

Modeling and Validation Subcommittee

Meeting Minutes
Virtual

Day 1—May 7, 2025

2:00 to 5:00 p.m. Mountain Time

1. Welcome, Call to Order

Song Wang, Modeling and Validation Subcommittee (MVS) Chair, called the meeting to order at 02:01 p.m. MT on May 7, 2025. A quorum was present to conduct business. A list of attendees is attached as Exhibit A.

2. Review WECC Antitrust Policy

Doug Tucker, Senior Engineer, read aloud the WECC Antitrust Policy statement. The policy can be found on wecc.org.

3. Approve Agenda

S. Wang introduced the proposed meeting agenda.

By consensus, the MVS approved the agenda.

4. Review and Approve Previous Meeting Minutes

S. Wang introduced the minutes of the meeting on January 29-31.

The 2025-01-29 MVS Minutes were amended as follows:

- “The MVS decided to move forward with developing a white paper” was added to the third bullet point in Item 11;
- “The MVS decided to keep the offshore wind model on the model development priority list” was added to the last bullet point in Item 11; and
- “version of GENQEC models on” was removed from the third bullet point on Item 14 and replaced with “model in.”

By consensus, the MVS approved the minutes of the meeting on January 29–31, 2025.

5. Review Previous Action Items

Maya Brimhall, Administrative Coordinator, reviewed action items carried over from the MVS meeting on January 31, 2025. Action items that are not closed and will be carried forward can be found on wecc.org.

6. Review Unapproved Dynamic Model List 26HW3

D. Tucker requested MVS participants review the Unapproved Dynamic Model List for 2026 Heavy Winter 3 (26HW3) cases before the September 2025 MVS meeting. The 26HW3 Unapproved Dynamic Model List can be found on the website for review.

7. MOD-33 Update

There were no new MOD-33 updates for RC West or Southwest Power Pool.

8. SCMOV Model

Jamie Weber, PowerWorld Corporation, reviewed a presentation he gave to the MVS in May 2024. Ramin Vakili, GE Vernova, presented on GE Vernova's SCMOV model simulation. The MVS then voted to approve the SCMOV model, and D. Tucker added an action item to add the SCMOV model to the Approved Models List by the meeting in September 2025.

Approval Item: SCMOV model

By consensus, the MVS approved the SCMOV Model.

9. Generic Model Naming Discussion

S. Wang led the Generic Model Naming discussion. The MVS agreed that while older generic models may still have vendor-specific names, generic models will not have vendor-specific names moving forward.

10. Discussion: Observations and Considerations Related to WECC Criterion TPL-001-WECC-CRT-4

S. Wang presented on the observations and considerations related to WECC Criterion TPL-001-WECC-CRT-4. The WR1.4 requirement (i.e., post-fault voltage recovery criteria) is not being complied with on a regular basis for many WECC member systems. D. Tucker and S. Wang took an action item to connect with the WECC Standards Development team to learn how to submit changes to TPL-001-WECC-CRT-4 WECC Criteria, and if so, to develop next steps.

11. Prioritizing the Next Set of Model Development

The MVS prioritized the following set of model development for approval, from most important to least important:

- Series Capacitor MOV Model (SCMOV) (approved at this meeting)
- VHVDC2
- IBR Controls—REEC_E
- Grid-forming Inverter Model—Hybrid
- Large Load
 - EV Charging Model

- Data Center
- Electrolyzer model
- VHVDC3—Offshore Wind
- Advanced Pump Storage Model
- SVSMO4 Model
- Multi-terminal VSC-HVDC

Day 2—May 8, 2025

9:00 a.m. to 5:00 p.m. Mountain Time

12. Renewable Energy Modeling

The MVS listened to the following presentations:

- Wei Du, Pacific Northwest National Laboratory (PNNL), presented an update on the grid-forming hybrid (i.e., both GFL and GFM functionality, REGFM_C1) inverter control model development. He introduced a change to the inverter controls and plant-level controls. The model specification was approved in a previous meeting, and Wei is now seeking model approval at the next MVS meeting in September.
- Songzhe Zhu, Qualus, LLC, shared significant updates to the IBR Model and Validation Guideline. The revised guideline incorporates recent modeling advancements and feedback from industry stakeholders. Songzhe is collecting more input and welcomes comments or suggestions from members to further refine the document.
- Eric Heredia, Bonneville Power Administration (BPA), provided an overview of Renewable Energy Interconnection requests and emerging grid-forming (GFM) requirements. He discussed the need for clear GFM specifications and shared preliminary findings on performance metrics such as voltage response, inertia, and short-term current capability.
- Pouyan Pourbeik, Power and Energy, Analysis, Consulting and Education, PLLC (PEACE), shared PEACE's updates on IBR model development.
- P. Pourbeik provided insights from Energinet and Global Applications on enhancements and regional adaptations to generic WECC Models.

