

DER process for participation in the 28/29 BRA

DISRS

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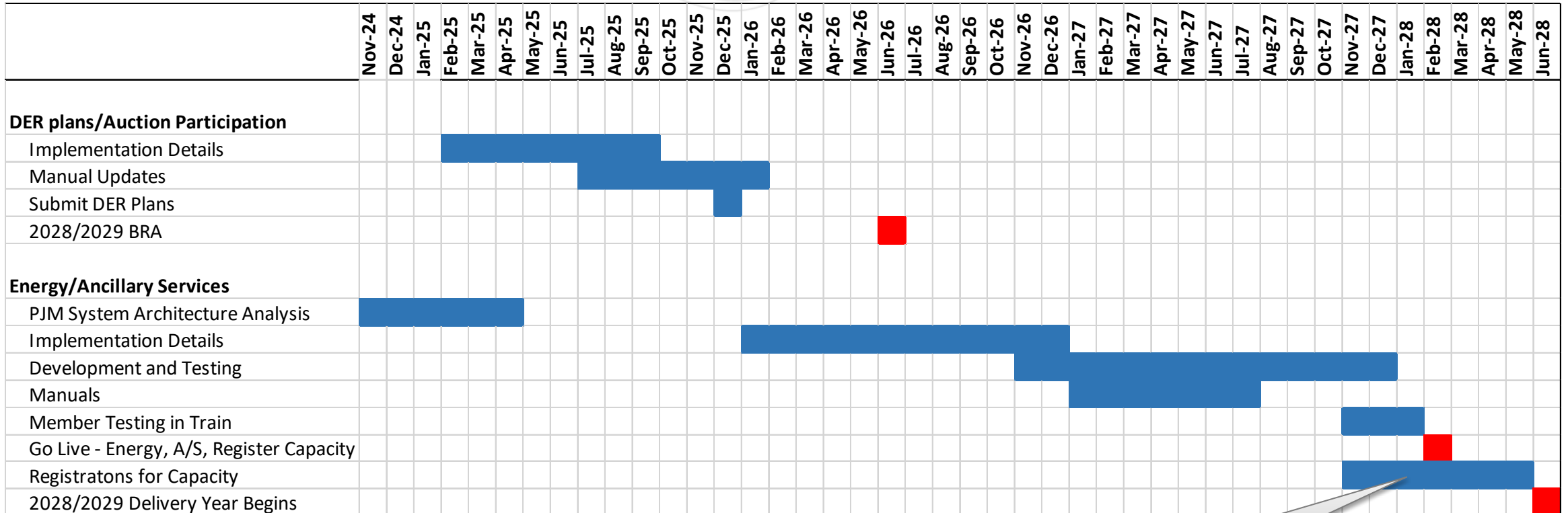
June 6, 2025

This represents PJM's draft approach. This will change and include more details for full implementation.

- Focus for this meeting
 - Manual update time line (slide 5)
 - Draft DER plan (slide 15-18)
 - High level review of energy must offer requirement (19-20)
 - Outage reporting (21)



Overall implementation schedule



DR registration will not start until 1/1/28 when PLC is available

Phase 1 Schedule focused on 28/29 BRA participation

	Feb/25	Mar/25	Apr/25	May/25	Jun/25	Jul/25	Aug/25	Sep/25	Oct/25	Nov/25	Dec/25	Jan/26	Feb/26	Mar/26	Apr/26	May/26	Jun/26
DER implementation details																	
Manual Updates (M18, etc.)																	
Key 28/29 BRA activities																	
Request ELCC rating for non-standard (hybrids, etc.)																	
Post DER Plan template																	
Submit DER plans																	
MOPR certification																	
Unit specific MSOC & MOPR request																	
28/29 BRA																	

Final BRA Pre-auction activity schedule will be posted on pjm.com in Sep timeframe

