

Markets Gateway – Hybrid Resource Participation

As of April 17, 2023





Action Required	Deadline	Who May Be Affected				
Electric Storage Resources participating in the ESR model, as well as Hybrid Resource owners, should review the User Interface changes in Markets Gateway when it's available in Train, or make the necessary XML changes per the updated Markets Gateway External Interface Specification Guide.	June 1, 2023	Markets Gateway UI & XML Users				
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2023 Markets Gateway Roadmap

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Hybrid Resource Participation (FERC approved)						Production 6/1						



- In July 2022, FERC approved Phase 1B of PJM including Hybrid Resources in their Markets
 - "Hybrid Resource" a resource composed of one generation component and one energy storage component behind the same point of interconnection operating in the capacity, energy, and/or ancillary services market(s) as a single integrated resource. A hybrid resource forms all or part of a Mixed Technology Resource.
 - Phase 1 hybrid project includes solar & storage resources
 - If hybrid resource is comprised of only renewable generation, it will be treated as intermittent generation
 - 2 distinct types of Hybrid Resources:
 - "Open-Loop Hybrid" physically and contractually capable of charging its storage component from the grid
 - "Closed-Loop Hybrid" physically or contractually incapable of charging from the grid



- A Hybrid Resource must be permitted to:
 - Sell the Energy, Capacity, and Ancillary Service the resource is technically capable of providing
 - Be dispatched and set price as seller and buyer
 - Account for the physical and operational characteristics of Electric Storage Resources (ESR) through bidding parameters or other means
 - Specify that the sale of electric energy must be at the wholesale LMP
- Manual changes will be reviewed and approved with Stakeholders at the April & May MIC/MRC
- FERC approved and PJM is expecting to go live with Hybrid Resource (Phase 1) capability effective June 1, 2023.



Impacts to Markets Gateway Participants

- The Markets Gateway changes that support Hybrid Resource functionality will impact only participants with ESR or Hybrid resource ownership
- Markets Gateway changes will be installed in the Train environment by May 5, 2023
- The Markets Gateway User Guide & External Interface Specification Guide will be updated to reflect the new Hybrid Resource functionality
- The Production go-live date is scheduled for June 1, 2023



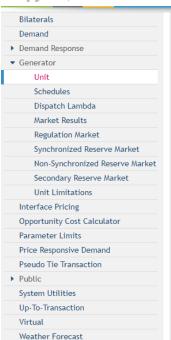
- The following fields will be used in Markets Gateway to accommodate Hybrid Resources
 - Mode selection (charging, discharging, continuous, intermittent)
 - Minimum/Maximum Discharge Limit (updateable intra-hour)
 - Minimum/Maximum Charge Limit (updateable intra-hour)
 - Emergency Minimum/Maximum Discharge Limit (updateable intra-hour)
 - Emergency Minimum/Maximum Charge Limit (updateable intra-hour)
 - Charge Synch Max (daily default and also hourly)
 - Discharge Synch Max (daily default and also hourly)
 - Charge Secondary Max (daily default and also hourly)
 - Discharge Secondary Max (daily default and also hourly)
 - Charge Up/Down ramp rate (daily default and also hourly)
 - Discharge Up/Down ramp rate (daily default and also hourly)
 - State of Charge Min/Max (information only)

