PJM Dynamic Model Development Guidelines for Stability Studies

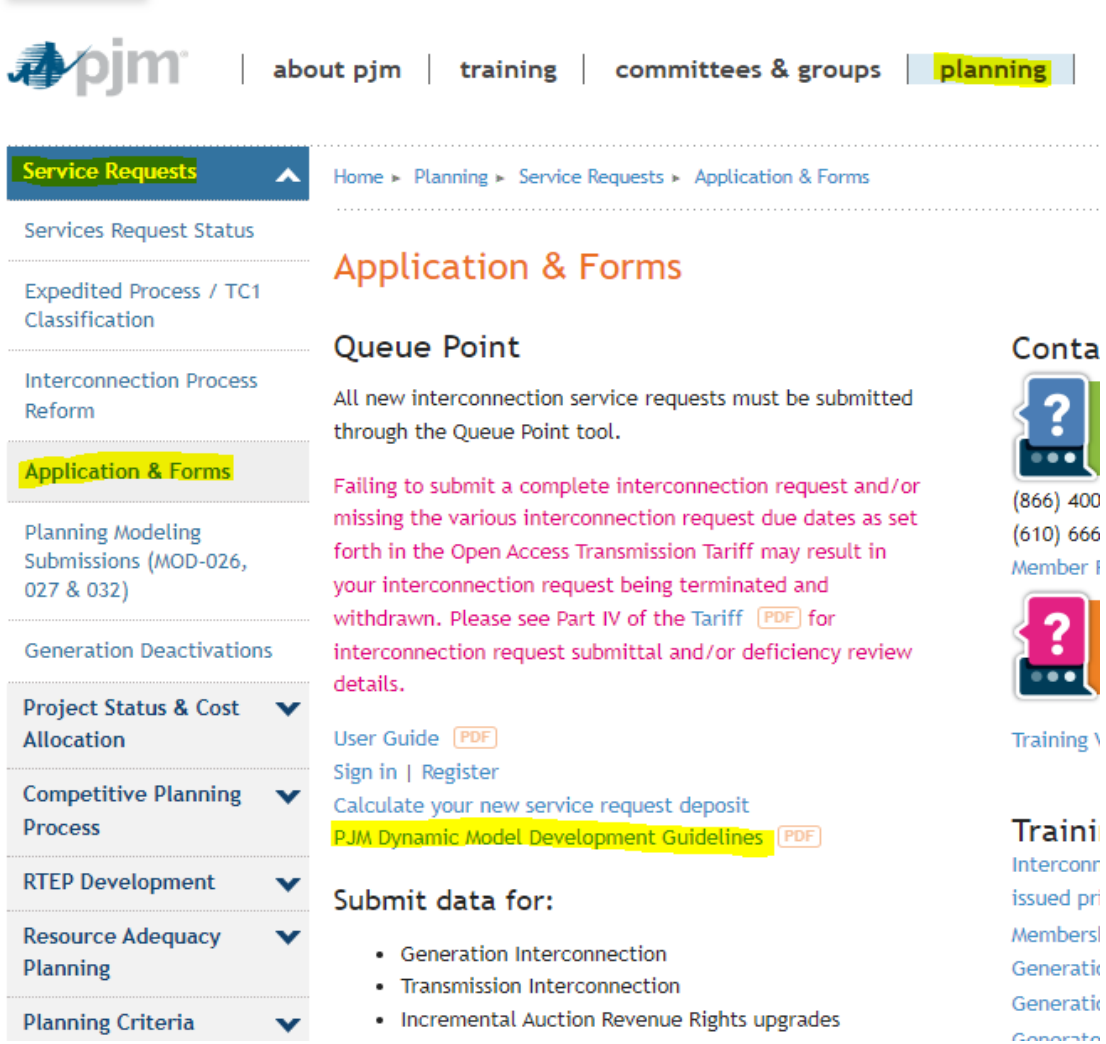
Interconnection Process Training for Developers

Location on PJM.com

- PJM Dynamic Model Development Guidelines posted here:

https://pjm.com/-/media/planning/services-requests/pjm-dynamic-model-development-guidelines.ashx

- To be used for:
  - New Service Request Projects
  - Necessary Study Requests
  - As Built Data Submissions