Distributed Resources Subcommittee (DISRS) - Work Plan										
Order 2222 Manuals				2025 / 2026						
Detailed Work Plan -- Order 2222 Workplan				7/2025	8/2025	9/2025	10/2025	11/2025	12/2025	1/2026
M-18 Capacity Market				x	x					
M-20A Resource Adequacy Analysis					x	x				
M-21B PJM Rules and Procedures for Determination of Generating Capability					x	x				
First Read - MIC, M-18						x				
Endorse - MIC, M-18							x			
First Read - PC, M-20A, M-21B						x				
Endorse - PC, M-20A, M-21B							x			
First Read - MRC, All Manuals							x			
Endorse - MRC, All Manuals								x		

Manual updates for Energy and Ancillary Services

Order 2222 Manuals	2027						
	1-Jan	1-Feb	1-Mar	1-Apr	1-May	1-Jun	1-Jul
Detailed Work Plan -- Order 2222 Workplan							
M18 Capacity Market	x	x					
M21 Rules & Procedures for Determination of Generating Capability	x	x					
M21a Determination of Accredited UCAP Using Effective Load Carrying Capability Analysis	x	x					
M21b PJM Rules and Procedures for Determination of Generating Capability	x	x					
M11 Energy & Ancillary Services Market Operations	x	x					
M12 Balancing Operations		x	x				
M14d Generator Operational Requirements		x	x				
M1 Control Center & Data Exchange Requirements		x	x				
M3a Energy Management System (EMS) Model Updates and Quality Assurance (QA)		x	x				
M10 Pre-Scheduling Operations		x	x				
M27 Open Access Transmission Tariff Accounting	x	x					
M28 Operating Agreement Accounting	x	x					
M29 Billing	x	x					
First Read - MIC , M18, M11, M28, M29				x			
Endorse - MIC , M18, M1, M28, M29					x		
First Read - SOS , M1, M12, M14d				x			
Endorse - SOS , M1, M12, M14d					x		
First Read - PC , M21, M21a				x			
Endorse - PC , M21, M21a					x		
First Read - OC , M1, M12, M14d				x			
Endorse - OC , M1, M12, M14d					x		
First Read - MRC , All Manuals						x	
Endorse - MRC , All Manuals							x

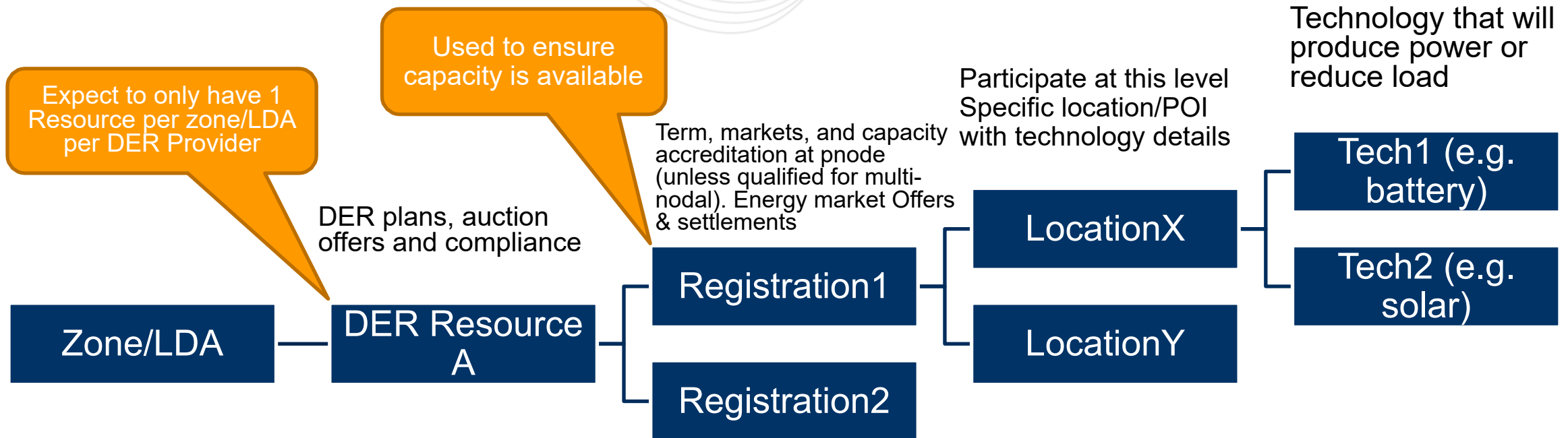
Nomenclature: PJM plans to standardize across models to help communication process

