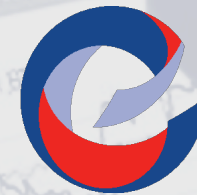


Key Issues Facing Capacity Market Demand Response and PJM Reliability

Advanced Energy Management Alliance



advanced
energy
management
alliance

PJM Interconnection

Resource Adequacy Senior Task Force

March 15, 2023

AEMA mission and members

Advanced Energy Management Alliance (AEMA) advocates for policies that empower and compensate customers appropriately--to contribute energy or energy-related services or to manage their energy usage--in a manner which contributes to a more efficient, cost-effective, resilient, reliable, and environmentally sustainable grid.

Our members are providers and supporters of distributed energy resources (DERs), including demand response (DR) and advanced energy management, united to overcome barriers to nationwide use of demand-side resources.

AEMA Members

Aypa Power

Centrica Business Solutions

Convergent

Demand Power

ELCON

Electric Advisors Consulting

Enel X

EnergyHub

Google

Great Circle Solar

Icetek

Innoventive Power

Modern Energy

NRG

Ormat

Resideo

Rodan Energy Solutions

Voltus

Vote Solar

Walmart

Workbench Energy

Comments do not necessarily represent the views of all members

Agenda

- Grid Trends & Reliability Report
- Market Design for Reliability
- Recommendations for PJM Reforms

Recommendations

- Enable DR/DER growth and reverse its decline
 - Reliable resource that PJM clearly needs
- Maintain DR exemption to energy and capacity must-offers
 - To extent price-based PAI triggers are preferred to current triggers, DR strike prices can be used
- Recognize accurate value of DR in capacity accreditation, if moving to ELCC

PJM Market Now Struggling to Attract Flexible Resources

- DR is critical part of energy transition, but current market design issues are limiting its role
- DR BRA participation falling faster than any other resource
 - DR 31% net reduction in last 3 BRAs
- Operational impacts - PJM has less control over flexible loads in times of grid stress

