Queue Scope User Guide

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For Public Use

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Disclaimer Notice

The PJM Queue Scope tool ("Queue Scope") is intended to provide Interconnection Customers and other interested parties ("Users") with estimates of grid congestion at the given points of interconnection within the PJM footprint. Queue Scope is an informational tool and is not intended to be a substitute for actual interconnection studies conducted by PJM as part of the PJM interconnection process. Queue Scope results are not reflective of current PJM system conditions and may not account for all study assumptions and considerations that would otherwise be considered in the formal interconnection study process. Queue Scope only addresses thermal impacts on the system, and it does not include voltage, stability or short circuit constraints. Queue Scope and the Queue Scope data is provided "as is," and PJM hereby disclaims all warranties, whether express, implied, statutory or otherwise. PJM specifically disclaims all implied warranties of merchantability; fitness for a particular purpose, title and non-infringement; and all warranties arising from course of dealing, usage or trade practice. PJM makes no warranty of any kind that the data, or any products or results of its use, will meet Users or any other person's requirements; operate without interruption; achieve any intended result; be compatible or work with any software, system or other services; or be secure, accurate, complete, and free of harmful code or error free. PJM may also, from time to time, update, supplement or delete the information, services, and/or the resources contained in this website and reserves the right to make such changes without prior notification. In no event will PJM be liable for any reason under any legal or equitable theory, including, but not limited to, breach of contract, tort (including negligence), strict liability, and otherwise, for any (a) consequential, incidental, indirect, exemplary, special, enhanced, or punitive damages, (b) increased costs, diminution in value, or lost business, production, revenues, or profits, (c) loss of goodwill or reputation, (d) use, inability to use, loss, interruption, delay, or recovery of any data or breach of data or system security, or (e) cost of replacement services, in each case regardless of whether User or any other persons were advised of the possibility of such losses or damages or such losses or damages were otherwise foreseeable. At any time, and for any lawful purpose, PJM may monitor, intercept, record and search any communications or data transiting or stored on Queue Scope. At PJM's sole discretion, PJM may disclose pertinent information to the U.S. Government and its authorized representatives to protect the security of critical infrastructure and key resources, ensure information security, or to comply with any applicable law, regulation, legal process, or enforceable governmental request. Users expressly consent to the terms and conditions contained in this Disclaimer Notice. Users have no reasonable expectation of privacy regarding communications or data transiting or stored on Queue Scope. Unauthorized use of Queue Scope may be subject to criminal prosecution or civil proceedings.

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Introduction

Queue Scope enables users to evaluate the placement of future generators before formally entering the PJM interconnection process. The tool screens potential points of interconnection (POI) on the PJM system by assessing grid impacts based on the amount of megawatt injection or withdrawal at a given POI.

Queue Scope is an informational tool and is not intended to be a substitute for actual interconnection studies conducted by PJM as part of PJM's interconnection process. Queue Scope results are not reflective of current PJM system conditions and may not account for all study assumptions and considerations that would otherwise be considered in the formal interconnection study process.

Queue Scope may help users determine where thermal grid impacts exist or where transmission headroom may exist for a potential generator interconnection at different POI areas across the PJM footprint. The data sets leveraged in the tool are created using a high-level DC flowgate screening across the PJM area. The DC flowgate screening is performed using the PJM TARA Generator Deliverability Tool developed by PowerGem.

Queue Scope uses the following two input case types and related contingency files:

- **RTEP base case**
  Only contains generators that have fully executed interconnection agreements (high commercial probability projects). This is the starting base case for the annual RTEP analysis and does not contain baseline upgrades later approved to address reliability violations identified in the given annual RTEP study.
- **Queue/Cycle study case**
  Based on the RTEP base case. Contains all active generators up through the queue/cycle under study (mix of high and low commercial probability projects). Includes the modeling of baseline upgrades with projected in-service dates up through the base case year. This case is used to conduct PJM's interconnection studies.

Queue Scope is available as two applications:

- **Tabular Application**
  - **Public Version**: No user login required; some data fields are restricted; does not have the ability to download results.
  - **Secure Version**: User login required through Account Manager; some data fields are restricted; results can be downloaded.
  - **Secure Version + CEII Data**: User login required; additional data fields are provisioned to the user (CEII access must be approved to view this version through Customer Account Manager).
- **Geospatial Application**
  - **Secure Version**: User login required through Account Manager; some data fields are restricted as seen in the Tabular Application.
  - **Secure Version + CEII Data**: User login required; additional data fields are provisioned to the user (CEII access must be approved to view this version through Customer Account Manager).

This guide provides an overview on how to use both applications and the features that are unique to each.

Section 1: Access Request for Queue Scope

The public version of Queue Scope's tabular application does not require any special access approval or login through Account Manager. In order to access the versions of Queue Scope's tabular and geospatial applications with secure or secure + CEII data, follow the steps below to set up or update your account in Account Manager. The tabular and geospatial applications share the same roles in Account Manager.

If your company is an active member of PJM:

1. Go to PJM's Account Manager page
2. Log in to Account Manager with your user ID and password and request **Queue Scope Read Only**.
3. If you do not see **Queue Scope Read Only**, request access through your company Account Manager (CAM). They will be able to authorize your access to the **Queue Scope Read Only** role. You may be required to create a new user ID under the specific organization provided by your CAM.

If your CAM administrator is not familiar with **Queue Scope Read Only**, please contact custsvc@pjm.com.

If your company is not an active Member and/or you do not have an account, please visit the Account Manager page for further guidance on Non-Member CAMs and Non-member accounts. For any additional questions and guidance, please contact custsvc@pjm.com.

Queue Scope CEII Data Access Request

Once approved, the Queue Scope CEII data request enables a user to view additional data fields such as the contingency description and the facility ratings in the study results of the tool. The CEII Request Process is as follows:

1. User must have a PJM.com account and already have **Queue Scope Read Only** provisioned before starting the CEII data request process. **Do not request the CEII data before requesting application access.**
2. Go to Library and fill out the form to request CEII access.
3. Fill out the form and put **Queue Scope** in the "Description of CEII Materials" box. Fill out the rest of the form and click Submit.
4. Submit the PJM CEII Non-Disclosure Agreement (NDA) if not completed previously.

After submitting the CEII request, users can expect the following:

1. Once the CEII secure area request goes through the workflow within PJM.com, it is automatically sent to the PJM CEII Admin for final approval.
2. Once approved, the user will be notified via email that access has been granted to the **My PJM Queue Scope CEII Data** secure area.
3. The user will now be able to view the additional CEII data fields when using the Account Manager Login for the Queue Scope secure access.

Section 2: Queue Scope Capabilities (Tabular & Geospatial)

With Queue Scope, users are able to assess injection and withdrawal operating modes.

Note: *Withdrawal modes apply to projects with a load component, such as battery charging from the grid, pumped hydro, Merchant Transmission Projects −MTX, etc.*

Queue Scope has the following capabilities in order to make these assessments:

- Queue Scope provides results based on the DC flowgate screening results from PJM's TARA Generator Deliverability Tool and provides flowgate (mon/con pair) loading with pre-/post-loading and megawatt headroom by POI.
- Users can assess over 6,000 POI buses within the PJM footprint.
- Users can select different case types (RTEP vs. Queue/Cycle) and different case years to compare results.
- Users can enter from 1 MW up to 9,999 MW of injection or withdrawal at a time per POI. (**Note:** Only positive megawatt values need to be entered for a withdrawal scenario, as the tool automatically calculates based on the selected operating mode.)
- Users can run an evaluation and export the results to an Excel file on up to 25 POI buses at a given time.
- The geospatial application allows users to locate POI buses via three methods: navigate to coordinates, search by transmission owner, and search by bus name/bus number.
- The geospatial application allows users to overlay transmission lines, new service requests, and generator deactivations within the map while reviewing POIs and running a generator evaluation.
- The geospatial application also includes a congestion overlay for the entire PJM footprint, which provides insight into the facility overloads by POI based on generation under study within the case. This overlay provides a visual representation of transmission headroom or the severity of facility overloads based on generation under study in the case. (**Note:** This overlay is not related to market-based congestion terminology and is similar in nature to what many call a "heat map" of the facility loading impacts by POI bus.)

Section 3: Queue Scope Limitations (Tabular & Geospatial)

Queue Scope has the following limitations and/or base assumptions for the analysis:

- Queue Scope is not capable of performing "On Demand" analysis (no TARA/PSSE software is running in the background).
- Datasets are generated using a linear DC flowgate analysis to estimate impacts and are **not** based on an AC solution. Queue Scope only provides a linear estimation of grid impacts and not a final AC solution used in impact studies to determine any required upgrades and the associated cost allocation.
- Transmission headroom calculation (Available MW) is only for thermal or steady-state load flow analysis.
- Results do not include any system impacts from voltage, short circuit or stability analysis.
- Project loaders in a flowgate are not provided with a megawatt contribution breakdown or flowgate loading breakdown. The assessment is only based on the desired MW value entered in the tool.

- Individual project impact reports are not generated by this tool or available for review.
- Reinforcement cost estimates or cost allocation for a flowgate overload is not provided.
- In a Queue/Cycle study case, reinforcements related to active projects are not built into the study case. This may result in low or no facility headroom since the reinforcement isn't modeled.
- POI selection is limited to existing POI buses within the PJM system/model, which correspond to existing transmission facilities/substations.
- Users cannot create new buses (POIs) using the tool or add tap buses to existing lines. The results from two desired POIs can, on either end of a branch, be used to provide a close estimate of grid impacts.
- POI bus selection is limited to 100 kV and above.
- Queue Scope is currently limited to summer peak analysis. Future enhancements will eventually incorporate light load analysis and winter peak analysis as applicable.
- Pre-contingency facility ratings may not have been applied for a small subset of monitored facilities in the results.
- Queue Scope assumes 100% commercial probability of the all the units modeled in the case.

Section 4: PJM Transmission Owner Abbreviations

Queue Scope lists Transmission Owner zones as abbreviations. Please use the following table as a reference for what these abbreviations mean in Queue Scope.

Abbreviation	Definition
AE	Atlantic City Electric | Exelon
AEP	American Electric Power
AP or APS	Allegheny Power | FirstEnergy
ATSI	American Transmission Systems, Inc. | FirstEnergy
BGE	Baltimore Gas & Electric | Exelon
CE	Commonwealth Edison Company (ComEd) | Exelon
DAY	Dayton Power and Light (Now AES Ohio)
DEO&K	Duke Energy Ohio/Kentucky
DP&L	Delmarva Power & Light | Exelon
DLCO	Duquesne Light Company
DVP	Dominion Virginia Power
EKPC	Eastern Kentucky Power Cooperative Inc.
JCPL	Jersey Central Power & Light | FirstEnergy
ME or METED	Metropolitan Edison Company | FirstEnergy
OVEC	Ohio Valley Electric Corporation
PECO	PECO Energy Company | Exelon
PENELEC	Pennsylvania Electric Company | FirstEnergy
PEPCO	Potomac Electric Power Company | Exelon
PL	PPL Electric Utilities Corporation
PSEG	Public Service Electric & Gas Company
PJM	Mid-Atlantic Area Council 500kV transmission backbone area buses only
RECO	Rockland Electric (East)
SMECO	Southern Maryland Electric Cooperative
UGI	UGI Utilities, Inc.

Section 5: Tabular Application Overview & Workflow

Display Overview

Queue Scope's tabular application displays transmission availability on the grid based on a user-defined generator at various locations across the PJM transmission system.

When first accessing Queue Scope, a user will be prompted to accept terms of use and acknowledge the PJM legal disclaimer before using the tool as shown in **Figure 5.1.**

Users can select inputs such as the case years/type, transmission owner area, voltage level, operating mode, desired megawatt amount, and the generation/storage POI as shown in **Figure 5.2**. After clicking the Submit button, the application runs the analysis and generates the evaluation results as shown in **Figure 5.3**. The results contain the list of flowgate facilities, contingency type, available megawatts, distribution factor (related to the selected POI bus), impact megawatts, pre-loading level and post-loading level.

Figure 5.1. Disclaimer Acknowledgment

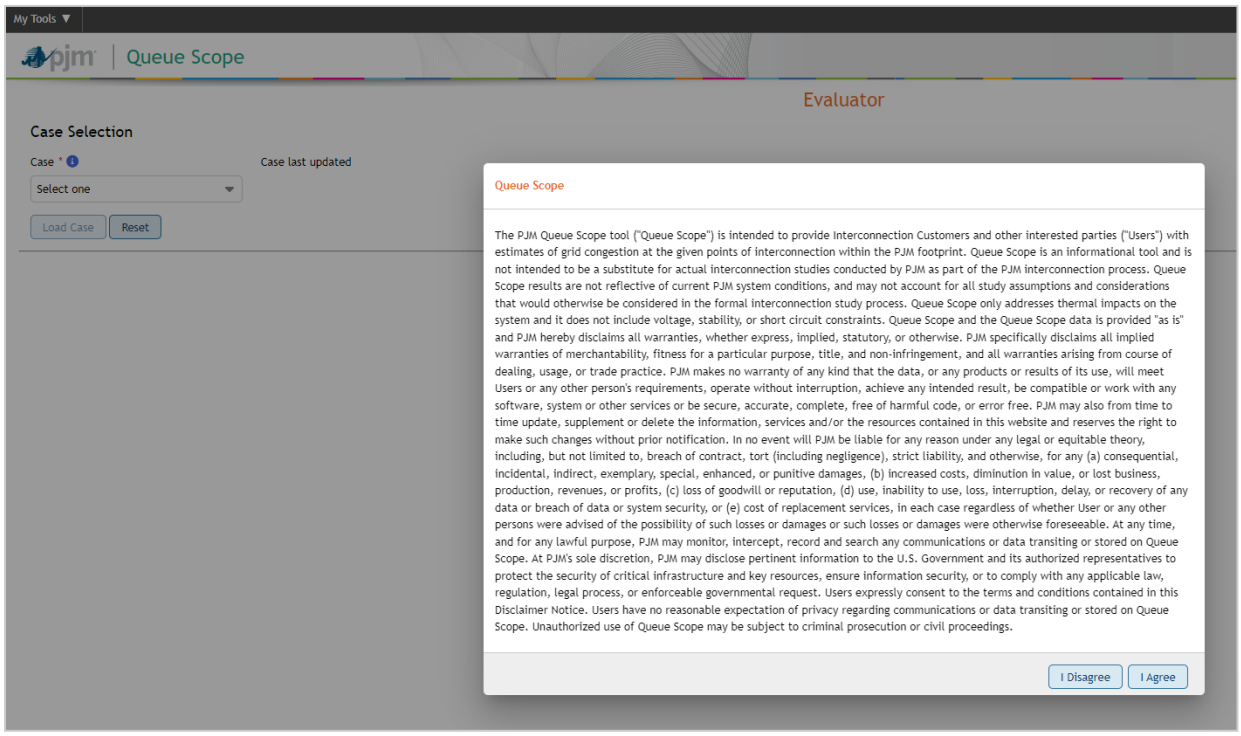


Figure 5.2. User Inputs

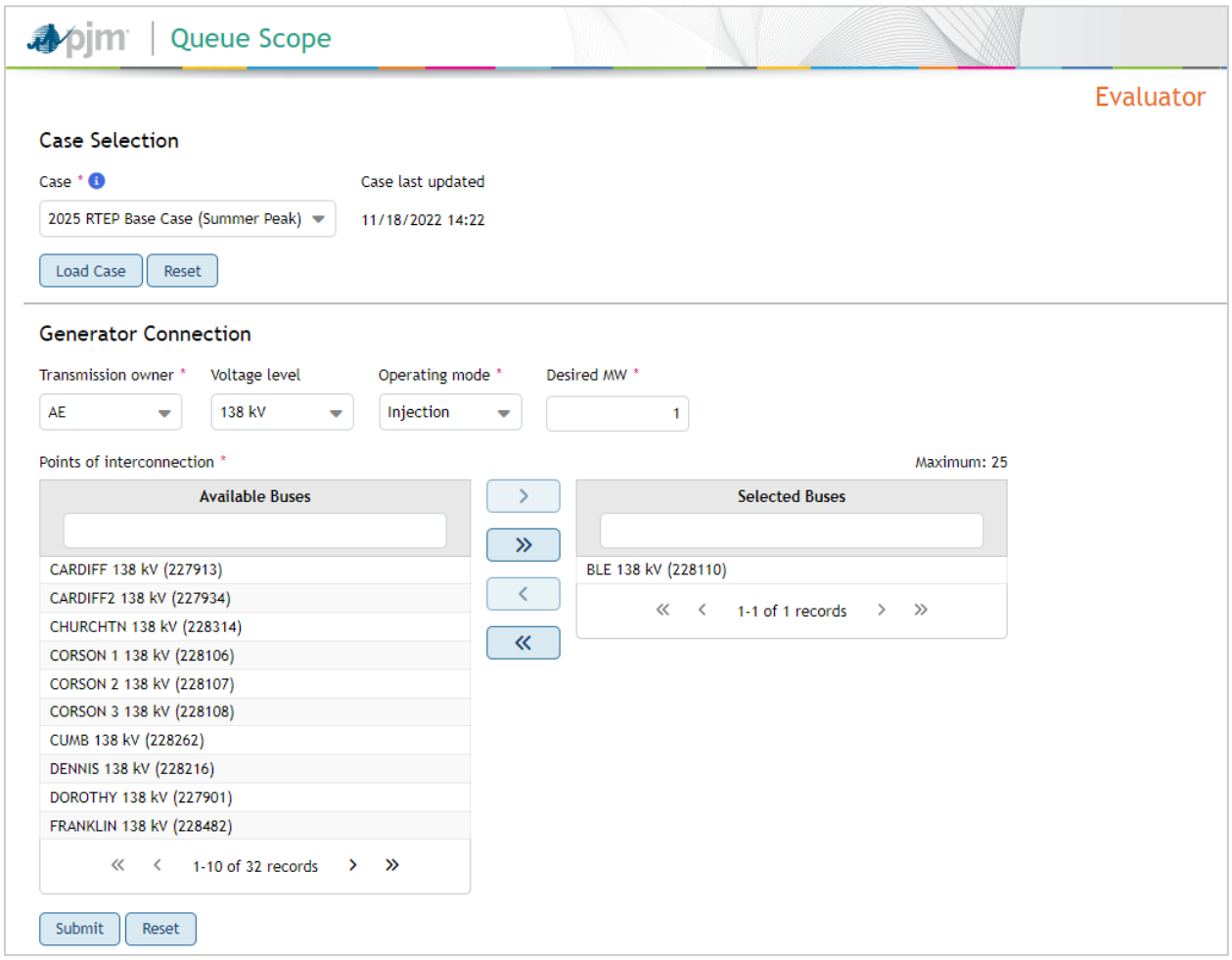
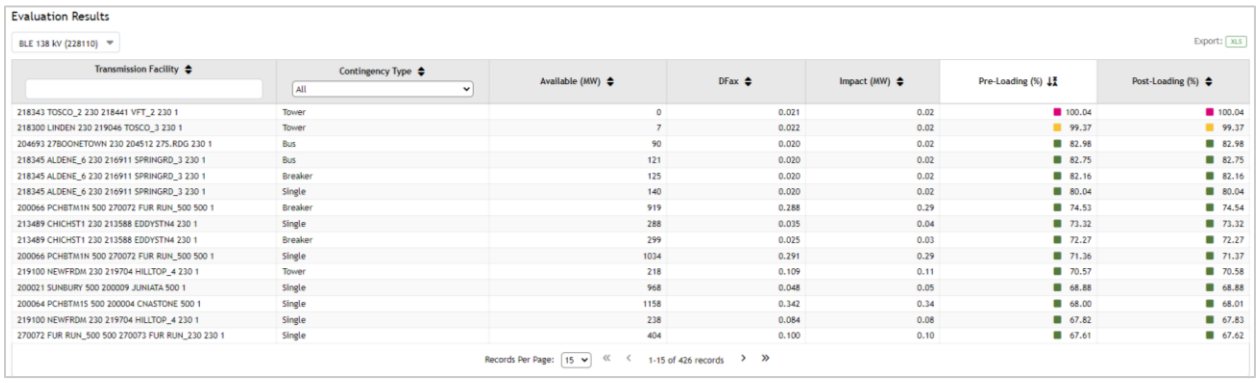


Figure 5.3. Output Results



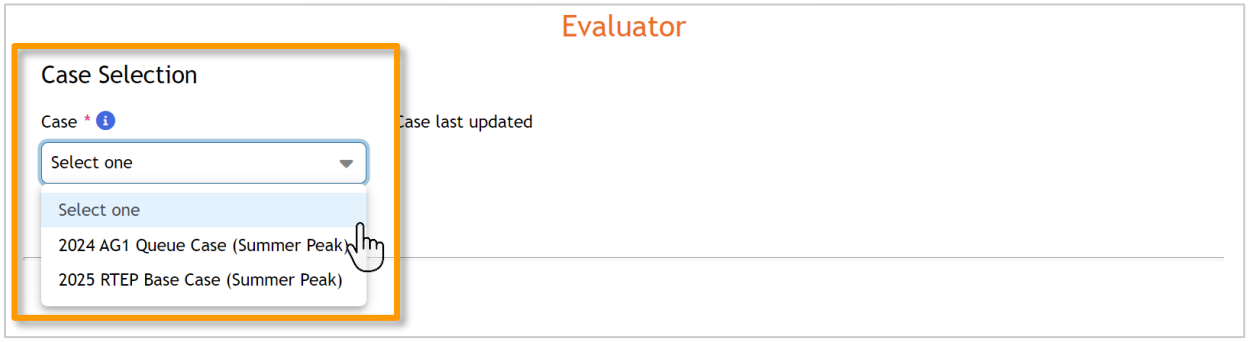
How To Use the Tool: General Walk-Through

This section contains the general steps on how to use the Tabular Application to run POI evaluations.

1. Case Selection

First, select a case, which corresponds to the case study results stored in a database. This can be a case used for Queue/Cycles labeled as the Queue or Cycle case or the yearly PJM Planning base case labeled as the RTEP base case. (This includes generation with executed interconnection agreements.)

Select the desired **case** from the drop-down list shown below.

