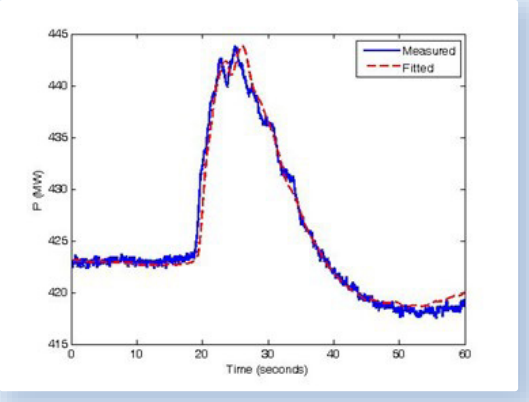
Supplemental Project Notice

MODELING AND MODEL VALIDATION TOOLS USER GROUP

2025 – 2027 Cycle



Example of model validation with PPPD using online data

PROJECT HIGHLIGHTS

- Learn to use tools and techniques for model validation of generation and transmission equipment to help in compliance with NERC MOD standards
- Learn to use tools for determining load composition for developing composite dynamic load models for transmission planning as required by NERC TPL standards
- User support for tools and general learning about the process of modeling and model validation from EPRI and peers of the User Group
- Learn to use tools for determining load composition for developing composite dynamic load models for transmission planning as required by NERC TPL standards
- Get updates to the software tools

Background, Objectives, and New Learnings

Power system model development and validation are foundational tasks for accurate power system analysis and decision making and are required as a part of the North American Electric Reliability Corporation (NERC) MOD standard compliance. As the U.S. moves toward ambitious renewable energy targets, the modelling needs of utilities are becoming more wide ranging. Emerging challenges for power system planners include modelling inverter-based generation, high voltage DC (HVDC), and other system elements for which the behavior is highly dependent on control design.

The third cycle of the Modeling and Model Validation Tools User Group will continue efforts to further develop generic models for power system elements and refine tools for periodic model validation and benchmarking by emphasizing experience sharing and interaction between members. It is critical to ensure that models can reasonably replicate the performance of the actual power system to avoid planning and operational decisions arising from model errors.

EPRI has been performing R&D related to modelling, model development, and model validation and worked with utilities to share knowledge on these topics. The objective of the User Group is to continue this engagement by providing a forum to share knowledge among participating members, and to provide continued support on the following:

- **Modeling guidance for power system dynamic studies**: EPRI has contributed to the development of **generic planning models** for a range of resources such as conventional generators, wind, solar photovoltaic (PV), battery storage, aggregated loads with distributed energy resources, flexible AC transmission systems (FACTS), and HVDC. EPRI plans to provide guidance on the development, benchmarking, and testing of these models for adoption into planning studies.
- **Guidance on emerging topics in inverter-based resource (IBR) modeling**: EPRI plans to provide guidance on parameterization of IBR models, determination of appropriate models for specific assessments, and model quality tests for OEM supplied blackbox models.

User Group participation also provides access to the following software tools:

- The **Power Plant Parameter Derivation (PPPD)** tool, which provides a semi-automated platform for deriving and validating power plant models using staged field data or recorded, online disturbance data, achieving model validation significantly quicker and cheaper than traditional methods.
- The **Load Component Export Tool (LCET**) which pulls information from various public resources and utility load demographic data to create composite load model records used in planning.

Benefits

This User Group has three key values:

- Automated algorithms to assist planning engineers in constructing reliable and accurate power system models, significantly reducing engineering time.
- The tools, methods, and group interactions, provide a unique environment for utility engineers to learn about the technical aspects of meeting the NERC MOD-26, MOD-27, MOD-32, MOD-33, and TPL-001-5 standards.
- Model validation tools that provide proven methods for using readily available fault information for model revalidation on a routine basis without the need for invasive testing.

This project will provide a forum to help utilities with the application of the tools through workshops, User group meetings, webcasts, and software support.

Project Approach and Summary

User Group interaction will be facilitated through periodic webcasts and in-person meetings. Events are intended to focus on disseminating information relating to generic planning models and updating model validation tools and methods. Topics for these events are expected to include:

- Technical discussion and mutual learning about modelling and model validation in planning.
- Recent developments and trends and impending modelling requirements.
- User support and updates for EPRI model validation tools as part of the annual User Group meeting.
- Coordinated engagement with commercial software vendors to promote application and transfer of new and updated models.

Deliverables

The following deliverables are expected to be issued from the project:

- Access to updated versions of PPPD and LCET, including any new releases that occur during each funding year.
- 3 in-person meetings (in the 3-year cycle) and periodic topical webcasts providing forums for learning, demonstrating tools and approaches for model validation, discussing modelling issues, sharing experiences with these models from case studies with participants, discussing advanced transmission planning challenges (e.g., grid forming) and identifying emerging modelling needs.

Price of Project

The price to participate is $15,000 per year. A three-year commitment is required for a total of $45,000. There is no prorating for those who join late in the 3-year User Group cycle. The software tools can only be licensed by joining the group. This project qualifies for Self-Directed Funding (SDF).

Commercial use of the software is presently not offered, and thus the members should use the tools only for work on their own assets.

Project Status and Schedule

The interest group in its second cycle and will run for three years from January 2025 to December 2027.

Who Should Join

Intended for transmission system operators, regional service centers, and transmission owners and operators.

Contact Information

For more information, contact the EPRI Customer Assistance Center at 800.313.3774 (askepri@epri.com).

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