Perform a Facilities Study. The Facilities Study in Phase II System Impact Study phase will be for the physical Interconnection Facilities. The Facilities Study requirements are outlined in Attachment C of PJM Manual 14H. The study will be conducted pursuant to Tariff, Part VII, Subpart D, section 307(A)(7).

Automatically Generated Report

GIA Drafting

- New tool PowerTemplate to help draft GIA documents (expected April)
- Plan to use tool to draft other documents needed as part of interconnection process: NUCRA, CSA, WMPA
- Will enable PJM to streamline final agreement phase



Service Agreement No. [ ]

GENERATION INTERCONNECTION AGREEMENT
By and Between
PJM Interconnection, L.L.C.
And
<<project_developer>>
And
<<transmission_owner>>
(Project Identifier #<<queue_number>>)

1.0 Parties. This Generation Interconnection Agreement ("GIA") including the Specifications, Schedules and Appendices attached hereto and incorporated herein, is entered into by and between PJM Interconnection, L.L.C., the Regional Transmission Organization for the PJM Region (hereinafter "Transmission Provider" or "PJM"), <<project_developer>> ("Project Developer" [OPTIONAL: or "[short name"]]) and <<transmission_owner>> ("Transmission Owner" or <<transmission_owner_shortname>>). All capitalized terms herein shall have the meanings set forth in the appended definitions of such terms as stated in Part I of the PJM Open Access Transmission Tariff ("Tariff"). [Use as/when applicable: This GIA supersedes the _____ {insert details to identify the agreement being superseded, the effective date of the agreement, the service agreement number designation, and the FERC docket number, if applicable, for the agreement being superseded.}]. [Use as/when applicable: Pursuant to the terms of an Agreement to Amend signed by all Parties effective {INSERT DATE}, this GIA amends the {ISA/GIA} entered into by {Party 1}, {Party 2}, and Transmission Provider effective {INSERT DATE} and designated as Service Agreement No. {INSERT NUMBER}.]

2.0 Authority. This GIA is entered into pursuant to the Generation Interconnection Procedures set forth in <<gia_main.sec2_tariff_part>> [instruction: {use Part VII if this is a transition period GIA subject to Tariff, Part VII} {use Part VIII if this a new rules GIA subject to

InfraTrack tool to help with process after GIA is signed

- **Milestone Tracking**
- **Invoice Cost Allocation Automation**
- **Tracking for PJM internal processes**
  - To manage the agreement (necessary study, interim deliverability, milestone extension, agreement to amend, scope change, suspension, breach)
  - To allow energization (EMS modeling, telemetry, PMUs, test energy, release to dispatch)