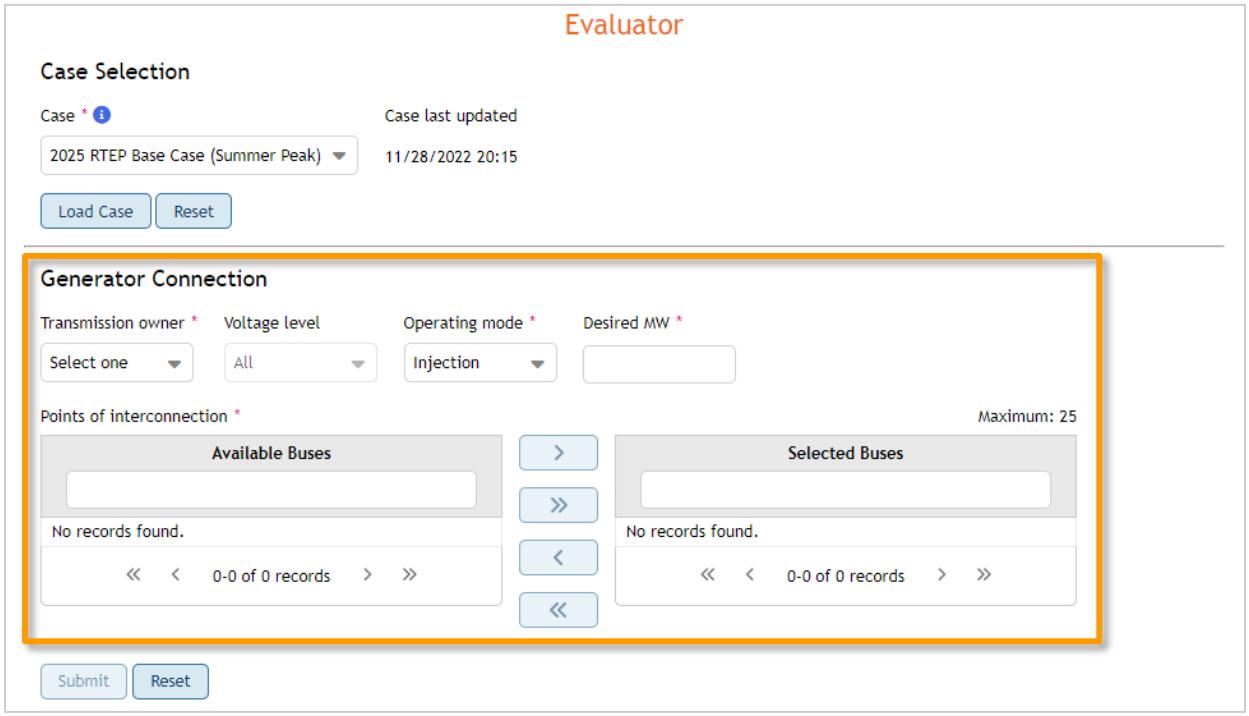


2. Load Case

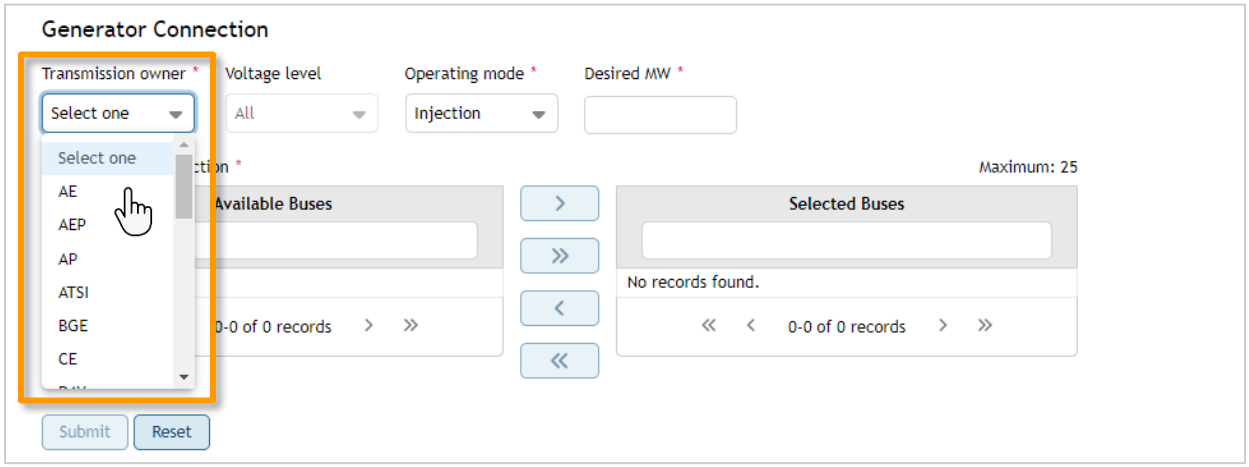
After making the case selection, click on **Load Case** as shown below. The case's last updated time stamp will be shown, which is the date when PJM last updated the case study results in the database. These files are static outputs/results files generated from the PowerGem TARA GD tool.

3. Generator Connection Details

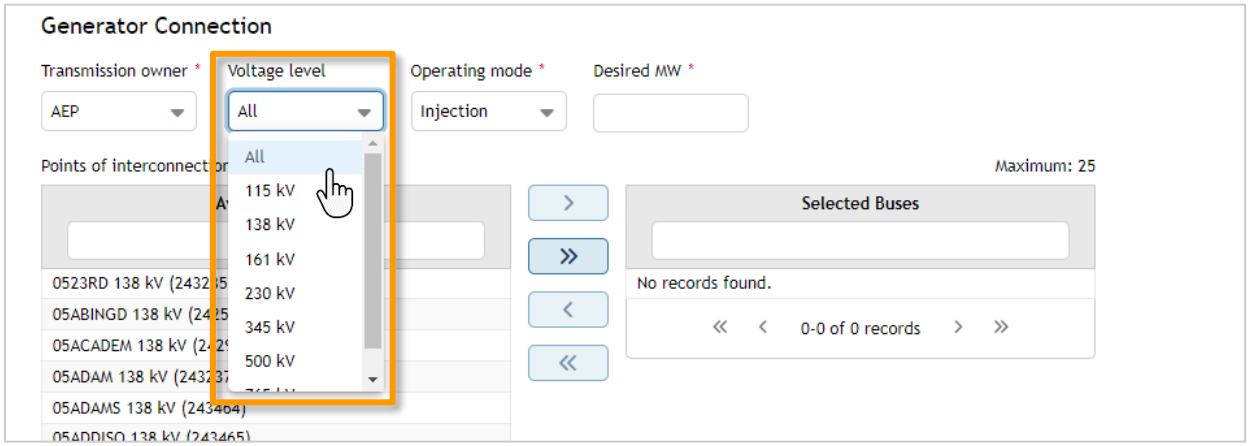
After loading the case results, the tool provides a prompt with generator-related selections and inputs, such as Transmission Owner area, voltage level, operating mode and desired megawatts. Choose available POIs to further evaluate based on these input parameters.



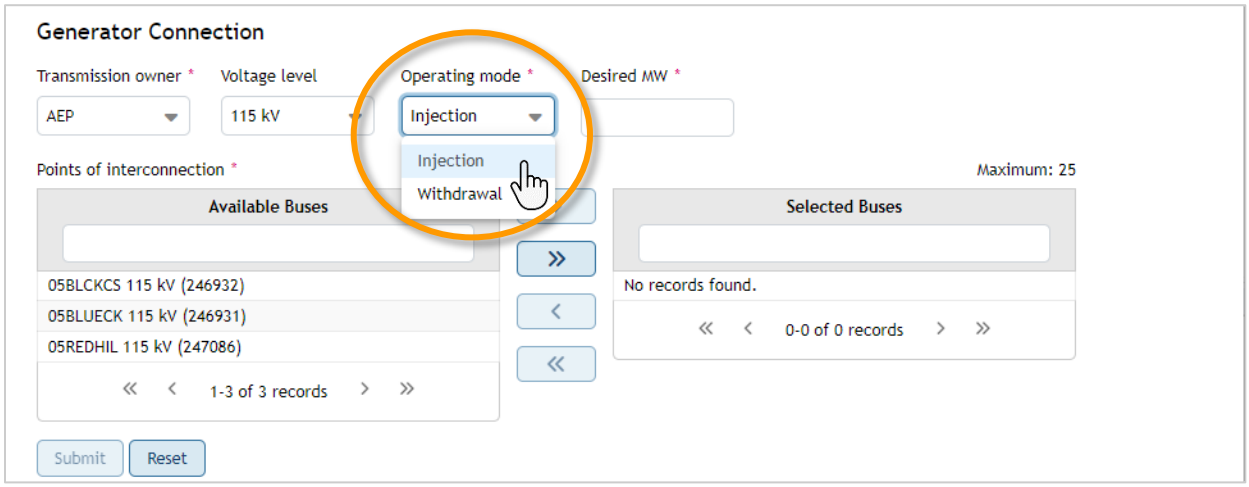
Select the desired **Transmission owner** area (one at a time) from the drop-down list as shown below. (Refer to the section on PJM Transmission Owner Abbreviations for definitions.)



Select the desired **Voltage level** (one at a time or "All") from the drop-down list as shown below.



Select the desired **Operating mode** from the drop-down list as shown below. Injection mode is selected for all units that are going to injection megawatts into the grid. Withdrawal is only for evaluating units that had a load or firm/non-firm withdrawal component (battery charging, pumped hydro, MTX).

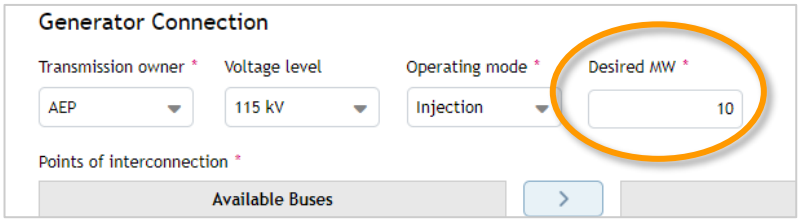


Note: *The "Desired MW" field shown above will only allow users to enter whole numbers between 1 and 9999*

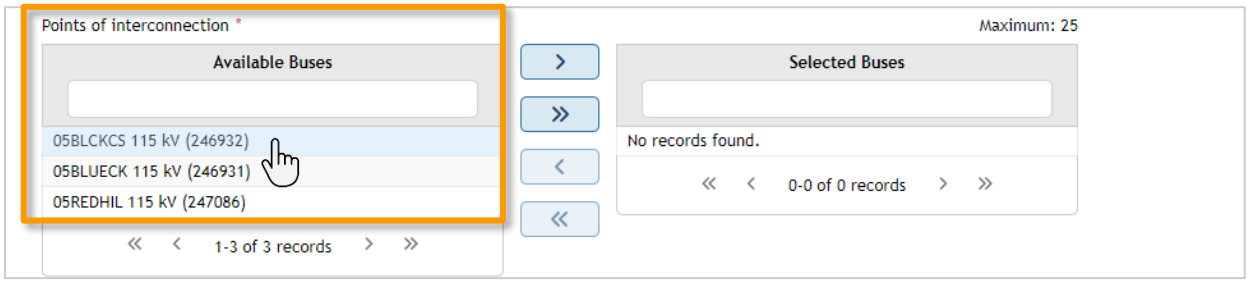
4. Example of User Generator Selection

In this example, the user wants to learn about the impact of a 10 MW solar unit at a specific location on the PJM grid. After going through the above-mentioned steps 1 to 3, the user selects/enters the following:

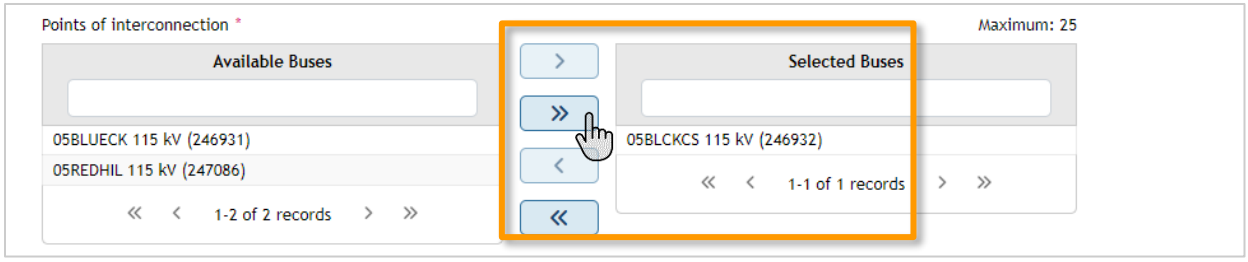
- Transmission owner: "AEP"
- Voltage level: "115 kV"
- Operating mode: "Injection"
- Desired MW: "10 MW"



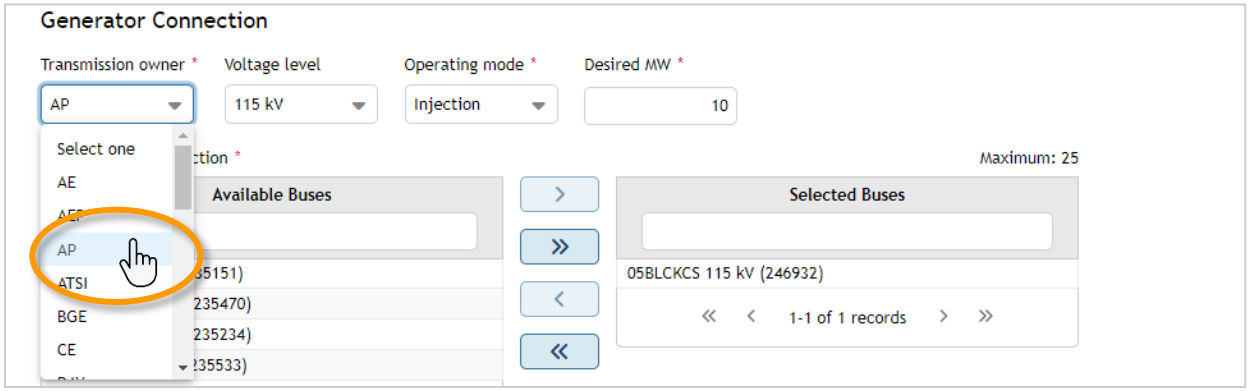
For the three available buses under the "***Point of interconnection***" list, the user selects "05BLCKCS 115 kV (246932)" as shown below:



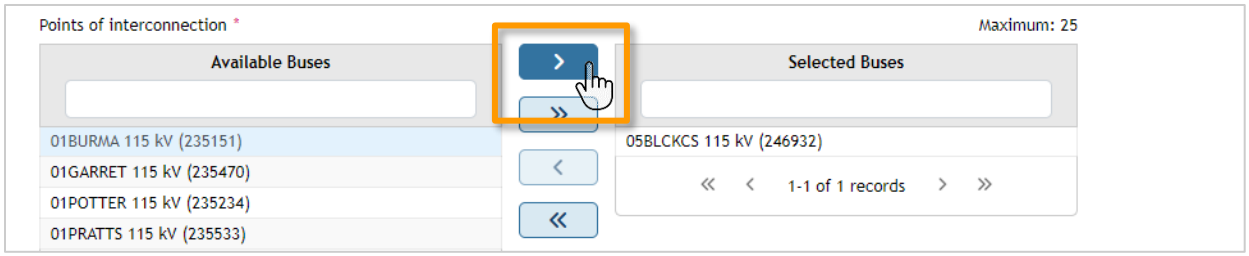
The user then moves the selected bus "05BLCKCS 115 kV (246932)" to the selected buses accumulator by clicking on the right arrow button as shown below:



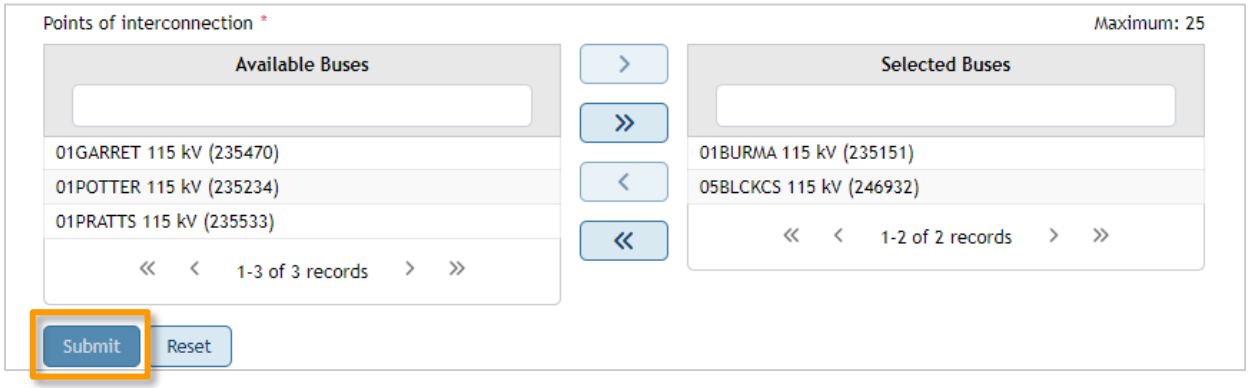
Alternatively, a user can select additional POIs for batch results. The user in the current example decides to select an additional transmission owner from the drop-down menu. The selected transmission owner is "AP" as shown below:



The user moves the selected bus "01BURMA 115 kV (235151)" to the **Selected Buses** area by clicking on the right arrow button as shown below:



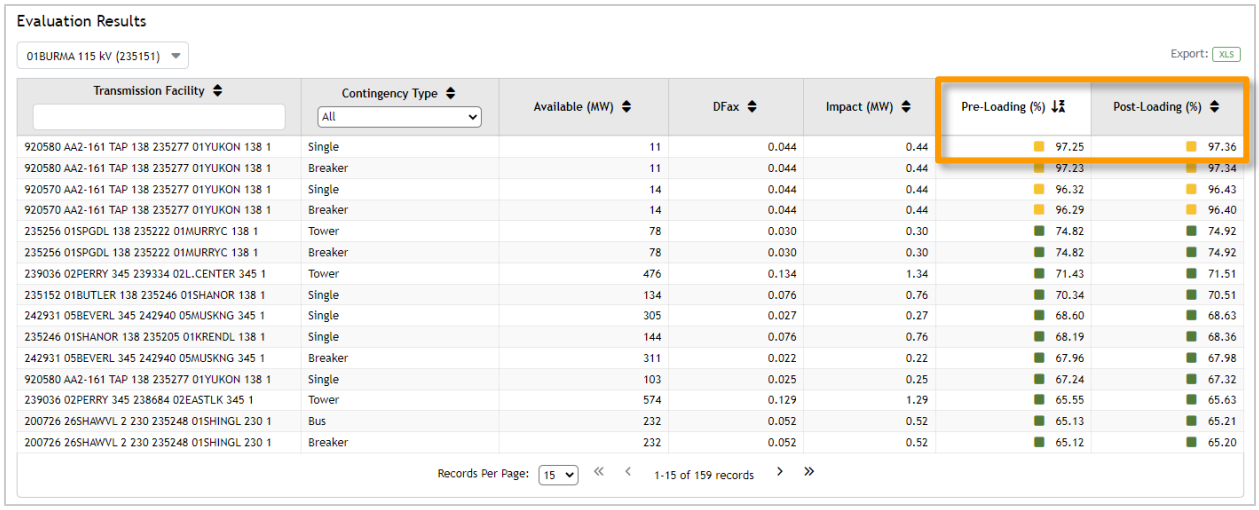
The user now has two different buses "05BLCKCS 115 kV (246932)" and "01BURMA 115 kV (235151)" under the Selected Buses area being evaluated for a solar unit of 10 MW as shown below. Once they click **Submit**, they can see the evaluation results populate in a table at the bottom of the screen.



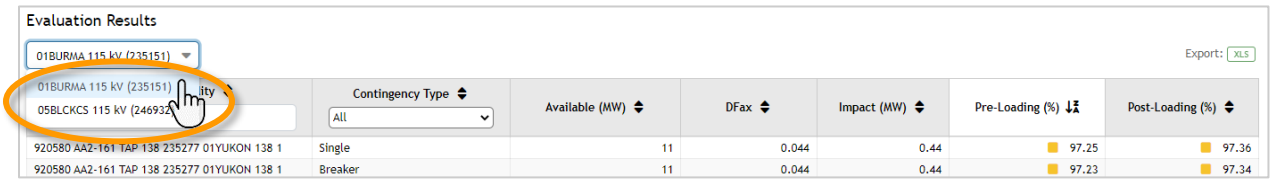
For this example, the Queue Scope evaluator presents the following results:

- Facilities will be impacted by a 10 MW solar unit injecting at the "01BURMA 115 kV (235151)" bus.
- Facility "920580 AA2-161 TAP 138 235277 01YUKON 138 1" with a single contingency has a pre-loading of 97.25%. With the new 10 MW solar unit loading into the facility, post-loading becomes 97.36%.
- The DFax or the distribution factor of 0.044 or 4.4% shows that the new 10 MW solar unit will only increase the loading on the above-mentioned facility under single contingency conditions.

Note: *The default sorting of the results is based on the pre-loading percentage (largest to smallest). However, users can adjust the sorting to be based on the post-loading percentage from largest to smallest (as highlighted in the impact below) to view any facilities impacted by the desired generator.*

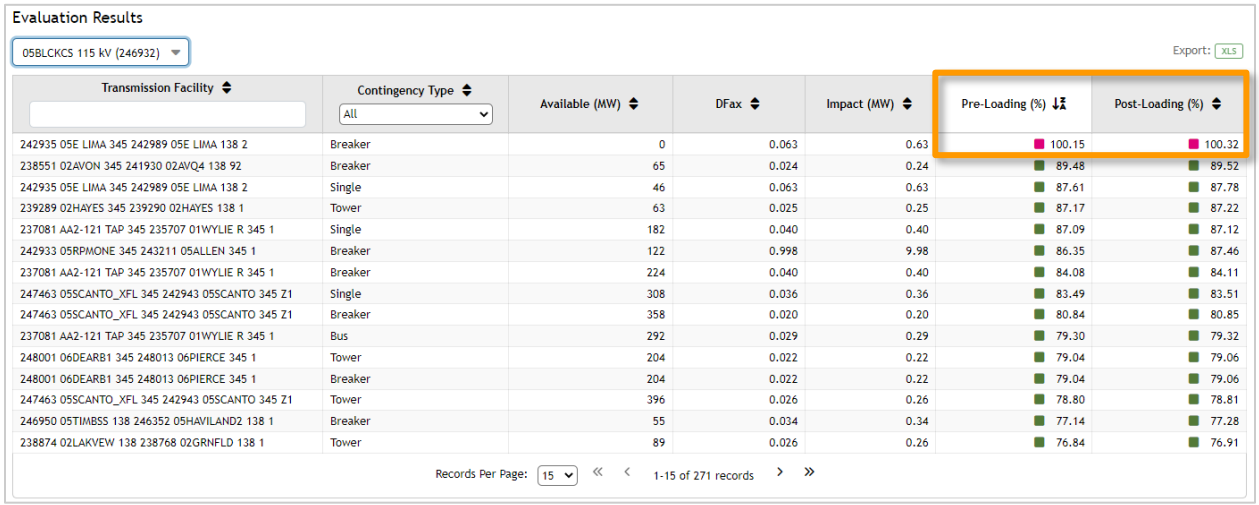


Using the **Evaluation Results** drop-down list, facilities being impacted by the 10 MW solar unit injection at the alternative “05BLCKCS 115 kV (246932)” bus can be selected as shown below:



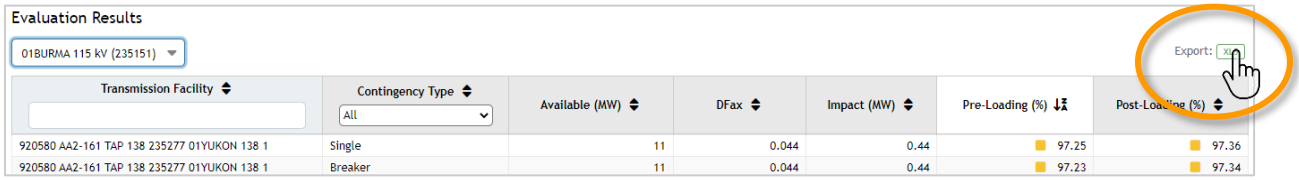
The evaluation presents the following results:

- Facilities are impacted by the 10 MW solar unit injection at “05BLCKCS 115 kV (246932)” bus.
- Facility “242935 05E LIMA 345 242989 05E LIMA 138 2” with a breaker contingency has a pre-loading of 100.15%. With the new solar unit loading into the facility, the post-loading becomes 100.32%.
- The DFax or the distribution factor of 0.063 or 6.3% shows that the new unit will only increase the loading on the above-mentioned facility under breaker contingency conditions.