- Location = Component DER. For DR related activity this is the EDC account number for retail premise. For DG, this is unique EDC reference number for POI.
 - Confirmed by EDC in 15 day location review process prior to registration process.
- Registration = ~DER Aggregation Resource. One of more locations based on the aggregation rule (pnode or zone & EDC). Identifies the markets, time and amount eligible to participate.
 - Reviewed by EDC in 45 day registration review process.
 - Requires PJM final approval based on EDC input
 - May have multiple registrations at same pnode.
- DER Resource = DER Capacity Resource. One or more registrations in the same LDA/Zone. Identifies “resource” that will offer into the capacity market.

- DG – Distributed Generation that interconnects through the State interconnection process (does not go through the PJM queue)
 - Existing BTMG or NRBTMG that will convert to DG must notify PJM by September prior to DY to ensure load forecast and OPL are accurate for future Delivery Year.
 - May not be a PJM Generation resource (Capacity or Energy Only)
- DRwl – DR with injections (same as DR but will participate in the wholesale market with both load reductions and injections)
 - Single DER Component/Location may either participate in DER or DR model
- DR – Demand Response, only reduces load at POI (EDC account number). Does not participate in the market at times when there are injections onto the distribution system.

One location may on participate with one provider as one of the following: DER, DR, PRD, PSA or front of the meter Generation

- PJM member with PJM DER participation agreement
- Size limit - Location \leq 5 MW of capability
- Registration and location data requirements subject to EDC review process
- RERRA approval
 - Small EDC is Opt in
 - Large EDC where location includes DR has opt out
- Settlement and Telemetry data
 - Settlement data by location required 1 business day after dispatch (hourly or more granular)
 - Telemetry by registration required at 1 minute scan or more granular based on market rules (i.e.: regulation)
- Aggregations
 - Energy market (includes must offer requirement for Capacity Resources)
 - location \leq 0.1 MW @ transmission zone and EDC (“multi-nodal aggregation”)
 - One location may be $>$ 0.1 MW
 - location $>$ 0.1 MW @ pnode (typically a load bus on the transmission system)
 - Capacity market = lower of LDA or transmission zone (for example – aggregate to DPL-S). Minimum DER Capacity Resource size is 0.1 MW.
- One Member (“PJM org”) per location for participation across all models
- Location on NEM contract may only participate in ancillary service markets with injection.



DER Plans consist of Planned and/or Existing DER

All DER will be considered Planned until registrations are approved

Existing	Planned
<ul style="list-style-type: none">I. Currently have capability to provide capacity and will provide the capability for DY of RPM AuctionII. Existing MWs based on pre-registrations in Capacity Exchange. Pre-registrations are based on current DR Hub registrationsIII. No Credit Requirement	<ul style="list-style-type: none">I. Location not registered and approvedII. Credit Requirement is Pre-Clearing BRA Credit Rate * Number of Planned MWs

DER Provider is required to provide Officer Certification that MWs will be delivered in the DY (similar to DR Plan)

