# PJM Planning Center: Gen Model User Guide

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Introduction

The PJM User Guide will provide instructions for requesting access, instructions on how to use the application, and helpful tips for the PJM internet application, Planning Center: Gen Model.

PJM Planning Center: Gen Model is an application that allows users to submit generator data for model builds on the planning horizon in order to support NERC MOD-032, TPL-007, and PRC-024 compliance.

The User Guide for the Planning Center: Gen Model consists of four sections. The topics of these sections are as follows:

1. Requesting Access to the Application
2. PJM Planning Center: Gen Model Screens Walkthrough for the:
   - Main Gen Model Screen
   - Plant Form Navigation Screen
   - General Information Screen
   - Synchronous Generator Parameters Screen
   - Wind Farm Parameters Screen
   - Inverter Based Parameters Screen
   - Circuit Breakers and Relays Screen
   - Main Transformer Screen
   - Load Transformer Screen
   - Attachment Line Data Screen
   - Additional Files Screen
3. Submitting Generation Data
4. Document Revision History

Intended Audience

The intended audience for the PJM Planning Center User Guide is:

- Any user who must submit generation data for NERC MOD-032 compliance

Section 1: Requesting Access

User and system IDs are created and updated through the PJM Account Manager tool.
Access to Account Manager

Account Manager can be accessed from PJM’s Account Manager Page using the following URL:


Users can register for an account or sign in to their existing account from this page. If you get locked out of your account, contact your Company Account Manager (CAM).

Please note that Production accounts differ from Training accounts. Users who do not have accounts in either environment should work with their CAM to provision the accounts or follow the New User Registration within the Account Manager User Guide.

In order to access the PJM Planning Center: Gen Model tool log into Account Manager with your User ID and request access to Planning Center Gen Model Read/Write Access. If you do not have the option to request Planning Center Gen Model Read/Write Access in the area, contact your CAM. They will be able to direct you to which organization has the ability to request access to Planning Center Gen Model Read/Write Access. You may be required to create a new user ID under the specific organization provided by your CAM. Depending on what plant you are trying to edit, always make sure to log into the account for the company in which the plant is assigned to in Gen Model.

If your CAM is not familiar with the Planning Center Gen Model Read/Write Access, please contact MOD-032@pjm.com.

If a generator is sold and the ownership transfers, contact MOD-032@pjm.com with the new company name exactly as it appears in Gen Model and Account Manager.
Section 2: PJM Planning Center: Gen Model Screens Walkthrough

Introduction to Planning Center: Gen Model Tool

The Planning Center: Gen Model tool was meant to make it as easy as possible for PJM and Generation Owners (GOs) to satisfy their NERC MOD-032 obligations. The application allows GOs to quickly and easily initially enter generation data, and then review and verify that data every year after. It also gives PJM the ability to efficiently and effectively review GO submitted data and apply it to planning horizon cases.

Gen Model is designed to let you save data throughout the process, allowing you to break as needed. If you are inactive for more than one hour, however, the system will automatically log you out for security reasons. Any data not saved will need to be reentered.

Main Gen Model Screen

Upon logging in, you will be taken to the Main Gen Model screen within Planning Center. This screen will contain all existing submissions for your company. This will include all the data for your company including previous year’s data for each plant and current year data. It will display the year of the submission, plant name, submission status, due date, who created the submission, submission date, available actions, and notes for each entry. If it is your first time logging in or no submissions have been started, none of that data will be populated. To begin the current year’s submission, you will have to click on the “Begin 2018 Submission” button indicated by the red arrow in Figure 1 below.

![Figure 1: Main Gen Model Screen](image-url)
Upon clicking that button, a box will pop up offering two options: “Add New Data” or “Review/Update Existing Data,” as shown in Figure 2. For plants that already have data entered, you can click “Review/Update Existing Data” to either confirm no data has changed from the previous year or to update the data.

