

1. Welcome, Call to Order

Tom Carr, Studies Subcommittee (StS) Chair, called the meeting to order at 1:05 p.m. MT on June 26, 2023. A quorum was present to conduct business. A list of attendees is attached as Exhibit A.

2. Review WECC Antitrust Policy

Jon Jensen, Engineer Reliability Modeling, read aloud the WECC Antitrust Policy statement. The meeting agenda included a link to the posted policy.

3. Approve Agenda

Mr. Carr introduced the proposed meeting agenda.

On a motion by Karen Reedy, the StS approved the agenda.

4. Review and Approve Previous Meeting Minutes

Mr. Carr introduced the minutes from the meeting on February 27, 2023.

The StS minutes were amended as follows:

- “grid forming” event to “grid frequency” event.
- “low impact” to “load level”.

On a motion by David Le, the StS approved the amended minutes from February 27, 2023.

5. Review Previous Action Items

There were no previous action items.

6. New Vice-Chair Nomination

Mr. Jensen publicly acknowledged Thomas Carr as the Chair of the StS. The StS is now accepting nominations to fill the vice chair vacancy. Please contact Thomas Carr or WECC staff if interested.

7. New StS Liaisons

There will be a change in liaisons for the StS. New StS liaisons are under review. Mr. Jensen is the liaison for the Production Cost Data Subcommittee (PCDS).

8. Path Task Force Recommendations

Matt Veghte, Pattern Energy Group, LP presented on the Path Task Force (PTF) recommendations. Hari Singh was his co-chair during this process. This task force was created to clarify best practices. This task force posted a final report on the WECC website.

The WECC PTF recognized changes in the industry on operations and the planning. This task force is looking for StS participation.

The first recommendation was to help bring stakeholders to the table. The second recommendation was for WECC retirement of different entities in the industry.

Mr. Singh, Public Service Company of Colorado (Xcel Energy), stated this task force decided it was best to assign the job of identifying processes to the StS committee.

Peter Mackin, GridBright, Inc. stated this is a modification to the Path Rating Process.

Mr. Carr stated this topic may come to a vote at a future StS meeting.

David Le, California Independent System Operator stated the StS should obtain information on what started these recommendations.

Mr. Carr will ask the StS to make a recommendation. This recommendation consists of setting up a new task force at a future StS meeting to discuss the two merging ideas.

Mr. Le stated there should be a presentation from The Path Task Force at a future meeting.

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

9. 2023 Annual Progress Report

The 2023 Annual Progress Report was amended as follows:

- “project name” changed to “entity name.”

On a motion by Peter Mackin, the StS approved the 2023 Annual Progress Report.

Approval Item: Annual Progress Report

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



10. RRC Risk Process

Tim Reynolds, Manager Risk Analysis presented on the Reliability Risk Committee (RRC) Risk Process. The RRC meets June 28, 2023 and will be providing a list of risks for review. These risks will cause departments to focus more on their Three-Year Work Plans.

11. 2023 Study Program Update

Tyler Butikofer, Senior Engineer Reliability Assessments, presented on the Year 10 Extreme Cold Event study. This study attempts to show how cold weather affects generator availability. Mr. Butikofer reviewed the study, timeline, scope, assumptions, and results. The group provided feedback and observations; Mr. Butikofer will include this information in the report where applicable.

Mr. Carr noticed the impact of cold weather in the northern part of the country. Mr. Butikofer will add Mr. Carr's observations to his report.

Mr. Le asked whether this study will run again after discussion with Hitachi on battery storage. Mr. Butikofer has already been in contact with Hitachi, and they do not have a response yet. Mr. Le suggested including this in Mr. Butikofer's report. Mr. Butikofer will add this to his report.

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

Bhavana Katyal, Senior Engineer presented on the Year 20 Extreme Heat Assumptions. She discussed the impact of extreme heat for 20 years into the future. This will be business as usual. It occurred during the months of June through August. The year 2020 had the highest heat loads.

Ms. Katyal has not made any predictions for the next 20 years. These load modifiers were developed as a comparison to the probabilistic forecast for 2020.

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

Mr. Jensen presented on the Year 20 Extreme Cold. He presented on the WECC updates and contributors to this event. There were Year 20 assessments establishing a foundational case as a starting point.

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

Katie Rogers, Senior Engineer Reliability Assessments, presented on the Year 20 Compound Load Impacts study. Ms. Rogers discussed the timeline for the project. She will publish this study in February 2024. The focus will be on electrification looking at buildings and transportation. The 2018 shapes in the Anchor Data Sets (ADS) are for this study.

Ms. Rogers used the standard scenarios, and these scenarios are not for use in this study.



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

Doug Tucker, Senior Engineer Reliability Assessments, presented on the Grid-Forming Inverters study. It was a high-wind generation case. The inertia was high at 3:00 a.m. They wanted to replace the synchronous generator with either GFL or GFM. The GFL added more grid-forming generation. There will be an updated report published in October 2023.

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

Tyson Niemann, Staff Engineer Reliability Modeling, presented on the Changes in Grid Strength study. The increase of inverter-based resources (IBR) in the system is under review. Mr. Niemann stated that base cases are not for this study.

Mr. Mackin will email Mr. Niemann a sample table listing voltages.

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

12. UFLSWG Update

Robby Anderst, Puget Sound Energy, Inc., updated the StS committee on the Underfrequency Load Shedding Work Group (UFLSWG), specifically, the Generator Priority Requests. On July 1, 2023, WECC is reviewing submittals and updating the Master Dynamics file. The PCs will assign units for tripping and remaining online during simulation. The UFLSWG is starting these assessments August 1, 2023.