- DG and Injection portion of DRwl: $\text{Nominated ICAP} * \text{ELCC class average} * \text{Unit Specific Performance Factor} = \text{Nominated UCAP}$
 - ICAP = Min (Nameplate or amount approved by EDC to inject onto the distribution system)
 - Provide additional information about closed or open loop by location during registration process
 - If no published ELCC class (similar to a hybrid) then DER Provider will need to request a value from PJM by August 1st prior to calendar year when auction is being conducted
 - DER provider may need to provide unit specific operational data, as needed (example [template](#))
 - Load Reduction portion of DRwl: $\text{Nominated ICAP} * \text{ELCC class average} = \text{Nominated UCAP}$
 - ICAP - same as DR
 - Summer ICAP = $\text{PLC} - (\text{FSL} * \text{CLF})$
 - Winter ICAP = $(\text{WPL} * \text{ZWWAF} * \text{CLF}) - (\text{FSL} * \text{CLF})$
- Registrations – calculate accreditation by location to come up with registration/aggregation UCAP.

	MOPR	MSOC
DG	MW by technology type	MW by technology type
DRwInjection	Injection MW by technology type	Injection MW by technology type
DR	Not applicable	Not applicable

- DG and injection from DRwI are required to provide the following based on the pre-auction activity deadlines if they would like to participate in the auction:
 - Planned and Existing
 - provide MOPR certification prior to deadline
 - Heterogeneous Capacity Resource must submit unit specific MSOC or offer at \$0

DER Resources do not have must offer obligation in the capacity market

- MOPR (planned or existing)
 - if subject to MOPR then must request unit specific price (may use weighted average MOPR price by technology) or is not eligible to participate in auction.
- MSOC (existing)
 - Price taker (\$0 offer price cap) unless unit specific MSOC is requested and approved.
 - Segment based MSOC by technology
 - Weighted Average MSOC

DER Plan

Planned DER Summary
Capacity Exchange

Existing DER
Capacity Exchange

Planned Details
template

Existing Details
Registrations from DR Hub in Capacity
Exchange (Pre-Registration process)

DER plan will require an officer certification similar to DR

Capacity Exchange

Delivery Year

Auction Type

Refresh



Save



Planned DER Setup

PJM >> 2028/2029 >> BASE

Row Count:

Zone / LDA	Zone	LDA	Unit Type	Unit Type Detail*	DR Injection (Yes/No)	Season	Nominated MW (ICAP)	ELCC Class Rating	Nominated MW (UCAP)	Approved	Credit Requirement
ATSI/ATSI	ATSI	ATSI	Onshore Wind		No	Winter	10.5	0.41	4.305		
ATSI/ATSI	ATSI	ATSI	Onshore Wind		Yes	Annual	2.1	0.41	0.861		
ATSI/ATSI-CLEVELAND	ATSI	ATSI-CLEVELAND	Demand		No	Summer	25	0.69	17.25		
DPL/EMAAC	DPL	EMAAC	Coal		No	Annual	200	0.83	166		
DOM/DOM			Nuclear		No	Annual	10				
DOM/DOM			Nuclear		Yes	Annual	5				
			Other								

* Provide detail information if the Unit Type is Other, and no default ELCC Class Rating.

DER plan will initially only include planned DER but will later incorporate existing DER based on approved registrations. PJM will create DER resources (ACCOUNT Name + ZoneSubzone + DER AGG) based on unique Zone/LDA submissions as needed from DER Plan information

Planned DR Details			
		<u>RPM Auction</u>	<u>Delivery Year</u>
Company Short Name:		DR Plan Submittal for: Base Residual Auction	2026/2027
		Submission Date:	
Description of program(s):			
Describe the program(s) that you plan to employ to achieve load reduction at end-use customer site(s).			
Equipment details(s):			
List equipment that you plan to control at end-use customer site(s). If applicable, provide description of cycling control strategy.			
List equipment that you plan to install at end-use customer sites(s).			
Provide assumptions regarding whether or not interval meters will need to be installed at end-use customer site(s).			
Description of customer acquisition strategy:			
Describe your customer acquisition strategy, including any strategic partnerships and third party mechanism.			
List all key assumptions used in the development of Estimated Nominated DR Value for a customer segment (such as size of the market for customer segment and considerations made for other CSPs targeting this customer segment). If further key assumptions within a customer segment are used (such as dwelling type targeted for residential segment or county/zip codes targeted for a customer segment), please provide such assumptions.			
Provide current size of sales force and expected size of sales force needed to achieve planned DR.			

