Large Load Additions

PJM CIFP initial proposal and Alternatives considered

(The following set of slides provide the core components and a process example for the PJM proposal. Additional details are available in the Options and Package Matrix)

Tim Horger, Senior Director, Forward Market Operations & Performance Compliance

September 15, 2025

PJM CIFP Objectives

Create ways for new large loads to connect as rapidly as possible and at the same time, determine a plan for how reliability is maintained in case there is a resource adequacy shortfall.

Create incentives and operational pathways for incremental loads planning to connect to the system to more directly support rapid build out of new supply to serve their needs.

Enable more efficient utilization of the grid by increasing demand flexibility.

Respect jurisdictional lines with states as well as commercial arrangements between load serving entities and their customers.

Initial Proposal

PJM believes that the stakeholder body should, minimally, evaluate taking action on large load additions in advance of the 28/29 BRA.

PJM's initial Stage 1 proposal includes elements related to Non-Capacity Backed Load (NCBL), and narrowly focused efforts related to Generation Interconnection and Load Forecasting.

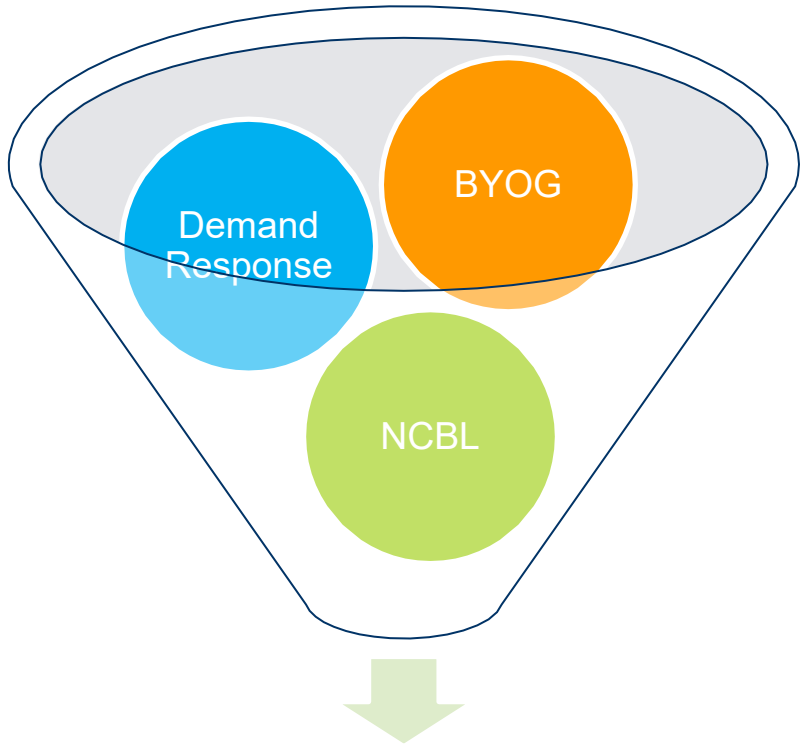
PJM received significant feedback from stakeholders and is willing to evolve its proposal, drop elements altogether and incorporate entirely new frameworks into its proposal that are proposed by other stakeholders.

PJM agrees with concerns around the market impacts of NCBL, but is simultaneously concerned about maintaining operational reliability as these new loads enter the system.

PJM Proposal

To ensure grid reliability when significant new loads emerge faster than new generation, PJM options include the following:

- Provide incentives for Large Loads to bring new generation (BYOG) or participate in existing load flexibility (Demand Response) products in order to avoid potential curtailment during capacity emergencies.
- Creation of an additional “Non-Capacity-Backed Load (NCBL)” service for new large loads. This could offer significant savings to participants, reduce the quantity of demand in the capacity auctions, and create a clear service priority in case the grid is resource inadequate.



These options support the reliability of the electrical grid during stressed conditions and periods of insufficient power to meet system need.

PJM Proposal (cont.)

Non-Capacity-Backed Load (NCBL)

Creation of an additional “Non-Capacity-Backed Load (NCBL)” service for new large loads that reduces the quantity of demand in the capacity auctions and creates a clear service priority in case the grid is resource inadequate.

PJM would credit incremental supply & demand response contracted by large loads (BYOG).

Generation Interconnection

Enhance transparency and partnership opportunities of tentatively planned resources that have not provided a Notice of Intent (NOI).

Provide step-by-step guidelines to facilitate most efficient path for interconnection.

PJM can consider moving Planning Committee Provisional Service review to this CIFP

PJM and stakeholders could explore narrow parallel process that expedites generation linked to large loads with project development confirmation

Proposed Non-Capacity-Backed Load (NCBL) Reliability Backstop

Interim solution until adequate supply is projected to be available

- Allocate a NCBL requirement pro-rata to areas to reduce their load requirement for a BRA to achieve a projected supply-demand balance.
- NCBL will not be subject to capacity charges and is intended to provide EDC/LSE's the ability to incentivize load flexibility as required to ensure reliability.
- PJM would direct the NCBL to areas as required to maintain reliability. This includes clarification of priority order and triggering emergency action.

