

DER and Inverter-based Resources Subcommittee

WebEx Only

March 31, 2021

9:00 a.m. – 4:00 p.m. ET

Administration (9:00 – 9:20)

1. Scott Baker opened the meeting and reviewed the agenda.
2. Hamad Ahmed reviewed the meeting participation guidelines. The minutes from the March DIRS meeting and the EDC coordination workshop were approved with 0 objections and 0 abstentions
3. Scott Baker reviewed the DIRS work plan.
 - Scott reviewed the detailed work plan for FERC order 2222 briefly discussing different milestones. Scott highlighted that today's DIRS meeting will be mostly spent walking through PJM's straw proposal for DER aggregation under FERC order 2222.
4. Thomas DeVita addressed FERC's Order 2222-A, which provides clarification on a number of issues contained in Order 2222.
 - Thomas reviewed key item topics from FERC order 2222-A.

Order 2222 – Discussion on straw proposal (9:20 – 3:00)

5. Scott Baker introduced a solutions matrix that will be used to track progress on PJM's compliance filing as well as compare policy options for certain topic areas.
 - Scott reviewed the status quo matrix for high level requirements within FERC order 2222 and indicated that PJM intends to use the matrix for tracking its compliance proposal moving forward.
6. PJM Staff reviewed a straw proposal for DER Aggregation that seeks to address the various compliance directives in Order 2222. The straw proposal was meant to provide a more holistic view of how PJM staff is initially approaching each topic area, and to serve as a starting place for further collaboration between staff and stakeholders on PJM's compliance filing.
 - Danielle Croop, PJM, provided an overview of PJM's high-level holistic design approach and additional areas that require further discussion. Danielle also reviewed the new extension timeline highlighting that PJM has not received feedback from FERC regarding the February 1, 2022 extension.
 - Danielle briefly discussed PJM's guiding principles for design development and compartmented FERC order 2222 into five designs; DERA Jurisdiction and Interconnection, Operations, Market Design, Settlements and Coordination. Danielle also reviewed various terminologies.
 - Sue Glatz, PJM, discussed FERC's guidance towards interconnection stating that FERC elucidates in the order that DER engaging in wholesale market activity through a DER aggregation do not fall under a Commission Jurisdictional interconnection.

- Sue discussed capacity interconnection rights (CIRs), status quo for retail connected BTM DERs and concerns with expanded DER participation and continued use of netted generation model. Sue also reviewed proposed data requirements for planning and analyzed a simplified example of netted and aggregated modeling.
- Thomas DeVita, PJM, discussed PJM's reasoning on Jurisdiction, discussing Market-Based Rate Authority, Market Participation Agreements and opt-in small utility.
- Danielle Croop, PJM, discussed location requirements for DER aggregations. Danielle also indicated that each DER will be mapped individually in PJM network. Danielle also reviewed nodal aggregations, weighting factors and various locational requirements definitions and discussed numerous examples.
- Maddie Beban, PJM, discussed zonal aggregation model and telemetry.
- Danielle Croop, PJM, discussed PJM's direction towards operational needs and reviewed Capacity, Energy, cost based offers and Ancillary services within the Market participation model.
- The group ran out of time to finish the entire proposal presentation and will pick up at the next full-day DIRS within the Size Requirements section of the presentation.

Solar-Battery Hybrid Resources (3:00 – 3:55)

7. Andrew Levitt, PJM, provided education around a synchronous reserves requirement for hybrids.
 - Andrew discussed primary and uncertainty considerations for Synchronized Reserve for solar-battery hybrids and reviewed language within PJM manual 11 regarding Synchronized Reserve.
8. Skyler Marzewski, PJM, provided an update on the application of the Minimum Offer Price Rule for co-located and hybrid resources.
 - Skyler discussed MOPR prices, MOPR for hybrid resources and co-located resources for Solar plus Battery. Skyler also reviewed MOPR decision tree for Solar plus Battery.
9. Stakeholders reviewed progress on the solar-battery hybrid solutions matrix and discussed next steps towards recommending a proposal to the MIC (and OC).
 - The group did not have time to review the matrix but agreed to work offline to see if the current two proposals could be narrowed to a single proposal by the next meeting.

