



Resource Adequacy Subcommittee (RASC)

Carmel, IN

July 10, 2024

10:00 am – 4:00 ET / 9:00 – 3:00 pm CT

Dial-in and Webex information available at www.misoenergy.org

Minutes

1. Administrative Items (Werner Roth)

a. Call to Order / Roll Call

Meeting called to order at 10:00 am ET.
The Public Meeting Notice was issued.

Chair: Werner Roth
Vice Chair: Trey Mayeux
MISO Liaison: Durgesh Manjure
Stakeholder Relations: Amanda Jones

In Person Participants:

Aaron Martin, CMS	Jacob Strauss, MN PUC	Michaela Flagg, CES
Art Iler, IN OUCC	James Dauphinais, RASC	Rebecca Moore-Darrah, WVPA
Brenda Prokop, CES	Jeffery Kelley, Nipsco	Robert Kosner, IMEA
Brent Reyher, RASC	John Reinhart, GRE	Sean Shafer, Voltus
Bryan Garnett, DUKE	John Wachtler, MN PUC	Theodore Kuhn, CES
Dave Johnston, IURC	Kyle Brouillette, APPA	Thomas Weeks, MPPA
David Ricketts, Vistra	Lauren Schuettler, WVPA	Trey Mayeux, RASC
David Sapper, CAS	Lise Trudeau, MN PUC	Warren Hess, CMP
Eric Thoms, Invenergy	Michael Fischette, LBWL	Werner Roth, PUCT
Erin Schlick, Next Era	Michael Schowalter, Fresh Energy	
Ginger Hodge, CES		

Remote Participants:

Abigail Reid, WPPI	Bill Booth, Michael Best	Colin Buckley, Potomac
Adam Moritz, CMS	Bill Raihala, Xcel	Collin Cain, Bates White
Adam Renfandt, NDSG	Bill Turnbull, MEC	Collin Dettmann,
Alan Mok, Duke	Bipin Balar, NIPSCO	Connie Groh, Liskey PLLC
Alan Mok, Duke	Bob German, DTE	Connie Szeto, Orsted
Alan Neal, Cooperative Energy	Brad Pope, OMS	Conor McKenzie, Advanced Energy United
Alyssa Cooper, Entergy	Brenda Harris, OXY	Cory Hetchler, Connex
Amber Joyce, MDU	Brian Callanan, MEC	Dan Martin, DPC
Amber Langemo, MPC	Brian Giggee, MDU	Daniel Boratko, Entergy
Andrew Taylor, Duke	Brock Ondayko, AEP Energy	Daniel Dyck, MB Hydro
Andy Kowalczyk, SREA	Bruce Grey, Samsung	Darrell Newcomer, CMS
Anita Collier, ACES	Cameron Elias, MEC	Darren Kearney, SD PUC
Ann Coultas, Cordelio Power	Carrie Bellamy,	Dave Evenson, GRE
Anna Sommer, Energy Futures	Carrie Milton, Potomac	Dave Harlan, Veriquest
Annette Holst, MEC	Casey Harding, MEC	Dave Sandefur,
Annie Minondo, NRDC	Chad Hanson, CMPAS	Dave Stolz, Hoosier Energy
Arash Ghodsian, Invenergy	Chad Herrick, CIPCO	David, NB Group
Art Iler, IN OUCC	Charles Shi, ICF	David Brauch, Peregrine
Ashtin Massie, RMI	Chip Estes,	David Carlson, IGS
Austin Hoekman, MRES	Chris Norton, AMP	David Davis, Apex
Bakhtawar Khan, Gabel	Chris Riley, DPC	David Johnston, IURC
Barton Norfleet, PSC MS	Christian Bernardi, Potomac	David Ricketts, Vistra
Ben Abing, ITC	Christopher Plante, WEC	David Sapper, CGA
Ben Arney, DTE	Christopher Moody, Entergy	David Savage, IURC
Ben Kaldunski, Xcel	Cicily McGee, AR PSC	



