

## **1. Welcome, Call to Order, Introductions**

Song Wang, Modeling and Validation Subcommittee (MVS) Chair, called the meeting to order at 9:03 a.m. on August 24, 2020. A quorum was present to conduct business. A list of attendees is attached as Exhibit A. Mr. Wang asked attendees to introduce themselves.

## **2. Review WECC Antitrust Policy**

Doug Tucker read aloud the WECC Antitrust Policy statement. The meeting agenda included a link to the posted policy.

## **3. Approve Agenda**

Mr. Wang introduced the proposed meeting agenda.

**By consensus, the MVS approved the agenda.**

## **4. Review and Approve Previous Meeting Minutes**

Rachel Smith, Administrative Assistant, introduced the minutes from the meeting on April 20, 2020.

**On a motion by Pouyan Pourbeik, the MVS approved the minutes from April 20, 2020.**

## **5. Review of Previous Action Items**

Mr. Tucker reviewed action items carried over from the MVS meeting on April 20, 2020. Action items that are not closed and will be carried forward can be found [here](#).

## **6. MVS Folder on WECC Website**

Mr. Wang reviewed the MVS WECC website accordions and discussed how to better organize the posted documents.

## **7. Modeling Priorities**

The MVS members discussed the need to compile all the updating and proposed models into a single prioritized list.

## 8. PRC-026 Generic Relay

Songzhe Zhu, California Independent System Operator (CAISO), reviewed the PRC-026 generic relay and discussed potential additions to the relay model including a way to filter out messages and notifications.

## 9. MOD-33 Update

Licheng Jin, CAISO, gave a presentation on the MOD-33 updates.

The presentation is posted to the [WECC website](#).

## 10. Program Updates

Juan Sanchez-Gasca, GE Energy Consulting Group (GE), reviewed the progress of PSLF program updates, tests, and implementation. GE is on track with these updates.

Jay Senthil, Siemens Energy, Inc., gave a presentation on the PSSE updates.

The presentation is posted to the [WECC website](#).

Jamie Weber, PowerWorld Corporation (PWC), reviewed the PowerWorld program updates including IEEE model testing and the benefits of the users to find and fix software issues.

Pouya Zadehkhosht, Powertech Labs, gave a presentation on TSAT program updates including the WECC MVS model development effort and IEE 421.5 standard models.

The presentation is posted to the [WECC website](#).

## 11. Load Modeling

Andres Schmitt, Bonneville Power Administration (BPA), and Bo Gong, Salt River Project (SRP), gave a presentation on the Load Model Sensitivity and Validation Studies including the Hassayampa Event Validation.

The presentation is posted to the [WECC website](#).

Kannan Sreenivasachar, NERC, gave a presentation on the NERC Load Modeling Task Force (LMTF) activities including the composite load model field test in the Eastern Interconnection.

The presentation is posted to the [WECC website](#).

Irina Green, CAISO, gave a presentation on transient voltage recovery criteria and studies using the WECC criteria. The MVS members discussed the efficacy of the criteria and whether it applies more to modeling than reality.

The presentation is posted to the [WECC website](#).



Parag Mitra, Electric Power Research Institute (EPRI), gave a presentation on the Load Model Sensitivity Studies.

The presentation is posted to the [WECC website](#).

Tony Faris, BPA, gave a presentation on the load composition update including feeder composition, electrification, building models, input data, and the software data flow.

The presentation is posted to the WECC website.

Shengnan Shao, Pacific Gas and Electric Company (PG&E), gave a presentation on behind the meter distributed energy resources (DER) forecast and modeling in PG&E.

The presentation is posted to the [WECC website](#).

Nan Duan and Junbo Zhao, Lawrence Livermore National Laboratory, gave a presentation on the development update on the load sculptor, a tool for dynamic load modeling and uncertainty quantification.

The presentation is posted to the [WECC website](#).

Nicholas Hatton, System Stability Engineer, gave a presentation on the current status of “load type” load model in the WECC base case.

The presentation is posted to the [WECC website](#).

Anish Gaikwad, EPRI, gave a presentation on composite load model specification.

The presentation is posted to the [WECC website](#).

## 12. Renewable Energy Modeling

Pouyan Pourbeik, Power and Energy, Analysis, Consulting and Education, PLLC (PEACE), presented the memo of RES modeling updates.