[Issue Tracking: Solar-Battery Hybrid Resources](#)

Action items and next meeting agenda (3:55 – 4:00)

10. The facilitation team reviewed action items from the meeting and took requests for future agenda items.

Future Meeting Dates

April 16, 2021 – EDC Workshop	10:00 – 12:00	WebEx
April 28, 2021	9:00 – 4:00	WebEx
May 05, 2021 – EDC Workshop	1:00 – 3:00	WebEx
May 17, 2021	9:00 – 4:00	WebEx
June 28, 2021	9:00 – 4:00	WebEx
July 15, 2021 – EDC Workshop	2:00 – 4:00	WebEx
July 23, 2021	9:00 – 4:00	WebEx
August 10, 2021 – EDC Workshop	3:00 – 5:00	WebEx
August 16, 2021	9:00 – 12:00	WebEx
September 14, 2021	9:00 – 12:00	WebEx
September 21, 2021 – EDC Workshop	3:00 – 5:00	WebEx
October 22, 2021	9:00 – 4:00	WebEx
November 22, 2021	9:00 – 3:00	WebEx
December 21, 2021	9:00 – 4:00	WebEx

Author: Hamad Ahmed

WebEx Meeting Attendance

Name	Company Name	Sector
Aguilera, Jorge	Duke Energy Ohio, Inc. (EDC)	Transmission Owner
Ahmad, Syed	Federal Energy Regulatory Commission	
Ahmed, Hamad	PJM Interconnection	None
Ainspan, Malcolm	NRG Curtailment Solutions, Inc.	Other Supplier
Allen, William	Commonwealth Edison Company	Transmission Owner
Anders, David	PJM Interconnection	None
Anderson, Jared	American Transmission Company - Retired	
Arnold, Katelyn	PPL Electric Utilities Corp. dba PPL Utilities (LSE)	Transmission Owner
Arsalan, Qamar	Public Service Electric & Gas Company	Transmission Owner
Baker, Jeff	PJM Connect	
Baker, Scott	PJM Interconnection	None
Barker, Jason	Exelon Business Services Company, LLC	Transmission Owner
Baur, Sean	GlidePath Power Operations LLC	Generation Owner
Beam, George	PPL Elec Utilities Corp dba PPL Utilities (PPL POLR Small C&I)	Transmission Owner
Beban, Madalyn	PJM Interconnection	None
Benckek, Jim	FirstEnergy Corporation	
Bernabeu, Emanuel	PJM	

Berner, Aaron	PJM Interconnection	None
Bernstein, Matthew	PJM Interconnection	None
Berton, Tyler	AEP Appalachian Transmission Company, Inc.	Transmission Owner
Besz, Matthew	PPL Electric Utilities Corp. dba PPL Utilities (TO)	Transmission Owner
Bhana, Rajesh	Exelon Business Services Company, LLC	Transmission Owner
Bielak, Donnie	PJM Interconnection	None
Borgatti, Michael	PJM Committee Voting Generic Account	
Borkoski, John	MD Public Service Commission	
Bowring, Joe	Monitoring Analytics	
Boyle, Glen	PJM Interconnection	None
Breidenbaugh, Aaron	Rodan Energy Solutions (USA) Inc.	Other Supplier
Brigaud, Olivier	NW NA	
Brodbeck, John	EDP Renewables North America LLC	Generation Owner
Brooks, Richard	Reliable Energy Analytics LLC	
Bryson, Michael	PJM Internal	
Buhler, Thomas	PJM Connect	
Burnham, Kat	Advanced Energy Economy (AEE)	
Callen, Zachary	Illinois Commerce Commission	
Campbell, Bruce	Enerwise Global Technologies, LLC	Other Supplier
Canter, David	Appalachian Power Company (AEP Generation)	Transmission Owner
Carmean, Gregory	Organization of PJM States, Inc.	
Cavan, Peter	Direct Energy Business Marketing, LLC	Other Supplier
Caven, Augustine	PJM Interconnection	None
Chakragiri, Mohan	ENGIE Energy Marketing NA, Inc. (Bluestone)	Other Supplier
Cham, Edrissa	Savion, LLC	
Chang, Sean	Shell Energy North America (US), L.P.	Other Supplier
Chee, Yee Hong	MCG Energy Solutions	
Chen, Yang	PJM Interconnection	None
Chocarro Aguirrebengoa, Iker	RWE Renewables Americas, LLC	Generation Owner
Christopher, Mahila	Public Utilities Commission of Ohio	