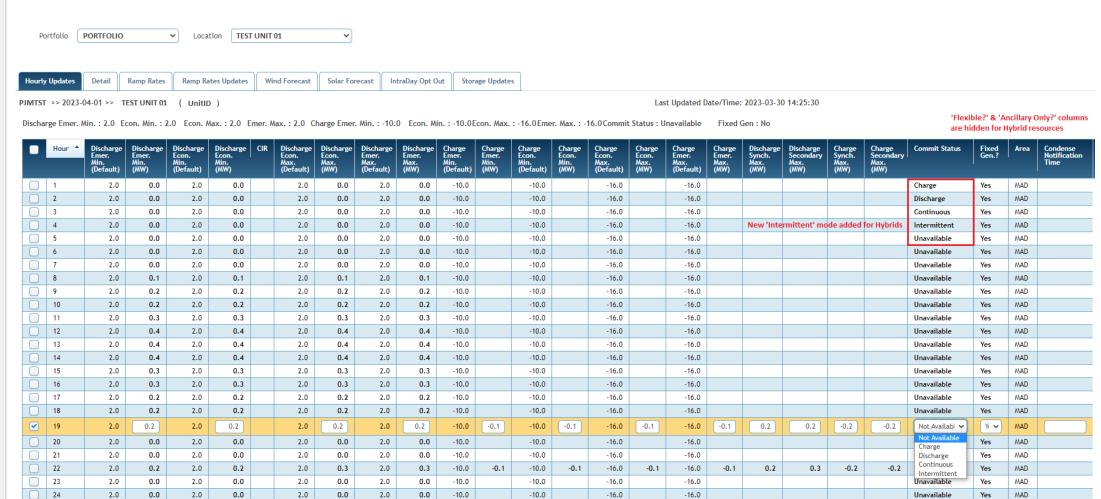


Generator > Unit > Hourly Updates (Open Loop Hybrid)