Proposed Non-Capacity-Backed Load (NCBL) Reliability Backstop

In the event of expected supply shortages given forecasted large loads that do not elect BYOG or DR, PJM would require sufficient load to be Non-Capacity-Backed Load (NCBL) to maintain the RTO Reliability Requirement.

Non-Capacity-Backed Load (NCBL):

- ***Will not*** be included in RPM auction and will not pay for capacity
- No impact to RTEP (all load included)
- May be curtailed during pre-emergency conditions before capacity backed DR.

TO will be responsible for ensuring NCBL can be removed from the system, consistent with the Operational Requirements set forth.

BYOG and DR are credited in Non-Capacity-Backed Load calculation. Requires Notice of Intent (NOI) and offer in RPM.

Trigger for NCBL

When will Non-Capacity-Backed Load (NCBL) be needed?

NCBL will only be necessary if there is expected supply shortage as a result of planned Large Load additions PJM expects that there will be a transitional period where NCBL will be necessary as a result of the significant integration of large loads. NCBL will not be utilized for organic load growth or existing Large Loads. NCBL is not available if there is no reliability requirement shortage.

Triggers

PJM Forecasted Supply < RTO Reliability Requirement

Must be associated with Large Load Additions.

If removal of planned Large Loads from forecast results in shortage then NCBL will not be triggered for non-Large Loads.

Expected supply includes Large Loads participating in DR and BYOG.

What Load Is Eligible for Non-Capacity-Backed Load (NCBL)?

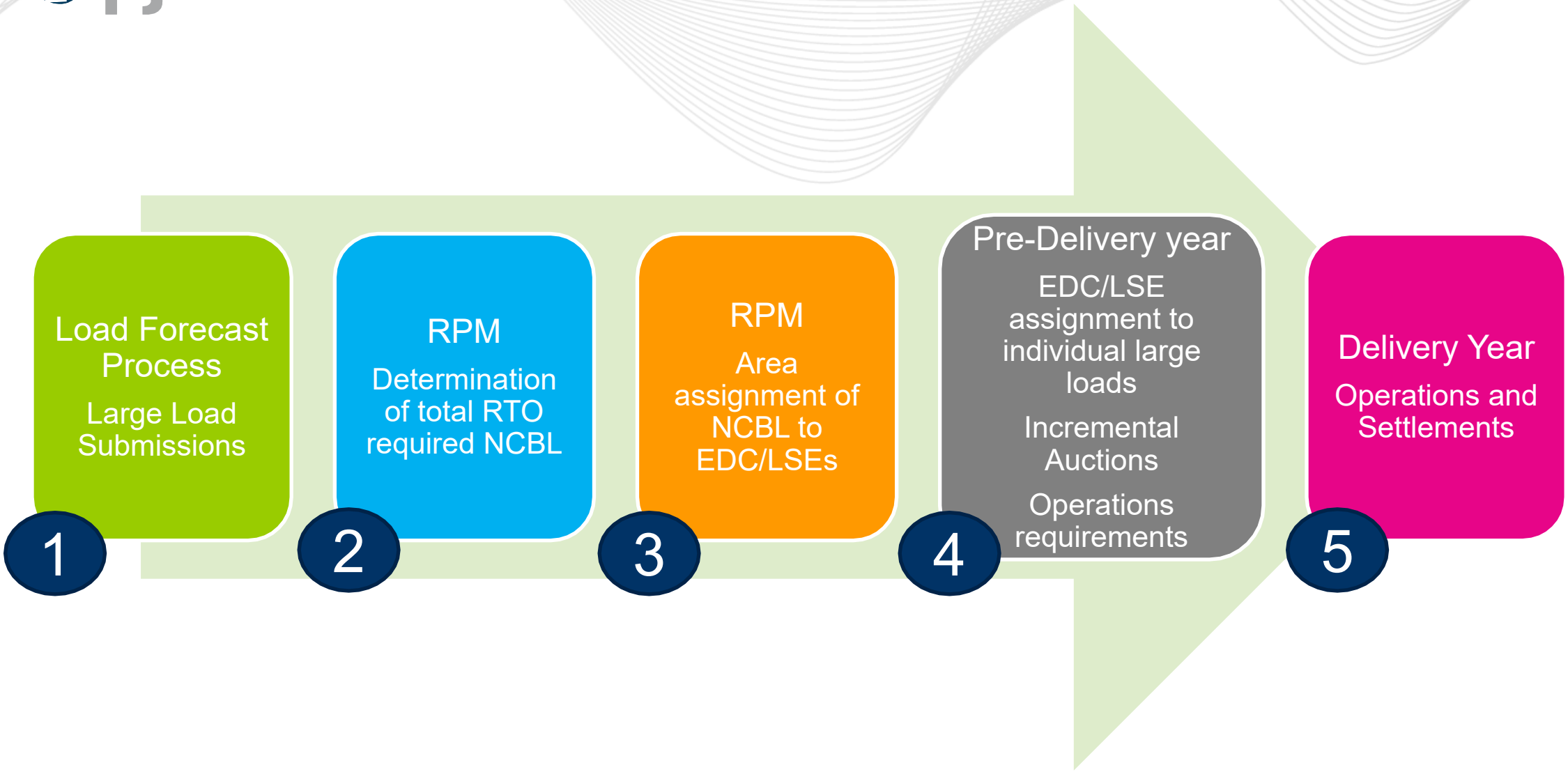
PJM determines the quantity of NCBL required for each area. PJM does not determine actual individual load participation.