DER plan details - DG and DR injection

Planned Distributed Generation and DR injection details														
			<u>RPM Auction</u>	<u>Delivery Year</u>										
Company Short Name:		DER Plan Submittal for:												
		Submission Date:												
Description of program(s):														
Describe how the DG and DR injection you intend to offer into the capacity market and how such resources are acquired.														
DG name	Type	Technology	Zone of Sub LDA	Address	EDC queue	EDC queue status	MW							
Hampton Road solar farm	DG	solar	BGE	50 Locust Ave	a978098	not submitted,submittted, under review, approved, in process, built	5							
Maple wind farm	DG	wind	ATSI	12 Maple Street	a978098		7							
tbd	DG	solar	DOM	na	na		4							
tbd	DRI	solar	PSEG	na	na		1							
MW = amount expected to be approved by EDC for injection onto the distribution system.														

- DER will be handled similar to ESR model (self schedule in DA market and RT dispatch through SCED based on parameters)
 - (tbd) parameters need to be defined
- Offer volume should be based on ICAP commitment and physical capability (availability and associated MWs) as outlined in M11, 2.3.3
 - DG registration should follow technology specifics
 - DR, DRwl or heterogeneous work in progress - DER Provider is required to develop, maintain and offer based on median RT energy delivery forecast value (p50) and make available to PJM & IMM upon request.

- DER Aggregators must submit both price and cost-based offers.
 - Homogeneous will follow associated technology rules
 - Heterogeneous DER Aggregation Resources, or homogeneous DER Aggregation Resources that consist of Component DER that do not have the technology type documented in PJM Manual 15 (e.g., demand response), will have a default cost-based offer of \$0/MWh.
 - DER Aggregators may request an exception for a non-zero cost based offer subject to review by the IMM and PJM (see M15, section 1.8 – Cost Methodology and Approval Process)
 - Fuel Cost Policy that includes transparent and verifiable incremental cost to deliver energy
 - Consideration for DR portion at Net Benefits Threshold (NBT) since load reductions are ineligible for payment

If there are trends in approved exception requests then consider going through CDS and incorporate in M15

- DER Providers are required to provide outage information
 - Potential excusal from PAI following existing rules
 - Must offer in energy market and PJM approval process
- DG and injection from DR
 - Planned and maintenance outages should be reported for equipment issues based on existing rules
 - Note – outage is not required for lack of wind, solar irradiance, etc. This is a function of forecast availability.
- DR (follow existing DR maintenance outage rules – only permitted between October and April):
 - Maintenance or repair at facility on end use device or generator that will be used to reduce load
 - Outage may be between 1 and 30 days
 - CSP maintenance to dispatch system subject to the following restrictions:
 - Limited to one day which must be a Saturday or Sunday, up to twice per quarter

PJM is in the process of determining where these should be reported

- Gen Rating Test – n/a
- Gen Operational Test – n/a
- All DER Capacity Resources are required to test all locations within the aggregation simultaneously at least once per year; the DER Aggregator may perform an unlimited number of tests.
 - The Aggregator must notify the relevant EDC of a test at least 7 days in advance.
- Test Failure Charge for any shortfall, multiplied by the DER Capacity Aggregation Resource Test Failure Charge rate.
 - The Test Failure Charge rate will equal such Seller's Weighted Daily Revenue Rate in the relevant Zone plus the greater of (0.20 times the Weighted Daily Revenue Rate in such Zone for the product(s) tested or \$20/MW-day).
 - Test Failure Charge revenue will be distributed to LSEs that were charged a Locational Reliability Charge, pro-rata based on the LSE's Daily Unforced Capacity Obligations.