*Disclaimer: Bid data in the screenshot below is for educational purposes only

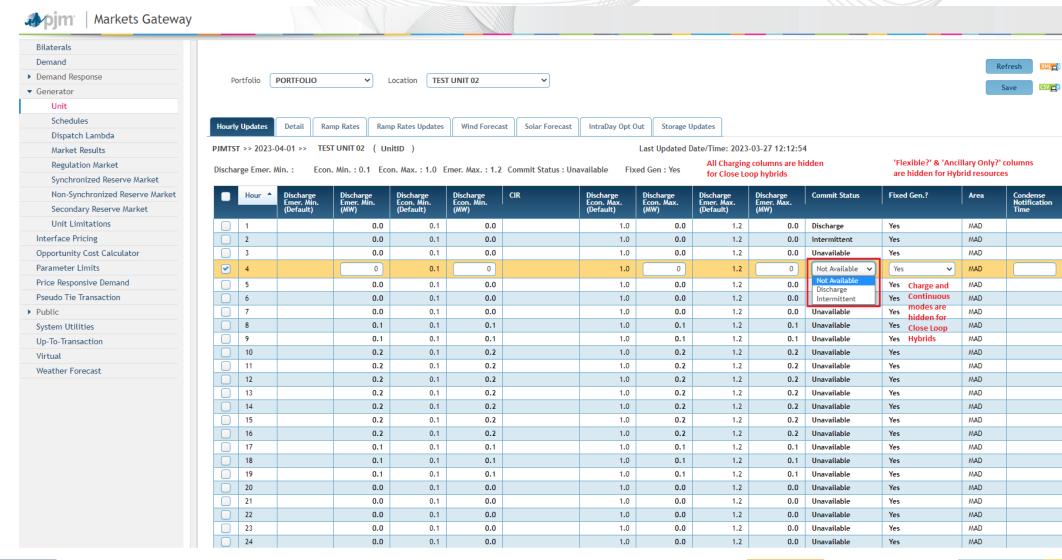






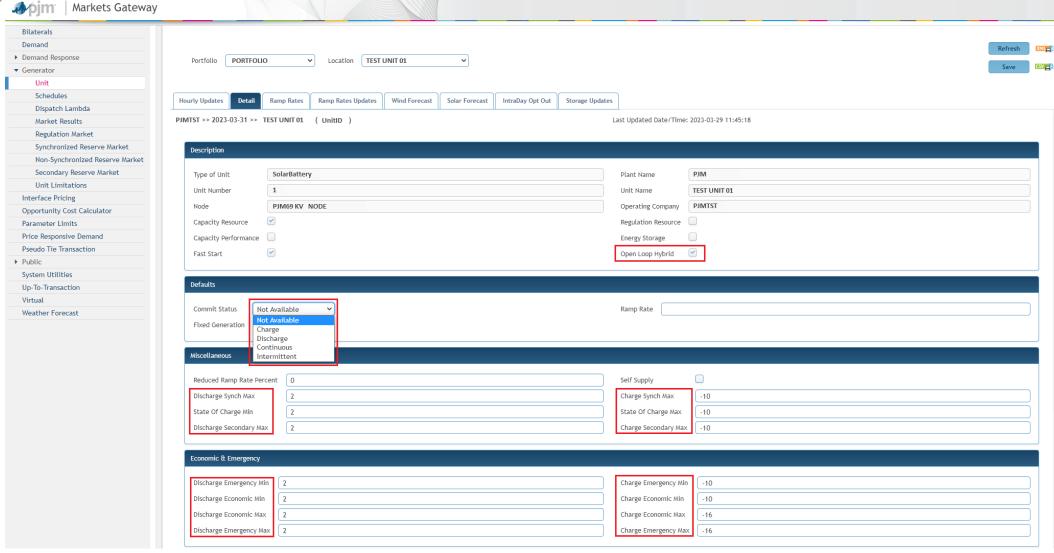


Generator > Unit > Hourly Updates (Close Loop Hybrid)



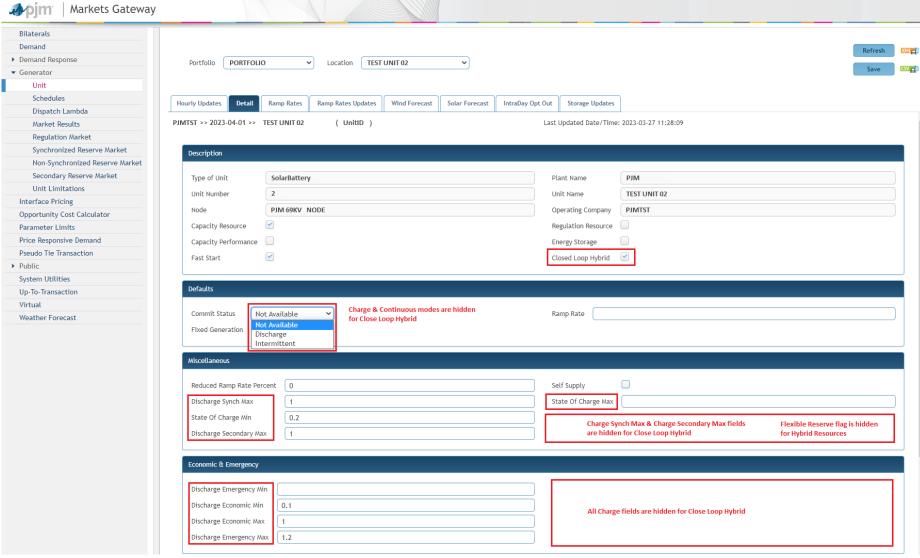


Generator > Unit > Detail (Open Loop Hybrid)





Generator > Unit > Detail (Close Loop Hybrid)





Generator > Unit > Ramp Rates (Open Loop Hybrid)

