Offer parameter to limit duration of dispatches for economic demand response in the energy market

May 8, 2023

voltus

Agenda

DR resources need the same parameters as generators

- Summary

- DR offer parameters

- Duration limits for non-DR resources

- How 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 contiguous hours for a dispatch–but cannot specify *maximum* downtime.

- Generators can set "maximum run time" and energy storage resources can set a "minimum state of charge". These parameters set a maximum duration on dispatches.

- In MISO and SPP–which also have co-optimized markets where demand response can offer into reserve products and the energy market– demand response assets can specify maximum downtime in their offers (+ other parameters that limit the number of dispatches and downtime between).

Current Offer Options for DR in Energy Market

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

Duration Limits for Other PJM Resources

Resource Type	Parameter	Definition
Generator in PJM	Maximum Runtime (hour)	Maximum run time is defined in the Markets Gateway User Guide in Section 8.7 and states: "Maximum Runtime (hour) – 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. The default value is infinity.
Energy Storage Resource in PJM	State of Charge Min (MWh)	Section 27.4 of Markets Gateway User Guide allows energy storage resources to specify a "State of Charge Min (MWh) – The minimum State of Charge, in MWh, that should be maintained."

Duration Limits for DR in Similar Markets

Resource Type	Parameter	Definition
Demand Response Resource Type I in MISO	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.
Dispatchable Demand Response in SPP	Max Runtime	Defined in SPP's Integrated Marketplace Protocols Revision 91 as: The maximum length of time a Resource can run from the time the Resource is synchronized to the time the Resource is off-line.

Why DR Needs a Duration Limit

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 sometimes 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.

Thank you

David Aitoro | daitoro@voltus.co

voltus™