

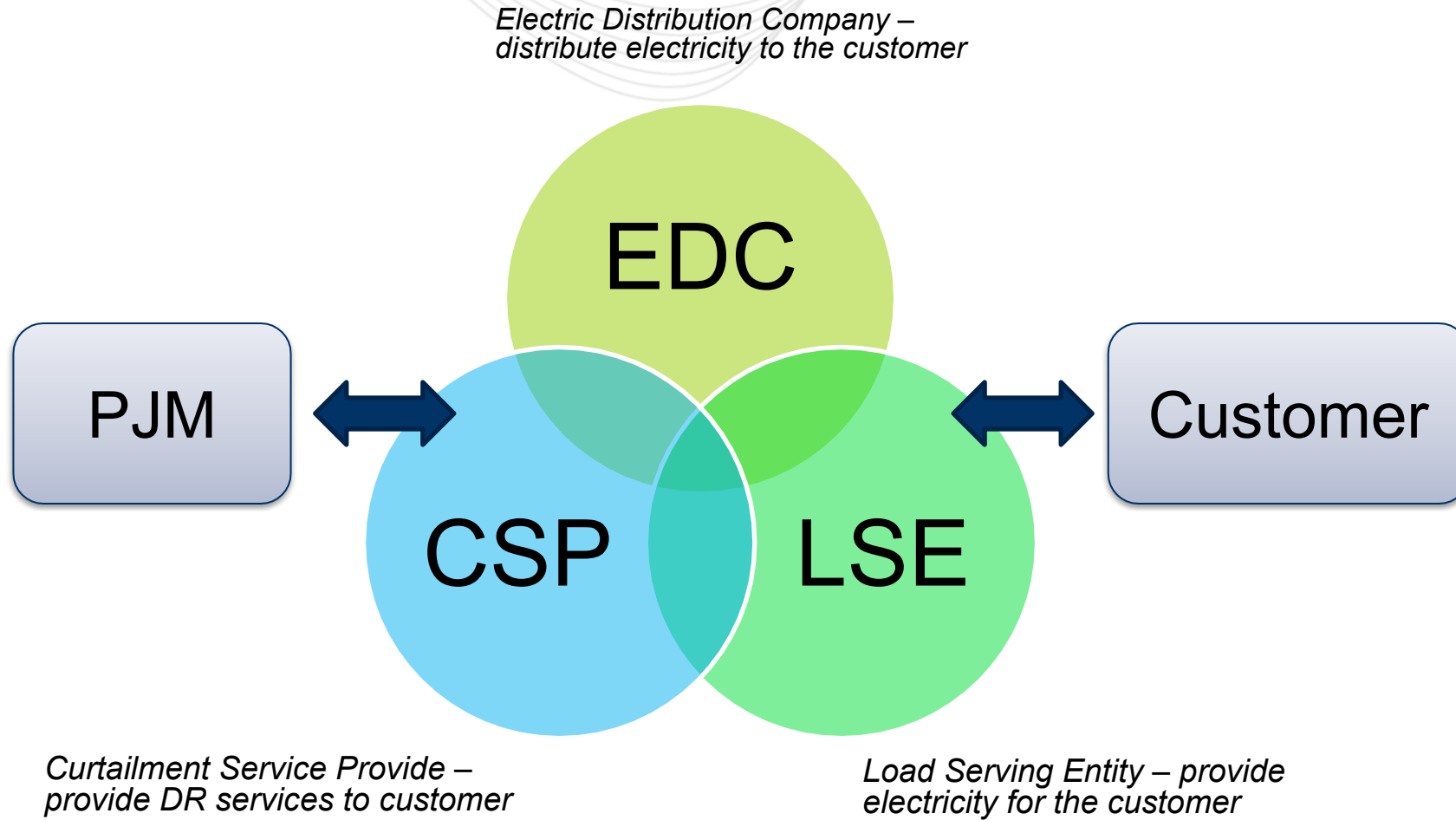


DR Overview

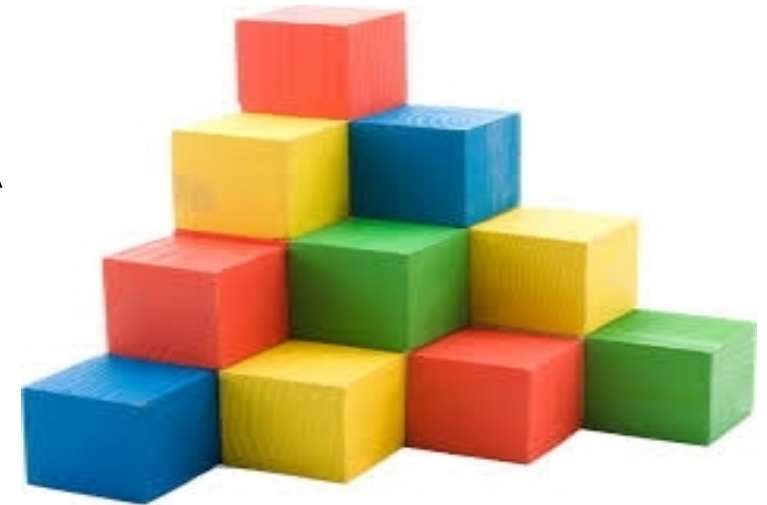
CIFP

June 1, 2023

Roles in the wholesale market

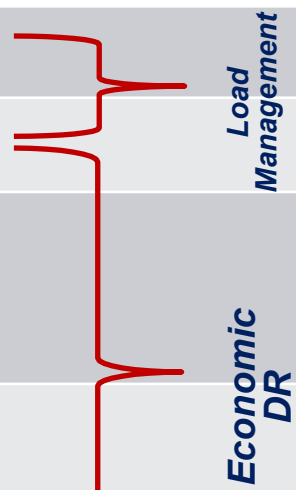


- Retail Electricity Regulator policy (state commissions) guides participation
 - If EDC is large (>4 million MWh) then DR may participate