

Benefits from Generation and Storage on the Distribution System

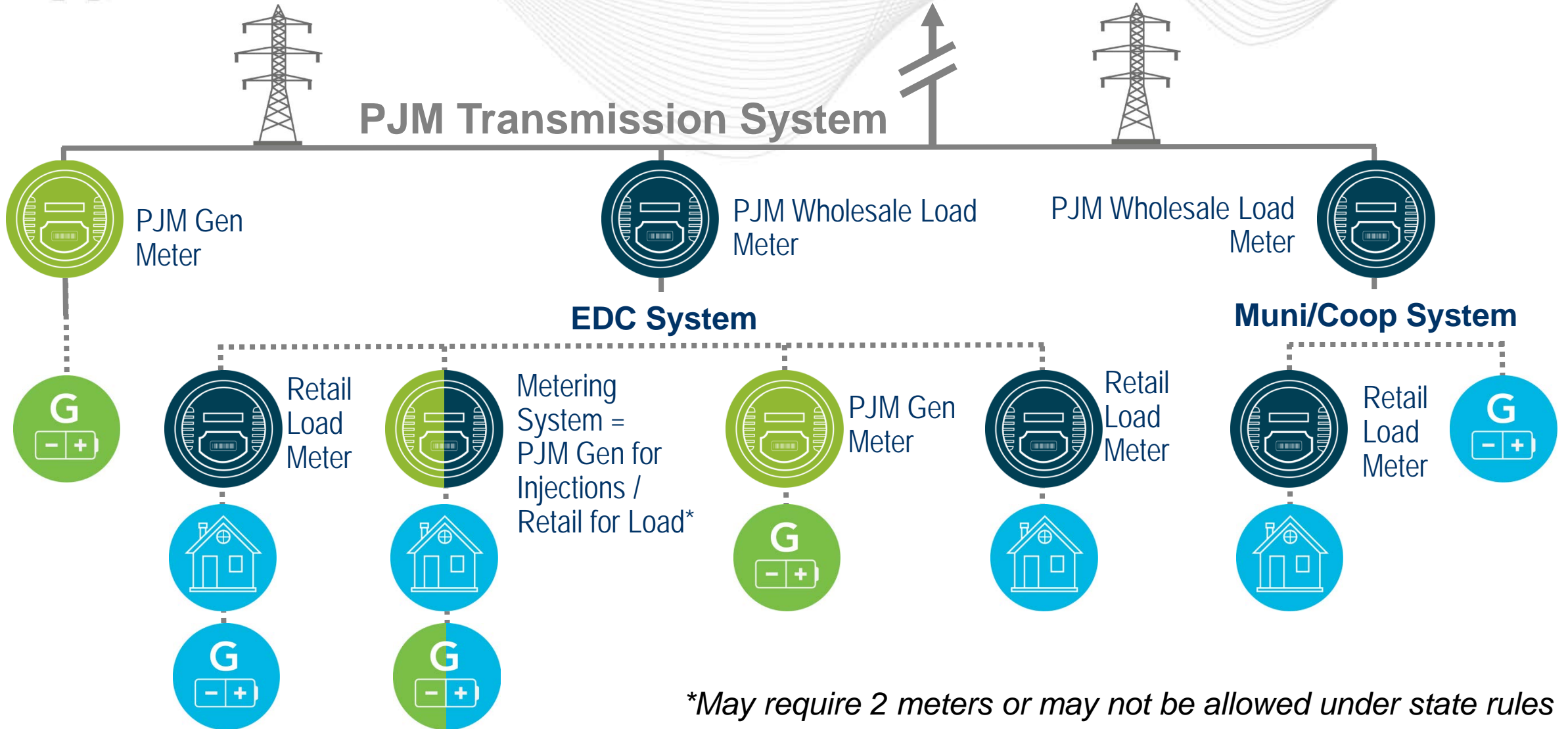
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Generation/Storage Resource Location and Meter Types



**May require 2 meters or may not be allowed under state rules*

Qualified resources can sell in the following PJM markets:

- Energy
- Capacity
- Ancillary services such as Synchronized Reserve and Regulation
- (Other PJM services like black start, etc are not market-based.)



PJM Energy And Capacity Not Mutually Exclusive

- Selling energy in PJM markets is in parallel with any PJM capacity commitment.