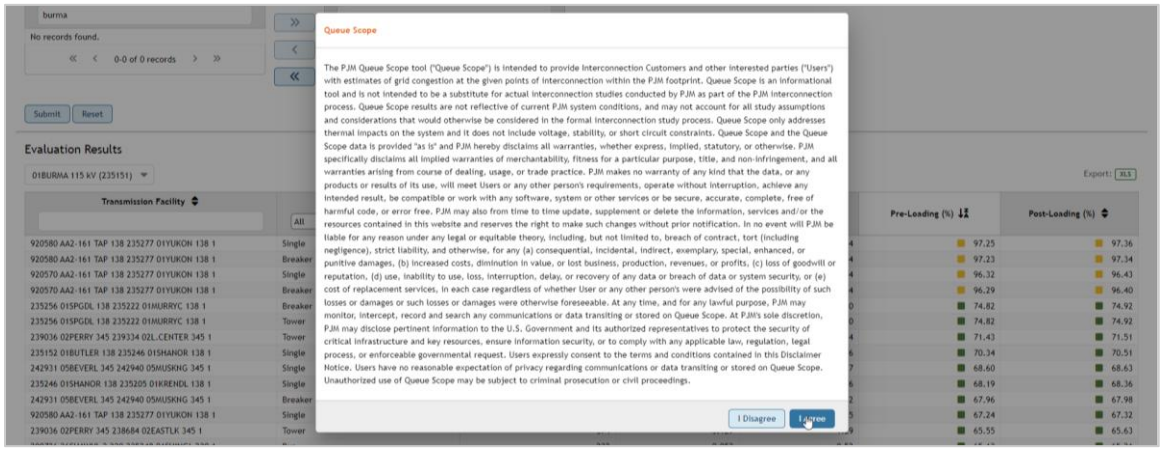


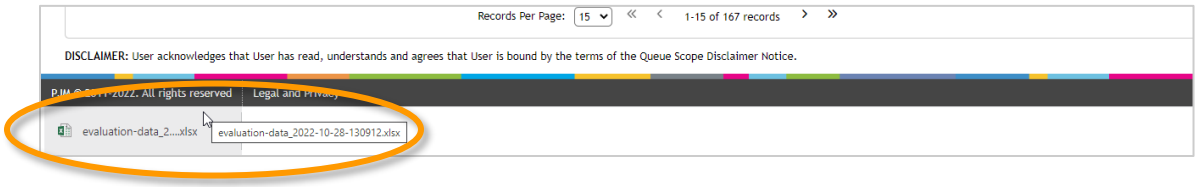
Users can export and download the results of the evaluation table into an Excel output file (.xls) as shown below.

***Please note** that this option is only available to users with established PJM user accounts. The public tool does not have the capability to download results.*

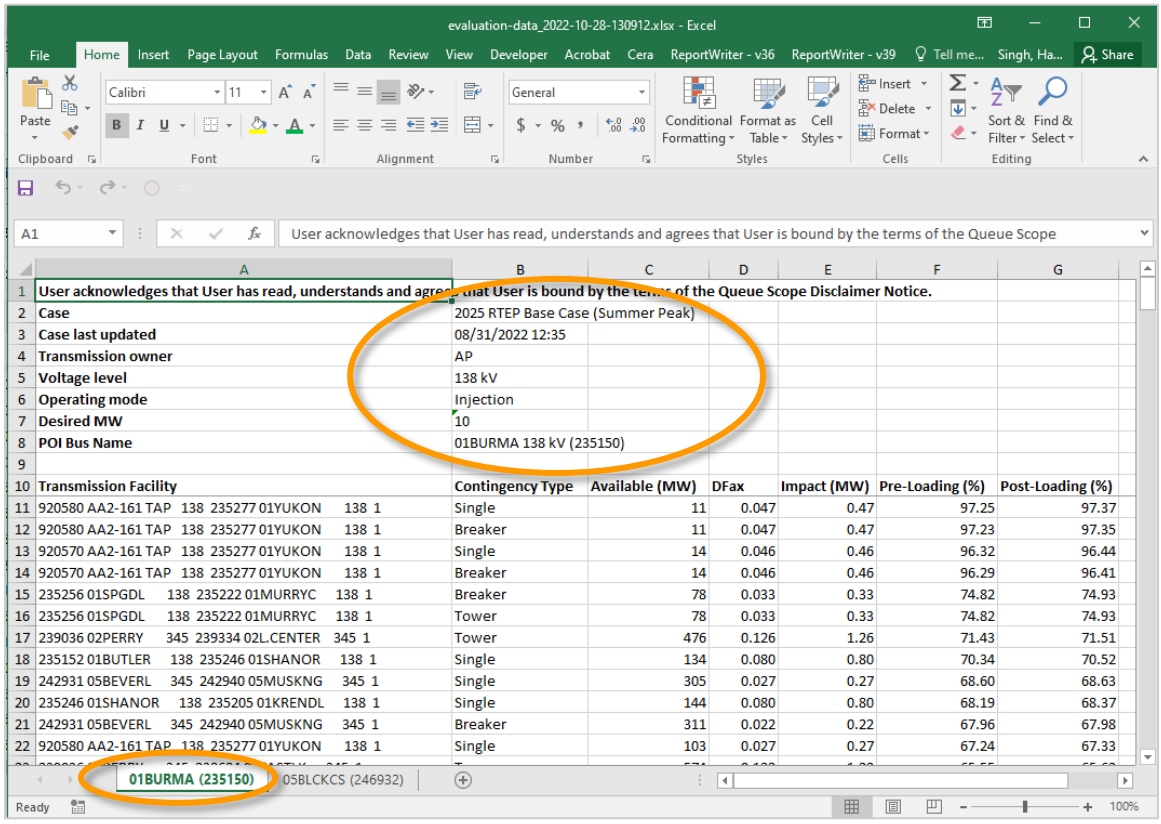


After agreeing to the disclaimer, the Excel file will be downloaded and automatically be named “evaluation-data” with date and time stamps as shown below.





The Excel file will contain multiple tabs with all the input user settings for every POI selected for analysis by the user.



	A	B	C	D	E	F	G
1	User acknowledges that User has read, understands and agrees that User is bound by the terms of the Queue Scope Disclaimer Notice.						
2	Case	2025 RTEP Base Case (Summer Peak)					
3	Case last updated	08/31/2022 12:35					
4	Transmission owner	AP					
5	Voltage level	138 kV					
6	Operating mode	Injection					
7	Desired MW	10					
8	POI Bus Name	01BURMA 138 kV (235150)					
9							
10	Transmission Facility	Contingency Type	Available (MW)	DFax	Impact (MW)	Pre-Loading (%)	Post-Loading (%)
11	920580 AA2-161 TAP 138 235277 01YUKON 138 1	Single	11	0.047	0.47	97.25	97.37
12	920580 AA2-161 TAP 138 235277 01YUKON 138 1	Breaker	11	0.047	0.47	97.23	97.35
13	920570 AA2-161 TAP 138 235277 01YUKON 138 1	Single	14	0.046	0.46	96.32	96.44
14	920570 AA2-161 TAP 138 235277 01YUKON 138 1	Breaker	14	0.046	0.46	96.29	96.41
15	235256 01SPGDL 138 235222 01MURRYC 138 1	Breaker	78	0.033	0.33	74.82	74.93
16	235256 01SPGDL 138 235222 01MURRYC 138 1	Tower	78	0.033	0.33	74.82	74.93
17	239036 02PERRY 345 239334 02L.CENTER 345 1	Tower	476	0.126	1.26	71.43	71.51
18	235152 01BUTLER 138 235246 01SHANOR 138 1	Single	134	0.080	0.80	70.34	70.52
19	242931 05BEVERL 345 242940 05MUSKNG 345 1	Single	305	0.027	0.27	68.60	68.63
20	235246 01SHANOR 138 235205 01KRENDL 138 1	Single	144	0.080	0.80	68.19	68.37
21	242931 05BEVERL 345 242940 05MUSKNG 345 1	Breaker	311	0.022	0.22	67.96	67.98
22	920580 AA2-161 TAP 138 235277 01YUKON 138 1	Single	103	0.027	0.27	67.24	67.33

Section 6: Geospatial Application Overview & Workflow

Display Overview

Queue Scope's geospatial application displays transmission availability (headroom) on the grid based on a user-defined generator at various locations across the PJM transmission system.

When first accessing the application, the user will be prompted to accept terms of use and acknowledge the PJM legal disclaimer before using the tool as shown in **Figure 6.1Figure 5.1**.

Users can select inputs such as the case years/type, search by transmission owner area and voltage level or bus name/bus number, and operating mode before loading and selecting one or multiple POIs for evaluation. Once POIs are selected by the user and added to the selected buses window, the user can enter a desired megawatt amount and select the final list of POIs before running the evaluation as shown in **Figure 6.2**. After clicking the "Run Study" button, the application runs the analysis and generates the evaluation results in a table as shown in **Figure 6.3Figure 5.3**. The results contain a list of flowgates with facility name, contingency type, available megawatts, distribution factor (related to the selected POI bus), impact megawatts, pre-loading level and post-loading level. In addition to these standard features, Queue Scope's geospatial application includes the following additional features:

- Coordinate Search: Lat/Long as shown in **Figure 6.4**
- Pre-Loading Status Symbology & Filtering as shown in **Figure 6.5**

- Congestion Overlay as shown in **Figure 6.6**
- Transmission Lines Overlay (kV Filter) as shown in **Figure 6.7**
- Generator Deactivations Filter as shown in **Figure 6.8**
- New Service Request Filter as shown in **Figure 6.9**
- Legend **Figure 6.10**

Figure 6.1. Disclaimer Acknowledgment

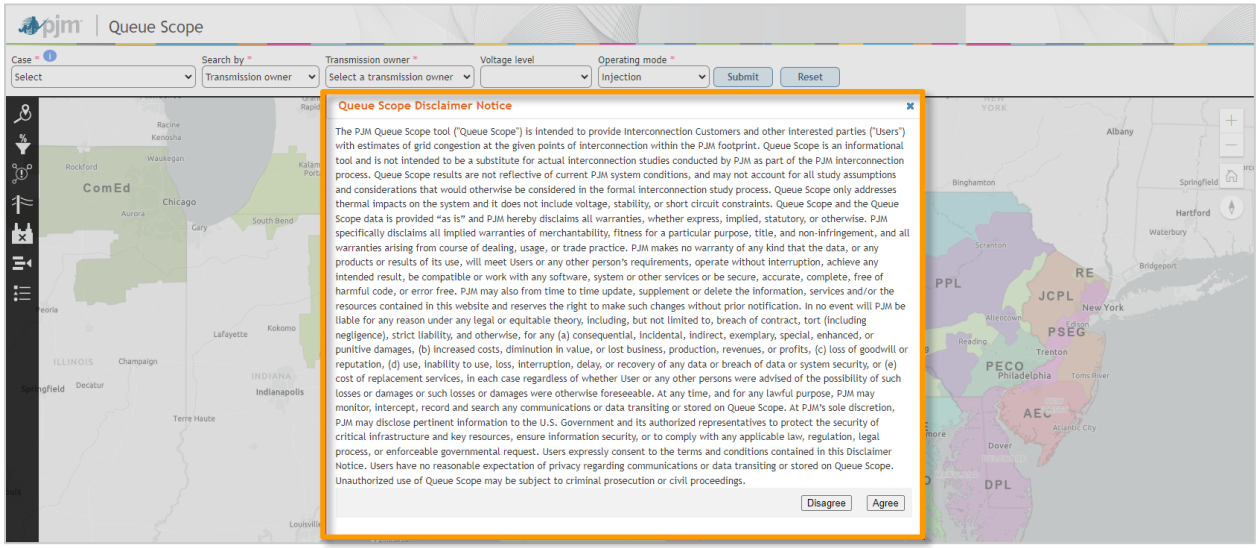


Figure 6.2. User Inputs

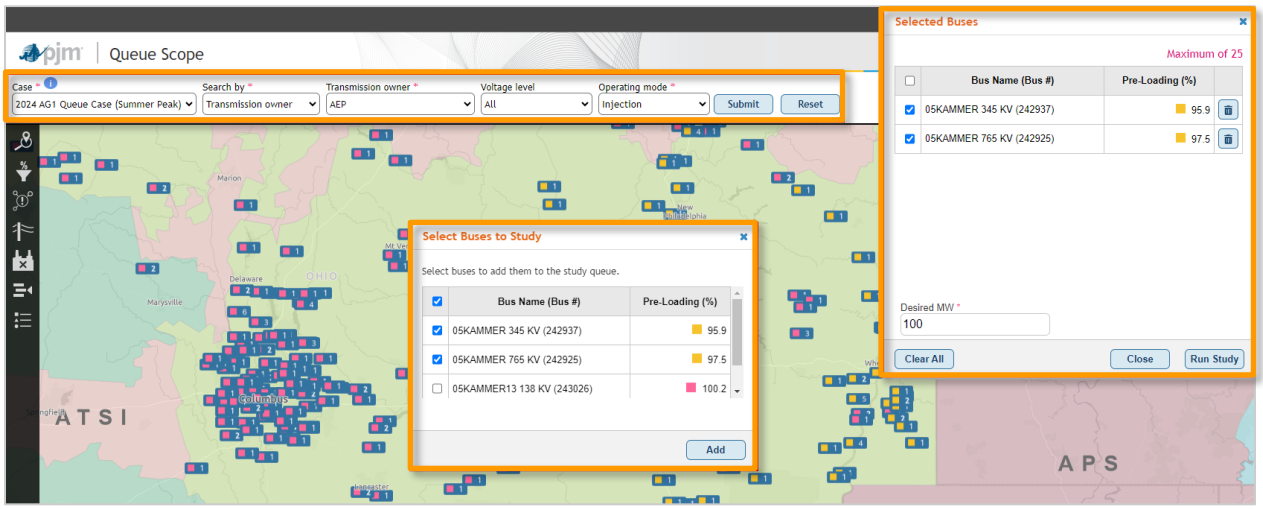


Figure 6.3. Output Results

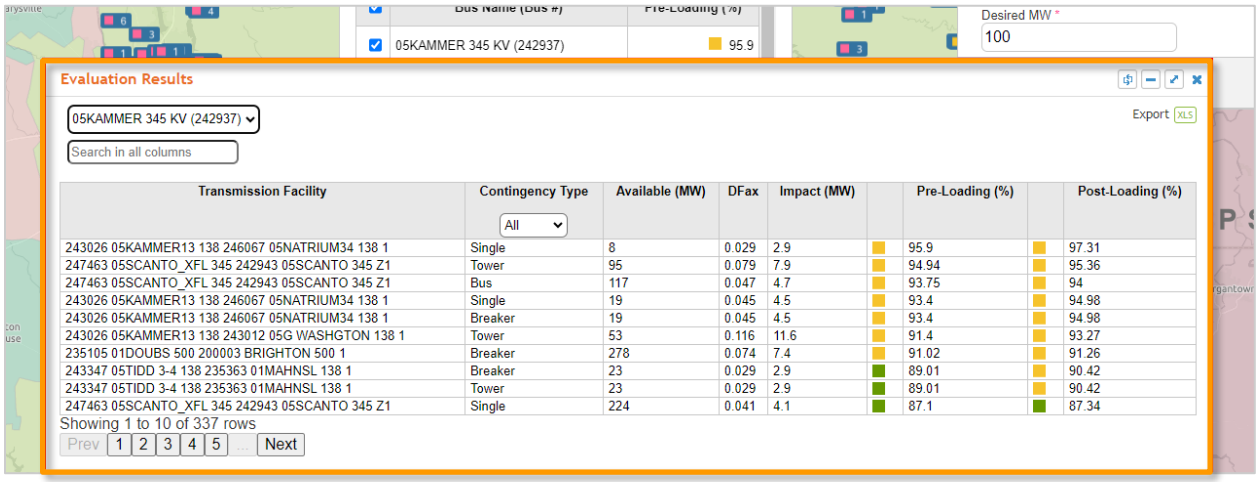


Figure 6.4. Coordinate Search: Lat/Long

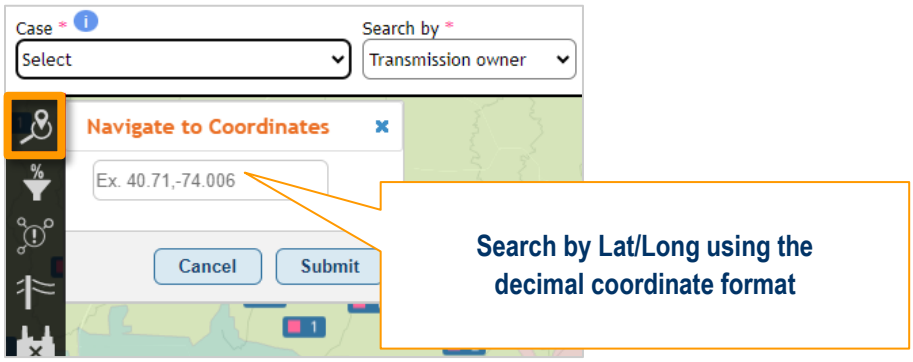


Figure 6.5. Pre-Loading Status Symbology & Filtering

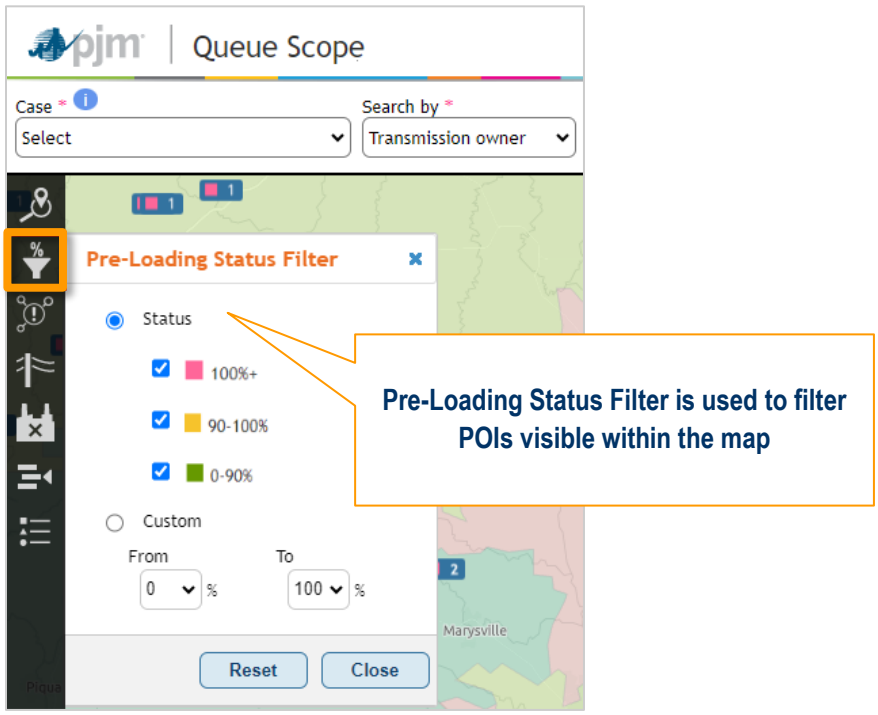


Figure 6.6. Congestion Overlay (Thermal Facility Loading by POI Bus)

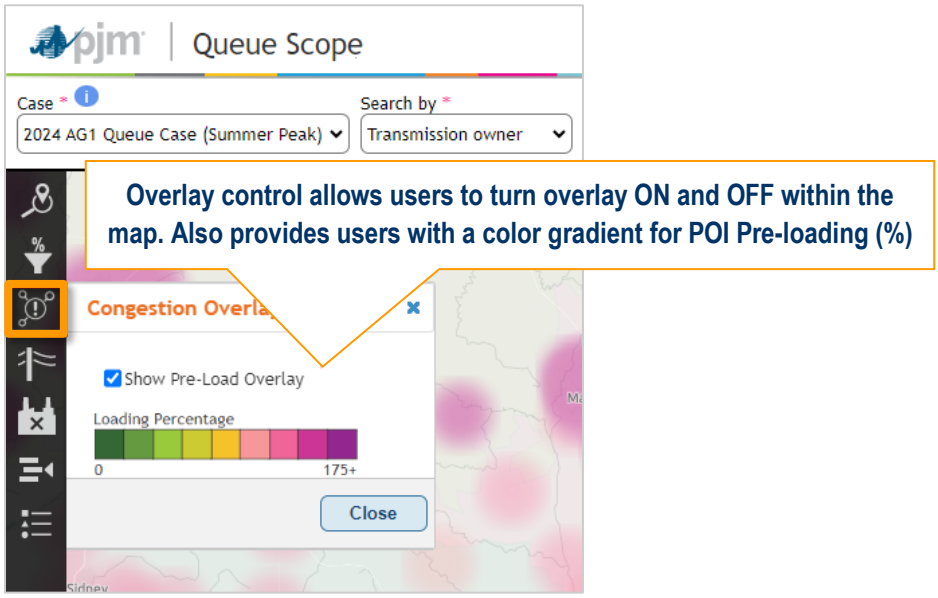


Figure 6.7. Transmission Lines Overlay (kV Filter)