The document is posted to the [WECC website](#).

Deepak Ramasubramanian, EPRI, gave a presentation on the updated REGC\_B and REEC\_D models.

**On a motion by Rajat Majumder, the MVS approved the models REGC\_B and REEC\_D.**

The presentation is posted to the [WECC website](#).

Songzhe Zhu, CAISO, presented the white paper on hybrid power plant of renewable energy and battery energy storage system.

**On a motion by Pouyan Pourbeik, the MVS approved the white paper.**

The whitepaper is posted to the [WECC website](#).



Mr. Pourbeik gave a presentation on utilizing the RERC\_B model.

The presentation is posted to the [WECC website](#).

Mr. Pourbeik demonstrated the reec\_b model with Mr. Wang.

Mr. Pourbeik gave a presentation on the concept of generic <<EMT>> models for RES.

The presentation is posted to the [WECC website](#).

Mr. Tucker reviewed the first-generation renewable model in the WECC base case.

Elliot Mitchell-Colgan, BPA, gave a presentation on wind plant model validation at BPA.

The presentation is posted to the [WECC website](#).

### 13. Power Plant Modeling

Quincy Wang, British Columbia Hydro and Power Authority (BCH), gave a presentation on the GENQEC model vee curve and Kw factor.

The presentation is posted to the [WECC website](#).

Sam Li, BCH, gave a presentation on GENQEC model system studies.

The presentation is posted to the [WECC website](#).

Mohamed Elkhatib, S&C Electric Company (S&C), gave a presentation on GENQEC model benchmarking.

The presentation is posted to the [WECC website](#).

Shawn Patterson, US Bureau of Reclamation, followed up on the integration plan for the excitation model including next steps for integration into the data sets.

Steve Yang, BPA, reviewed the Power Plant Model Validation and Data Work Group (PPMVDWG) survey results.

The results are posted to the [WECC website](#).

### 14. Active Transmission System Modeling Update

Mr. Pourbeik gave a presentation on the chvdc2 update and DC models in the WECC master dynamic file.

The presentation is posted to the [WECC website](#).

Bruno Leonardi and Alberto Del Rosso, EPRI, reviewed their experience with using chvdc2 in an <<EI>> study.

The presentation is posted to the [WECC website](#).



Mr. Pourbeik gave a presentation on hybrid STATCOM modeling.

The presentation is posted to the [WECC website](#).

## 15. Review Approved Dynamic Model List

Mr. Tucker reviewed the unapproved model list in the WECC master dynamic file.

The list is posted to the [WECC website](#).

## 16. Public Comment

No comments were received.

## 17. Review of New Action Items

- Create priority list for all models proposed and under development.
  - Assigned To: Song Wang and Pouyan Pourbeik
  - Due Date: November 12, 2020
- Draft a summary document of all the 2nd generation RES models.
  - Assigned To: REMWG
  - Due Date: November 12, 2020
- Update the whitepaper on converting REEC\_B to REEC\_D.
  - Assigned To: Songzhe Zhu
  - Due Date: November 12, 2020
- Write a benchmarking testing plan for the power flow control and droop control.
  - Assigned To: Jamie Weber
  - Due Date: November 12, 2020
- Find out if PPMVDWG can have closed session meetings.
  - Assigned To: Doug Tucker
  - Due Date: November 12, 2020
- Rerun the micro-WECC case comparing the ABB user-written model to the chvdc2 parameterized model with the DC-Line dynamics disabled (i.e. set line capacitance in the power flow case to zero).
  - Assigned To: Sergey Pustovit
  - Due Date: November 12, 2020
- Try the newly parameterized chvdc2 model for PDCI on a stressed WECC base case in GE PSLF and Siemens PIT PSSE and report back to the group.
  - Assigned To: Song Wang and Dmitry Kosterev
  - Due Date: November 12, 2020
- Get a model specification document on the newly proposed SVSMO4 model.
  - Assigned To: Pouyan Pourbeik



- Due Date: November 12, 2020
- Have beta version of the vhwcd1 model completed by March 2021 and ready for benchmark testing.
  - Assigned To: Software vendors
  - Due Date: November 12, 2020

## **18. Upcoming Meetings**

## **19. Adjourn**

Mr. Wang adjourned the meeting without objection at 12:58 p.m.



