

# Offer parameters to limit duration and frequency of dispatches for economic demand response in the energy market

August 9, 2023  
PJM Market Implementation Committee





# Agenda

## **DR resources need the same parameters as generators**

- Summary
- Current DR offer parameters
- Equivalent parameters for other resources
- How new offer parameters will increase market access

# Summary

## Seeking parity with other PJM resources & with DR treatment in other markets

- Economic demand response participating in the PJM energy market has access to limited offer parameters to reflect operational constraints.
- Economic DR can specify *Minimum* Downtime – the minimum length of a dispatch
- Economic DR cannot specify:
  - *Maximum* Downtime – the maximum length of a dispatch
  - *Minimum Runtime* – the minimum gap needed between dispatches
- Generators already have equivalents of these parameters (called Maximum Runtime and Minimum Downtime, respectively)
- In MISO and SPP, DR can already specify both maximum dispatch length and minimum gap between dispatches in their offers

# Current Offer Options for DR in Energy Market

Limited to MW, price, downtime limit, notification time, MW, & commit status

Portfolio: ECON and SRM participants | Location: [REDACTED] | Schedule: [REDACTED]

Refresh [Icon] Save [Icon]

Offer Curve Manager | Offers | Offer Updates | Parameters | Schedule Selection

VOLTUS >> 2023-05-01 >> [REDACTED]

MW	Price

Portfolio: ECON and SRM participants | Location: [REDACTED] | Schedule: [REDACTED]

Refresh [Icon] Save [Icon]

Offer Curve Manager | Offers | Offer Updates | Parameters | Schedule Selection

VOLTUS >> 2023-05-01 >> [REDACTED]

Parameters

Period 1 Shutdown Cost (\$)  | Period 2 Shutdown Cost (\$)

Minimum Downtime Limit  | Notification Time (Hour)

Portfolio: ECON and SRM participants | Location: [REDACTED] | Schedule: [REDACTED]

Refresh [Icon] Save [Icon]

Offer Curve Manager | Offers | Offer Updates | Parameters | Schedule Selection | Hourly Updates | Comp

VOLTUS >> 2023-05-01 >> [REDACTED]

Hour	Commit Status	Econ. Min.	Econ. Max.
1	Unavailable	0	54
2	Unavailable	0	54
3	Unavailable	0	54
4	Unavailable	0	54
5	Economic	54	54
6	Economic	54	54
7	Economic	54	54
8	Economic	54	54
9	Economic	54	54
10	Economic	54	54
11	Economic	54	54
12	Economic	54	54
13	Economic	54	54
14	Economic	54	54
15	Economic	54	54
16	Economic	54	54
17	Economic	54	54
18	Economic	54	54
19	Economic	54	54
20	Economic	54	54
21	Economic	54	54
22	Economic	54	54
23	Economic	54	54
24	Economic	54	54

# Duration Limits for Other PJM Resources

Resource Type	Parameter	Definition
Generator	Maximum Runtime (hour)	Markets Gateway User Guide, Section 8.7: “The maximum number of hours a unit can run before it needs to be shut down, calculated as difference between the time the unit is put on-line to the time the unit is shut down. In the Day-Ahead Scheduling process, it is calculated at the maximum number of hours a unit is producing > 0 MW output.”
Generator	Minimum Downtime (hour)	Markets Gateway User Guide, Section 8.7: “The minimum number of hours between starts, calculated as the difference between when the unit shuts-down and the next time the unit is put online.”

# Equivalent Parameters for DR in MISO

Resource Type	Parameter	Definition
Demand Response Resource Type I	Maximum Interruption Duration	Per MISO Business Practice Manual 26: The Maximum Interruption Duration restricts the number of consecutive hours a DRR -Type I can be committed during the Day-Ahead Energy and Operating Reserve Market and the Real-Time Energy and Operating Reserve Market.
Demand Response Resource Type I	Minimum Non-Interruption Interval	Per MISO Business Practice Manual 26: The Day-Ahead Energy and Operating Reserve Market and the Real-Time Energy and Operating Reserve Market commitments respect the Minimum Non-Interruption Interval in determining when a DRR –Type I is available for shut down.

# Equivalent Parameters for DR in SPP

Resource Type	Parameter	Definition
Dispatchable Demand Response	Maximum Run Time	Per SPP Integrated Marketplace Protocols, Revision 98: The maximum length of time a Resource can run from the time the Resource is synchronized to the time the Resource is off-line.
Dispatchable Demand Response	Minimum Down Time	Per SPP Integrated Marketplace Protocols, Revision 98: The minimum length of time required following desynchronization that a Resource must remain off-line prior to a subsequent synchronization.

# Why DR Needs These Parameters

## Increasing market access & demand side participation

- HVAC load: price-sensitive, but can generally only participate for limited durations.
  - ~65 GW of HVAC load in PJM.
  - A large fraction of that is residential, which Voltus is prepared to tap into.
- EV load: projected to increase 10x in PJM by 2030.
  - ESR model will not work for all use cases; will often need to participate as DR.
- Every demand resource in every industry ultimately has some operational constraints (just like generators).
  - 8 GW of DR currently enrolled in PJM; Voltus models peg potential at almost 20 GW.



# Why DR Needs These Parameters

## Status quo infeasible to work with

- Day-ahead market: all 24 hours clear at once
  - Impossible to limit dispatch duration except by artificially confining availability
- Real-time market: while technically possible to monitor how long a site has been dispatched for and then manually make them unavailable when they approach their cap, this is impractical and not scalable
- Minimum gap between dispatches is needed to prevent sites from being dispatched again immediately after a prior dispatch ends
  - E.g. the engine stops dispatching a site because it has hit its max dispatch length of 4 hours, but then dispatches it again starting 5 minutes later

# Thank you

David Aitoro | [daitoro@voltus.co](mailto:daitoro@voltus.co)