PJM gen metered resources providing market-based A/S (i.e., synch and reg):

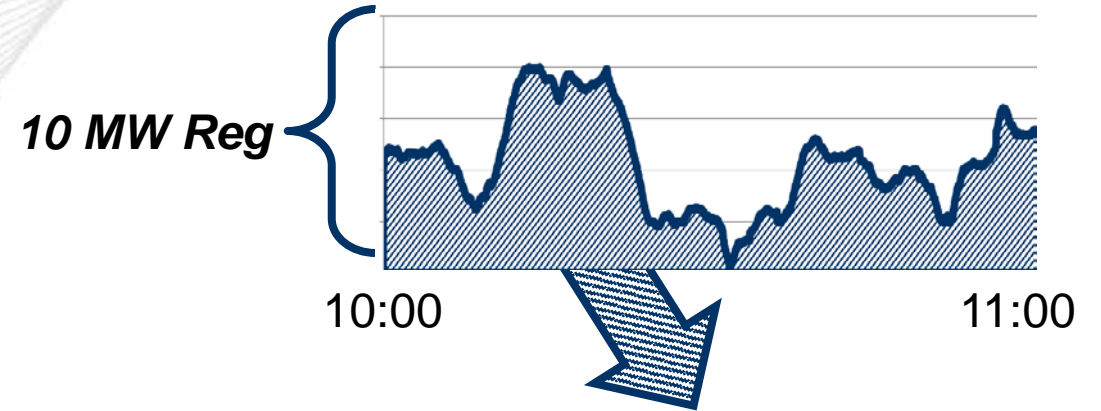
- Reserve the appropriate MW capability to follow PJM signal;

-AND-

- Produce or consume according to PJM signal.

Units get 2 categories of payments:

- A/S payment based on market clearing price, performance, LOC, etc. as appropriate;
- Settlement for energy provided at LMP.