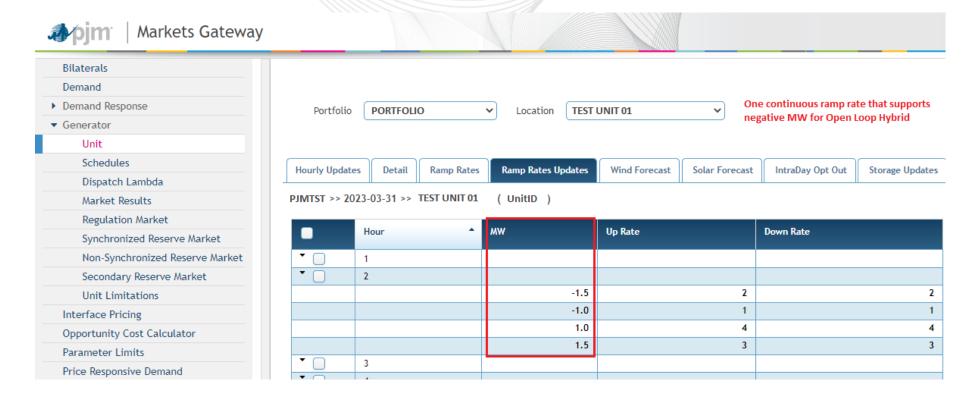
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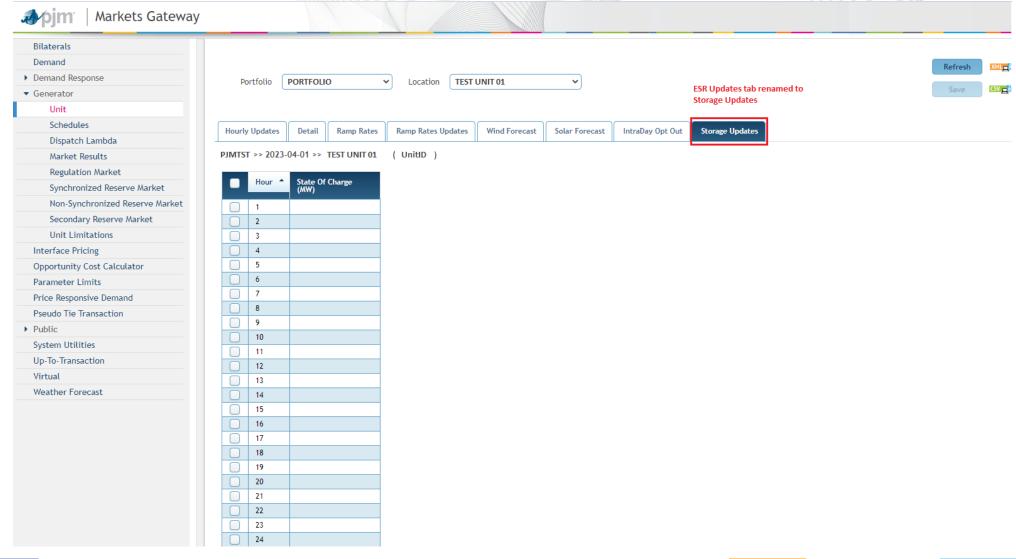
Generator > Unit > Ramp Rates Updates (Open Loop Hybrid)

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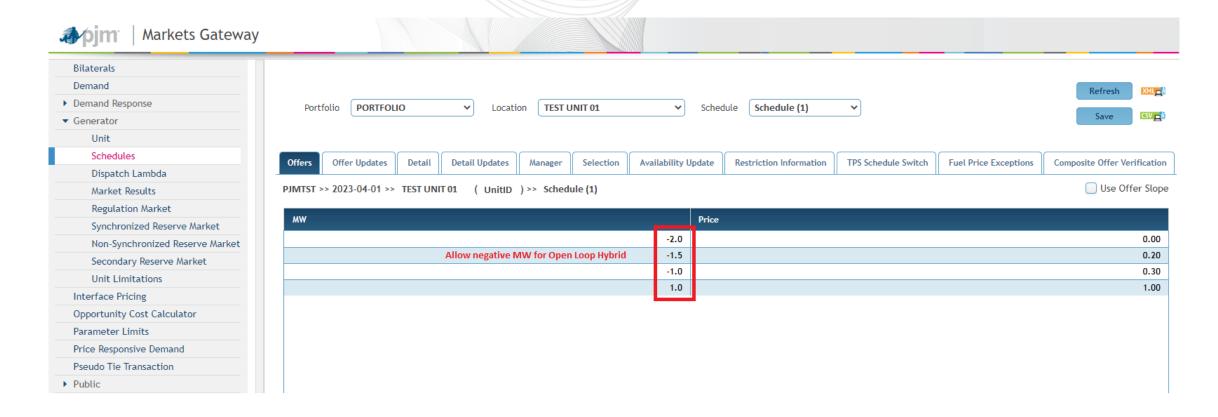
Generator > Unit > Storage Updates (information only)