New Service Request Projects

- **Purpose:** Use this modeling guideline to develop a dynamic model specific to your project
- **Requirements:** Required to meet requirements in Section 8, Deliverables for submission to be considered valid
- **Consequences:** Per PJM Manual 14H, Section 2.1.2, failure to comply or cure deficiencies will result in withdrawal
- **Queue Point Attachment:** Dynamic Model package must be uploaded in Queue Point with the completed Queue Point Data Application Form during the Application Phase of the Cycle
- **Changes at Decision Points:** For any allowable changes made at DP 1 and/or 2, an updated dynamic model package must be submitted in Queue Point

Necessary Study Requests

- **Purpose:** Once a Necessary Study Agreement is initiated, this modeling guideline must be used to develop the dynamic model for the project
- **Expectations:** The dynamic model shall be parameterized as closely as possible to the intended design/settings
- **Queue Point Attachment:** The dynamic model and files per the Deliverables section must be uploaded in Queue Point with the completed Necessary Study data submission

As Built Data Submissions

- **Purpose:** This modeling guideline must be used to develop the dynamic model for an As Built project submission
- **Expectations:** The As Built dynamic model must reflect the facility settings after commissioning
- **Queue Point Attachment:** The dynamic model and files per the Deliverables section must be uploaded in Queue Point with the completed As Built Data submission

Applicability

- New Service Request Projects
  - Applicable to all projects beginning with Transition Cycle 2
  - Also applicable to Transition Cycle 1 projects, that choose to make changes at Decision Point 1 and/or 2

- Necessary Study Requests & As Built Data Submissions
  - Effective immediately, for any new requests/submissions made after 9/20/23

Expectation from Project Developer

- **For a valid request:** Must meet the requirements outlined in Section 8 “Deliverables” in order for PJM to consider any submission of dynamic data as valid.

- **Consequences of not meeting “Deliverables” requirements:** Failure to comply with the requirements of the document or cure deficiencies within the deficiency review period will result in the application being withdrawn.

Deliverables

- Dynamic Model Report with quality assurance sign offs from responsible parties to ensure these guidelines were reviewed and followed
- Completed Dynamic Model Checklist must be included
- Dynamic Model package/folder containing relevant files as outlined in the Checklist

Deliverables (cont'd)

- Completed Queue Point Application form with all required data and documentation

- Dynamic Model:
  - Library Models (preferred): PSSE .idv and .dyr
  - User Defined Models: PSSE .sav, .idv, .dyr and .DLL appropriately parameterized

- PSSE case including full build of generator project (.raw, .sav, .cnv, .snp, and .sld file)

Deliverables (cont'd)

- Test Results:
  - MFO assessment table
  - Power Factor Assessment Table (including .sav cases for this assessment)
  - Confirmation unit meets FERC Order No. 827 AVR requirements
  - Results of flatstart test including log, out and test plots
  - Results of VRT test including log, out and test plots

- Refer to Section 8 for complete list of Deliverables

Dynamic Model Checklist

Item	Description	Comment	Check
1	Completed Queue Point Data Application form along with all requested files are submitted via Queue Point portal		
2	If a PSSE library model is submitted (preferred), .idv and .dyr files developed using the guidelines in this document are included		
3	If a UDM is submitted, a properly compiled PSSE version .sav case along with .idv, .dyr, and .dll files appropriately parameterized for the project using the guidelines in this document in included		
3a	A report on how the settings of the model were parameterized along with the manufacturer's documentation, including a user guide of the UDM		
3b	Block diagram for the model and sub modules, along with values, names and detailed explanation of all model parameters		
4	.raw, .sav case, .cnv, .snp, and .sld file for the project (case setup folder/files) are submitted		

Dynamic Model Checklist (cont'd)

5	Verify all testing requirements are met:		
5a	MFO assessment table is included in the Dynamic Model report		
5b	Power Factor Assessment table along with PQ curve used and case setup for power factor assessment (lagging and leading scenarios) is included in the Dynamic Model report		
5c	Confirm that the unit meets FERC Order No. 827 with regards to automatic voltage regulation, with appropriate model settings included in the Dynamic Model report		
5d	Results for the flatstart test including log, out and test plots showing Power, VARs, Eterm, Freq and Volt for each inverter/generator is included		
5e	Results for the VRT test including log, out and test plots showing Power, VARs, Eterm, Freq and Volt for each inverter. Provide confirmation that Momentary Cessation is eliminated (if not, provide reason)		
5f	Confirm Primary Frequency Response is enabled		