13. Active Transmission System Modeling Update

The MVS listened to the following presentations:

- P. Pourbeik updated the MVS on the following active transmission system modeling:
 - VHVDC2;
 - VHVDC3; and

- SVSMO4.

The MVS then voted to approve the VHVDC3 model specification.

Approval Item: VHVDC3 model specification

By consensus, the MVS approved the VHVDC3 model specification.

- W. Du introduced the Standard Library HVDC and MTDC model development plan.

14. Load Modeling

The MVS listened to the following presentations:

- Nick Hatton, Staff Engineer, shared updates on the PSLF modular model validation, and the MVS discussed officially switching to the modular model. The Modular Composite Load model and current associated sub models will be listed as an approval item in the September 2025 MVS meeting.
- Hasala Dharmawardena, NERC, presented on data center modeling.
- Jackson Daly, Idaho Power Company, presented on regional sensitivities to motor D component stalling in load models.
- Malati Chaudhary, Public Service Company of New Mexico, presented on the dynamic behavior of the 3-Phase motor segment in composite load modeling. MVS Members acknowledged the modeling challenges and recognized improvements in the WECC load model structure. However, they emphasized that parameter accuracy still requires coordinated efforts across the region. As a result of this discussion, MVS agreed to develop a guidance document to help WECC members better understand the model and identify practical approaches for collecting data to improve parameter accuracy.
- A. Schmitt and S. Wang shared the load modeling work plan, focusing on the following aspects:
 - Transitioning the load model to a modular-based structure;
 - Calibrating parameters;
 - Testing and verifying, including equipment testing and model performance verification based on system events or other methods;
 - Reviewing WECC load model composition data;
 - Completing a system-wide simulation;
 - Reviewing EV and data center control and protection; and
 - Supporting NERC emerging load plans.

Day 3—May 9, 2025

9:00 a.m. to 12:00 p.m. Mountain Time



15. Generation Modeling Validation Workshop

The MVS held a generation modeling workshop focused on improving understanding and practices related to generator model validation. The workshop covered the following topics:

- Procedures for Generating Modeling Parameters, including a review of the NERC model validation guideline, field testing and study procedures, and common challenges with mitigation strategies;
- A hands-on session introducing a parameter validation tool, featuring an overview of its capabilities, a live demonstration of key functions, and a preview of the WECC GENEQEC Kw Tool, which will be posted on the MVS website under the “Tools” section;
- Transmission Planner’s Role in Model Verification and Usability Assessment, highlighting procedures for reviewing model documentation and results, criteria for model usability.

16. Power Plant Modeling

The MVS listened to the following presentations:

- J. Weber presented on the IEEE Type C Excitation (i.e., alternator-supplied rectifier type) Limiter Transient Stability Models for transient stability studies, focusing on Over Excitation Limiters (OEL), Under Excitation Limiters (UEL), and Stator Current Limiters (SCL). The presentation highlighted how these limiters interface with various IEEE Type C exciter models, configuration requirements for valid input locations, and compatibility considerations.
- Ningchao Gao, National Renewable Energy Laboratory, presented ongoing work on developing a generic model specification for advanced pumped storage hydro (APSH) technologies, including adjustable, ternary, and quaternary PSH (pumped storage hydro). The project, led by NREL in collaboration with ANL (Argonne National Laboratory), GEV (General Electric Vernova), Siemens, and other partners, aims to produce both positive-sequence and EMT models, incorporating input from OEMs and validating against field data when available. The group is seeking model specification approval at the next MVS meeting.

17. Program Updates

The MVS listened to the following program updates:

- Mengxi Chen, GE, provided PSLF recent releases and upcoming changes.
- S. Wang provided PSSE recent releases and upcoming changes.
- Caroline Marzinzik, PowerWorld Corporation, announced an in-person training session from June 2-6, 2025, and encouraged people to attend.



- Jeff Bloemink, PowerTech Labs, provided Powertech Labs TSAT recent releases and upcoming changes. He shared that PowerTech Labs is hosting an in-person training in July and encouraged participants to attend.