David Webb, Entergy
Dean Lee, OTP
Demeter, CWP Energy
Dennis Kimm, MEC
Deral Danis, Pattern
DeWayne Todd,
Diane Kearney, Potomac
Dino Vivanco, ICF
Doug Price,
Dylan Stockert, MDU
EJ White, NIPSCO
Emily McClure, ICC
Eric Smith, Avant Energy
Eric Thoms, Invenergy
Erica Miller, Potomac
Erik Hanser, MI PSC
Erika Ward, Consumers
Energy
Erin Buchanan, Xcel
Frederick Salvo, Baker
Donelson
Gertrude Rivera, Entergy
Greg Rislov, SD PUC
Greg Weiss, Ameren
Heather Evans, Duke
Henry Chu, DPC
Hussein Ali, Qcells
Ian Bowen, ICF
Jaden Zurn, PSCW
Jamie Niccolls, Alliant Energy
Jamie Watts, Long Law
Jason Fogarty, Potomac
Jason Mazigian, BEPC
Jay Rasmussen, Duke
Jeff Berg, Ameren
Jeff Kelley, NIPSCO
Jeff Wernert, The Prime Group
Jennifer Vosburg, Jennifer J.
Vosburg, LLC
Jeremi Wofford,
Jeremi Wofford, Ameren
Jeremy Jones, Entergy
Jeremy Martin, CenterPoint
Energy
Jim Holsclaw, Calfee
Jim Sherman, DPC
Joan Soller, WVPA
Jodi Walters, EDP Renewables
Joe Kingery, BEPC
John Bott, IMPA
John Hare, Hare Soft
John Liskey, Liskey PLLC
John Orr, Constellation
John Reinhart, GRE
John Wachtler, MN PUC
Jose Ruiz-Monroy, Hoosier
Energy
Julie Swisher, MEC
Justin McNeil, KY PSC
Justin Stewart, Ameren
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Karolanne Foley, DPC
Kathryn Dial, NextEra
Kavita Maini, MIC and MLEC
Keith Parrott, MPUA
Keith Pike, Duke
Ken Dell Orto, Entergy
Ken Kagy, CFU
Ken Schlinggen, DPC
Kenneth Weiland, Ameren
Kevin Cline, MEC
Kevin Kingsley, MDU
Kimberly Dunning, CenterPoint
Energy
Kristina Grandquist, MEC
Kristina Hubbell, MI PSC
Kurt Vanderlick, Cleco
Kyle Allen, SIPC
Kyle Watson, Entergy
Laine Greenwood, Alliant
Energy
Lane Sisung, SiSung
Laura Baker, SMXB Law
Laura Mitchum, TEA
Laura Weir, MI PSC
Laura Witzling, PSCW
Lauren Evans, PSC LA
Lauren Strager, ITC
Lisa Ehrichs, Duke
Lise Trudeau, MN PUC
Lucas Johnson, WPSCI
Luke Kinder, AR PSC
Luke Metcalf, Voltus
Malcolm Ainspan, NRG
Margaret Kristian, NGR
Margie Johnson, Karbone
Maria Serratos, Entergy
Mark Peters, Ameren
Mark Tiemeie, MRO
Mark Volpe, COMPP
Matt Engels, WPSCI
Matt King, GDS
Matthew Wyatt, MPW
Maxx Snell, MDU
Mayfield, Jason, Entergy
Meg Nguyen, Xcel
Melissa Seymour, Sun2o
Micah Bushnell, Prairie Power,
Inc.
Michael DeCuir, Entergy
Michael Fortini, ITC
Michael Krupa, Entergy
Michael Milligan,
Michael Saer, GRE
Michelle Bloodworth, Americas
Power
Michelle Lynch, Hoosier
Energy
Mike Marino, Potomac
Mike Mooney, Hoosier Energy
Mike Schowalter, Fresh Energy
Mohit Agrawal, NextEra
Natalie McIntire, CGA