![Figure 2: Choosing New or Existing Data to Submit](image)

**Plant Form Navigation Screen**

Upon clicking the “Add New Data” button, you will be taken to the Plant Form Navigation screen shown below. The navigation screen contains the various forms that need to be filled out, their current status, the actions available, and the ability to select which forms are not applicable for the particular plant being submitted. The form statuses include Not Started, In Progress, and Complete.

There are different forms for the various pieces of data needed for each plant:

- For each plant, the “General Information” form must be filled out.
- Depending on the type of generator, one of the three forms following it (Synchronous, Wind Farm, or Inverter Based) must also be filled out.
- Circuit breakers owned by the GO on the high side of the GSU and operating at 100kV or greater should be captured in the “Circuit Breakers and Relays” form.
• If the GO owns a transformer other than the GSU submitted in an earlier form, it must be submitted in the “Main Transformer” form.

• If the GO owns a transformer for BES (100kV or greater) connected loads at the plant, the “Load Transformer” form must be filled out.

• If the GO owns the lead line, the “Attachment Line Data” form must be filled out.

• Additional Data Files allows the user to upload any necessary supporting files, including dynamics files, test sheets, etc.

To begin entering data for a plant, click on the pencil in the actions column for the General Information form, indicated by the red arrow in Figure 3.

**General Information Screen**

Upon clicking the pencil to enter the General Information screen, you should note that your information was prepopulated using data from the pjm.com credentials. An example of the General Information screen with Individual Complete Data automatically filled can be seen in Figure 4.
To pick the plant you want to add data for, you should first pick the transmission owner area that the plant is located in. For the example in Figure 5, we will pick ATSI as the Transmission Owner Area.

Once the TO area is picked, the plant name dropdown will be prepopulated with a list of plants in that TO area. In the example in Figure 6, we will select Beaver Valley.
Figure 6: Selecting Plant Name

If you cannot find your plant listed in the drop down after selecting the correct TO, please change the TO area to “Other” and manually fill out the name of your plant. An example of this can be seen in Figure 7.

Figure 7: Adding Plant that is not in the Drop Down

Note that each field has parameters that must be met in order for the data to be accepted. This is to help eliminate errors in the submitted data. If the entered data does not fit the constraints, a message will pop up. An example of this can be seen in Figure 8.
Total Plant Generation Capability

Name Plate (MVA) * must be greater than or equal to 0.00

Figure 8: Error Message Example

At the bottom of the page you have three buttons: Back, Save Draft, and Submit as is shown in Figure 9. Clicking “Back” will take you back to the Plant Form Navigation screen. Note that your progress will NOT be saved if you click the back button. Clicking “Save Draft” will save your current data in the form. If you click “Save Draft” and then “Back,” your work will be saved. Upon completion of the form you should click “Submit.” If required data is missing or data is outside the constraints of the box, the form will alert you. If the form is complete, you will be returned to the Plant Form Navigation screen and the form status for the “General Information” form will be “Complete.”

Figure 9: Back, Save Draft, and Submit Buttons

Synchronous Generator Parameters

In most cases for a plant that is a synchronous generator, the “Not Applicable” button should checked for “Wind Farm Parameters” and “Inverter-Based Parameters.” Note that if you have entered data for either and click the
“Not Applicable” button, it will remove any data entered. To begin filling out the form, click the pencil icon under the “Actions” column indicated by the red arrow in Figure 10.

Clicking the pencil icon under the “Actions” column will bring you to the screen below. Note that you can submit data for both synchronous machines and for step up transformers. Multiples of each can be entered to suit each plant’s configuration. To begin submitting data, pick either “Synchronous Generator” or “Synchronous Transformer” from the drop down as can be seen in Figure 11.
If you click “Synchronous Generator,” the form will load the data fields necessary for Synchronous Generators. If the plant has several machines that have the same characteristics, these can be entered at once. This can be done by entering several machine IDs in the Machine ID field as shown in Figure 12.