## Exhibit A: Attendance List

### Members in Attendance

Bajarang Agrawal ..... Arizona Public Service Company  
Hassan Baklou..... San Diego Gas and Electric  
Zak Baumann .....Salt River Project  
Ken Che..... Public Utility District No. 1 of Snohomish County  
Jonathan Cichosz ..... Portland General Electric Company  
Roberto Favela ..... El Paso Electric Company  
Irina Green.....California Independent System Operator  
Bo Gong.....Salt River Project  
Aaron Hancock ..... Tucson Electric Power  
My-Quan Hong..... Southern California Edison Company  
Eric Hy ..... Los Angeles Department of Water and Power  
Robert Jones..... Seattle City Light  
Gordon Kawaley.....Bonneville Power Administration—Transmission  
Lesley Kayser-Sprouse..... Hetch Hetchy Water and Power  
James Keller .....Western Area Power Administration - Rocky Mountain Region  
Barrie Kokanos..... Schweitzer Engineering Laboratories, Inc.  
Dmitry Kosterev .....Bonneville Power Administration—Transmission  
John Q. Martinsen..... Public Utility District No. 1 of Snohomish County  
Erik Olson ..... Puget Sound Energy, Inc.  
Shawn Patterson ..... US Bureau of Reclamation  
Pouyan Pourbeik ..... Power and Energy, Analysis, Consulting and Education, PLLC  
Sergey Pustovit ..... Bonneville Power Administration  
Juan Sanchez-Gasca..... GE Energy Consulting Group  
Amanuel Selassie ..... Los Angeles Department of Water and Power  
Jayapalan (Jay) Senthil ..... Siemens Energy, Inc.  
Spencer Tacke..... Modesto Irrigation District



Chifong Thomas ..... Smart Wires Inc.  
Song Wang.....PacifiCorp  
Jeffery Watkins.....NV Energy  
Xiaofei (Sophie) Xu..... Pacific Gas and Electric Company  
Xiaokang Xu ..... S&C Electric Company  
Steve Yang .....Bonneville Power Administration—Transmission

**Members not in Attendance**

Casey Baker .....NV Energy  
Eric Bakie .....Idaho Power Company  
Ben Brownlee ..... Energy Strategies  
Desmond Chan ..... Seattle City Light  
Dennis Chesnakov .....Public Utility District No. 2 of Grant County  
Wonbae Choi..... Power System Consultants, Inc.  
Alex Chua ..... Pacific Gas and Electric Company  
Tuan Dang .....Puget Sound Energy, Inc.  
Ben Davis ..... Vestas  
Chris Effiong ..... Western Area Power Administration  
Abraham Ellis.....National Nuclear Security Administration - Sandia National Laboratories  
Kathy Estrada..... Pacific Gas and Electric Company  
Xiaoyuan Fan..... Pacific Northwest National Laboratory  
Jennifer Galaway .....Portland General Electric Company  
William Gibson ..... Hetch Hetchy Water and Power  
Allison Hidalgo..... US Bureau of Reclamation  
Hamody Hindi.....Bonneville Power Administration—Transmission  
Siraji (Sam) Hirsi..... Bonneville Power Administration  
Robert Jenkins ..... Flynn Resource Consultants, Inc.  
Brendan Kelly..... Smart Wires Inc.  
Linda Kubo ..... Los Angeles Department of Water and Power