13. Public Comment

No comments were made.

14. Review New Action Items

- Give another presentation on approving PTF recommendations.
 - Assigned To: StS
 - Due Date: August 21, 2023
- Discussion of future GMV studies.
 - Assigned To: StS
 - Due Date: August 21, 2023

15. Upcoming Meetings

August 21, 2023, 1:00–5:00 p.m. Virtual
October 16, 2023, 1:00–5:00 p.m. Virtual



16. Adjourn

Mr. Carr adjourned the meeting without objection at 4:40 p.m.



Exhibit A: Attendance List

Members in Attendance

Robby Anderst Puget Sound Energy, Inc.
Brenna Andrews NorthWestern Energy
Shawn Carlson Basin Electric Power Cooperative
Thomas Carr Western Interstate Energy Board
Ken Che Public Utility District No. 1 of Snohomish County
Jonathon Flores Los Angeles Department of Water and Power
Chris Gilden Tri-State Generation and Transmission—Reliability
Talal Hanna San Diego Gas and Electric
Jon Jensen WECC
Lesley Kayser-Sprouse Hetch Hetchy Water and Power
May Le Public Utility District No. 2 of Grant County
David Le California Independent System Operator
Todd Lichtas Tucson Electric Power
Peter Mackin GridBright, Inc.
Mitchell Miller NorthWestern Energy
Eepsita Priye Puget Sound Energy, Inc.
Ebrahim Rahimi California Independent System Operator
Dipendra Rai British Columbia Hydro and Power Authority
Karen Reedy Public Service Company of New Mexico
Alejandro Solis El Paso Electric Company
Angela Tanghetti California Energy Commission
Xiaofei (Sophie) Xu Pacific Gas and Electric Company
Cole Youngers Avista Corporation
Jake Maxfield PacifiCorp

Members not in Attendance

Nayeem Mohammad Abdullah Metropolitan Water District of Southern California



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Waseem Arif..... FortisBC, Inc.

Philip Augustin..... Salt River Project

Vinson Banh Alberta Department of Energy

Ian Beil..... Portland General Electric Company

Scott Beyer Western Power Pool

Aseem Bhatia..... California Department of Water Resources

Benjamin Borowiak Arizona Electric Power Cooperative, Inc. (Arizona G&T Cooperatives)

Ron Calvert..... Utility System Efficiencies, Inc.

David Cathcart..... Bonneville Power Administration—Transmission

Desmond Chan Seattle City Light

Tom Christensen..... Basin Electric Power Cooperative

Patrick Corrigan..... Public Service Company of Colorado (Xcel Energy)

Tuan Dang Public Utility District No. 1 of Snohomish County

Thomas Duane Public Service Company of New Mexico

Thomas Flynn..... California Energy Commission

Alex Fratkin..... NV Energy

Jeff Hanson Colorado Springs Utilities

Fred Heutte..... NW Energy Coalition

Bryant Hicks..... Salt River Project

Bill Hosie..... PSI Power System Innovation Corp.

Robert Jackson..... Burns & McDonnell (1898 and Co.)

Daniel Johnson Jr. Black Hills Corporation

Michael Korhonen Western Area Power Administration

Christopher Kulink..... Portland General Electric Company

Chelsea Loomis Western Power Pool

Richard Maguire Public Utility District No. 2 of Grant County

Daniel McGuire..... Salt River Project

Christopher McLean..... California Energy Commission



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Pete Mensonides Turlock Irrigation District
Patrick MontPlaisir Western Area Power Administration
Valeriy Oleshko Jr Western Area Power Administration
Daniel Ramirez Energy Strategies
Benjamin Rodriguez El Paso Electric Company
Faranak Sarbaz Los Angeles Department of Water and Power
Erik Schellenberg Idaho Power Company
Masoud Shafa California Department of Water Resources
Amy Sopinka British Columbia Ministry of Energy and Mines
Jan Strack San Diego Gas and Electric
Spencer Tacke Auriga Corporation
Khanh Thai Tacoma Power
Chifong Thomas Thomas Grid Advisor
David Tovar El Paso Electric Company
Patrick Truong Sacramento Municipal Utility District
Louis Vigil El Paso Electric Company
Jeremy Webber FortisBC, Inc.
Curtis Westhoff Idaho Power Company
Di Xiao Southern California Edison Company
Dennis Yegorov PacifiCorp
Janice Zewe Sacramento Municipal Utility District
Kevin Zhang British Columbia Hydro and Power Authority
Wenjuan (Wendy) Zhang Pacific Gas and Electric Company

Others in Attendance

Glenn Blackmon Washington Department of Commerce—State Energy
Tyler Butikofer WECC
Lakmal Chanfrasekara Turlock Irrigation District
Jyotsna Chatrati NV Energy



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Drew Cox Guidehouse Consulting (formerly Navigant Consulting, Inc.)
Arkadeept Das WECC
Enoch Davies WECC
David Frederick Z Global Inc.
Richard Marrs Qfuantum Planning Group
Nima Miri Seattle City Light
Tyson Niemann WECC
Emily Parry Public Utility District No. 1 of Snohomish County
Brian Rahman Z Global Inc.
Tim Reynolds WECC
Katie Rogers WECC
Amanda Sargent WECC
Gary Simonsen PacifiCorp
Hari Singh Public Service Company of Colorado (Xcel Energy)
Marie Smith WECC
Doug Tucker WECC
Matt Veghte Pattern Energy Group, LP
Song Wang Portland General Electric Company
Rashid Warsame Bonneville Power Administration
Ken Wilson Western Resource
Jonathan Young Bonneville Power Administration