This form asks for various parameters necessary for steady state, dynamics, and short circuit model builds. Please enter the data as best you can and use engineering judgement when necessary. Similar to the “General Information” form, at the bottom of the form are Back, Save Draft, and Submit buttons. Clicking “Back” will take you back to the Plant Form Navigation screen. It will NOT save your work on the page. Clicking “Save Draft” will save your current data in the form. Once all required data is filled out without any errors you can submit the form. If required data is missing or data is outside of the constraints of the box, the form will alert you. If the form is complete, you will be returned to the Plant Form Navigation screen and the form status for the “Synchronous Generator” form will be “Complete.”

However, if additional machines or transformers need to be entered, you can navigate back to the synchronous generator form by clicking the pencil again and you will see your submitted data. You can edit the previous entry by clicking the pencil or delete the entry by clicking the trash can. To add an additional machine, click the drop down again and select “Synchronous Generator” from the drop down shown in Figure 13.
It is important to note that you can click “Save Draft” at the bottom of the form and it will save your progress and have a submission status of “In Progress” for that machine as shown in Figure 14. You can finish your submission by clicking on the pencil icon next to the machine in progress and then clicking Submit.

To fill out data for the GSU, once again click the pencil for “Synchronous Generator Parameters.” In the drop down box, this time select “Step-Up Transformer” and the form for a transformer will appear as shown in Figure 15. In this form, enter the GSU data for this plant. Use the dual list boxes to assign machines to the GSU.
Upon completely and accurately filling out the form and clicking submit, the user will be taken back to the Plant Form Navigation screen. Additional transformers can be added in a similar fashion to the machines. Data can be edited or deleted for any submitted generators or transformers.

**Wind Farm Parameters**

In general for a plant that is a wind farm, the “Not Applicable” button should checked for “Synchronous Generator Parameters” and “Inverter Based Parameters.” Note that if you have entered data for either and click the “Not Applicable” button, it will remove any data entered. To begin filling out the form, click the pencil icon under the “Actions” column indicated by the red arrow in Figure 16.
To add a generator, select “Wind Farm Generator” from the drop down shown in Figure 17 and the form, shown in Figure 18, will load underneath.

![Wind Farm Screen](image)

**Figure 17: Wind Farm Screen**
## Wind Farm Parameters

**Machine Id**
- List all the Machine IDs that these data corresponds (e.g. EG1, EG2)

**Prime Mover Code**
- Select

**Energy Source Code**
- Select

**Specify Manufacturer**

**Specify Model**

**MW Value per Turbine (Nominal Rating)**

**Number of Turbines**

**MVA Base**

**Terminal Voltage (KV)**

**Nominal Power Factor**

**Type 4 turbine**
- Select

**Control Mode**
- Select

**Voltage relays installed**
- [ ] Yes
- [ ] No

**Frequency relays installed**
- [ ] Yes
- [ ] No

**Additional Wind Farm Compensation**
- No

### Stability Models

To submit multiple files at once, please place them into a Zip file before uploading.

**Generator Models, Relay Model & Frequency Relay Model**

**Other documents**

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**Figure 18: Wind Farm Generator Form**
Similar to the “General Information” form, at the bottom there are Back, Save Draft, and Submit buttons. Clicking “Back” takes you back to the Plant Form Navigation screen. It will NOT save your progress. Clicking “Save Draft” will save your current data in the form. Once all the required data is filled out without any errors, you can submit the form. If required data is missing or data is outside the constraints of the box, the form will alert you. If the form is complete, you will be returned to the Plant Form Navigation screen and the form status for the “Wind Farm Parameters” form will be “In Progress,” as shown in Figure 19. A transformer must be submitted for wind farms in order for the status to be complete, so you will have to return to the Wind Farm Parameters form.

Click the pencil icon to return to the Wind Farm Parameters form.

You will see the wind farm you already submitted and you can add additional Wind Farms if necessary. If you want to enter GSU information, use the drop down menu to select “Wind Farm Transformer,” as shown in Figure 20.
Once GSU data is completely and accurately entered, clicking submit will take you back to the Plant Form Navigation Screen with the status of the Wind Farm Form as “Complete.” If there are additional wind farms/GSUs that need to be added, click the pencil icon and follow the steps outlined above to add additional wind farms or GSUs.