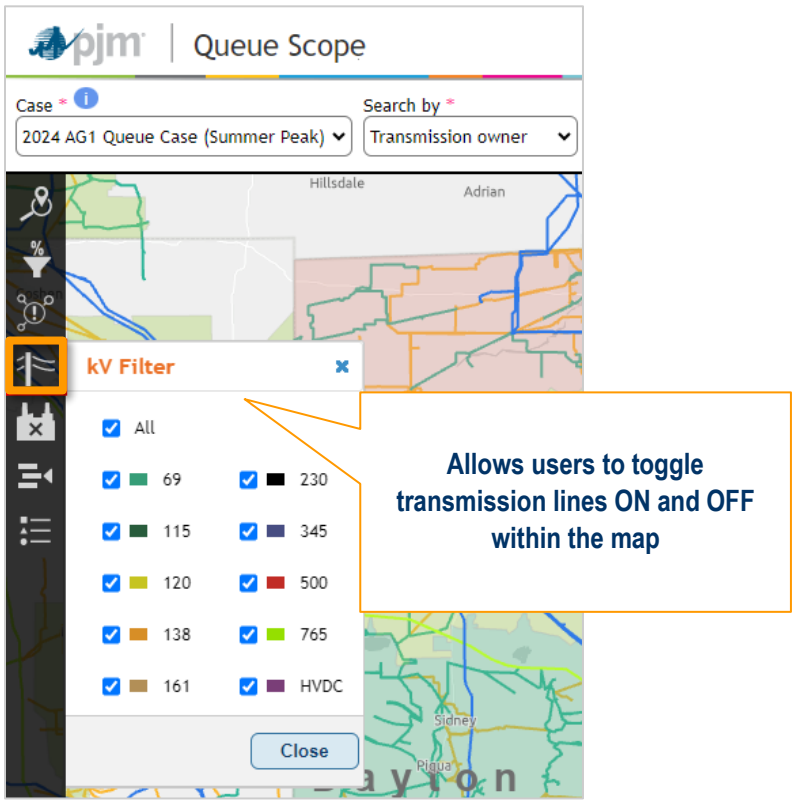


Figure 6.8. Generator Deactivations Filter

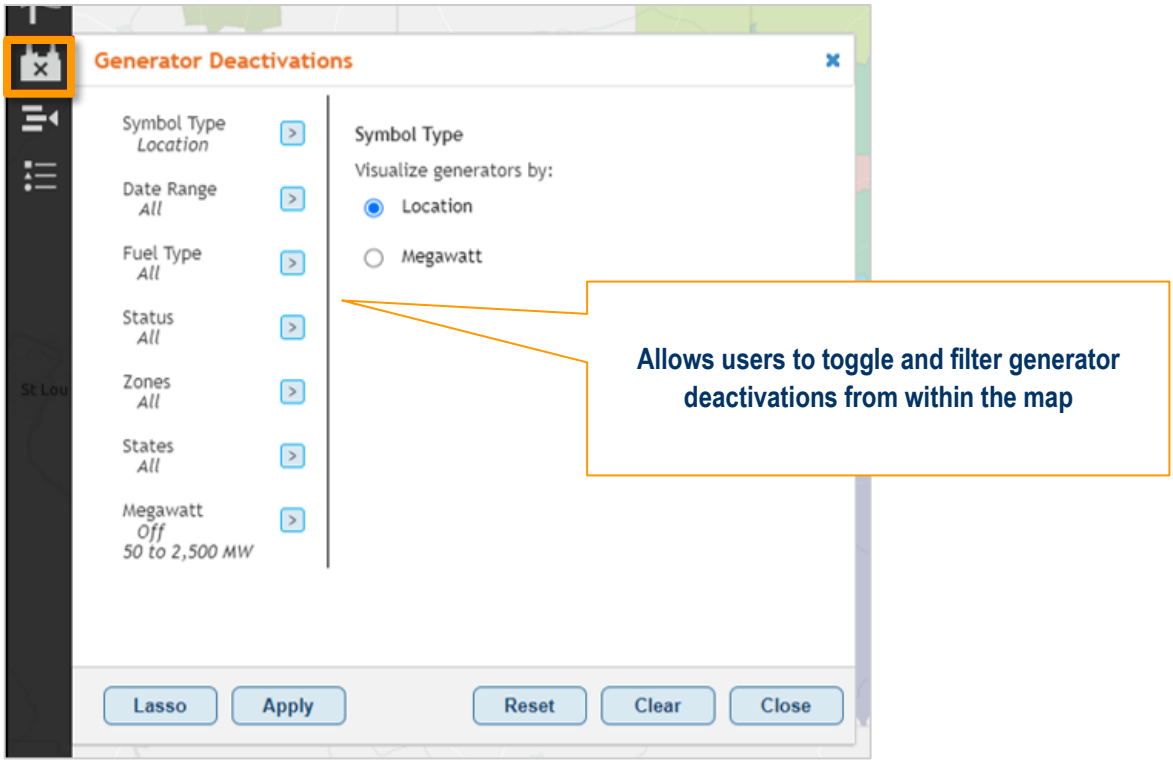


Figure 6.9. New Service Request Filter

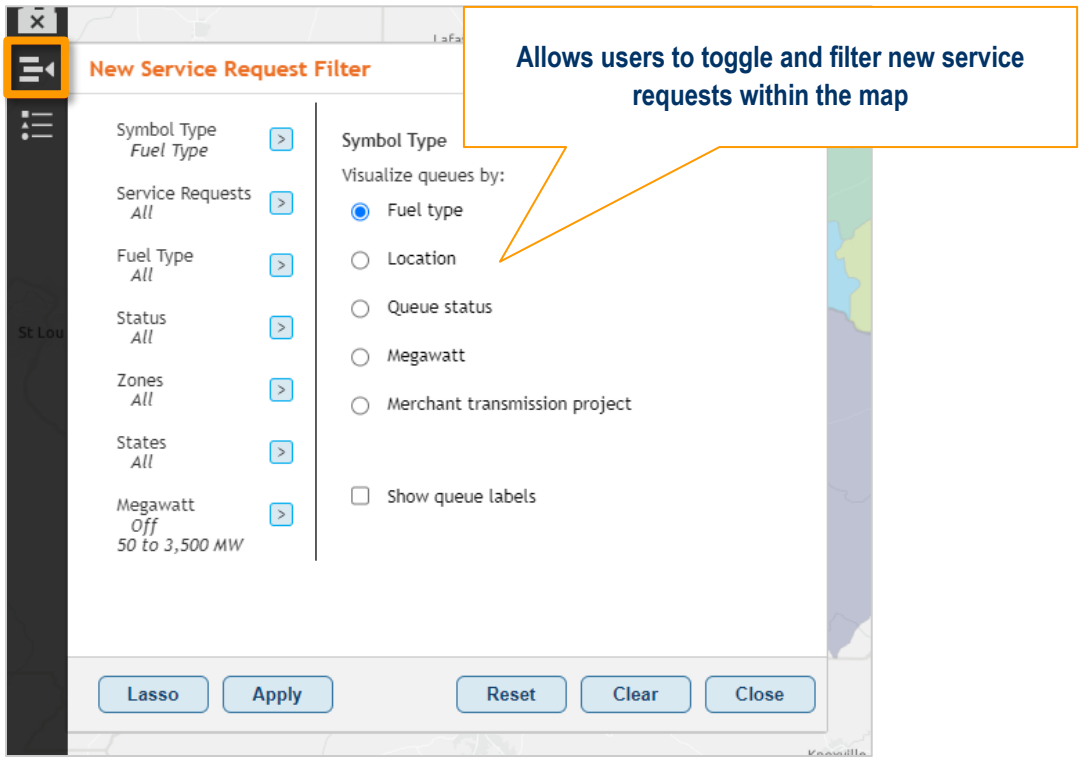
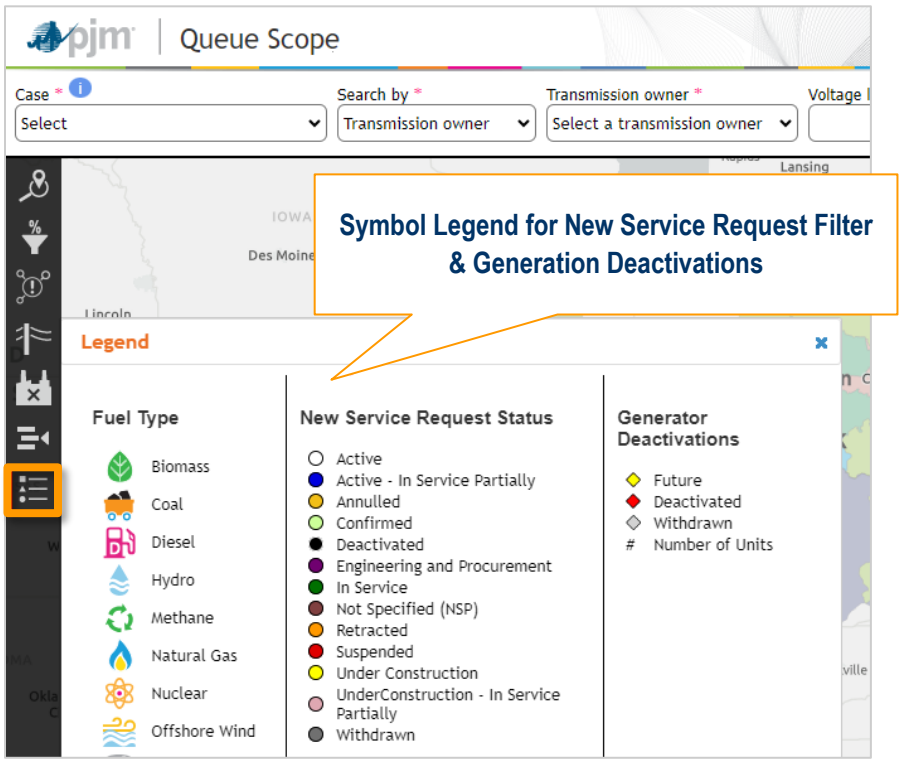


Figure 6.10. Legend



How To Use the Tool: General Walk-Through

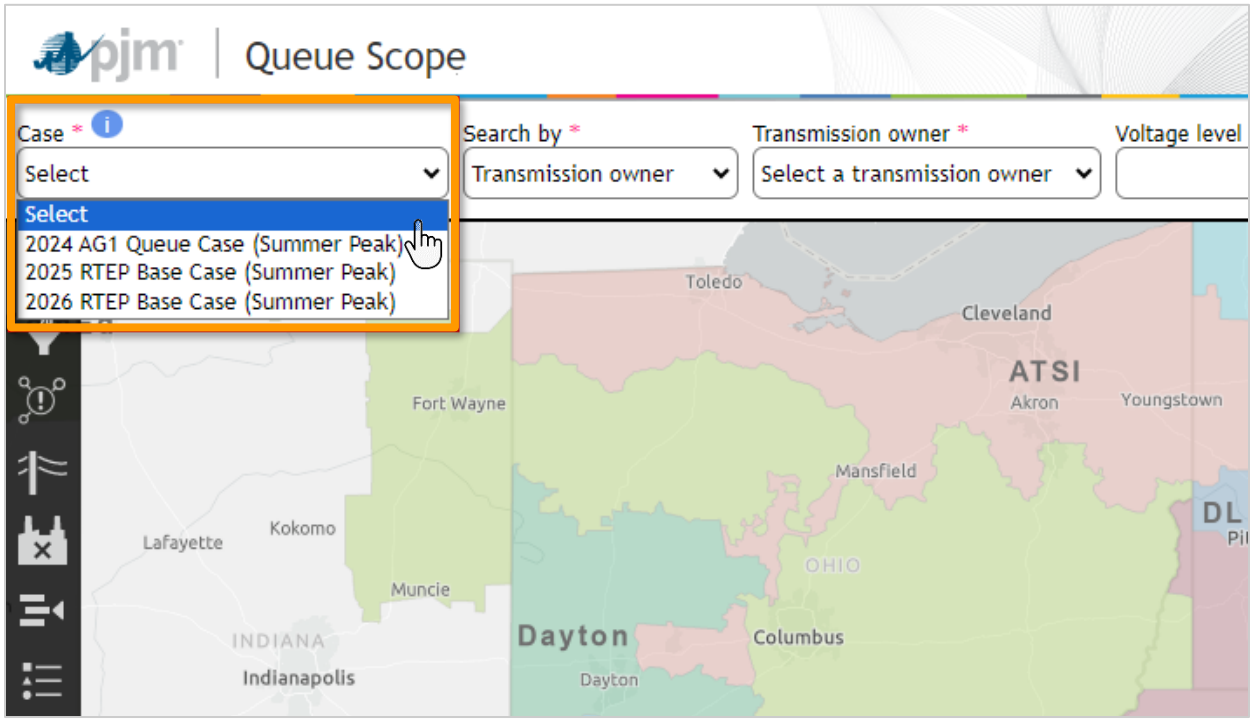
This section contains the general steps on how to use the geospatial application to run POI evaluations and leverage other geospatial features.

1. Case Selection

First, select a case, which corresponds to the case study results stored in the Queue Scope database. This can be a case used for Queue/Cycle studies labeled as the Queue or Cycle case or the yearly PJM Planning base case labeled as the RTEP base case.

Note: *The RTEP base case studies only include generation with executed interconnection agreements.*

Select the desired **case** from the drop-down list as shown below.

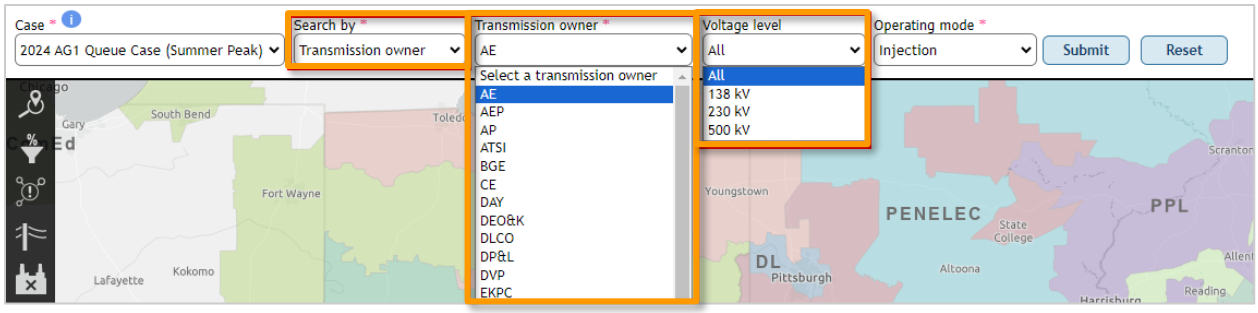


Once the case is selected, the dataset is loaded for use within the rest of the application's workflow and running POI evaluations.

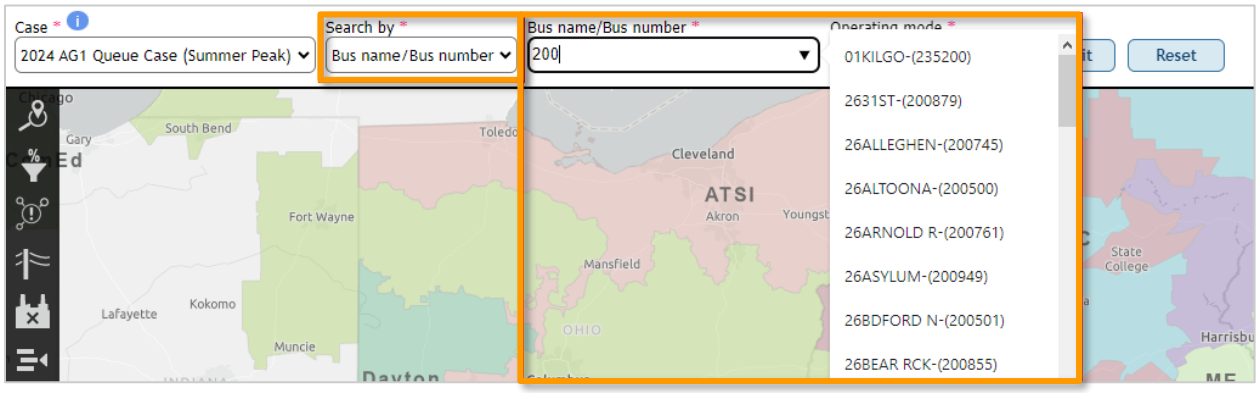
2. Search by Feature

After making the case selection, click on the "**Search by**" feature to select either "Transmission Owner" or "Bus name/Bus number" to search for potential POI buses within the PJM footprint on the map.

When "**Transmission Owner**" is selected, a drop-down is populated with all of the different PJM Transmission Owners within the case dataset. Once the selection is made for Transmission Owner and the applicable voltage level, only POI buses within the Transmission Owner footprint and that voltage level will be loaded in the map for selection and evaluation.



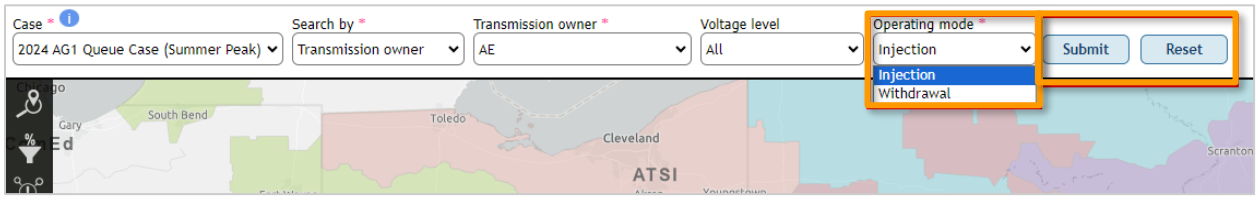
Alternatively, if "**Bus name/Bus number**" is selected, type in a bus name or bus number in the corresponding field, which will query the available buses in the case dataset. This field includes a predictive search feature that will populate a list of possible matches. Only a single bus can be selected by using this search feature.



3. Operating Mode and Submit

Once the targeted search feature is selected for Transmission Owner or Bus name/Bus number, the **Operating mode** must be selected based on whether the proposed generator interconnection needs to be assessed for injecting MWs or withdrawing MWs (battery charging, pumped storage, MTX) from the PJM grid. This ensures the correct flowgates (facility loading) are reported for each POI bus that is run through the evaluation in the tool. Once the operating mode is selected, select **Submit** to load the POI buses in the map. All of the POI buses will be related to a location in the map, which in most cases will be an existing substation. After clicking **Submit**, the map will pan and zoom to the desired cohort of POI bus locations.

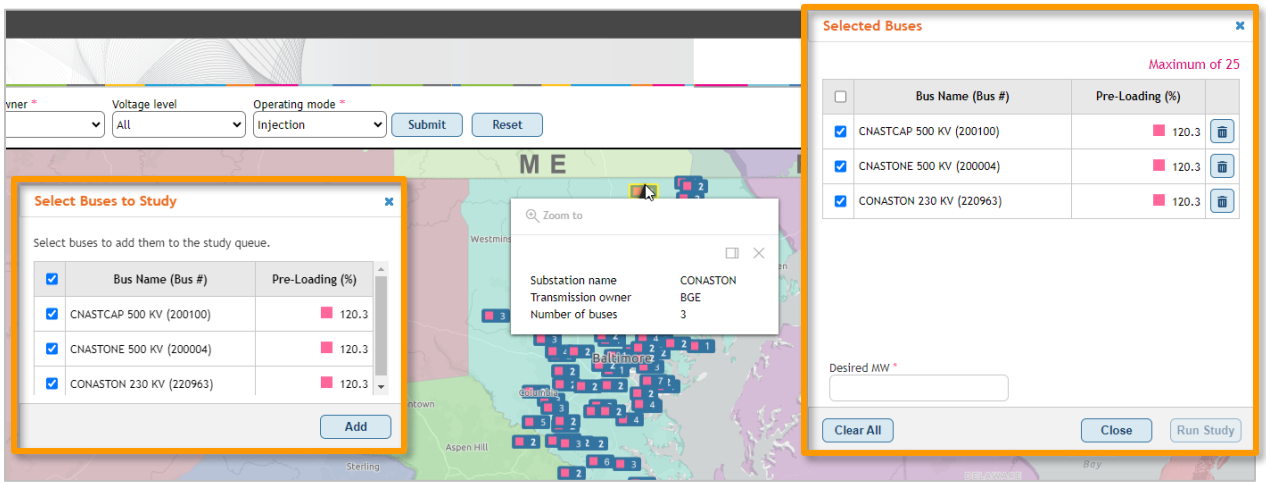
Note: *Depending on the size of the Transmission Owner footprint, there may a momentary delay until the results are presented in the map due to the volume of POI buses that need to be processed for viewing.*



4. Point of Interconnection (POI) Selection

Once the substation symbols with the associated POI buses are visible in the map, select any symbol to review the POI buses at that location. In many instances, multiple POI buses may be available at each location with different voltage levels. Select specific POI buses to add to a new study for a generator interconnection. After clicking **Add**, a "Selected Buses" window will appear in the top right corner of the application in order to select which buses to include in a study based on the desired MWs entered.

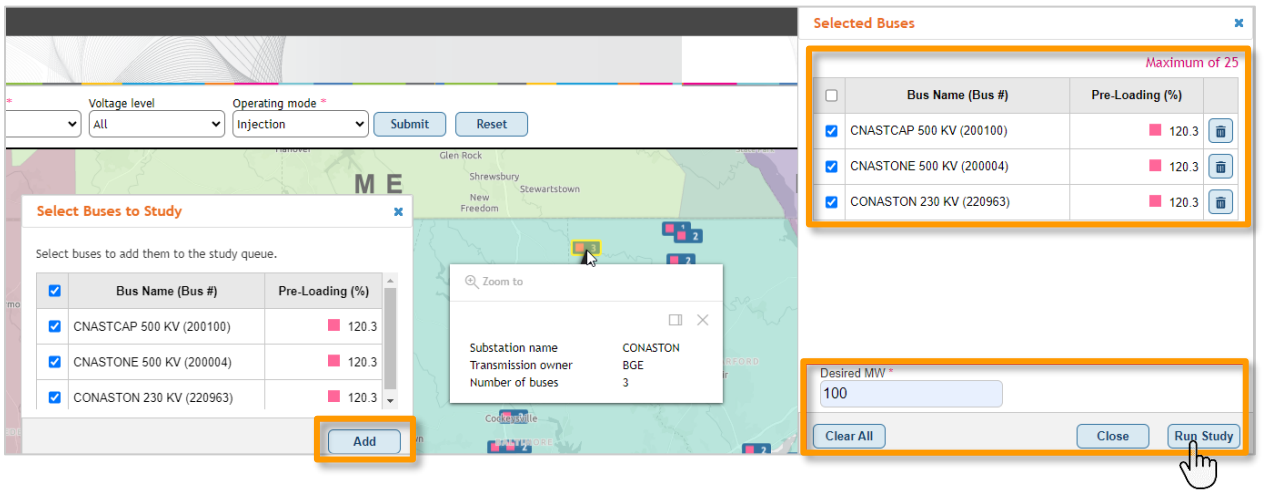
Users can also add buses to the "**Selected Buses**" window from different substation locations across the Transmission Owner footprint.