unless there is RERRA evidence that prohibits participation
 - If EDC is small ($=\leq 4$ million MWh) then DR may **not** participate unless there is RERRA evidence that allows participation
 - Typically municipalities/cooperatives



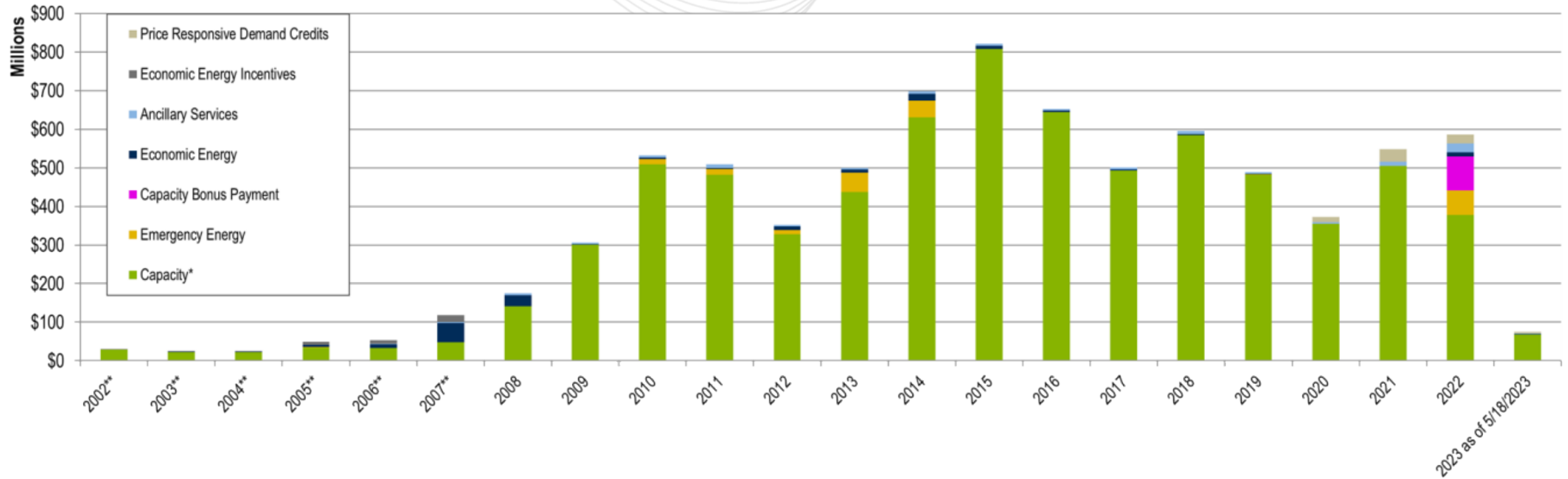
Demand Response Opportunities in PJM Wholesale Market