**Inverter Based Parameters**

For a plant that is inverter based, generally the “Not Applicable” button should checked for “Synchronous Generator Parameters” and “Wind Farm Parameters.” Note that if you have entered data for either and click the “Not Applicable” button it will remove any data entered. To begin filling out the form, click the pencil icon under the “Actions” column in the Inverter-Based Parameters row indicated by the red arrow in Figure 21.

![Figure 21: Selecting Inverter-Based Parameters Form on the Plant Form Navigation Screen](image)

To add an inverter based generator, click the drop down menu and pick “Inverter Based Generator” from the drop down, shown in Figure 22, and the form will load.
If there are multiple inverter based generators with the same characteristics, they can be entered once by entering multiple machine IDs. An example of this can be seen in Figure 23.

Similar to the “General Information” form, at the bottom there are Back, Save Draft, and Submit buttons. Clicking “Back” will take you back to the Plant Form Navigation screen. It will NOT save your progress in the sheet. Clicking “Save Draft” will save your current data in the form. Once all required data is filled out without any errors, you can submit the form. If required data is missing or data is outside the constraints of the box, the form will alert you. If the form is complete, you will be returned to the Plant Form Navigation screen and the form status for the “Inverter Based Parameters” form will be “In Progress,” as shown in Figure 24. A transformer must be submitted for inverter based generators in order for the status to be complete. Click the pencil icon to be returned to the form.
Click the pencil icon to be returned to the Inverter Based Parameters form. You will see the inverter based generator you already submitted as shown in Figure 25. Using the drop down menu, you can select Inverter Based Generator to add an additional inverter based generator or select “Inverter Based Transformer” to add GSU data.

Once GSU data is completely and accurately entered, clicking Submit will take you back to the Plant Form Navigation screen and will show the status of the Inverter Based Parameters Form as “Complete.”
additional Inverter based generators/GSUs that need to be added, click the pencil icon and follow the steps outlined above to add additional inverter based generators or GSUs.

**Circuit Breakers and Relays**

Circuit breakers owned by the GO on the high side of the GSU and operating at 100kV or greater should be captured in the “Circuit Breakers” form. In Figure 26, this would correlate to the B1 breaker. If the GO does not own any such circuit breakers, they should check the “Not Applicable” box.

![Figure 26: Circuit Breakers that PJM Models Example](image)

To begin entering circuit breaker data, click on the pencil icon in the actions column and you will be brought to the form shown in Figure 27.

![Figure 27: Circuit Breaker Screen](image)
To add a circuit breaker, click on the drop down and click “Yes” and the circuit breaker form will load, as shown in Figure 28. GOs should fill out Nameplate Interrupting Rating in either kA or MVA depending on how their circuit breaker is rated.
Figure 28: Circuit Breaker Form

Relay information related to PRC-024 compliance is collected on this form as well. The user has the option of selecting “Yes”, “No”, or “N/A” and providing text explanation or file upload to support PRC-024 compliance.

The user can save progress at any time by clicking the Save Draft button. Upon completing the required data, the user can click “Submit.” The data will then be submitted and they will be returned to the Plant Form Navigation screen. As soon as one submission is received, the form status for Circuit Breakers will be Complete. However, if more circuit breakers need to be entered, the user should once again click the pencil icon to navigate to the circuit breaker page, and select “Yes” from the drop down menu.

Main Transformer

The Main Transformer sheet is for those that have an additional transformer in addition to the GSU data submitted in the synchronous generator, wind farm, and inverter based sheets. For most submissions, main transformer data is not necessary and the GO can select “Not Applicable,” as shown in Figure 29. A Main Transformer is typically found in wind farms where GSUs will step up from individual turbine terminal voltage (i.e. 690volts) to a collector system voltage (i.e. 34.5 kV) and then a Main Transformer will step from collector system voltage to Transmission System voltage (i.e. 345 kV). If you have previously submitted the GSU data in previous forms and those are the only transformers the generation owner owns, no data is required here.