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May Le.....Public Utility District No. 2 of Grant County  
Xi Lin ..... Powertech Labs, Inc.  
Saw Linn ..... Los Angeles Department of Water and Power  
Hongtao Ma.....North American Electric Reliability Corporation  
Peter Mackin..... GridBright, Inc.  
Ron Markham ..... Pacific Gas and Electric Company  
Caroline Marzinzik..... PowerWorld Corporation  
Monte Meredith ..... Utility System Efficiencies, Inc.  
Amir Mohammednur..... Southern California Edison Company  
Avinash Narava ..... Tucson Electric Power  
Ram Nath ..... Siemens Energy, Inc.  
James O'Brien ..... Pacific Northwest National Laboratory  
Mark Pigman..... Tacoma Power  
Chris Pink ..... Tri-State Generation and Transmission—Reliability  
Nathan Powell..... Deseret Generation & Transmission Cooperative  
Gerardo Pulido..... El Paso Electric Company  
Ryan Quint ..... North American Electric Reliability Corporation  
Matin Rahmatian ..... Power System Consultants, Inc.  
Ramu Ramanathan ..... Maxisys, Inc.  
Daniel Ramirez..... Energy Strategies  
Alistair Rennie..... Salt River Project  
David Roop..... Mitsubishi Electric Power Products, Inc.  
Slavomir Seman ..... Vestas  
Karim Shaarbafi ..... Alberta Electric System Operator  
Hari Singh.....Public Service Company of Colorado (Xcel Energy)  
Jonathan Stahlhut ..... TransCo Energy, LLC  
Khanh Thai ..... Tacoma Power  
Jade Thiemsuwan ..... Sempra Renewables Services, Inc.



Chad Thomson..... Utility System Efficiencies, Inc.  
Patrick Truong ..... Sacramento Municipal Utility District  
John Undrill..... Independent Subject Matter Expert  
Zhaoyu Wang.....Iowa State University  
Chong Wang.....Iowa State University  
Jianhui Wang.....Southern Methodist University  
Jonathan Wedeen..... Los Angeles Department of Water and Power  
David Wiley..... Arizona Public Service Company  
Scott Wilson.....Avista Corporation  
Janice Zewe..... Sacramento Municipal Utility District  
Dongbo Zhao..... Argonne National Laboratory

**Others in Attendance**

Shahrokh Akhlaghi ..... Southwest Power Pool  
Angel Aquino..... PowerWorld Corporation  
Marcos Ayala..... Pacific Gas and Electric Company  
Wes Baker .....Electric Power Research Institute  
Sina Baghsorkhi ..... Juwi Inc.  
Anna Beus.....  
Tony Bilello.....  
Jeff Bloemink .....  
Mickie Cassady ..... Bonneville Power Administration  
Malati Chaudhary.....Public Service Company of New Mexico  
Baus Dev .....  
Nan Duan.....  
Evangelos Farantatos ..... Electric Power Research Institute  
Tony Faris ..... Bonneville Power Administration  
Antonio Franco ..... Gridforce Energy Management, LLC  
Reza Goldoost .....



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Aboutaleb Haddadi.....Electric Power Research Institute  
Nicholas Hatton.....WECC  
Daniel Hauge ..... Bonneville Power Administration  
Licheng Jin..... RC West  
Brandon Johnson .....Avangrid Renewables  
Robert Jones..... Seattle City Light  
Brian Keel.....Salt River Project  
Brett Kelly ..... Sacramento Municipal Utility District  
Sam Li.....  
Shanna Love .....Salt River Project  
Kristian Lund ..... Powertech Labs Inc.  
Olushola Lutalo ..... NERC  
Richard Maguire.....Avista Corporation  
Rajat Majumder..... Siemens Energy, Inc.  
Akhil Mandadi..... Arizona Public Service Company  
Cesar Martinez.....  
Megan Miller.....  
Elliott Mitchell-Colgan..... Bonneville Power Administration  
Ali Mohammadpour ..... Tesla Energy  
Saurav Mohapatra ..... PowerWorld Corporation  
Deepak Ramasubramanian .....Electric Power Research Institute  
Shruti Rao ..... GE Energy Consulting Group  
Andreas Schmitt .....Bonneville Power Administration—Transmission  
Prabal Singh..... Sacramento Municipal Utility District  
Rachel Smith.....WECC  
Kannan Sreenivasachar.....  
Rui Sun.....PG&E  
Diwaker Tewari .....



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Shilpa Toppo ..... Mitsubishi Electric Power Products, Inc.  
Doug Tucker.....WECC  
Oguzhan Ustundag .....  
Xiaoyu Shawn Wang..... Electric Reliability Council of Texas  
Jamie Weber ..... PowerWorld Corporation  
Pouya Zadkhast ..... Powertech Labs, Inc.  
Gang George Zheng ..... GE Energy Consulting Group  
Yu Zhang .....  
Junbo Zhao .....  
Chelsea Zhu..... National Grid USA Service Company, Inc.  
Songzhe Zhu.....California Independent System Operator  
Jonathan ..... Electric Reliability Council of Texas