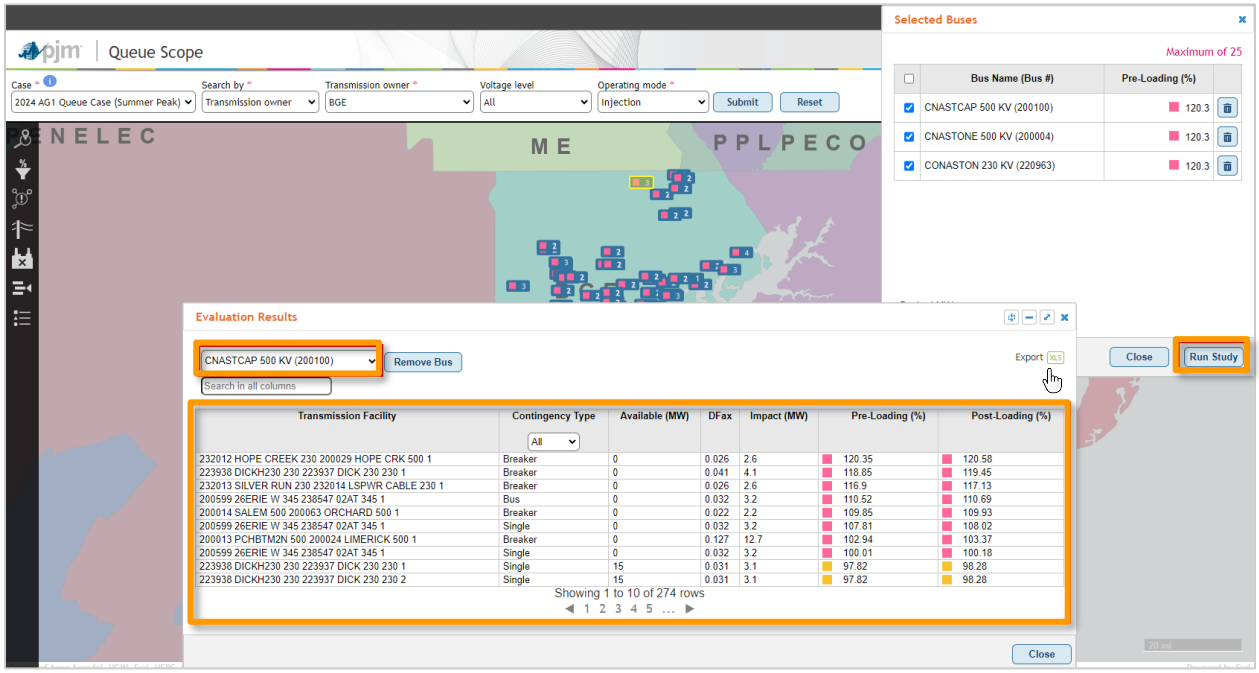
5. Run Study and Evaluation Results

After selecting the desired POI buses at one or multiple locations and clicking **Add**, the "Selected Buses" window will appear. Enter the desired MWs for the generator based on injection or withdrawal and then select the final set of POI buses to include in the study. Select "**Run Study**" to run the analysis and view the evaluation results in a table format. The table of results can be filtered and sorted as well as exported to an Excel file for offline review.

Note: *The "Desired MW" field shown below will only allow users to enter whole numbers between 1 and 9999*



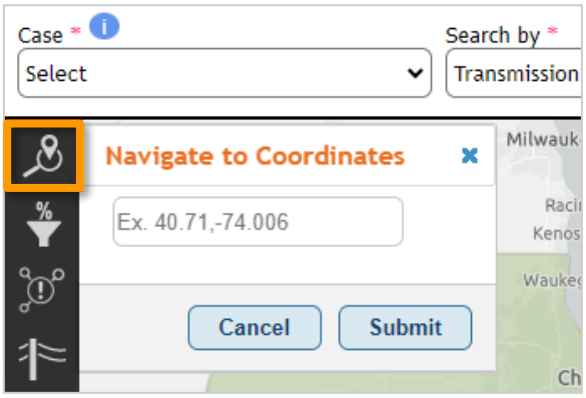
Note: *Users are limited to selecting a maximum of 25 buses in the "Selected Buses" window when running a study.*



6. Additional Features

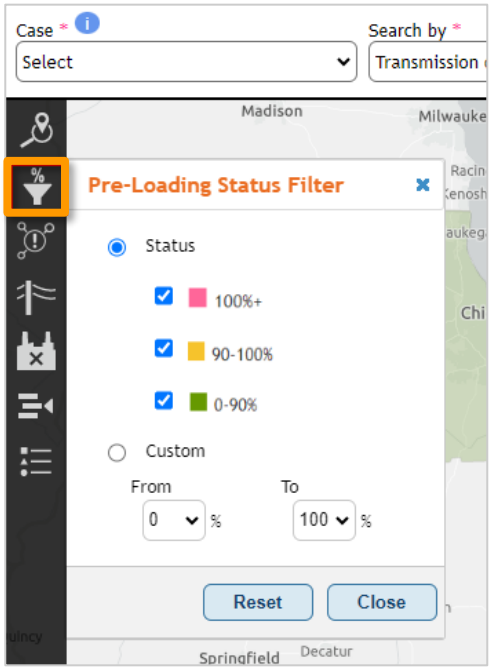
Navigate to Coordinates

This feature allows users to pan and zoom to a specific location within the PJM footprint using a decimal degree latitude/longitude format. Once the user pans and zooms to a location, they will be able to select the applicable transmission owner area to view and select POI buses in the local vicinity of the entered coordinate location.



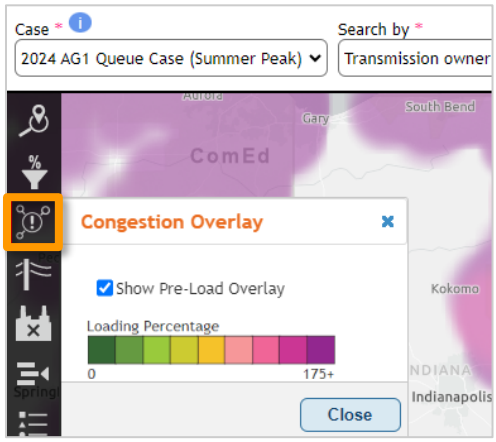
Pre-Loading Status Filter

This feature provides a user with a combined legend and filter for substation/POI bus loading percentage and the corresponding color. The filtering capability allows users to filter substation/POI bus symbols based on three pre-loading (%) ranges or via the use of a custom-defined loading range.



Congestion Overlay

The congestion overlay gives the user the ability to visualize the facility loading at each substation/POI bus across the entire PJM footprint based on the selected case dataset. This visualization (often referred to as a heat map) can provide an indication on available transmission headroom across the PJM footprint and also give an indication on the severity of facility thermal loading based on generator impacts within a study. Once loaded, the overlay will dynamically update as the user pans around and/or zooms within the map. Lastly, the congestion overlay is merely a visual representation of the most severe thermal facility impacts by POI as seen in the results coming from the Generator Deliverability test.

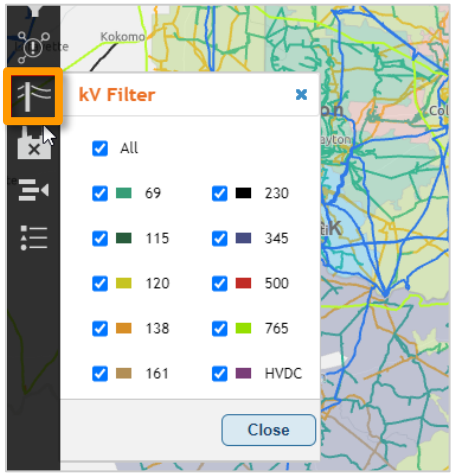


Note: *This overlay is not related to the market-based definition of grid congestion and merely provides a visualization of facility transmission loading by POI.*

Due to the volume of POI buses in the case dataset (over 6,000), it may take 5-10 seconds until the overlay is fully rendered and visible to the user. This is due to the processing time required for the size of the dataset and rendering within the web-based application. Once the overlay is rendered, it can be toggled ***off*** *and* ***on*** *without a noticeable delay in processing.*

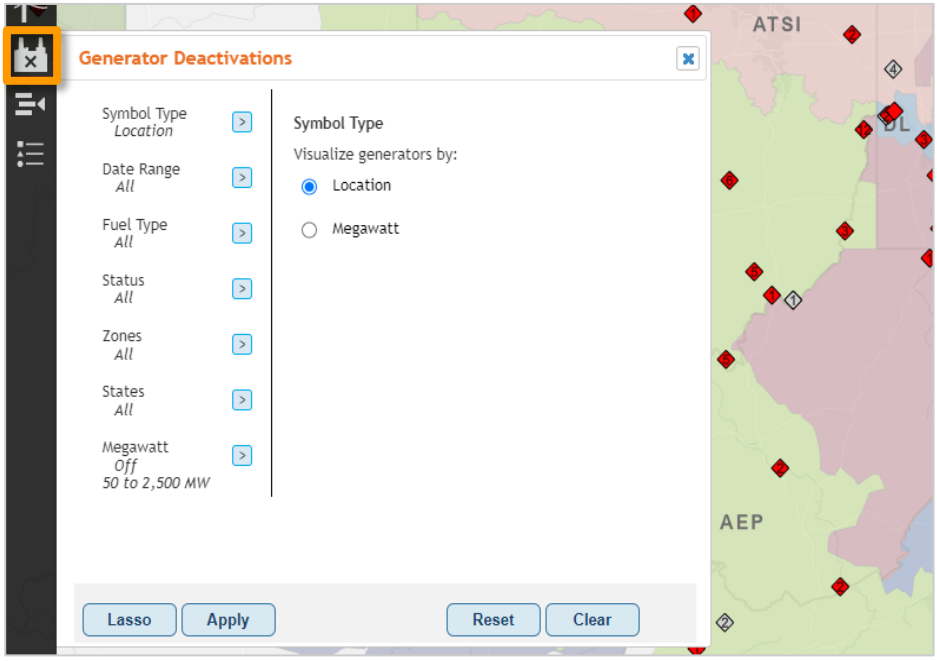
kV Filter

The kV filter (or transmission lines filter) allows users to load a layer of all the transmission lines within the PJM footprint. This layer is identical to the transmission lines seen in the PJM System Map application. Users can filter by voltage class and see an overview of the corresponding line coloring by voltage class.



Generator Deactivations

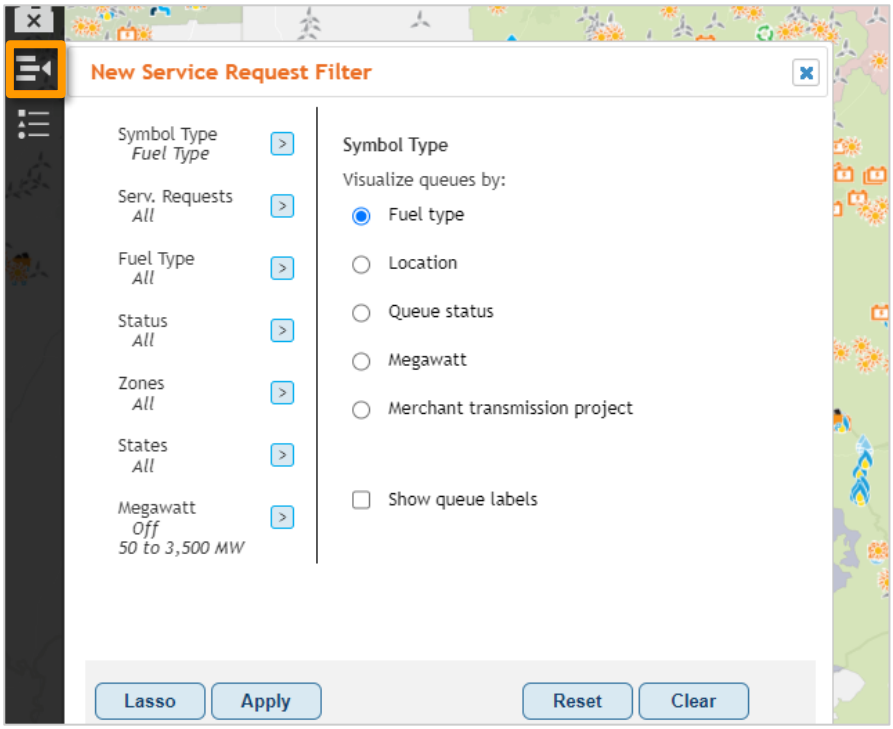
The generator deactivations filter is nearly identical to the layer/filter provided to users in the existing PJM System Map application. This filter will allow users to display future deactivations, deactivated generators and withdrawn deactivations while using the geospatial application to assess potential generator impacts at various points of interconnection. As shown below, there are various filtering options based on date of the request/event, fuel type, status, location and size. A legend is also available at the bottom of the left-hand navigation menu, which provides an overview of all of the generator deactivation symbols and coloring.



New Service Request Filter

The new service request filter is nearly identical to the layer/filter provided to users in the existing PJM System Map application. This filter allows users to display all types of projects that ever entered the queue/cycle study process within PJM. This includes all projects with statuses such as Active, Withdrawn, Deactivated, Engineering & Procurement and Under Construction. Users can see past and present projects proposed across the PJM system to help assist with the POI assessment process. This also allows users to review existing projects near any potential POIs and further review any posted system impact studies on PJM.com.

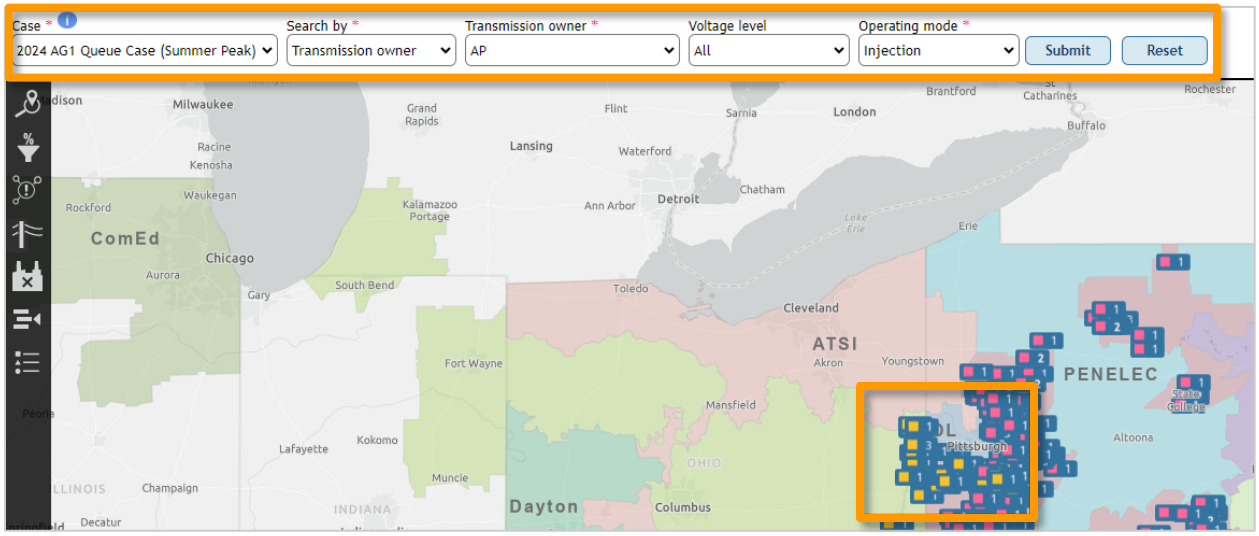
Much like the generator deactivations filter, there are various filtering options based on the request name, fuel type, status, location and size. A legend is also available at the bottom of the left-hand navigation menu, which provides an overview of all of the queue/cycle project symbols based on fuel type and queue/cycle status.



7. Example of User Generator Selection

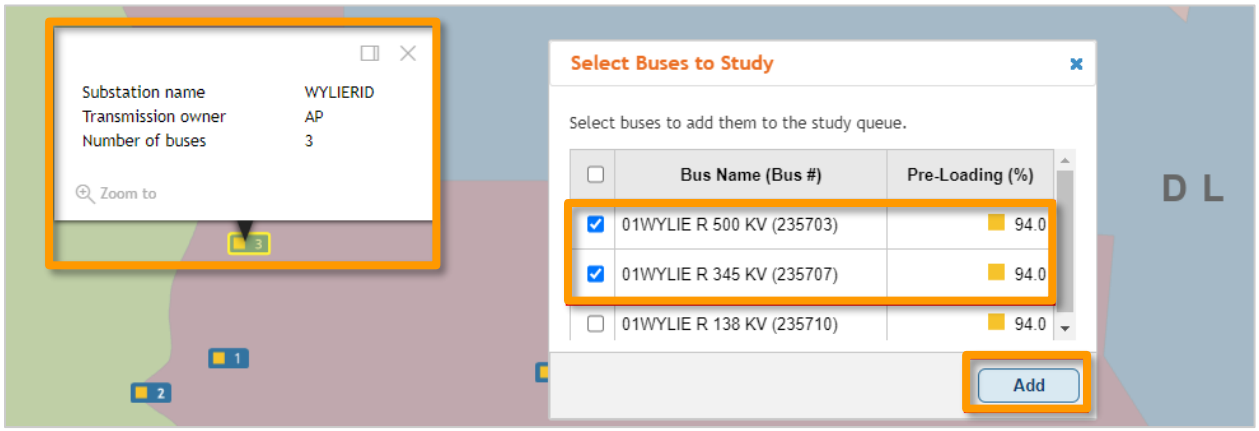
In this example, the user wants to assess the potential impact of a 100 MW solar unit at a specific location on the PJM grid. After going through the above-mentioned steps 1 to 3, the user selects/enters the following:

- Search: Transmission owner
- Transmission owner: AP
- Voltage level: All
- Operating mode: Injection

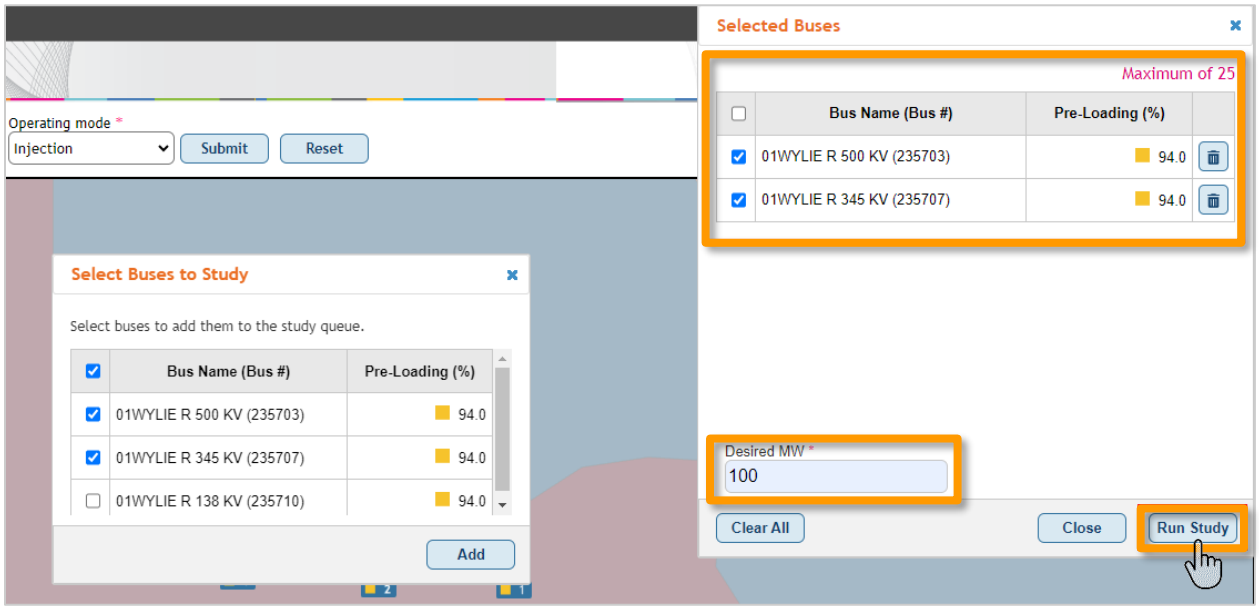


Once all of the potential locations are loaded with the available POI buses, the user decides to pan and zoom in on substation Wylie Ridge within the AP transmission owner footprint. A hover box is presented with the number of available buses for selection in running a study. Once the substation symbol is selected by the user, a "**Select Buses to Study**" window appears for user selection of buses to run in a study. In this instance, there are three buses available at 500 kV, 345 kV and 138 kV.

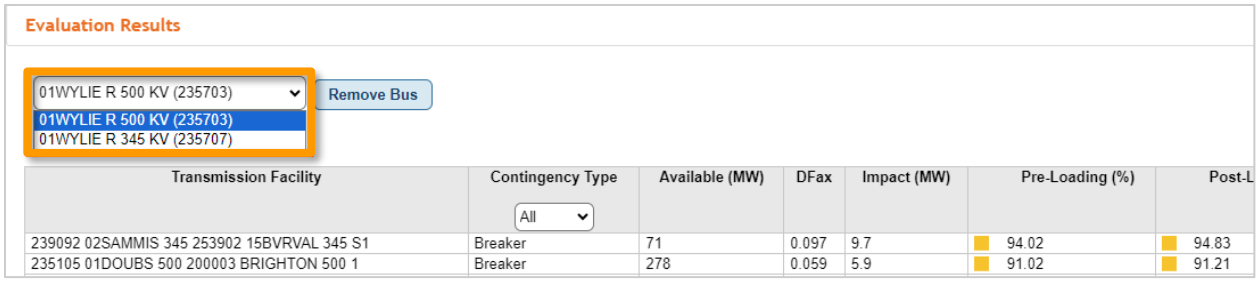
The user then selects the 500 kV (235703) and 34 5kV (235707) buses to add to the study.