Nate Elling, MN Power
Natisha Wilkerson, LBWL
Neil Hammer, MEC
Nicholas Lorenz, MPW
Nicolas Kumm, Marsh Fields
Utilities
Nina Sidhu, Esai Energy
Steve Dowll, Alcoa
Oliver Burke,
Peg Abbadini, HE
Peter Dotson-Westphalen,
Cpower Energy
Presley Reed, Dentons
Rachael Moore, CMS
Rachel Passman, Gabel
Rajat Pungaliya, Clearway
Raju Brahmandhabheri, ITC
Raquel Acosta, MI PSC
Rashmi Saurav, ICF
Ray McCausland, Ameren
Renee Colbert, DPC
Richard Gordon, Ameren
Rick Gillingham, Hoosier
Energy
Rick Liang, Cooperative
Energy
Robert Frank, NDSG
Robert Schmidt, Rainbow
Energy
Robert Thorson, MGE
Robert Vosberg, LPSC Staff
Consultant
Roberto Paliza, Paliza
Rodney Massman, PSC MO
Ron Franz, DPC
Ryan Davis, Rainbow Energy
Ryan Lowe, MB Hydro
Ryan Schmitt, NMPP
Ryan Wernette, WPSCI
Ryan Yeoman, MPSC
Sahabia Ahmed, Entergy
Sam Wendt, MEC
Sameer Doshi, Earth Justice
Sandeep Singh, ICF
Sarvesh Tiwari, ICF
Sean Shafer, Voltus
Shagun Parekh, ICF
Shaun Mohler, SMXB Law
Shelby Leisz, IPL
Sherian Krause, MEC
Srijan Karim, MEC
Sterling Passingham, Tenaska
Steve Dowell, Alcoa
Sunny Jansen, MEC
Taylor Carpenter, Calfee
Taylor Martin, Potomac
Temujin Roach, EDF
Terry Jarrett, Healy Law
Thomas Chamberlain, Entergy
Tia Elliott, Pelican Power
Tim Beddow, OTP
Tim Cervený, NMPP



TJ Cochran, Ameren
 TJ Duff, MEC
 Todd Komplin, WPPI
 Tom Butz, MN Power
 Tom King, WPSCI
 Tom McDonough, Xcel
 Tom Siegrist, SMXB Law
 Tony Salman, Duke

Travis Foster, MPUA
 Travis Stewart, Gabel
 Tricia Debleeckere, OMS
 Vinay Gupta, ICF
 Vince Vandaveer, Ameren
 Wade Warnecke, MEC
 Walt Cecil, PSC MO
 Warren Hess, CMPAS

Werner Roth, TX PUC
 Will Koebel, PSCW
 Wyatt Ellertson, Entergy
 Yao Wang, NextEra
 Zac Callen, ICC
 Zach Fjestad, OTP
 Zachary Callen, ICC

b. Review Agenda

Agenda accepted as posted.

c. Review Meeting Minutes / Action Items

Minutes for the May 22 meeting were accepted as posted. Action items from the previous meeting were reviewed:

Action Item	Owner	Date	Status
Action Items for RBDC: <ul style="list-style-type: none"> MISO will define how short each season should be to achieve CONE in each season. MISO also asked to re-run revised RBDC curves on a regional basis utilized across previous PRA data. 5/22/2024: Stakeholders asked MISO to expand this action item to include 2024/2025 PRA results as well Response: MISO is working on the request for August – This item will be closed with discussion of Item 07a on today’s agenda	MISO	8/22-23/2023	Closed
MISO was asked for strategy insights of how the various pieces of RA long range strategy fit together Response planned for August	MISO	4/17/2024	Open
Management Plan <ul style="list-style-type: none"> August: Add LOLE modeling enhancements: Storage Modeling 	RASC Leadership	5/22/2024	Closed
Feedback requests will be opened for: <ul style="list-style-type: none"> The LMR proposal problem statement (comments due by May 30) 	MISO	5/22/2024	Closed
Action Item: Summary comparison of other RTOs’ treatment of LMRs Response: Material is contained in posted presentation Item 06a	MISO	5/22/2024	Closed
In RRA study, how many total members were surveyed vs. how many responded? Response: MISO reached out to 51 members and 41 responded	MISO	5/22/2024	Closed