18. Public Comment

J. Daly asked whether any other entity had a use for a distributed generation model to be added to the composite load model, specifically for hydro, and if they did, if they had any experience developing a model to include in the composite load model. N. Hatton and J. Daly took an action item to gather data and report back on details for small hydro representation in the composite load model in the next MVS meeting.

19. Review New Action Items

- Update the Approved Models List with the SCMOV model.
 - Assigned To: Doug Tucker
 - Due Date: September 12, 2025
- Send notes to entities still using unapproved dynamic models.
 - Assigned To: Doug Tucker
 - Due Date: September 12, 2025
- Connect with WECC Standards Development team to find out how to submit changes to TPL-001-WECC-CRT-4 WECC Criteria.
 - Assigned To: Doug Tucker and Song Wang
 - Due Date: September 12, 2025
- Gather data and report back on details for small hydro representation.
 - Assigned To: Nick Hatton and Jackson Daly
 - Due Date: September 12, 2025
- Draft composite load modeling guideline.
 - Assigned To: Song Wang and Andreas Schmitt
 - Due Date: Ongoing
- Present REGFM_c1 & REPCGFM_c1 model specification approval item.
 - Assigned To: Wei Du
 - Due Date: September 12, 2025
- Present APSH specification approval item.
 - Assigned To: Ningchao Gao
 - Due Date: September 12, 2025

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- Post tool for GENQEC Kw.
 - Assigned To: Doug Tucker
 - Due Date: September 12, 2025
 - Present VHVDC2 & REEC_E model approval item.
 - Assigned To: Doug Tucker and Song Wang
 - Due Date: September 12, 2025

20. Review Upcoming Meetings

September 10–12, 2025..... Virtual

21. Adjourn

S. Wang adjourned the meeting without objection at 11:52 a.m. MT.

Exhibit A: Attendance List

Members in Attendance

Angel Aquino	PowerWorld Corporation
Zachary Beus.....	Puget Sound Energy, Inc.
Kevin Brooks.....	Southern California Edison Company
Ken Che.....	Public Utility District No. 1 of Snohomish County
Mengxi Chen.....	GE Vernova (GE Energy Consulting Group)
Christopher Corral.....	El Paso Electric Company
Jackson Daly	Idaho Power Company
Tuan Dang	Public Utility District No. 1 of Snohomish County
Fangfang Du	PacifiCorp
Wei Du	Pacific Northwest National Laboratory
Chris Effiong.....	Western Area Power Administration
Roberto Favela	El Paso Electric Company
Carlos Flores Lopez	U.S. Army Corps of Engineers-Walla Walla District
Christopher Fuchs.....	California Independent System Operator
Cindy Fung	Alberta Electric System Operator
Miguel Garcia	Sacramento Municipal Utility District
Chris Gilden	Tri-State Generation and Transmission—Reliability
Bo Gong	Salt River Project
Allison Hidalgo	U.S. Bureau of Reclamation
Robert Jackson	Burns & McDonnell (1898 and Co.)
Robert Jones	Seattle City Light
Lesley Kayser-Sprouse	Hetch Hetchy Water and Power
Seong Tae Kim	PacifiCorp
Slaven Kincic	Pacific Northwest National Laboratory
Yuriy Komlev.....	U.S. Bureau of Reclamation
Pouyan Pourbeik	Power and Energy, Analysis, Consulting and Education, PLLC
Spencer Tacke.....	Auriga Corporation
Jin Tan	National Renewable Energy Laboratory
Anthony Taylor	Black Hills Corporation
Chifong Thomas.....	Thomas Grid Advisor
Doug Tucker	WECC
Ramin Vakili.....	GE Vernova (GE Energy Consulting Group)
GuiHua Wang.....	British Columbia Hydro and Power Authority
Song Wang	Portland General Electric Company
Jeffery Watkins	NV Energy
James Weber	PowerWorld Corporation
Trevor Werho	Arizona Public Service Company
Xiaofei (Sophie) Xu	Pacific Gas and Electric Company
Steve Yang.....	Bonneville Power Administration—Transmission