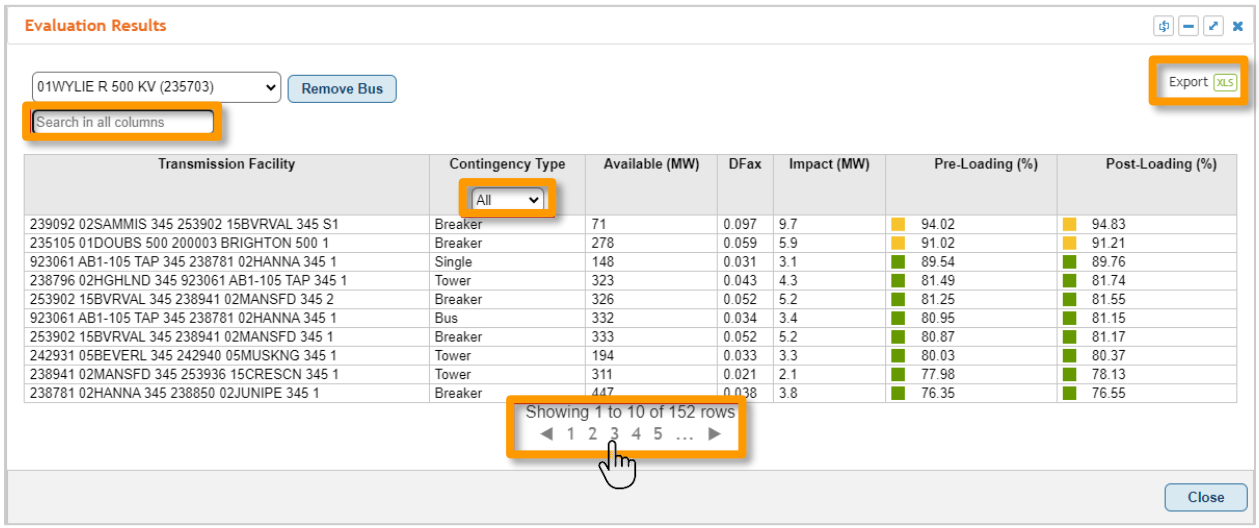
Once the user selects the "**Add**" button, a "**Selected Buses**" window will appear in the top right corner of the screen, which allows the user to input the desired MWs of 100 to inject at each bus location. The user must select the buses in this window to ensure they are run in the study. Once the buses are selected and the desired MWs are entered, the user selects the "**Run Study**" button to produce the evaluation results.



Once the user clicks **Run Study**, the tool will run an evaluation of the 100 MW injection at each bus and produce a table of results where the user can toggle between the POI buses for reviewing the impacts. The results can be filtered by using a text search function and a contingency-type drop-down or the results can be sorted (ascending/descending) by selecting a column header.



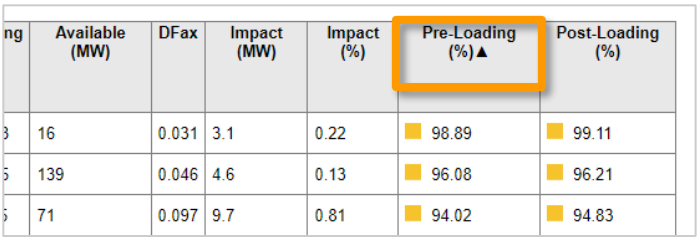
At the bottom of the table there is the option to select additional pages of results and a total row count is provided to indicate the number of reported flowgates at the POI bus. In this case there are 152 flowgates reported for Bus 235703 and 188 flowgates reported for Bus 235707. If the user also desired to review the evaluation results offline, the results can be exported to an Excel output file identical to what is produced in the tabular application.



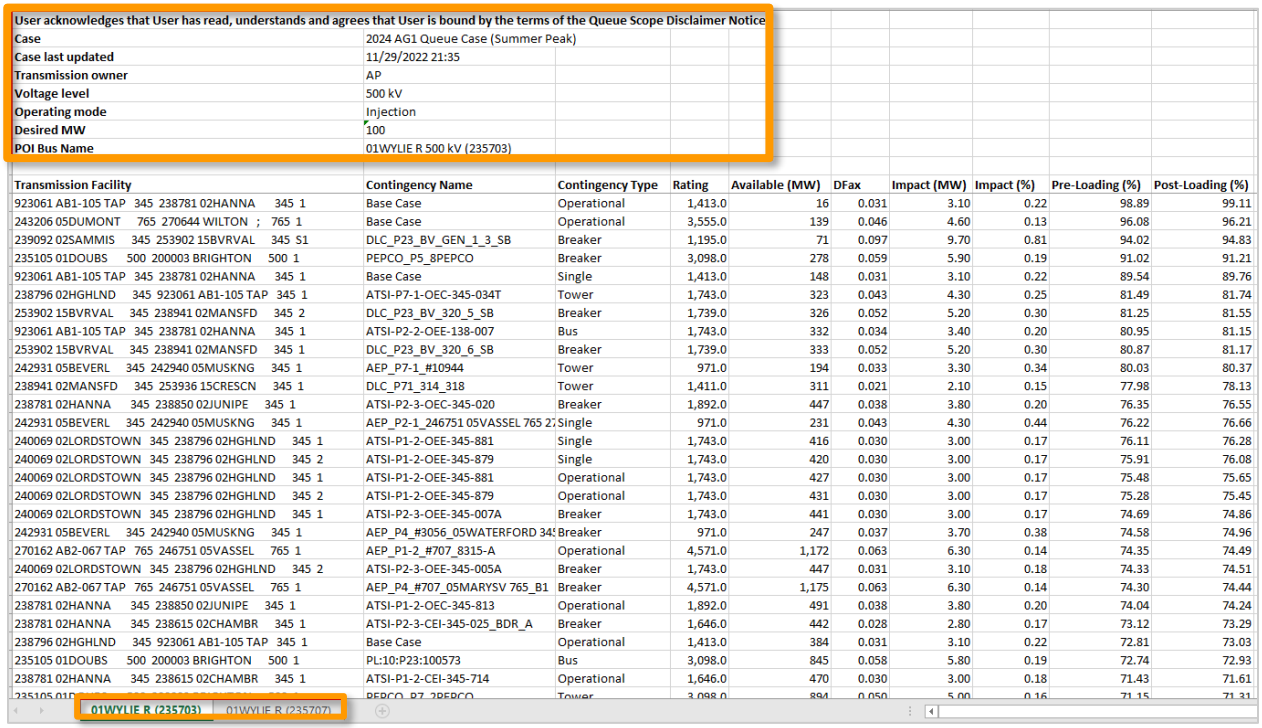
The evaluation presents the following results:

- Facilities will be impacted by a 100 MW solar unit injecting at the “01WYLIE R 500 kV (235703)” bus. For this example, we will ignore flowgates based on operational contingencies since they highlight potential congestion and we will focus just on single, breaker, bus and tower contingency flowgates.
- Facility “239092 02SAMMIS 345 253902 15BVRVAL 345 S1” with a breaker contingency has a pre-loading (%) of 94.02%. With the new 100 MW solar unit loading into the facility, post-loading (%) becomes 94.83% and the generator is imparting a 9.7 MW impact on the facility based on the DFax or the Distribution Factor.

The default sorting of the results is based on the pre-loading percentage (largest to smallest). However, the user can adjust the sorting to be based on the post-loading percentage from largest to smallest to view the facility-loading impacts from the desired generator.



To download an Excel file, select the XLS button next to **Export** and agree to the disclaimer in order to download the results. Once the results are downloaded, there will be a separate tab generated for each POI bus in the evaluation. This feature is identical to the export feature in the tabular application.



User acknowledges that User has read, understands and agrees that User is bound by the terms of the Queue Scope Disclaimer Notice	
Case	2024 AG1 Queue Case (Summer Peak)
Case last updated	11/29/2022 21:35
Transmission owner	AP
Voltage level	500 kV
Operating mode	Injection
Desired MW	100
POI Bus Name	01WYLIE R 500 kV (235703)

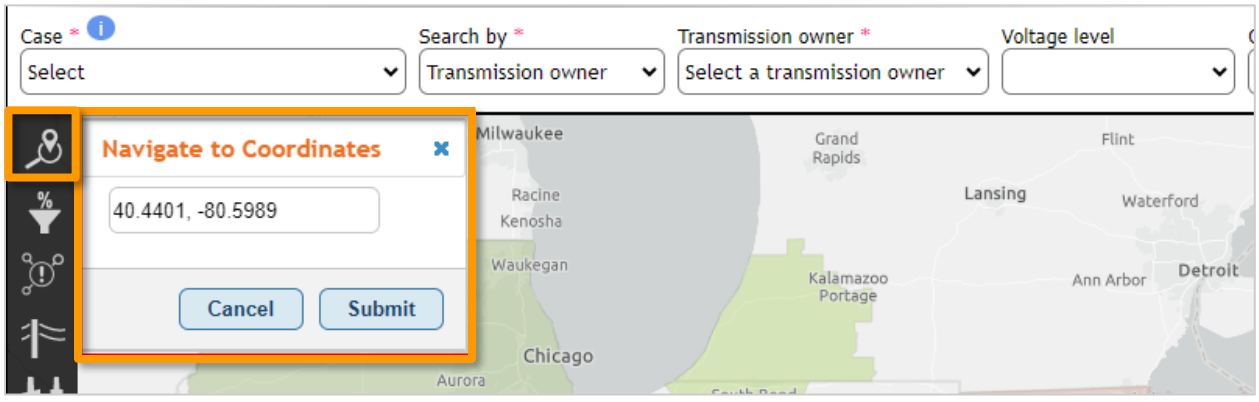
Transmission Facility	Contingency Name	Contingency Type	Rating	Available (MW)	DFax	Impact (MW)	Impact (%)	Pre-Loading (%)	Post-Loading (%)
923061 AB1-105 TAP 345 238781 02HANNA 345 1	Base Case	Operational	1,413.0	16	0.031	3.10	0.22	98.89	99.11
243206 05DUMONT 765 270644 WILTON ; 765 1	Base Case	Operational	3,555.0	139	0.046	4.60	0.13	96.08	96.21
239092 02SAMMIS 345 253902 15BVRVAL 345 S1	DLC_P23_BV_GEN_1_3_SB	Breaker	1,195.0	71	0.097	9.70	0.81	94.02	94.83
235105 01DOUBS 500 200003 BRIGHTON 500 1	PEPCO_P5_8PEPCO	Breaker	3,098.0	278	0.059	5.90	0.19	91.02	91.21
923061 AB1-105 TAP 345 238781 02HANNA 345 1	Base Case	Single	1,413.0	148	0.031	3.10	0.22	89.54	89.76
238796 02HGHLND 345 923061 AB1-105 TAP 345 1	ATSI-P7-1-OEC-345-034T	Tower	1,743.0	323	0.043	4.30	0.25	81.49	81.74
253902 15BVRVAL 345 238941 02MANSFD 345 2	DLC_P23_BV_320_5_SB	Breaker	1,739.0	326	0.052	5.20	0.30	81.25	81.55
923061 AB1-105 TAP 345 238781 02HANNA 345 1	ATSI-P2-2-OEE-138-007	Bus	1,743.0	332	0.034	3.40	0.20	80.95	81.15
253902 15BVRVAL 345 238941 02MANSFD 345 1	DLC_P23_BV_320_6_SB	Breaker	1,739.0	333	0.052	5.20	0.30	80.87	81.17
242931 05BEVERL 345 242940 05MUSKNG 345 1	AEP_P7-1_#10944	Tower	971.0	194	0.033	3.30	0.34	80.03	80.37
238941 02MANSFD 345 253936 15CRESCN 345 1	DLC_P71_314_318	Tower	1,411.0	311	0.021	2.10	0.15	77.98	78.13
238781 02HANNA 345 238850 02JUNIPE 345 1	ATSI-P2-3-OEC-345-020	Breaker	1,892.0	447	0.038	3.80	0.20	76.35	76.55
242931 05BEVERL 345 242940 05MUSKNG 345 1	AEP_P2-1_246751 05VASSEL 765 2	Single	971.0	231	0.043	4.30	0.44	76.22	76.66
240069 02LORDSTOWN 345 238796 02HGHLND 345 1	ATSI-P1-2-OEE-345-881	Single	1,743.0	416	0.030	3.00	0.17	76.11	76.28
240069 02LORDSTOWN 345 238796 02HGHLND 345 2	ATSI-P1-2-OEE-345-879	Single	1,743.0	420	0.030	3.00	0.17	75.91	76.08
240069 02LORDSTOWN 345 238796 02HGHLND 345 1	ATSI-P1-2-OEE-345-881	Operational	1,743.0	427	0.030	3.00	0.17	75.48	75.65
240069 02LORDSTOWN 345 238796 02HGHLND 345 2	ATSI-P1-2-OEE-345-879	Operational	1,743.0	431	0.030	3.00	0.17	75.28	75.45
240069 02LORDSTOWN 345 238796 02HGHLND 345 1	ATSI-P2-3-OEE-345-007A	Breaker	1,743.0	441	0.030	3.00	0.17	74.69	74.86
242931 05BEVERL 345 242940 05MUSKNG 345 1	AEP_P4_#3056_05WATERFORD 34	Breaker	971.0	247	0.037	3.70	0.38	74.58	74.96
270162 AB2-067 TAP 765 246751 05VASSEL 765 1	AEP_P1-2_#707_8315-A	Operational	4,571.0	1,172	0.063	6.30	0.14	74.35	74.49
240069 02LORDSTOWN 345 238796 02HGHLND 345 2	ATSI-P2-3-OEE-345-005A	Breaker	1,743.0	447	0.031	3.10	0.18	74.33	74.51
270162 AB2-067 TAP 765 246751 05VASSEL 765 1	AEP_P4_#707_05MARYSV 765_B1	Breaker	4,571.0	1,175	0.063	6.30	0.14	74.30	74.44
238781 02HANNA 345 238850 02JUNIPE 345 1	ATSI-P1-2-OEC-345-813	Operational	1,892.0	491	0.038	3.80	0.20	74.04	74.24
238781 02HANNA 345 238615 02CHAMBR 345 1	ATSI-P2-3-CEI-345-025_BDR_A	Breaker	1,646.0	442	0.028	2.80	0.17	73.12	73.29
238796 02HGHLND 345 923061 AB1-105 TAP 345 1	Base Case	Operational	1,413.0	384	0.031	3.10	0.22	72.81	73.03
235105 01DOUBS 500 200003 BRIGHTON 500 1	PL:10:P23:100573	Bus	3,098.0	845	0.058	5.80	0.19	72.74	72.93
238781 02HANNA 345 238615 02CHAMBR 345 1	ATSI-P1-2-CEI-345-714	Operational	1,646.0	470	0.030	3.00	0.18	71.43	71.61
235105 01D...	PEPCO_P7_2PEPCO	Tower	3,098.0	894	0.050	5.00	0.16	71.15	71.31

01WYLIE R (235703) 01WYLIE R (235707)

There are two additional alternatives to searching for substation/POI bus locations in the geospatial application. These are the "**Navigate to Coordinates**" feature and the "**Search by**" feature with "Bus name/Bus number selected."

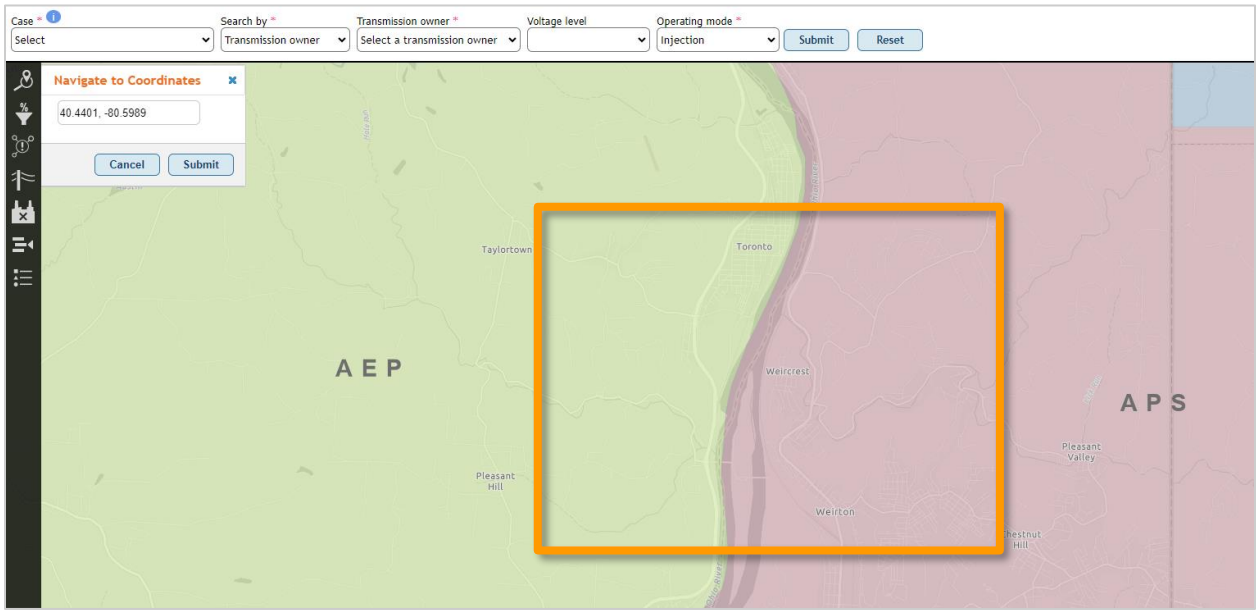
Navigate to Coordinates Feature

For this example the user selects the first alternative and utilizes the coordinate search function using a potential POI location near the existing Wylie Ridge substation: 40.4401, -80.5989.

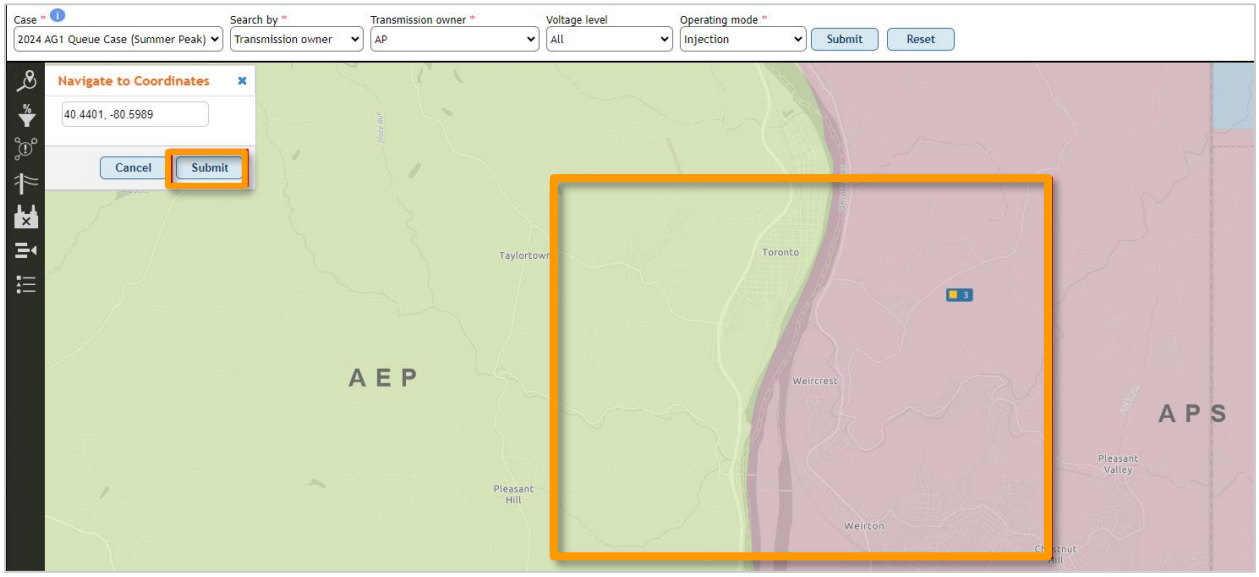


After clicking **Submit**, the application will pan to and zoom in on the grid coordinate location. Once the map is refreshed, the user can determine which transmission owner to load via the transmission owner drop-down with the "**Search by**" feature set to "Transmission owner" as shown below.

In this instance, the user selects AP (aka APS) to load the applicable substations/POI buses. When the user selects the transmission owner and continues with the remaining workflow and selects "**Submit**," the map will automatically zoom out to the extent of the AP (aka APS) footprint with all of the substation symbols loaded.

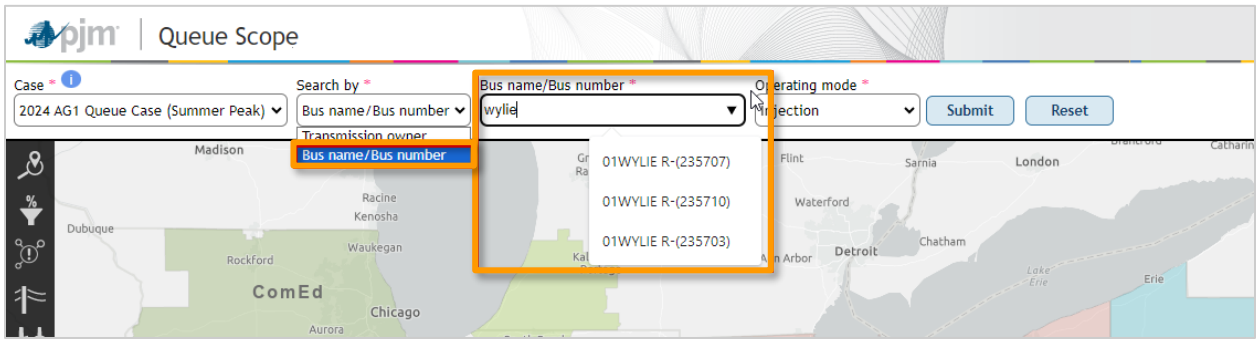


At this point the user can resubmit the coordinates entered in the "**Navigate to Coordinates**" feature in order to zoom back to the original location. Now the Wylie Ridge substation symbol is visible and can be selected by the user to run through the workflow already outlined above in order to generate evaluation results.