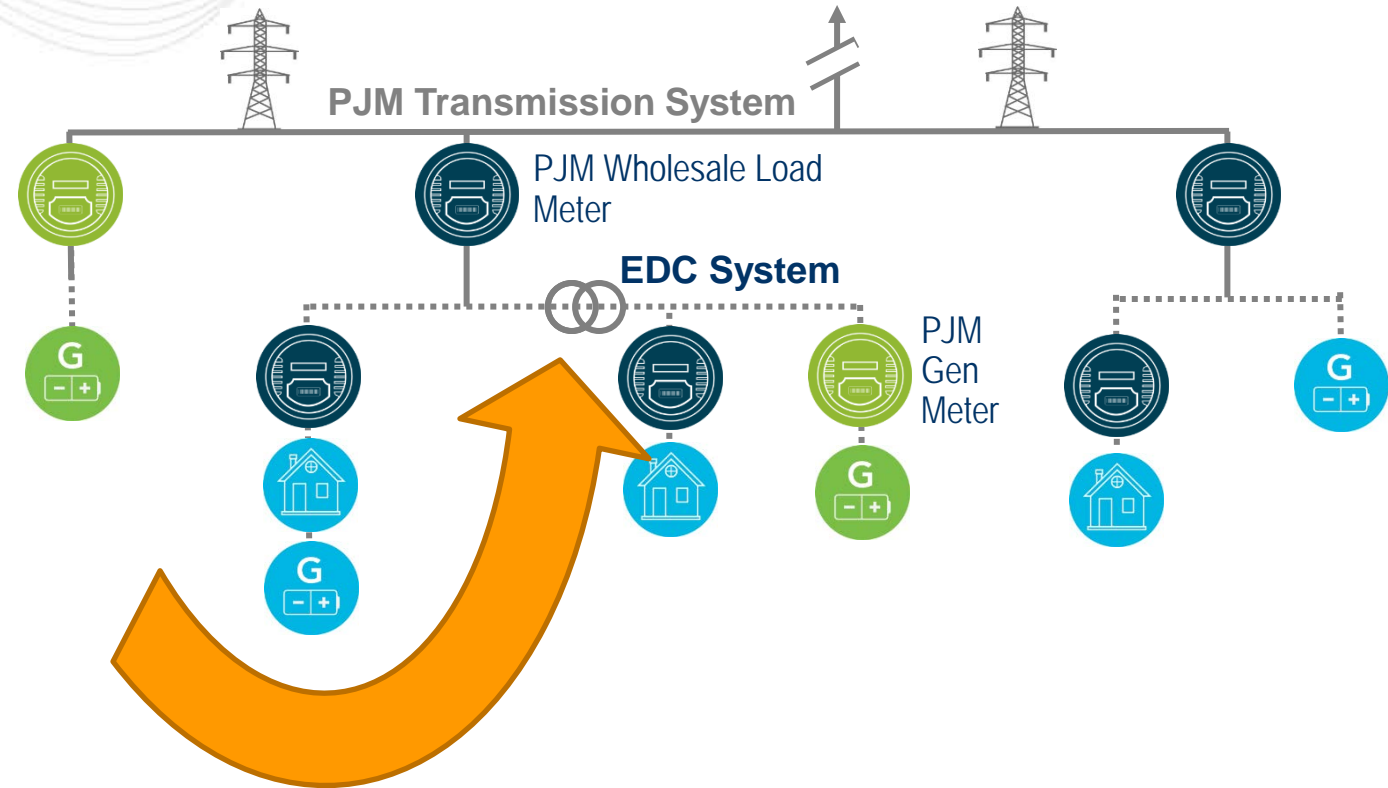


Example:

8 MWh Energy

- 10 MW regulation compensated from regulation market
- 8 MWh of energy produced in the process of following regulation signal, paid at RT LMP

- “Distribution constraint management”
- E.g., EDC transformer is at thermal limit
 - Unit is dispatched in coordination with PJM
 - Energy is provided, and benefit to the EDC also provided simultaneously





Grid-Tied Gen/Storage Services

By Column: Can Do All Checks w/ Given MW Over Applicable Time*

Service	Resource Location →	Load Metered		PJM Generation Metered	Transmission Asset	Off-Grid
	Service Jurisdiction ↓	Not DR	DR			
PJM Energy Sales	Federal		✓	✓		
PJM Capacity Sales	Federal		✓	✓		
PJM Ancillary Services Sales	Federal		✓	✓		
Bill Reduction: Consume Less Energy	Federal/State	✓	✓			
Bill Reduction: Capacity	Federal/State	✓				
State Sale/Credit: Inject Energy (including Net Metering)	State	✓				
Distribution Constraint Management	State	✓	✓	✓**		
Distribution Voltage Support	State	✓	✓	✓		
Transmission Asset					✓	
Emergency Backup for Customer	State					✓**

*Subject to constraints on following slides

** "Energy Storage" may only use energy bought at wholesale for PJM Energy, Capacity and Ancillary Services

Applicable Periods	
PJM Energy Sales Bill Reduction: Consumer Less Energy State Sale/Credit: Inject Energy	1 hour
PJM Ancillary Services Sales	1 hour
Any PJM Markets: Switching among PJM Generation Metered, Non-DR and DR	Delivery Year: e.g. June 2018 – May 2019
PJM Capacity Sales Bill Reduction: Capacity	Delivery Year: e.g. June 2018 – May 2019
Transmission Asset	Permanent until no longer qualifying



Definitions and Additional Restrictions

Demand Response (DR)	<p>Unit cannot inject past applicable meter when in market as PJM DR.</p> <p>In practice, each DR MW of capability may participate in Energy <u>or</u> Ancillary Services market in a given hour.</p> <p>DR resources cannot also be PJM Generation Metered resources in the same delivery year.</p> <p>In a given delivery year, each MW of capability may participate as a wholesale DR capacity resource <u>or</u> peak shave to reduce retail capacity commitment.</p> <p>DR in energy market is compensated for load reductions done specifically for PJM dispatch when it would not have otherwise reduced load.</p>
PJM Generation Metered Unit	<p>Only generation/storage resources studied as Capacity Resources may provide PJM capacity.</p> <p>Any portion of a resource designated as a Capacity Resource may not net against wholesale load.</p> <p>Eligible resources choosing to be “Energy Storage” or “Capacity Storage Resource” under PJM Tariff must be used solely to participate as Market Seller in PJM capacity, energy and/or Ancillary Services markets.</p>
State Sales: Net Metering	<p>Net Energy Metering units cannot inject onto the transmission without being compliant with applicable PJM rules.</p>
Bill Reduction: Capacity	<p>Use of Non-Retail Behind The Meter Generation to net against load for reducing LSE RPM capacity charges is subject to PJM business rules. Non-Retail Behind the Meter Generation cannot inject onto the transmission system.</p>