Figure 29: Plant Form Navigation Screen with Main Transformer checked as Not Applicable
For those situations in which an additional main transformer is owned by the generation owner, click on the pencil and it will take you to the main transformer sheet. The form in Figure 30 can be filled out and machines that were previously filled out can be assigned to the transformer.

![Figure 30: Main Transformer Form](image)

Similar to the “General Information” form at the bottom has Back, Save Draft, and Submit buttons. Clicking “Back” will take you back to the Plant Form Navigation screen. It will NOT save your progress in the sheet. Clicking “Save Draft” will save your current data in the form. Once all required data is filled out without any errors, you can submit the form. If required data is missing or data is outside the constraints of the box, the form will alert you. If the form is complete, you will be returned to the Plant Form Navigation screen and the form status for the “Main Transformer” form will be “Complete.”

**Load Transformer**

The Load Transformer sheet is for those that have an additional transformer for BES (≥100 kV) connected loads at the plant. For most submissions, load transformer data is not necessary and the GO can select “Not Applicable,” as shown in Figure 31.
For those situations that a load transformer is owned by the generation owner, click on the pencil and it will take you to the load transformer sheet shown in Figure 32.

Selecting “Load Transformer” from the drop down, will pull up the form to submit information on the transformer as shown in Figure 33.
Figure 33: Load Transformer Form

Similar to the “General Information” form at the bottom has Back, Save Draft, and Submit buttons. Clicking “Back” will take you back to the Plant Form Navigation screen. It will NOT save your progress in the sheet. Clicking “Save Draft” will save your current data in the form. Once all required data is filled out without any errors, you can submit the form. If required data is missing or data is outside the constraints of the box, the form will alert you. If the form is complete, you will be returned to the Plant Form Navigation screen and the form status for the “Load Transformer” form will be “Complete.”
**Attachment Line Data**

For GOs that own the lead line to the generator, the “Attachment Line Data” form should be filled out.

![Figure 34: Selecting Attachment Line Data on the Plant Form Navigation Screen](pjm-planning-center.png)

It should be noted that there is no “Not Applicable” option for this form, so it must be filled out before being able to submit plant data. If the generator is directly connected to the substation and there is no lead line, please fill out all required forms with a 0 as can be seen in Figure 35 below.
Figure 35: Attachment Line Data Form
Additional Data Files

This form can be used to submit additional data the generation owner feels could be helpful. Text based (.dyr, .txt, .csv) and binary files are supported on this form. Dynamic model data, relay data, and plant single lines are requested elsewhere in Gen Model.

In order to upload a file you may select the upload icon in the “Actions” column. This will bring up the screen shown in Figure 36.

![Figure 36: Additional Data Files Screen](image)

The GO can then select any necessary files by clicking the “Choose” button and then selecting the necessary files. You can also add a file description in the text box.
Section 3: Submitting Generation Data

Once the General Information form is “Complete” and all other forms are either “Complete” or checked as “Not Applicable,” click on the Submit button indicated by the red arrow in Figure 37.

![Complete Plant Form Navigation Screen](image)

Figure 37: Complete Plant Form Navigation Screen

After clicking the Submit button, you will be notified that you are about to submit plant data. Type any additional comments in the text box provided. Once you are confident your data is ready for submission, click the Submit button indicated by the red arrow in Figure 38.
After once again clicking the Submit button, you will be taken back to the Main Gen Model screen. You will now see that the submission status of your new plant is “Submitted.” An example of this is indicated by the red arrow in Figure 39. Once form submission is complete an automatically generated email will be sent confirming receipt.
Figure 39: Main Gen Model Screen after Submitting Plant Data
Section 4: Revision History

Revision Version 00 – Draft (04/25/2016)

Created a new document for the PJM Planning Center: Gen Model; this is the first release of the PJM Planning Center: Gen Model User Guide.

Revision Version 01 – Draft (04/02/2018)

Updated the PJM Planning Center: Gen Model user guide to include more recent information and snapshots of the tool.

Revision Version 02 – (03/29/2019)

Updated snapshots for 2019 Gen Model Enhancements. Minor text revisions.