d. Management Plan Review

Updates to the management plan were posted in redline. The floor was opened to questions. A stakeholder noted the need to add LMR accreditation to Q4. Another stakeholder indicated that a group of stakeholders sent a list of their “open” DL0L methodology issues and questions to MISO for



consideration. The list largely reflects MISO's plans as well and will be reviewed internally. Davey Lopez noted that deliverability is scheduled for discussion with the RASC in August.

2. Status Updates ➡ (Werner Roth)

- a. Steering Committee (SC): Next meeting is August 8
- b. Loss of Load Expectation Working Group (LOLEWG): Next meeting is July 19
These groups have not met since their last reports to the RASC.

3. Liaison Report (Durgesh Manjure)

Durgesh provided highlights of his written liaison report, including:

- PRA Reminder Calendar 2024-25
- Workshops/General Announcements

4. MISO Posted Items ➡ (Durgesh Manjure)

- a. FERC Status Report
BPM changes for RBDC we'll expand on that later today and come back in August to address

5. New Issue: Capacity Accreditation for External Resources facilitated by HVDC Transmission ✓ (Andy Kowalczyk)

Andy presented on behalf of the Southern Renewable Energy Assoc. (SREA), summarizing their concerns to be addressed with the adoption of their recommended issue. He shared potential benefits and key questions to address (clearing prices, accreditation, LOLE). Several stakeholders shared their experience with a slice of system concept and the performance and usage of HVDC in the state of Minnesota. Andy explained approaches to HVDC and clearing price and asked, how should the transfer capability of HVDC be represented in LOLE analysis? Two follow up questions were proposed: 1) Should LOLE studies model the increased capability of resources utilizing the line based on the geographic location of the resources? 2) Should transfer capability/HVDC system performance be separate from generation profiles?

The RASC was asked to consider adopting this issue into the management plan; there was no opposition. This will be added to the management plan for future discussion.

6. Policy Items

a. LMR Reforms (RASC-2019-9)^ (Joshua Schabla)

Zak Joundi introduced the presentation, which was a continued discussion of Load Modifying Resource (LMR) reforms and review of MISO's consideration for a revised proposal. Based on stakeholder feedback, MISO has revised the Problem Statement and is working on a revised proposal. MISO is evaluating participation options that best match the capabilities of demand resources with system needs. A detailed design will be presented to the RASC in August. Testing requirements have been relaxed to one test or event per year per program. MISO will have robust stakeholder discussions on the LMR reform proposal prior to FERC Filing. Target filing date is pushed out to Q4 2024.

Over the past few years, MISO has focused on multiple Resource Adequacy reforms to improve pricing and accreditation in response to the Reliability Imperative, of which LMR reforms is a key initiative.

MISO has revised the problem statement and is working on revising its LMR reform proposal based on stakeholder feedback while taking into consideration historical performance of demand resources and its operational experience. (see slide 6 for problem statement). MISO acknowledged the need for robust stakeholder discussion of the proposal prior to a FERC filing and adjusted the target filing date to Q4 2024 (and will evaluate the feasibility based on progress over the next 3 months).

Joshua Schabla presented MISO's design considerations for LMR reforms as described on slides 7 and 8: 1) MISO is considering implementing two capacity only participation options for demand resources with no energy market payment for either one. 2) MISO is also considering changes to the accreditation of existing Demand Response Resource Type I and II options to ensure alignment across all participation models for Demand Resources. Demand Resources will have varying levels of response time and accreditation depending on the participation option chosen. Stakeholders asked



numerous clarifying questions and discussed some of their experiences with LMR performance. They were encouraged to provide detailed feedback responses that include examples of these experiences and performance. There was discussion of impacts on accreditation and capacity value. MISO will bring forward more information on accreditation proposal in the August meeting.