Circelli, Roseanne	Public Service Electric & Gas Company	
Cocco, Michael	Old Dominion Electric Cooperative	Electric Distributor
Collette, Lucas	Duquesne Light Company	Transmission Owner
Connelly, Nancy	Duke Energy Ohio, Inc.	Transmission Owner
Coyle, Billy	Dominion Virginia Power	Transmission Owner
Croop, Danielle	PJM Interconnection	None
Currier ES, Jeff	Dominion Virginia Power	Transmission Owner
D'Alessandris, Louis	American Transmission Systems, Inc.	Transmission Owner
Dantonio, Phil	PJM Interconnection	None
Davis, Elizabeth	PJM Interconnection	None
Davis, James	Dominion Energy Generation Marketing, Inc.	Generation Owner
DeBleekere, Tricia	Minnesota Public Utilities Commission	
Delaney, Liz	Borrego Solar	
DeLosa, Joseph	New Jersey Board of Public Utilities	
Denby, Brett	Northern Virginia Electric Cooperative (NOVEC)	Electric Distributor
DeVita, Thomas	PJM Interconnection	None
DiNicola, Laura	firstenergy	
Diong, Mamadou	Dominion Virginia Power	Transmission Owner
Dolan, Ryan	Dayton Power & Light Company (The) (EDC)	Transmission Owner
Domian, Christin	Duquesne Light Company	Transmission Owner
Downs, Jere	PJM Connect	
Drom, Rick	Rick Drom	
Dropkin, Ilyana	PJM Interconnection	None
Dugan, Chuck	East Kentucky Power Cooperative, Inc.	Transmission Owner
Dumitriu, Nicolae	PJM Interconnection	None
Elkins, Rachel	American Transmission Systems, Inc.	Transmission Owner
Ellis, David	Public Service Electric & Gas Company	Transmission Owner
Ericson, Christine	Illinois Commerce Commission	

Essah, David	N/A	
Esterly, Theresa	PJM Interconnection	None
Everngam, Scott	Blue Horseshoe Energy LLC	
fan, zhenyu	PJM Interconnection	None
Feldman, Brett	Other	
Filomena, Guy	Customized Energy Solutions, Ltd.	None
Fleisher, Madeline	Dickinson Wright PLLC	
Foladare, Kenneth	Geenex Solar LLC	Generation Owner
Ford, Adrien	Old Dominion Electric Cooperative	Electric Distributor
Foster Cronin, Denise	East Kentucky Power Cooperative, Inc.	Transmission Owner
Frogg, Darrell	PJM Interconnection	None
Fuller, Peter	Autumn Lane Energy Consulting LLC	
Gahimer, Michael	Indiana Office of Utility Consumer Counselor (IN OUCC)	
Garcia, Luis	Public Service Electric & Gas Company	Transmission Owner
Garnett, Bryan	Duke Energy Ohio, Inc.	Transmission Owner
Gates, Terry	Appalachian Power Company (AEP Generation)	Transmission Owner
Genuario, Gabrielle	PJM Interconnection	None
Gilani, Rehan	ConEdison Energy, Inc.	Other Supplier
Glatz, Suzanne	PJM Interconnection	None
Glazer, Craig	PJM Interconnection	None
Granstrand, Luke	Dominion Virginia Power	
Greening, Michele	PJM Interconnection	None
Greiner, Gary	PSEG Energy Resources and Trade LLC	Other Supplier
Guistwhite, Jeffrey	PJM Interconnection	
Guntle, Vince	American PowerNet Management, L.P.	End-Use Customer
Hanser, Erik	Michigan Public Service Commission	
Hartman, Gary	PPL Electric Utilities Corp. dba PPL Utilities (LSE)	Transmission Owner
Hastings, David	PJM Committee Voting Generic Account	
Hauske, Thomas	PJM Interconnection	None
Hays, Christina	Dominion Virginia Power	Transmission Owner