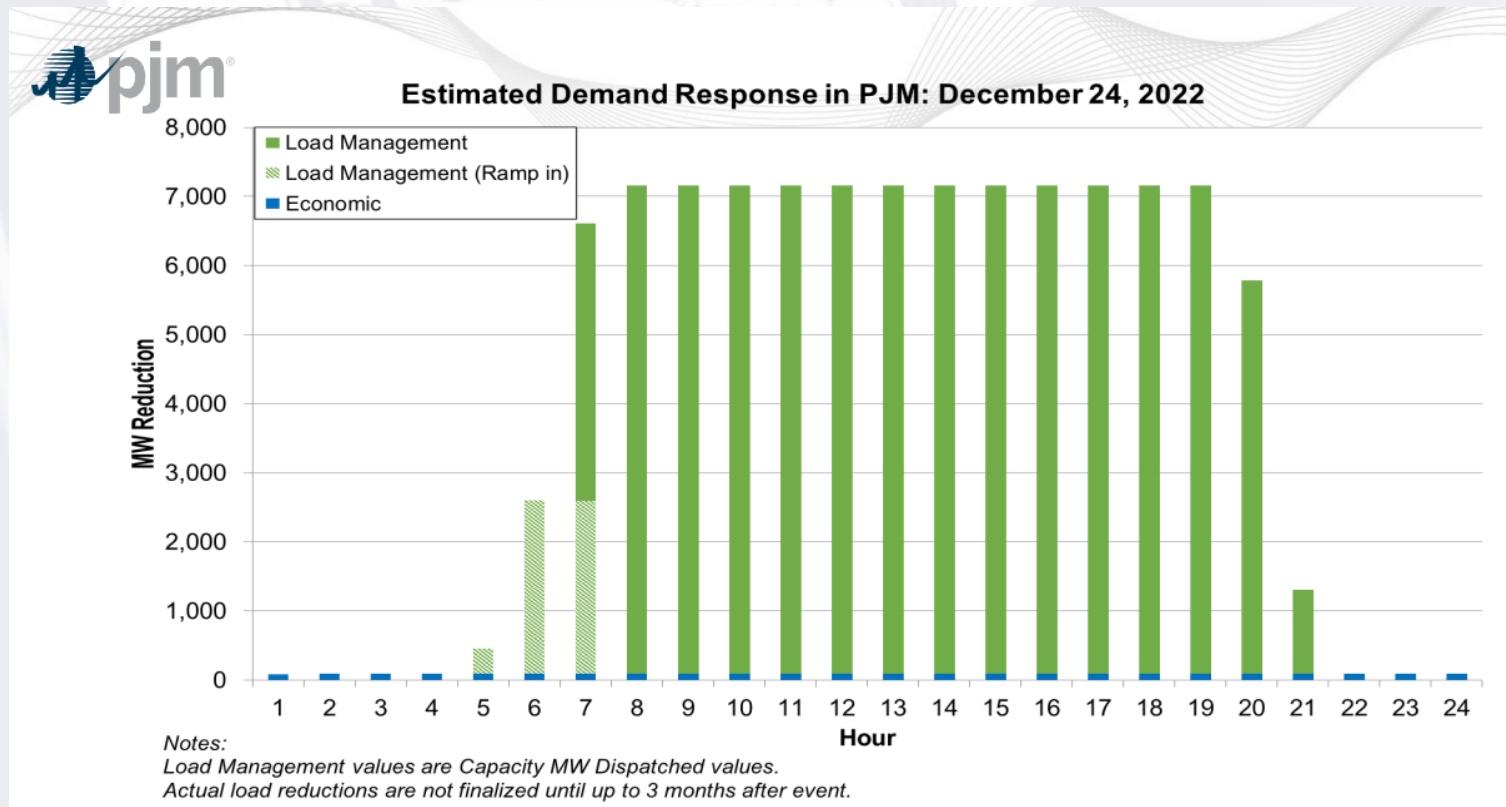
The greatest changes among resources clearing [including Fixed Resource Requirement (FRR) capacity plans] were increases in natural gas (+1,615 MW) along with solar (+1,297 MW), as the capacity market continues to facilitate the overall transition to lower-carbon generation resources. The greatest decreases in resources cleared (including FRR capacity plans) were demand response (-451 MW), nuclear (-331 MW), coal (-278 MW), hydro (-237 MW) and oil (-230 MW).

GRID TRENDS & RELIABILITY REPORT

PJM CEO: Potential for Increased DR Dispatches

- Mr. Asthana recently commented at OPSI and PJM Annual Meeting on the key role of DR and likelihood of increased dispatches during energy transition
- AEMA members open to and preparing for increased reliance on DER/DR

Winter Storm Elliott Results in Two Days of Extensive PJM DR Dispatches



PJM Reliability Analysis Points to Growing Need for DR/DERs

- Winter Storm Elliott highlighted challenges between electric and gas markets
- DR/DERs are critical part of a diverse resource mix
 - Curtailments via DR occur where they are least harmful to load and most economically efficient (via dispatch rather than load dumping)
- PJM Reliability Report questionably assumes quantity of DR stays constant through 2030
 - Assumption is inconsistent with other major trends discussed in the report including growth of data center loads (frequent participants in DR programs)

MARKET DESIGN FOR RELIABILITY

Unique Attributes of DR/DERs

- DR/DER subject to capacity and transmission charges
 - DR participants receive non-firm transmission while paying for Network Service
- DR resources are small – averaging less than 1 MW – even when counting aggregations as a single resource
- DR participation in wholesale markets is a secondary or tertiary concern of participants – at best

Unique Attributes of DR/DERs (II)

- For the vast majority of customers, the hourly value of electricity far outweighs its costs
 - This contributes to why there is very little economic DR participation
- Hourly curtailment costs for DR are based on customer specific factors that, even if known, are often confidential
 - Curtailment costs can't be linked to a handful of publicly available sources such as fuel indices