Joshua continued discussing MISO design considerations for reforms as reflected on slide 9 – 12: 3) improving registration, testing, auditing, and communication procedures; 4) aligning accreditation across all demand participation options; 5) considering eliminating all dual-registration options; and 6) the expected implementation date is 2028-2029 in line with other accreditation changes. He discussed the proposed testing framework criteria and process steps as well as proposed penalty provisions then answered stakeholder questions. Again, stakeholders were encouraged to provide detailed feedback about the design proposals and share experiences with operating current LMRs. A stakeholder asked about the LMR location enrollment tool being developed for PY 26-27; MISO was asked to confirm the implementation timeframe for this tool.

A feedback window on these following questions will be open through August 2, though earlier feedback submission is encouraged to help MISO consider the content and prepare responses.

- *What are your thoughts on the proposed participation options? For your Demand Resource and/or BTMG, if you have any concerns with the proposed participation options, please provide operating characteristics (with all relevant details) of your resource, and rationale for why the proposed participation options would not be feasible for your resource.*
- *Proposed testing criteria and procedure*
- *How should accreditation vary based upon response time?*
- *Which of the two options should be the “new” option and which should continue to carry the name, Load Modifying Resource?*

b. WPPI Motion on LMR Problem Statement √ (Todd Komplin)

Todd Komplin, speaking for WPPI, shared concerns that solutions were moving forward before the problem statement was well-defined. He provided WPPI's rationale for bringing a motion forward along with an alternative problem statement. The following motion was moved by Todd (WPPI) and seconded by Tom Weeks (MPPA). There was no formal discussion. Stakeholders requested a roll call vote via email ballot.

“The RASC supports the following Problem Statement: Explore and address as needed –

- *The gap between LMR availability and capacity cleared in the PRA MISO has been reporting*
- *The difficulty MISO Operators are having effectively using LMRs to address capacity emergencies*
- *MISO existing accreditation methods for LMRs to ensure that the accredited capacity value appropriately reflects each resource’s contribution toward resource adequacy”*

There was some discussion about what next steps MISO might take, which will be discussed further in the next meeting. Completed ballots will be posted and announced to the RASC following the meeting and must be returned by 5:00 pm ET on Wednesday, July 17, 2024.

c. LOLE Modeling Enhancements (Planned Outage Modeling) (Eduardo Ibanez)

Eduardo continued discussion that kicked off in Q1 with presentation of a list of planned initiatives focused on reviewing and updating the resource adequacy probabilistic model. MISO previously introduced discussion of how planned outage distribution across Resource Classes during critical hours may affect Resource Class-level UCAP. Key takeaways from the April RASC presentation were shown on slide 3. At that time, feedback was requested on the impact of maintenance on Resource-Class level UCAP and accreditation. Key themes from that feedback were shown on slides 5 and 6.

Eduardo shared the estimated impact of distribution of planned outages across different resource classes on Direct-Loss of Load (DLOL) accreditation. The impact of distribution of planned outages



across resource classes on class-level UCAP, based on current modeling practices, is non-substantive. However, there is room to further improve class-level UCAP calculations by post-processing model outputs. MISO is considering adoption of this revised methodology to refine class-level UCAP calculations.

Contribution of each resource class to the total pool of maintenance depends on the size of the class and its maintenance rates. Annual maintenance in the PY23-24 model was distributed as shown in the table on slide 7. Eduardo answered a few clarifying questions about the data. To measure the impact of maintenance in the DLOL calculations, accredited capacity can be calculated with and without maintenance. Results based on the PY23-24 model, depicted on slide 9, show the impact of maintenance during critical hours, primarily observed in spring and winter. Further clarifying questions were asked and answered on topics of outage scheduling, maintenance scheduling, model inputs, actual planned outages for 2023, and the connection between when outages are scheduled and accreditation values.