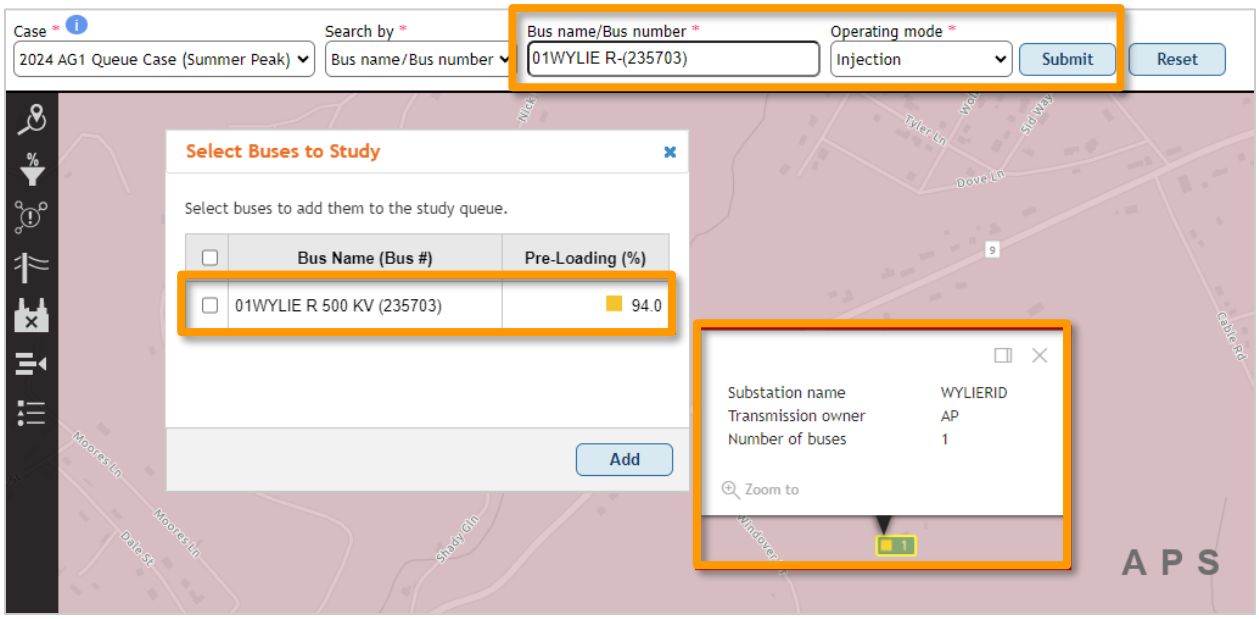


Search by Feature

The other alternative search feature is using the "**Search by**" drop-down with "**Bus name/Bus number**" selected. Once this is selected, the "Bus name/Bus number" field appears for the user to enter characters (numbers or letters) for the POI bus that the user intends to locate. In this case, the user is searching directly for buses at Wylie Ridge substation.



Once the user sees 01WYLIE R-(235703) appear in the list, the user can select the Bus name/Bus number and proceed through the rest of the workflow to locate the POI bus in the map. At this point, the user can select the substation window and only the 01WYLIE R 500 KV (235703) will be available for selection in running the analysis. This is a function of searching for a single Bus name/Bus number using this aspect of the Search by feature.

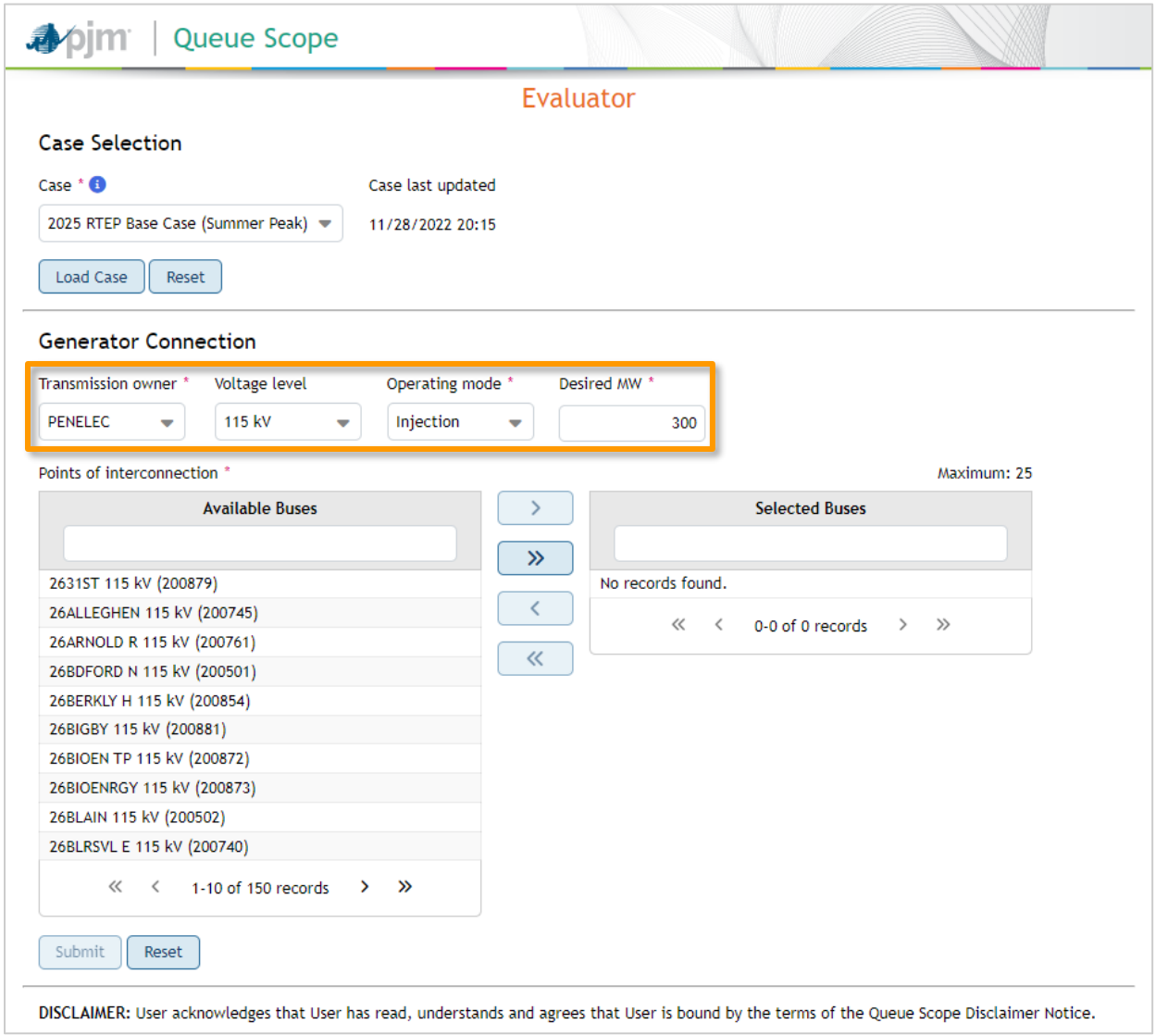


Section 7: Appendix 1 – Additional Examples (Tabular Application)

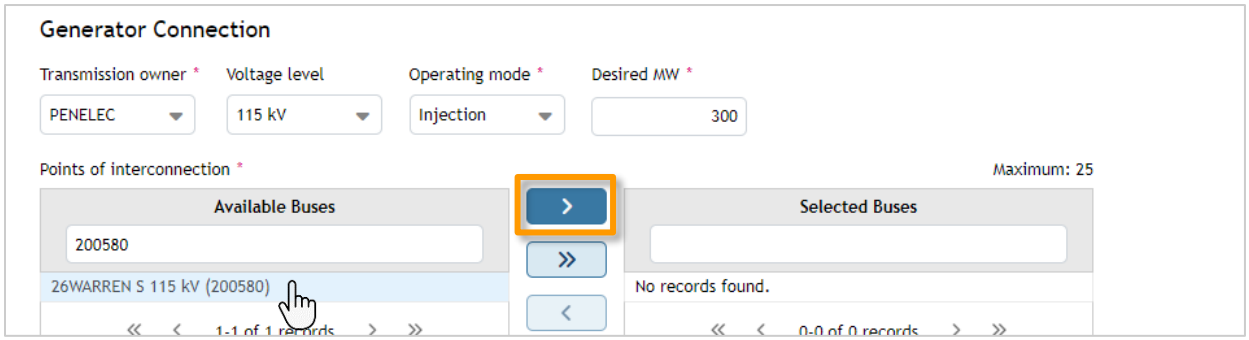
Example 1: 300 MW Natural Gas Generator Injection

In this example, the user wants to learn about the impact of a 300 MW natural gas unit injecting at a specific location on the PJM grid. After going through steps 1 to 3 in the previous sections, the following inputs are selected:

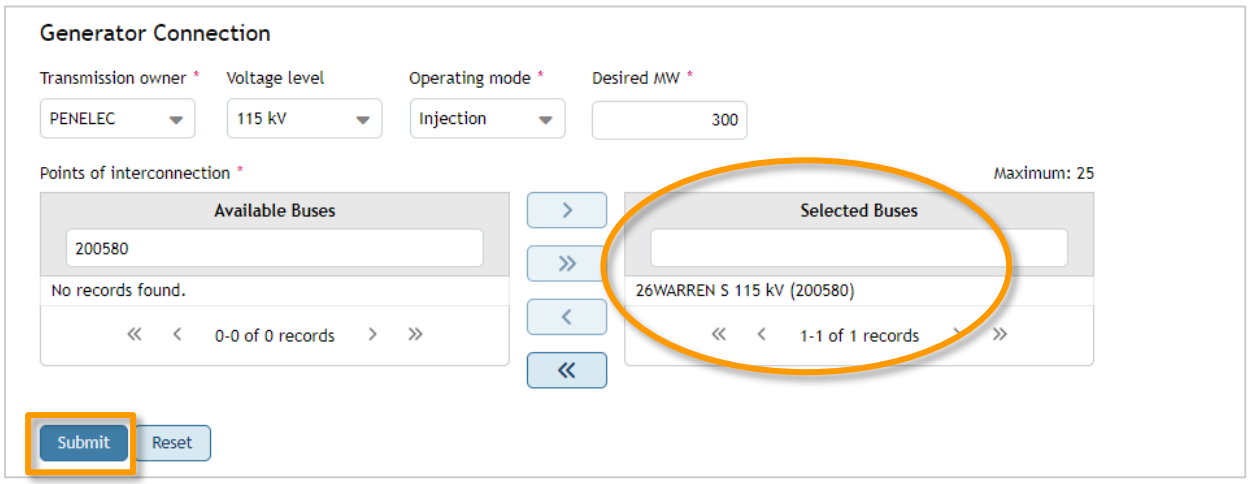
- Transmission owner: PENELEC
- Voltage level: 115 kV
- Operating mode: Injection
- Desired MW: 300 MW



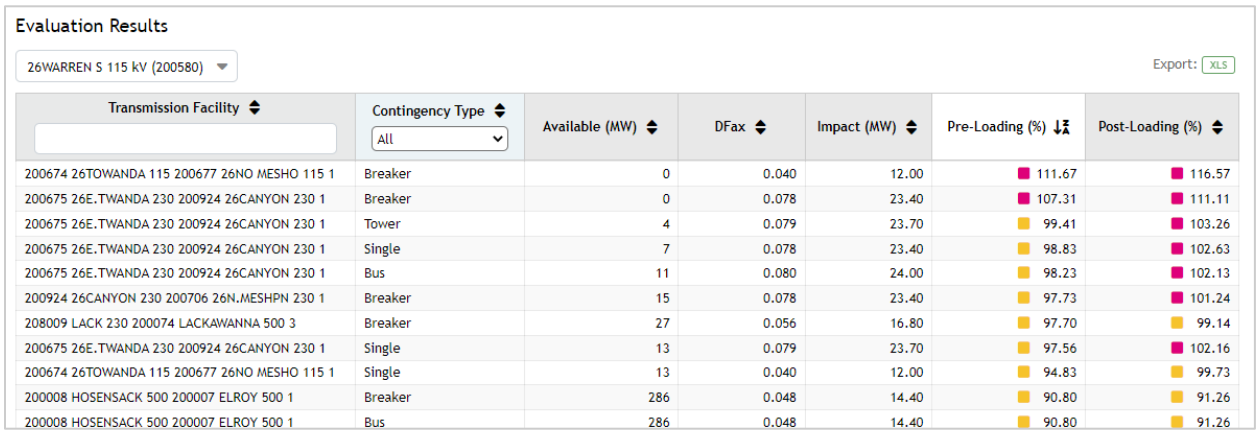
The user selects the “Warren South 200580” bus then moves the selected bus “26WARREN S 115 kV (200580)” to the selected buses accumulator by clicking on the **right arrow button** as shown below:



Then the user can click on **Submit** to generate the evaluation results.



After clicking **Submit**, the evaluation results should appear as shown below:



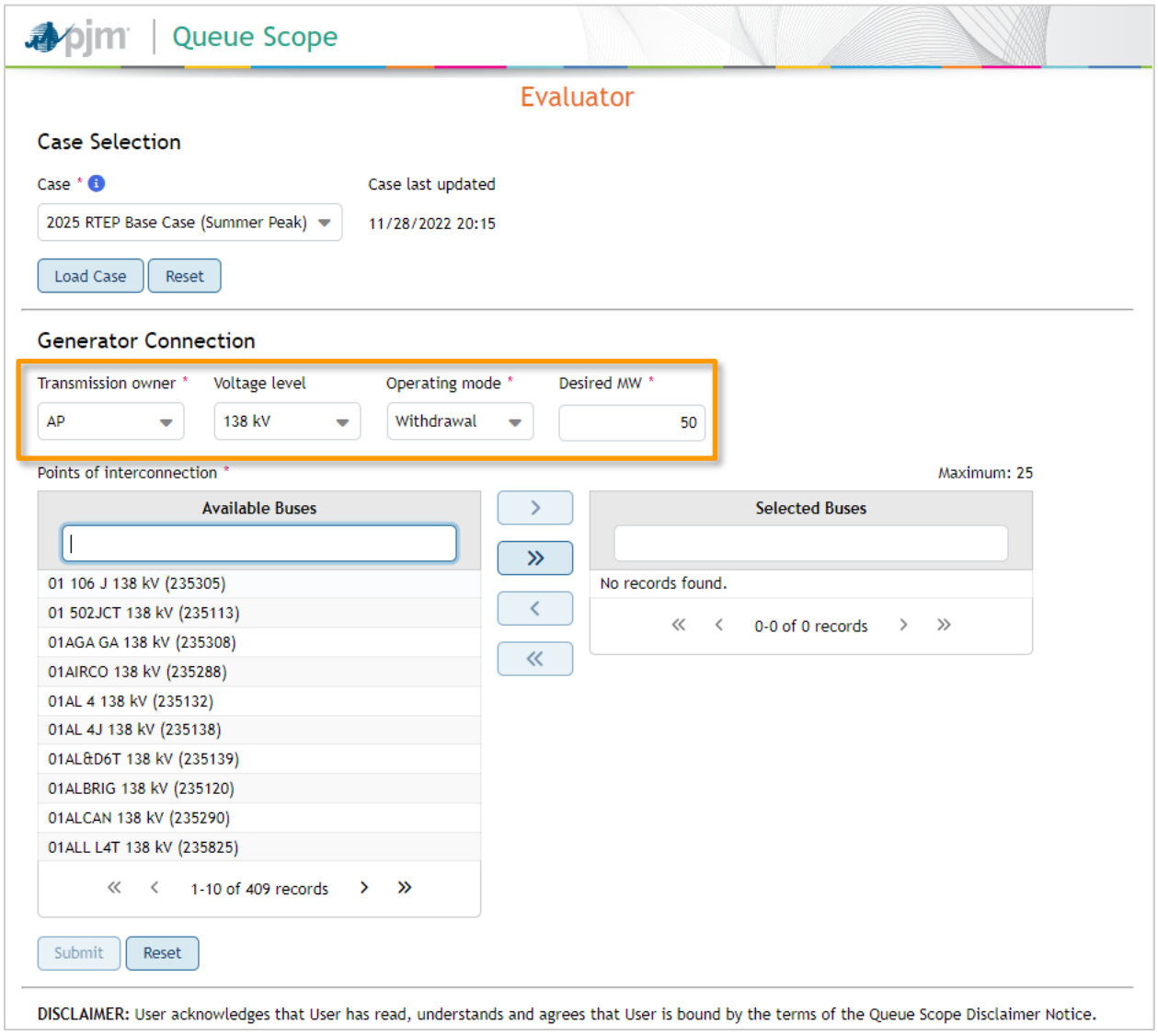
Transmission Facility	Contingency Type	Available (MW)	DFax	Impact (MW)	Pre-Loading (%)	Post-Loading (%)
200674 26TOWANDA 115 200677 26NO MESHO 115 1	Breaker	0	0.040	12.00	111.67	116.57
200675 26E.TWANDA 230 200924 26CANYON 230 1	Breaker	0	0.078	23.40	107.31	111.11
200675 26E.TWANDA 230 200924 26CANYON 230 1	Tower	4	0.079	23.70	99.41	103.26
200675 26E.TWANDA 230 200924 26CANYON 230 1	Single	7	0.078	23.40	98.83	102.63
200675 26E.TWANDA 230 200924 26CANYON 230 1	Bus	11	0.080	24.00	98.23	102.13
200924 26CANYON 230 200706 26N.MESHPN 230 1	Breaker	15	0.078	23.40	97.73	101.24
208009 LACK 230 200074 LACKAWANNA 500 3	Breaker	27	0.056	16.80	97.70	99.14
200675 26E.TWANDA 230 200924 26CANYON 230 1	Single	13	0.079	23.70	97.56	102.16
200674 26TOWANDA 115 200677 26NO MESHO 115 1	Single	13	0.040	12.00	94.83	99.73
200008 HOSENSACK 500 200007 ELROY 500 1	Breaker	286	0.048	14.40	90.80	91.26
200008 HOSENSACK 500 200007 ELROY 500 1	Bus	286	0.048	14.40	90.80	91.26

Example 2: 50 MW Battery Withdrawal (Charging) From Grid

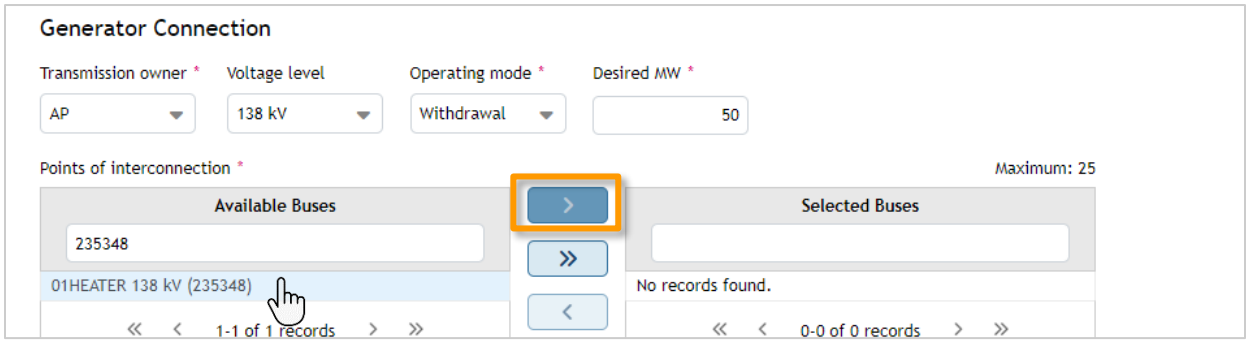
In this example, the user wants to learn about the impact of a 50 MW battery/storage unit at specific location on the PJM grid. This example focuses on the analysis for the load component of the battery when charging from the grid.

After going through steps 1 to 3 in the previous sections, the following inputs are selected.

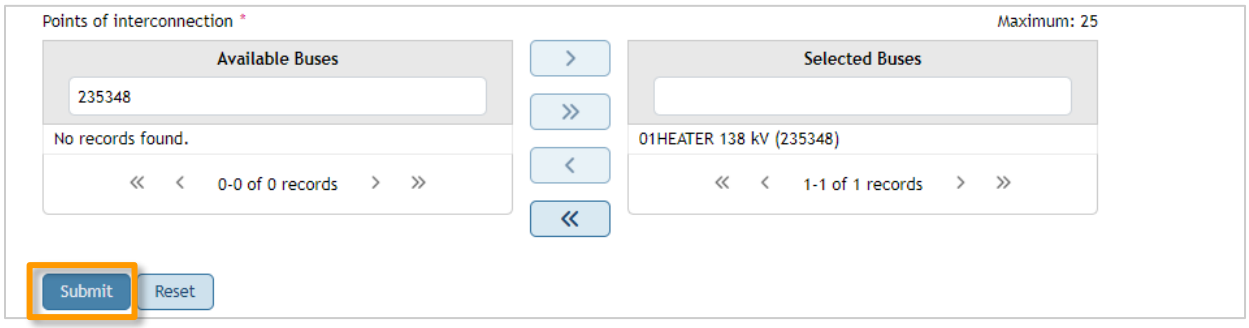
- Transmission Owner: AP (aka APS)
- Voltage level: 138 kV
- Operating Mode: Withdrawal
- Desired MW: 50 MW



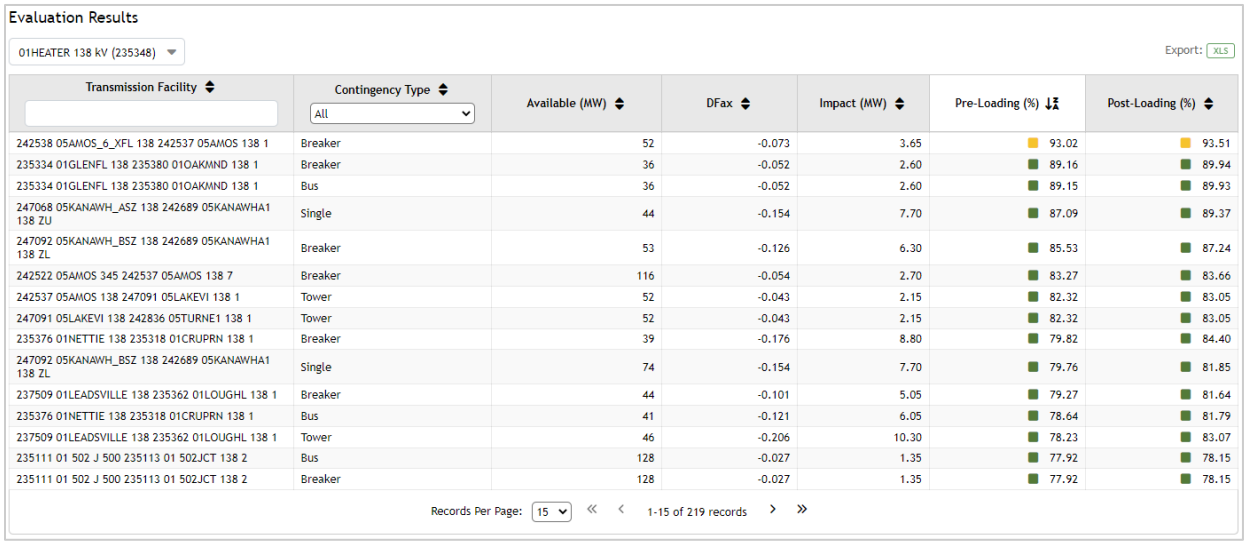
The user searches and selects the “01HEATER 138 kV (235348)” bus as shown below. The user then moves the given bus “01HEATER 138 kV (235348)” to the selected buses accumulator by clicking on the right arrow button.