Capacity is Key Market for DR

- **Since RPM inception, capacity DR resource type has existed.** DR rules have gone through reforms to remain consistent with capacity definition and serve reliability
- **Capacity has been critical to DR market.** Capacity regularly accounts for over 95% annual DR compensation in PJM mkts
- **Low prices.** DR market down 31% in 3 years, driven by low pricing. Customers need earning potential to participate
- **Capacity product likely to remain most active mkt for DR**
 - Capacity is DR “availability payment”; entry point now for most flexible load types

Accreditation

- AEMA is open to exploring “ELCC for All”
- DR performed in 2022 for long-duration June and December emergencies
- DR is available 12-15 hours/ day now. Analysis indicates periods that drive reliability risk unlikely to change significantly

PJM/FERC Rightfully Exempted DR from Must-Offer & Cost-Based Offers

- Demand response by its nature is responsive to market conditions
- FERC precedent supports that demand response does not exert market power
 - “We disagree that emergency demand response must be subjected to market power mitigation screens. PJM’s proposal allows for adequate competition that will result in accurate and efficient pricing, as based on the offer prices of marginal resources.” (FERC Order, April 19, 2012, ER09-1063)
- In the 15+ years of DR in PJM markets, we are unaware of DR exhibiting market power

Current Strike Prices Compatible with Price-Based PAI Dispatch Trigger (I)

- **DR can set LMP** but usually doesn't – even when dispatched – because it is usually inframarginal
- **Operating Reserve shortages trigger LMPs** based on Operating Reserve Penalty factors added to the cost of marginal energy resources.
 - DR contributes to price setting only when DR becomes the marginal energy resource

Current Strike Prices Compatible with Price-Based PAI Dispatch Trigger (II)

- **DR cost-based offers – the juice isn't worth the squeeze.** MMU recommendation to remove strike prices does not recognize the overwhelming administrative costs required to determine marginal costs for DR
- **PJM should consider DR experience in ISO-NE,** where significant staff and budget resources were required when ISO chose to adopt DR must-offer without corresponding benefits in participation or market pricing outcomes
 - Low DR participation in ISO-NE (about $\frac{1}{4}$ of PJM's relative to size) may be related to must offer requirement
 - PJM should be eliminating barriers to participation rather than unreasonably making all resources comply with identical rules

Recommendations

- Enable DR/DER growth and reverse decline
 - Reliable resource that PJM clearly needs
- Maintain DR exemption to energy and capacity must-offers
 - To extent price-based PAI triggers are preferred to current triggers, DR strike prices can be used
- Recognize accurate value of DR in capacity accreditation, if moving to ELCC

Contact

Katherine Hamilton, Executive Director

katherine@aem-alliance.org

Bruce Campbell, PJM Consultant to AEMA

bruce@campbellea.com

Brian Kauffman, Chair, Mid Atlantic/PJM
Committee

Brian.Kauffman@enel.com

APPENDIX



DR/DER Still Primarily Resource of Last Resort

- PJM (June 2022) – 100 MW C&I DR called over 3 days/20+ hours after heat wave/extreme weather downs Ohio Transmission and avoids rolling black outs
- ERCOT (July 2022) – C&I DR called after extreme hot weather combined with 13 GW forced thermal outages
- Arizona (Summer 2022) – 1200 MWh reduced for contingency relief during peaks via load shifts from Resi DR

31% decline in DR BRA participation in 3 years

BRA	RTO Price (\$/MW-day)	MWs DR cleared (Includes both Annual and Summer)	YoY Change in Cleared MWs
2021/2022	140.00	11,126	--
2022/2023	50.00	8,812	(2,314)
2023/2024	34.13	8,096	(716)
2024/2025	28.92	7,669	(427)

Source: PJM

Unique Attributes of DR/DERs

- For many industrial DR sources, shutdown costs are significant and often exceed hourly energy costs
 - Shutdown costs generally vary by the season, day of the week and even hour of the day

Energy Must-Offer Concerns

- Energy Must-Offer opens the door to discussions about cost-based offers, which would substantially raise barriers to entry – just when more participation is needed

Energy Must-Offer Concerns

- The unique attributes of DR mean:
 - Cost-based offers for DR would be challenging for DR participants to develop
 - Development and review of cost-based offers for DR would represent a significant barrier to entry and PJM/MMU resources