The split of maintenance during critical hours mimics the Resource-Class distribution of annual maintenance. The impact of maintenance on accreditation can be made to completely align with the distribution of annual maintenance. The Resource Class-level UCAP changes are minimal when these adjustments are considered.

In summary, impact of distribution of planned outages across resource classes on Resource Class-level UCAP, based on current modeling practices, is non-substantive. There is room to further improve Resource Class-level UCAP calculations by post-processing model outputs. MISO is considering adoption of this revised methodology to refine the Resource Class-level UCAP calculations.

7. Reliability Based Demand Curve (RBDC) (RASC-2019-8)

a. PRA Clearing with Indicative RBDCs (Neil Shah)

In response to an open action item, Neil shared results of PRA clearing with indicative RBDCs and reviewed seasonal shortage quantity (MWs). MISO simulated PRA clearing for PY23-24 and PY24-25 to estimate Auction Clearing Prices (ACP) with indicative RBDCs. The simulation with RBDCs indicates that clearing prices for Summer season are higher than those with the current vertical demand curve. Based on the indicative RBDCs developed in 2023 prior to the FERC filing in September 2023, on average 3,335 MW shortage is needed in a season to reach ACPs at seasonal CONE (or seasonal price cap). MISO will provide PY24-25 RBDCs in the next couple of months. Neil talked about the further analysis that MISO intends to provide for the next meeting and answered a couple of clarifying questions.

b. Implementation Status Update (Yong Jiang)

Yong presented a status update on the implementation of RBDC. Overall implementation is on target and the PRA timeline updated to accommodate RBDC requirements. RBDC related changes to BPM-011 will be presented in August for stakeholder feedback. Training and support will be provided to ensure stakeholder readiness for the PY2025-26 PRA. A timeline was shared on slide 3, indicating that development of MRI/RBDC curves is on target as well as PRA engine modifications and integration of MECT. The timeline on slide 4 showed the RBDC opt-out feature timeline. MRI curves will be reviewed with the LOLEWG on December 2. Preliminary RBDC curves will be posted around mid-January 2025. On slide 5, Yong outlined the BPM sections to be shared in August.

8. BPM-011 Annual Review^ (Yong Jiang)

- Yong shared a summary of redlined BPM updates. High level changes (non-RBDC) include continuous enhancements to improve process certainties for Seasonal Accreditation Capacity (SAC) calculation and process changes to better align with the seasonal construct. Yong talked about these sections in greater detail and noted that the redline BPM was posted with meeting materials. Stakeholders were asked to provide feedback by July 31. There were questions related to new outage exemption related resolution timeline, that MP may not be able to see their impact to accreditation before submitting resolution request. MISO responded that outage exemption should be validated at the time of outage



submission/modification, the same way as any other real time info being used in the accreditation process. There are further clarifications that MP can still submit other types of resolution requests between initial and final SAC posting as indicated in the PRA timeline in Appendix K of BPM.

9. New Business

No new business

10. Review Action Items (Amanda Jones)

Action Item	Owner	Date	Status
MISO was asked for strategy insights of how the various pieces of RA long range strategy fit together	MISO	4/17/2024	Open
Response planned for August			
Management Plan <ul style="list-style-type: none"> • Add LMR Accreditation to Q4 • Add new issue on HVDC 	RASC Leadership	7/10/2024	Open
Feedback requests will be opened for: <ul style="list-style-type: none"> • LMR reforms questions (due August 2) • BPM-011 annual review (due July 31) 	MISO	7/10/2024	Open
Update PRA reminder calendar in liaison report to include load forecast data from LSEs due Nov. 1	MISO	7/10/2024	Open
LMR Accreditation Problem Statement BALLOT will be posted today; completed ballots are due by 5:00 pm ET on Wed. July 17	RASC Leadership	7/10/2024	Closed
Item 06c presentation slide 9 title will be corrected and reposted	MISO	7/10/2024	Open

11. Adjournment

Meeting adjourned at 4:26 pm ET.

Next Meeting: August 21, 2024