- Daily Deficiency
 - Similar to DR process today where shortfall is determined based on sum of registration Nominated UCAP compared to UCAP Capacity commitment on each day.
 - Deficiency Rate is same as DR and Generation today
- PAI - Compliance is aggregated to DER Capacity Resource (typically 1 resource per Zone|LDA per Org)
 - Expected & Actual performance is based on existing technology specific rules
 - DG – approved maintenance and planned outages may be excused
 - DR – subject to DR rules

- Real time dispatch process
- Training requirements
- Clarify BTMG or NRBTMG conversion to DER (any changes to existing process?)
- Consolidate DER information on pjw webpage (DR, DER, PRD, etc.)
- Pre-Registration Process
 - All DER will be considered Planned for 28/29 BRA. Firm up any differences from existing DR Pre-Registration process over time

- DR and DER rule comparison

	DR Capacity and Energy Markets	DER Capacity and Energy Markets	Only applies to capacity
Registrations	Need Pricing Point (usually zone's residual aggregate)	Need PSSE ID from EDC, corresponding pnode from PJM	
	EDC must approve registration	EDC approves location before location can be included on a registration	
	Registration must have appropriate metering (EDC hourly interval)	Registration must have telemetry	
	One location allowed per registration	Multiple locations allowed per registration if at same pnode	
	Locations <= .1 MW are allowed	Locations <= .1 MW may be aggregated zonally (multi-nodally), with same EDC and state.	
	Locations have no MW limit	Locations have a 5 MW limit	
	Two-Provider rule - 1 for capacity, 1 for energy allowed	One provider per location	
	No injections allowed	Injections allowed	
	Not subject to MOPR Or MSOC	Subject to MOPR and MSOC	X
	ICAP to UCAP conversion uses Demand Response Class Average	ICAP to UCAP conversion depends on underlying technology and Performance Adjustment	

	DR Capacity and Energy Markets	DER Capacity and Energy Markets	Only applies to capacity
Events	Dispatch comes from DR Hub via electronic notification (Web Services)	Telemetry signal	
	No must offer in energy market	Has must offer in Day-Ahead energy market	X
	In the absence of a PAI Load Management event, all registrations in a zone test for 2 hours at a time designated by PJM. Depending on performance, 1 PJM Re-test may be allowed or multip CSP Re-tests are allowed	All DER Capacity Resources are required to test all locations within the aggregation simultaneously at least once per year. The number of tests is unlimited.	X
	EDC does not have a role in dispatch	EDC may override dispatch for reliability concerns	
	No PAI excusals	Maintenance and Planned Outages approved by PJM are excused for PAI event. Only applies to generator portion	X
Settlements	Meter data due 60 days from event date	Meter data due 1 calendar day from event date	
Compliance	Meter data due 45 days from end of month of event date	Meter data due 1 calendar day from event date	
	Compliance is based on Demand Response rules	Compliance rules are based on underlying technology	

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**2222 implementation – DER plans for capacity
auction**



Member Hotline

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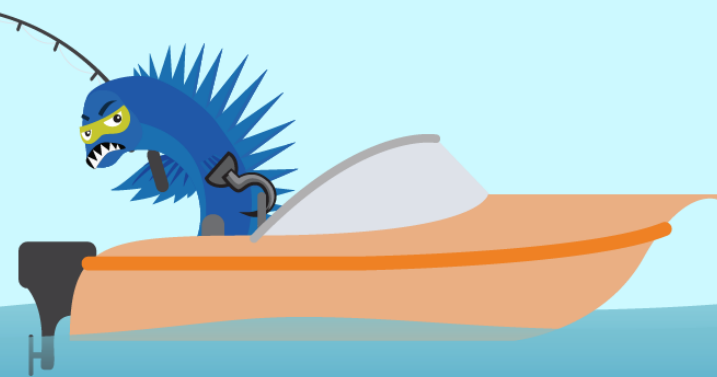
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