Heinle, Frederick	Office of the Peoples Counsel	
		Generation Owner
Heisey, Bradley	Tenaska Pennsylvania Partners, LLC	
Herel, Suzanne	PJM Interconnection	None
		Generation Owner
Hoatson, Tom	West Deptford Energy, LLC	
		Generation Owner
Hohenshilt, Jennifer	Talen Energy Marketing, LLC	
Holdbrook, Ruth	Northern Virginia Electric Cooperative (NOVEC)	Electric Distributor
Horning, Lynn Marie	Customized Energy Solutions, Ltd.	None
		Transmission Owner
Horstmann, John	Dayton Power & Light Company (The)	
Howe, Cullen	Natural Resources Defense Council	
Hugee, Jacquelyn	PJM Interconnection	None
		Electric Distributor
Hull, Gerit	American Municipal Power, Inc.	
Hyzinski, Tom	gtpghyzinsk	
	Indiana Office of Utility Consumer Counselor	
Iler, Arthur		
Janicki, Diane	Boston Energy Trading and Marketing LLC	Other Supplier
		Other Supplier
Jardot, Gina	NRG Curtailment Solutions, Inc.	
		Other Supplier
Jens, Thomas	Black Oak Capital, LLC	
		Transmission Owner
Jett, William	Duke Energy Business Services LLC	
Jha, Monica	PCI	
		Transmission Owner
Johnson, Augustus	Dominion Virginia Power (EDC)	
		Transmission Owner
Johnson, Bethany	PPL Electric Utilities Corp. dba PPL Utilities (TO)	
Johnson, Carl	Customized Energy Solutions, Ltd.	None
		Transmission Owner
Johnson, Nathaniel	Appalachian Power Company (AEP Generation)	
Johnston, David	Other	
Joshiyura, Neil	Virginia State Corporation Commission	
		Other Supplier
Kauffman, Brian	Enel X North America, Inc.	
		Other Supplier
Kelly, Stephen	Brookfield Renewable Trading and Marketing LP (BSMH)	
Kennedy, Thomas	Commonwealth Edison Company	
		Transmission Owner
Kent, Janessa	Duquesne Light Company	

Kilgallen, Kevin	Avangrid Renewables, LLC	Generation Owner
Kimmel, David	PJM Interconnection	None
Koehler, Nicolas	Appalachian Power Company (AEP Transmission)	Transmission Owner
Kogut, George	New York Power Authority	Other Supplier
Kopinski, John	ITC Interconnection LLC	Transmission Owner
Kozuharov, Dimitar	State Commissions	
Lee, Lori Murphy	PJM Interconnection	None
Levitt, Andrew	PJM Interconnection	None
Lieberman, Steven	American Municipal Power, Inc.	Electric Distributor
LOWE, CONNIE	Dominion Virginia Power	Transmission Owner
Luo, Xiaochuan	ISO New England Inc	
Lyakhovich, Leonid	Public Service Electric & Gas Company	Transmission Owner
Mabry, David	McNees Wallace & Nurick LLC	
Marcino, Angelo	PJM Interconnection	None
Mariam, Yohannes	Office of the People's Counsel for the District of Columbia	
martin, Valerie	Federal Energy Regulatory Commission	
Marzewski, Skyler	PJM Interconnection	
mason, julie	Duke Energy Ohio, Inc.	Transmission Owner
Matheson, Doug	Enel X North America, Inc.	Other Supplier
Mattson, Lisa	Pivot Energy	
McCormick, Katharine	Illinois Commerce Commission	
McGlynn, Paul	PJM Interconnection	None
McInerney, Timothy	Commonwealth Edison Company	Transmission Owner
Midgley, Sharon	Exelon Business Services Company, LLC	Transmission Owner
Morelli, Lisa	PJM Interconnection	None
Muhl, Nancy	PJM Interconnection	None
Newman, Jonathan	AES Energy Storage, LLC	Generation Owner
Nix, Emma	Jersey Green Energy LLC	Other Supplier