| Wholesale Service | Demand Response (DR) | Price Responsive Demand (PRD) | Peak Shaving Adjustment (PSA) | Distributed Energy Resources (Order 2222) |
|--------------------------------|----------------------|-------------------------------|-------------------------------|---|
| Capacity | Yes | Yes | Yes | Yes |
| Energy | Yes | | | Yes |
| Secondary Reserves (30 min) | Yes | | | Yes |
| Synchronized Reserves (10 min) | Yes | | | Yes |
| Regulation | Yes | | | Yes |



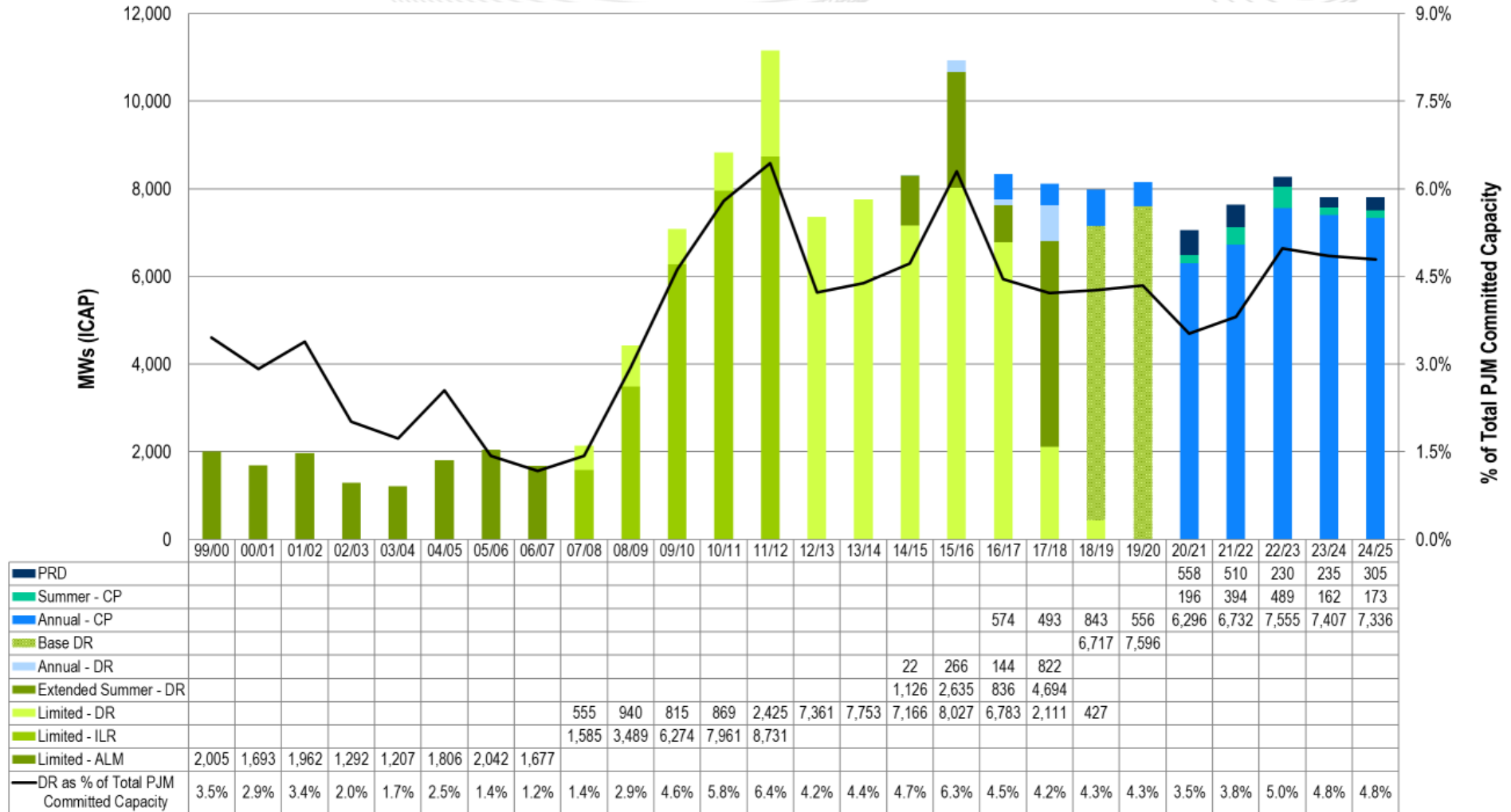
Work in progress

DR is another type of resource that competes to provide (or reduce need for) wholesale market service



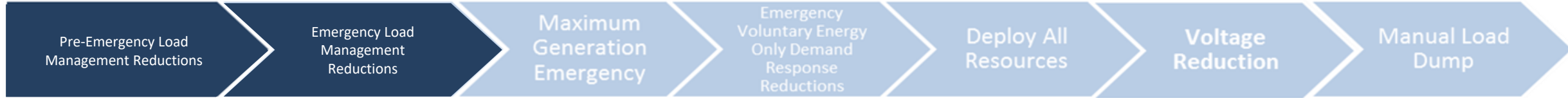


DR Capacity Market Participation by Type by DY



Load Management (Capacity and Energy) requirements

- Load Management = Emergency DR + Pre-emergency DR
 - Emergency DR = behind the meter generator with permit that requires an EEA2 to be issued in order to operate
 - Pre-Emergency DR = everything except Emergency DR
- Availability
 - June through Oct and following May: 10am to 10pm
 - Nov through April: 6am to 9pm
- Offer in auction(s) similar to all other capacity resources
- CSP required to register all locations prior to start of Delivery Year
 - Load must be reduced within 30 minutes unless it qualifies for an exception (60 or 120 minutes)
 - Safety, potential damage, generation startup
 - Capacity accreditation/Nominated Capacity
 - Summer ICAP: Peak Load Contribution (“PLC”) – (summer firm service level (“FSL”) * line loss factor)