The user can then click **Submit** to see evaluation results.



After clicking **Submit**, the evaluation results should appear as shown below:



Evaluation Results

01HEATER 138 kV (235348)

Export: XLS

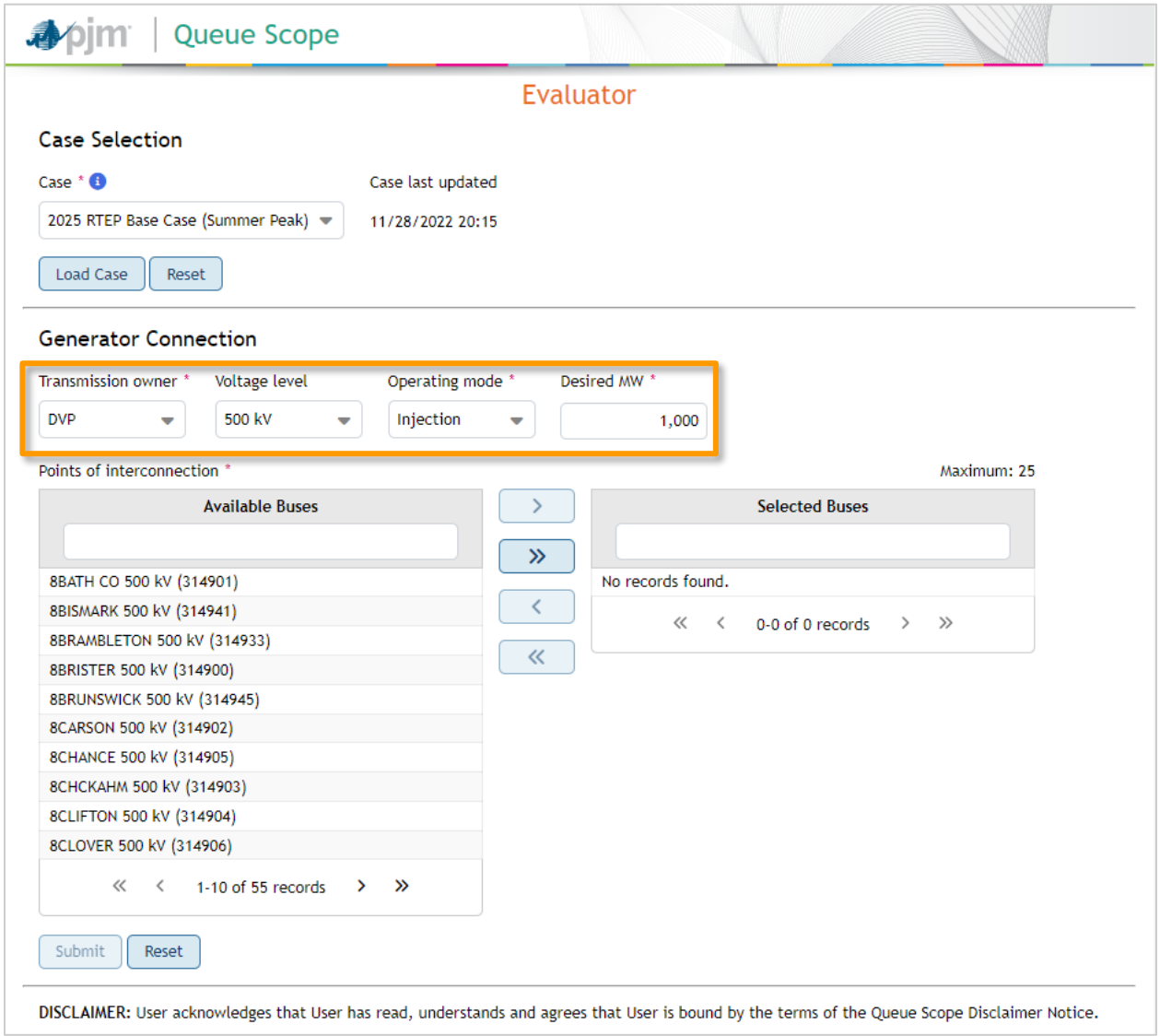
Transmission Facility	Contingency Type	Available (MW)	DFax	Impact (MW)	Pre-Loading (%)	Post-Loading (%)
242538 05AMOS_6_XFL 138 242537 05AMOS 138 1	Breaker	52	-0.073	3.65	93.02	93.51
235334 01GLENFL 138 235380 01OAKMND 138 1	Breaker	36	-0.052	2.60	89.16	89.94
235334 01GLENFL 138 235380 01OAKMND 138 1	Bus	36	-0.052	2.60	89.15	89.93
247068 05KANAWH_ASZ 138 242689 05KANAWHA1 138 ZU	Single	44	-0.154	7.70	87.09	89.37
247092 05KANAWH_BSZ 138 242689 05KANAWHA1 138 ZL	Breaker	53	-0.126	6.30	85.53	87.24
242522 05AMOS 345 242537 05AMOS 138 7	Breaker	116	-0.054	2.70	83.27	83.66
242537 05AMOS 138 247091 05LAKEVI 138 1	Tower	52	-0.043	2.15	82.32	83.05
247091 05LAKEVI 138 242836 05TURNE1 138 1	Tower	52	-0.043	2.15	82.32	83.05
235376 01NETTIE 138 235318 01CRUPRN 138 1	Breaker	39	-0.176	8.80	79.82	84.40
247092 05KANAWH_BSZ 138 242689 05KANAWHA1 138 ZL	Single	74	-0.154	7.70	79.76	81.85
237509 01LEADSVILLE 138 235362 01LOUGHL 138 1	Breaker	44	-0.101	5.05	79.27	81.64
235376 01NETTIE 138 235318 01CRUPRN 138 1	Bus	41	-0.121	6.05	78.64	81.79
237509 01LEADSVILLE 138 235362 01LOUGHL 138 1	Tower	46	-0.206	10.30	78.23	83.07
235111 01 502 J 500 235113 01 502JCT 138 2	Bus	128	-0.027	1.35	77.92	78.15
235111 01 502 J 500 235113 01 502JCT 138 2	Breaker	128	-0.027	1.35	77.92	78.15

Records Per Page: 15 1-15 of 219 records

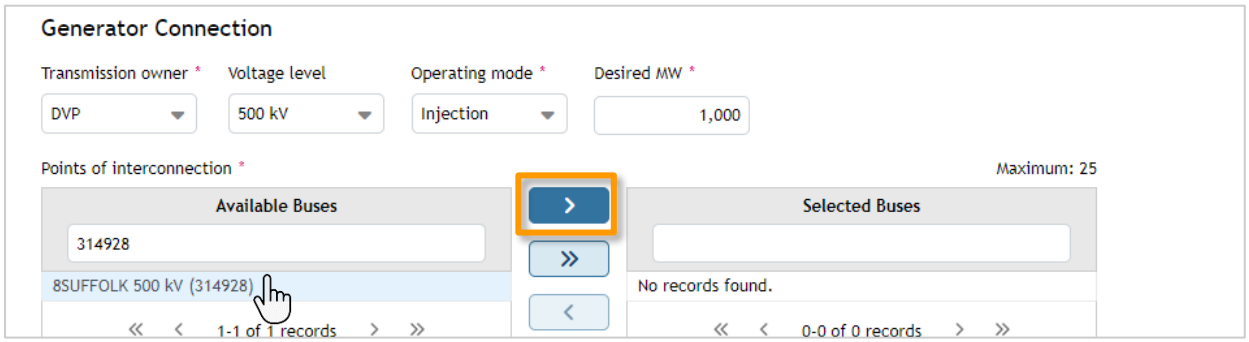
Example 3: 1,000 MW MTX Injection

In this example, the user wants to learn about the impact of a 1,000 MW Merchant Transmission (MTX) Injection at a specific location on the PJM grid. After going through steps 1 to 3 in the previous sections, the following inputs are selected:

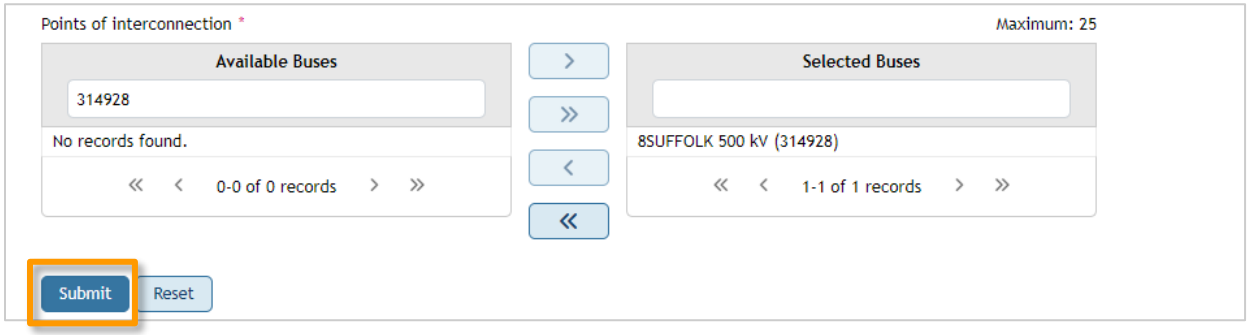
- Transmission owner: DVP Dominion
- Voltage level: 500 kV
- Operating mode: Injection
- Desired MW: 1,000 MW



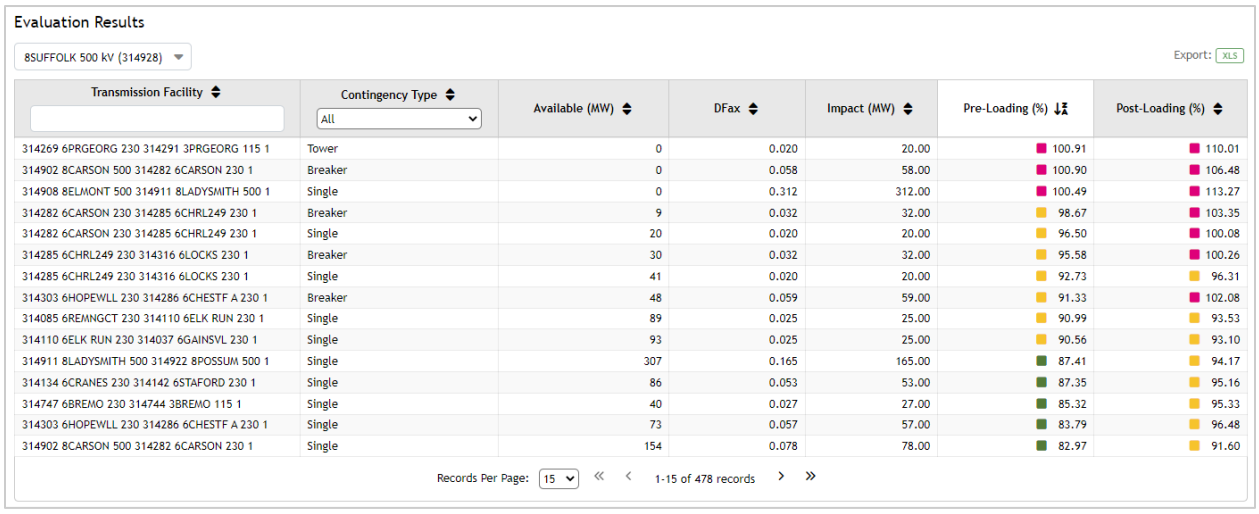
The user searches and selects the “8SUFFOLK 500 kV (314928)” bus as shown below. The user then moves the given bus “8SUFFOLK 500 kV (314928)” to the selected buses accumulator by clicking on the right arrow button.



The user can then click **Submit** to see the evaluation results.



After clicking **Submit**, the evaluation results should appear as shown below:



Section 8: Frequently Asked Questions

Q1. What are the DFax values shown in the list of evaluation results?

A1. The DFax values (Generator Distribution Factor or the Generation Shift Factor) represent the change (or sensitivity) of active power flow in a reference direction on a transmission line with respect to a change in injection at the generator bus and a corresponding change in withdrawal at the reference system.

The DFax values change when:

- Transmission topology changes (such as Line outage, rebuild, generator addition or load changes)
- Line impedance changes

Q2. How are the Tool data sets (case study results) updated?

A2. The data sets will only be updated when a new case is available or when an existing case has a significant change in topology or generation.

Q3. Does the Tool show PJM case information updated in real time?

A3. The most recent Queue/RTEP models and inputs available will be used when updating the data sets (case study results).

Q4. What is the purpose of the Queue case selection?

A4. A Queue case results use a Queue study case created by the PJM Interconnection Analysis Department, which contains all active queue/cycle projects (mix of high and low commercial probability projects). This is a worst-case scenario with all active generation modeled that can load into transmission facilities. Grid congestion in these results will likely be high due to the queue volume.

Q5. What is the purpose of the RTEP Case selection?

A5. The RTEP Case selection uses the RTEP base case from Transmission Planning, which only contains existing generators and queue/cycle project generators that have a signed interconnection agreement (high commercial probability projects). This case will typically have results that align more with the Transmission Planning five-year RTEP study. This allows users to view the thermal impacts that Transmission Planning will see in the annual RTEP analysis, which will trigger new baseline upgrades to address the identified violations.

Q6. Why are contingency names not shown in the tool?

A6. Only the secure content version of the tool (with CEII data provisioned) displays the contingency name. This additional data field can be provisioned to your user account if you submit the request and are approved. Fill out the form to make a request.

Q7. Should I enter a negative MW value if I select the “Withdrawal” operating mode?

A7. No, the selection of the Withdrawal mode, which is generally used for Withdrawal applications, applies to projects with a load component (such as battery charging from the grid, pumped hydro and Merchant Transmission Projects) impact on the grid. The withdrawal impacts are automatically calculated based on the MW amount entered by the user.

Q8. How do I know what some of the POI Bus numbers and abbreviations mean?

A8. The POI bus numbers are specific to the bus numbers in the PSSE study case for the PJM network. The bus names can also be full names or abbreviations of substations or transmission taps within the PJM network. An access request can be submitted through Account Manager for access to the PJM System Maps wherein full names of substations and locations can be accessed by the user.

Q9. How do I assess a generator in the tool if it connects on a lower voltage network not modeled by PJM or provided in the POI bus list?

A9. The nearest 100 kV bus can be selected to provide an estimation of results. Ultimately, the user needs to know which transmission bus (>100 kV) the generator will likely inject into. The Queue Scope tool is limited to POIs 100kV and above since PJM is only studying impacts on BES facilities and not all lower kV networks (especially) distribution are available in the PJM base case models.

Q10. How do you evaluate MWC and MWE?

A10. The tool isn't currently set up to evaluate the capacity and energy component of a generator together. It is based more on an MFO assessment. The user does have the ability to enter a MWC (Capacity) or MWE (Energy) value, but the impacts are based on a variety of factors listed in Manual 14b. These factors are beyond the scope of this tool.

Q11. Why are Short Circuit, Voltage and Stability Analysis not evaluated in the Tool?

A11. The typical constraints on the PJM grid are directly driven by thermal violations and the associated network upgrades to mitigate those violations. These other types of analysis are still critical but do not typically present the largest barrier to interconnecting on the PJM grid. The above-mentioned studies are also time-consuming and data intensive, and they could involve commingling data sets from different software other than PowerGem GenDeliv.

Q12. Why are possible network upgrades and associated costs not provided in the Tool for the overloaded facilities presented in the evaluation results table?

A12. These may be possible in a future version of the Tool, but it is beyond the scope of the Tool at this time. There is publically available information on PJM.com to indicate what baseline, supplemental or network upgrades are active on the PJM system.

Q13. Why doesn't PJM consistently update the case results based on retools, etc.?

A13. The study process to generate the results for this Tool is very different from PJM's typical interconnection studies and requires modifications to the GenDeliv study settings and the case files. It is a large effort outside of the normal interconnection studies process to generate and maintain these data sets for the Tool. These results are estimates and informational only, so they will not have the precision of a formal interconnection study for an active queue/cycle project that has paid to enter the PJM interconnection process.

Q14. Why does it appear that some of the data for some queues/new service requests or generator deactivations in the geospatial Tool are not current/accurate?

A14. The data for these items are only refreshed on a scheduled recurring basis and not dynamically updated like some pages on PJM.com with current new service request and generator deactivation data. Generally there should be minimal lag in refreshed data being available in the tool.

Q15. Are the POI buses available for selection also guaranteed to support future generator interconnections?

A15. No, the POI buses available for selection do not provide clarity on whether a project can physically interconnect the transmission system at the desired location. These existing bus locations in the PJM footprint are intended to provide the user with an estimate of grid impacts in the area and at the various voltage levels based on the injection or withdrawal of MWs.

Q16. Is the congestion overlay a representation of market-based grid congestion or is it just related to thermal impacts seen on the system based on the Generator Deliverability Test?

A16. The congestion overlay is merely a visual representation of the most severe thermal facility impacts by POI as seen in the results coming from the Generator Deliverability test. This overlay is not related to the market-based definition of grid congestion based on energy prices as defined in the following statement: Heavy use of the electricity grid can result in congestion – a condition where the lowest-priced electricity can't flow freely to a specific area – and higher-priced power is needed to keep the lights on. Queue Scope just provides a visual representation of the results that a user will see when running a POI evaluation in the tool.

Q17. What data is used to support rendering of the congestion overlay when it is available for viewing within the geospatial application?

A17. This overlay is rendered based on the pre-loading (%) for the most heavily loaded flowgate at each POI bus across the PJM footprint. Only single, breaker, bus and tower con flowgates are considered in this visualization. Operational con flowgates are ignored. When this overlay is initially loaded, there is a slight delay since these results are being visualized in the map for 6,000+ POI buses.

Q18. For transmission facilities that are already overloaded (pre-loading % >100%), can a developer expect to be responsible for any required upgrades?

A18. Keep in mind that Queue Scope is a screening tool that provides an estimate of the thermal impacts on transmission facilities for the given MW injection/withdrawal at a selected POI. Facilities that are already overloaded may already be identified as constraints in the annual RTEP studies by Transmission Planning or in the ongoing Queue/Cycle studies, but that is not a guarantee. The key here is that if a facility (or facilities) is already overloaded before injecting/withdrawing MWs at the POI, it is possible (or there is risk) that the constraints will show up as reportable violations in a system impact study during the formal interconnection process where a cycle project may receive cost allocation for an upgrade(s) or be contingent on an upgrade(s) to mitigate the violation.

Q19. What types of network upgrades are usually required for Single, Breaker, Bus, and Tower contingencies?

A19. The type or scope of network upgrades are really based on the type of facility being overloaded and what the limiting equipment is for the facility rating in the study. In some cases, the contingency event driving the overload may dictate the type of proposed mitigation. One way to begin an assessment on required upgrades is to look at the type of facility overload (line, transformer, etc.) and the voltage class of the facility. PJM.com has many examples of violations identified during the RTEP process and what upgrades were identified.

- For example, a transmission line may be limited by a wave trap in one instance but another transmission line may actually be limited by the overhead line conductor, which greatly impacts

the scope of work and costs. The voltage class may also greatly impact costs and the scope of the upgrade.

- In some cases, an upgrade may specifically address the contingency event and not directly upgrade the overloaded facility itself. You may also want to look at historical and current queue/cycle system impact study reports on PJM.com to see the types of upgrades that are being seen for overloads you may find in Queue Scope: Service Requests.

Q20. If upgrades are required to mitigate violations being seen in the Queue Scope results, how is cost allocation calculated by project for each upgrade?

A20. Cost allocation is determined during the formal interconnection study process. Please reference Attachment B in Manual 14H on how cost allocation is determined: Manual 14H. PJM also posted a training video that explains the cost allocation process conceptually: New Interconnection Process Cost Allocation.

Q21. Why do some facilities have an "Available (MW)" value in excess of a few Gigawatts?

A21. In some cases there are facilities on the transmission system, typically 500kV & 765kV, where the facility ratings may exceed 5,000-6,000 MVA. As a result, if there is minimal loading on these facilities when running the POI analysis, it will appear that the headroom on that facility is on the order of 5+ GWs based on the facility loading and rating. Be advised that the headroom on the transmission system for the given injection/withdrawal at a selected POI is always going to be limited by the most severely loaded flowgates (facility & contingency pair).

Q22. Why do the Queue Scope results differ from my own Generator Deliverability analysis using the TARA GD software?

A22. The Queue Scope tool leverages an offline DC flowgate analysis to estimate the constraints and headroom at each POI bus across the PJM system. This DC flowgate analysis also uses specific parameters to support the screening process and developing a managing volume of flowgate data for use within the application by online users. If a user has access to TARA GD and the PJM case files, it is recommended to run your own analysis directly in TARA GD using an AC contingency analysis for a given generation project. These results are more likely to resemble the results expected in the formal interconnection study process.

Section 9: Additional Questions

Any additional questions regarding this guide or the Queue Scope application should be directed to Member Relations at (866) 400-8980 or custsvc@pjm.com.

Section 10: Terms & Acronyms

The following terms and acronyms are specific to this project and any supporting programs or functions within PJM.

Term/Acronym	Definition
CEII	Critical Energy Infrastructure Information
Con	Contingency
DFax	Distribution Factor
FG or FGT	Flowgate
GenDeliv	Generation Deliverability
GIS	Geographic Information System
IA	Interconnection Analysis
IC	Interconnection Customer
IPA	Interconnection Planning Analysis
ISO	Independent System Operator
kV	Kilovolt
MFO	Max Facility Output
Mon	Monitor
MTX	Merchant Transmission
MVA	Megavolt-ampere
MW	Megawatt
MWC	MW Capacity
MWE	MW Energy
POI	Point of Interconnection
PSSE	Power System Simulator for Engineering (Siemens PTI)
RTEP	Regional Transmission Expansion Plan
RTO	Regional Transmission Organization
TARA	Transmission Adequacy & Reliability Assessment (PowerGem software)
UI	User Interface

Section 11: Revision History

Date	Rev	Changes
12/01/2022	0	Initial Issue
12/29/2022	1	Updated language and references in Section 1 for User Access and CEII Data requests
12/18/2023	2	Updated introduction and sections 1,2,3 and 8 and added section 6 to include content for the release of the new Geospatial Application
8/12/2024	3	Updated to provide additional clarity on the case dataset definitions, user experience improvements in the Geospatial tool, and to add additional questions & answers to the FAQ section.