Norton, Chris	American Municipal Power, Inc.	Electric Distributor
nyemko, masha	PJM Interconnection	None
O'Hara, Christopher	PJM	
Okenfuss, James	Savion, LLC	
Ondayko, Brock	AEP Energy Partners, Inc. (AEP Gen Resources)	Transmission Owner
Pakela, Greg	DTE Energy Trading, Inc.	Other Supplier
Parker, Amanda	Pennsylvania Electric Company	Electric Distributor
Pawar, Aasawari	NRG Curtailment Solutions, Inc.	Other Supplier
Phillips, Darlene	PJM Interconnection	None
Pilong, Christopher	PJM Interconnection	None
Pilong, Melissa	PJM Interconnection	None
Placide, Scott	Potomac Electric Power Company	Electric Distributor
Polka, Joseph	Duquesne Light Company	Transmission Owner
Poulos, Greg	PJM Committee Voting Generic Account	
Pratt, Nicholas	PPL Electric Utilities Corp. dba PPL Utilities (TO)	Transmission Owner
Price, Ruth	Delaware Division of the Public Advocate	
Proconiar, Jason	Buckeye Power, Inc.	Electric Distributor
Purdie, Michael	Dominion Virginia Power	Transmission Owner
Quier, David	PPL Electric Utilities Corp. dba PPL Utilities (TO)	Transmission Owner
Rainey, John	Northern Virginia Electric Cooperative (NOVEC)	Electric Distributor
Reagan, Ryann	New Jersey Board of Public Utilities	
REILLY, Jim	Reilly Associates	
Robinson, Becky	visra energy	
Rodriguez, Tomas	Organization of PJM States, Inc.	
Rohrbach, John	Wabash Valley Power Association, Inc.	Electric Distributor
Rosenblatt, Alex	Duquesne Light Company	Transmission Owner
Rouland, James	PPL Electric Utilities Corp. dba PPL Utilities (LSE)	Transmission Owner

Roychowdhury, Rajarshi	Dayton Power & Light Company (Default)	Transmission Owner
Rumsey, Amanda	PPL Electric Utilities Corp. dba PPL Utilities (TO)	Transmission Owner
Salet, Sal	PPL Electric Utilities Corp. dba PPL Utilities (LSE)	
Sasser, Jonathan	Customized Energy Solutions, Ltd.	None
Scarpignato, David	Calpine Energy Services, L.P.	Generation Owner
Scheirer, Alexandra	PJM Interconnection	None
Schisler, Kenneth	Enerwise Global Technologies, LLC	Other Supplier
Schreim, Morris	MD PSC	
Schuyler, Ken	PJM Interconnection	None
Schweizer, David	PJM Interconnection	
Seireg, Bahaa	Rockland Electric Company	Transmission Owner
Sells, Scott	East Kentucky Power Cooperative, Inc.	Transmission Owner
Sharkazy III, William	PPL Electric Utilities Corp. dba PPL Utilities (LSE)	Transmission Owner
Shearer, Evan	Duke Energy Business Services LLC	Transmission Owner
Shukla, Tanmay	Environmental Law and Policy Center	
Singh, Mohit	Commonwealth Edison Company	Transmission Owner
Smith, Mark	AEP Energy Partners, Inc. (AEP Retail)	Transmission Owner
Solomon, Greg	Peak Power Inc	
Sorrels, James	AEP Appalachian Transmission Company, Inc.	Transmission Owner
Stefanowicz, Vincent	PJM Interconnection	None
Stein, Ed	Ohio Edison Company	Electric Distributor
Stern, Alexander	Public Service Electric & Gas Company	Transmission Owner
Stupar, Rob	Invenergy Energy Management LLC	Generation Owner
Sun, Haibin	Exelon Business Services Company, LLC	Transmission Owner
Svenson, Heather	Public Service Electric & Gas Company	Transmission Owner
Swalwell, Brad	Tangent Energy Solutions, Inc.	Other Supplier