 - Winter ICAP: (Winter Peak Load (“WPL”) * Winter Weather Adjustment Factor (WWAF) – winter FSL) * line loss factor
 - UCAP = ICAP * FPR
 - Hourly metering by location (premise)



- CSP required to report hourly real time expected load reductions to help with dispatch process
- DR is dispatched when economic resources are not expected to be able to meet load plus reserves
 - May be dispatched on “subzonal” basis to address localized issue

- Load must be at or below the firm service level (“FSL”)
 - Capacity load reduction based on PLC in the summer and WPL in the winter
 - Performance is aggregated across all registrations dispatched in the emergency action area for each interval
- Paid for energy based on offer price and LMP
 - Energy load reduction based on expected real time load (customer baseline or “CBL”) minus load
- Required to test if not dispatched by PJM
 - PJM initiated 2 hour test (effective 6/1/23)
- Add backs are used for future load forecast (determine unrestricted peak load)

- Requirements
 - Commit in BRA or 3rd IA if forecast increases
 - Dynamic retail rates (linked to nodal LMP)
 - Supervisory Control.
 - Not allowed to participate as economic DR or receive compensation from the energy market
 - PRD hourly curve (load and LMP) by pnode
- Penalties
 - Daily deficiency and event based on PLC and firm service level
 - No winter load benchmark
 - Event penalties apply when: $LMP > PRD$ curve AND Emergency event
- Testing same as DR
- Add Back - Based on emergency event and 5 CPs

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