Generator > Schedules > Offers (Open Loop Hybrid)

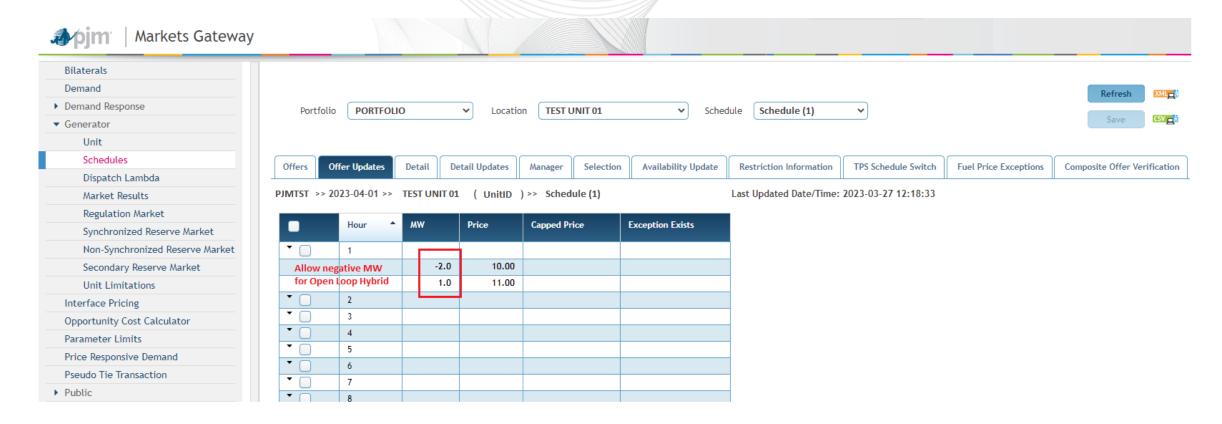
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Generator > Schedules > Offer Updates (Open Loop Hybrid)

*Disclaimer: Bid data in the screenshot below is for educational purposes only





Generator > Schedules > Detail (Close Loop Hybrid)

Markets Gateway

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	Bilaterals					
	Demand					
١	Demand Response					
•	Generator					
	Unit					
	Schedules					
	Dispatch Lambda					
	Market Results					
	Regulation Market					
	Synchronized Reserve Market					
	Non-Synchronized Reserve Market					
	Secondary Reserve Market					
	Unit Limitations					
	Interface Pricing					
	Opportunity Cost Calculator					
	Parameter Limits					
	Price Responsive Demand					
	Pseudo Tie Transaction					
٠	Public					
	System Utilities					
	Up-To-Transaction					
	Virtual					
	Weather Forecast					

	Detail Updates Man	ager Selection	Availability Update	Restriction Information	TPS Schedule Switch	Fuel Price Exceptions	Composite Offer Ve
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31 2023-04-01 TEST ONIT	oz (Onitib) >> Scriedule (1)					
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Discharge Emergency Min							
Discharge Emergency Min Default				All Char	ge fields are hidden for	Close Loop Hybrid	
Discharge Economic Min							
Discharge Economic Min Default	0.1						
Discharge Economic Max							
	1						
Discharge Economic Max Default	1						
Discharge Economic Max Discharge Economic Max Default Discharge Emergency Max	1						



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Markets Gateway – Hybrid Resource Participation



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Product Details



Markets Gateway allows users to submit information and obtain data needed to conduct business in the Day-Ahead, Real-Time, Regulation and Reserve Markets.

Key Product Features

- View Market Results
- Manage Generation and Load Response Portfolios
- Manage Ancillary Service Data
- Manage Market Offers and Transactions