Sweeney, Rory	GT Power Group, LLC	None
Swenson, Kristin	Midcontinent Independent Sys Op, Inc. (CTS)	
Tacka, Natalie	PJM Interconnection	None
Taylor, Robert	Commonwealth Edison Company	Transmission Owner
Teeter, Valerie	Exelon Business Services Company, LLC	Transmission Owner
Thomas, Sharon	Energy Storage Association	
Thundiyil, Kevin	Exelon Generation Co., LLC (NEV_XLON)	Generation Owner
Tighe, Andrea	CAPS	
Tobia, James	FirstEnergy Services	
Tyler, Catherine	Monitoring Analytics	
Von Pinho, Fred	Apex Clean Energy Holdings, LLC	
Walch, Ian	Enchanted Rock, LLC	
Walker, Jacqueline	Duke Energy Business Services LLC	
Walter, Laura	PJM Interconnection	None
Watson, Betty	Affirmed Energy LLC	Other Supplier
Weber, Adam	Union Electric Company d/b/a Ameren Missouri	Other Supplier
Webster, John	Icetec.com, Inc.	Other Supplier
Wehnes, Kathleen	Maryland Department of the Environment	
Wehr, Christopher	Ohio Edison Company (EDC)	Electric Distributor
White, Brett	Brett White	
Whitehead, Jeffrey	GT Power Group	
Wicks, Tonja	Duquesne Light Company	Transmission Owner
Wiley, Amy	Delaware Public Service Commission	
Wilmoth ES, Emily	Dominion Virginia Power	Transmission Owner
Wilson, De Andre	Maryland Public Service Commission	
Wisersky, Megan	Madison Gas & Electric Co.	Other Supplier
Wisniewski, Christian	Centrica Business Solutions	
Wray, Gizelle	Solar Energy Industries Association (SEIA)	
Xenopoulos, Damon	Other	
Yeaton, Andrea	PJM Interconnection	None
Yoo, Kyungjin	Monitoring Analytics	

Yoo, Kyungjin	Monitoring Analytics	
Yu, Joel	Enchanted Rock	
Zhang, Mike	PJM Interconnection	None

Antitrust:

You may not discuss any topics that violate, or that might appear to violate, the antitrust laws including but not limited to agreements between or among competitors regarding prices, bid and offer practices, availability of service, product design, terms of sale, division of markets, allocation of customers or any other activity that might unreasonably restrain competition. If any of these items are discussed the chair will re-direct the conversation. If the conversation still persists, parties will be asked to leave the meeting or the meeting will be adjourned.

Code of Conduct:


As a mandatory condition of attendance at today's meeting, attendees agree to adhere to the PJM Code of Conduct as detailed in PJM Manual M-34 section 4.5, including, but not limited to, participants' responsibilities and rules regarding the dissemination of meeting discussion and materials.

Public Meetings/Media Participation:

Unless otherwise noted, PJM stakeholder meetings are open to the public and to members of the media. Members of the media are asked to announce their attendance at all PJM stakeholder meetings at the beginning of the meeting or at the point they join a meeting already in progress. Members of the Media are reminded that speakers at PJM meetings cannot be quoted without explicit permission from the speaker. PJM Members are reminded that "detailed transcriptional meeting notes" and white board notes from "brainstorming sessions" shall not be disseminated. Stakeholders are also not allowed to create audio, video or online recordings of PJM meetings. PJM may create audio, video or online recordings of stakeholder meetings for internal and training purposes, and your participation at such meetings indicates your consent to the same.

Participant Identification in WebEx:

When logging into the WebEx desktop client, please enter your real first and last name as well as a valid email address. Be sure to select the "call me" option. PJM support staff continuously monitors WebEx connections during stakeholder meetings. Anonymous users or those using false usernames or emails will be dropped from the teleconference.

<p>On the Phone, Dial</p>  <p>to Mute/Unmute</p>	<p>Linking Teleconference Connection to Webex</p> <p>When logging in to the meeting, access Webex first and select the "call me" feature to receive a direct call to your phone. Using this feature will connect your name to your Webex presence.</p>
--	---

<p>Join a Meeting</p>	<ol style="list-style-type: none"> 1. Join meeting in the Webex desktop client 2. Enter name (<i>First and Last*</i>) and corporate email 3. Under "Select Audio Option" select "Call Me" option from the dropdown menu
------------------------------	--

**Note: Anonymous users or those using false usernames or emails will be dropped from the teleconference.*

Provide feedback on the progress of this group: [Facilitator Feedback Form](#)
 Visit learn.pjm.com, an easy-to-understand resource about the power industry and PJM's role.