Ratanan Yoopat..... Bonneville Power Administration

Members not in Attendance

Hassan Baklou San Diego Gas and Electric
Jess Boatwright NorthWestern Energy
Sean Brosig US Army Corps of Engineers
Emerson Butler..... Puget Sound Energy, Inc.
Daniel Cervantes Los Angeles Department of Water and Power
Lakmal Chandrasekara..... Turlock Irrigation District
Jim Ding..... British Columbia Hydro and Power Authority
Xiaoyuan Fan..... Pacific Northwest National Laboratory
Jonathon Flores Los Angeles Department of Water and Power
Joseph Gillette Utility System Efficiencies, Inc.
Licheng Jin California Independent System Operator
Gordon Kawaley Bonneville Power Administration—Transmission
James Keller..... Western Area Power Administration - Rocky Mountain Region
Rabi Kiran..... Pacific Gas and Electric Company
Dmitry Kosterev..... Bonneville Power Administration—Transmission
May Le..... Public Utility District No. 2 of Grant County
Ron Markham Pacific Gas and Electric Company
Mitchell Miller..... NorthWestern Energy
Parag Mitra Electric Power Research Institute
Saurav Mohapatra..... PowerWorld Corporation
Michael (Logan) Pokallus..... Western Area Power Administration
Nathan Powell Deseret Generation & Transmission Cooperative
Sergey Pustovit Bonneville Power Administration
Deepak Ramasubramanian Electric Power Research Institute
Anthony Rendon..... Salt River Project
Tracy Rolstad Public Utility District No. 2 of Grant County
Amanuel Selassie..... Los Angeles Department of Water and Power
Jayapalan (Jay) Senthil Siemens Industry, Inc.
Hari Singh Public Service Company of Colorado (Xcel Energy)
Jonathan Stahlhut..... TransCo Energy, LLC
Muhammad Tayyab Western Area Power Administration
Patrick Truong..... Sacramento Municipal Utility District
Maggie Watkins..... U.S. Army Corps of Engineers-Seattle District
George Zhou..... S&C Electric Company

Others in Attendance

Muthanna Abusbeaa..... British Columbia Hydro and Power Authority
Eric Bahr..... NorthWestern Energy
Dirk Barton..... Public Service Company of New Mexico



Jeff Bloemink Powertech Labs
Maya Brimhall..... WECC
Gregory Brooks..... US Army Corps of Engineers
Jared Campbell Electrical Consultants, Inc.
Malati Chaudhary Public Service Company of New Mexico
Alejandro Conti..... Mitsubishi Electric Power Products, Inc.
Enoch Davies WECC
Hasala Dharmawardena North American Electric Reliability Corporation
Zerui Dong OPAL-RT Technologies Inc.
William Dull..... U.S. Army Corps of Engineers-Walla Walla District
Tony Faris Bonneville Power Administration
Neil Flodin..... Puget Sound Energy, Inc.
Ningchao Gao..... National Renewable Energy Laboratory
Jack Gibfried North American Electric Reliability Corporation
Philip Hart GE Vernova (GE Energy Consulting Group)
Nick Hatton..... WECC
Eric Heredia Bonneville Power Administration
Eric Hy Los Angeles Department of Water and Power
Prasuna Katta..... Public Service Company of New Mexico
Ilhan Kocar..... DlgSILENT North America Inc.
Sam Li British Columbia Hydro and Power Authority
Shanna Love Salt River Project
Richard Maguire Electrical Consultants, Inc.
Mehrdad Majidi San Diego Gas and Electric
Ron Marlow Salt River Project
Caroline Marzinik PowerWorld Corporation
Elliott Mitchell-Colgan..... Bonneville Power Administration
Amir Mohammednur..... Southern California Edison Company
Ram Nath Siemens Industry, Inc.
Quan Nguyen Pacific Northwest National Laboratory
Shawn Patterson..... U.S. Bureau of Reclamation
Ebrahim Rahimi California Independent System Operator
Ricardo Rodriguez..... El Paso Electric Company
Andreas Schmitt..... Bonneville Power Administration
Edward Shepel..... WECC
Ailin Sun Southern California Edison Company
Sushrut Thakar Electric Power Research Institute
John Undrill Independent Subject Matter Expert
Oguzhan Ustundag Siemens Industry, Inc.
Jerod Vandehey Public Utility District No. 1 of Cowlitz County
Giritharan Vijay Iswaran..... Arizona State University
Quincy Wang..... British Columbia Hydro and Power Authority

Michael Xia Powertech Labs, Inc.
Yuguang Xiao British Columbia Hydro and Power Authority
Armando Yanez Peralta Salt River Project
Chuanjiang (Chelsea) Zhu National Grid USA Service Company, Inc.
Songzhe Zhu Qualus, LLC
David Zirbel PGR
Scott Zuloaga Electric Reliability Council of Texas