- Planned Large Load Additions (LLA) submitted via the Load Analysis Subcommittee.
- Requests of 50 MW or more. LLA are meant to capture trends that are not captured in the model and will ultimately be used to justify decisions to build. Large loads below 50 MW will be considered by PJM upon request from the EDC/LSE on a case-by-case basis.
- BYOG and DR will be exempt from mandatory PJM area assignments.
- Existing in-service large loads will be exempt from mandatory PJM area assignment.

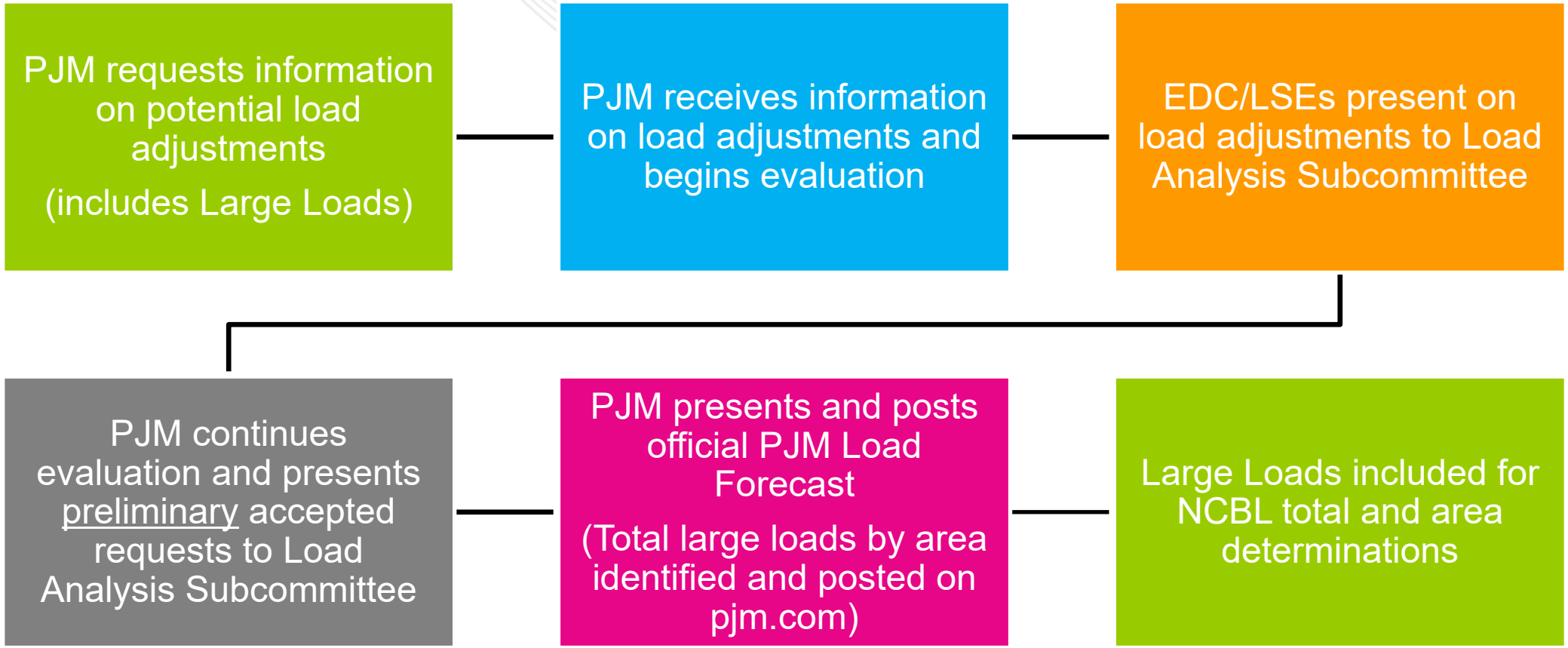
State/EDC/LSE determines actual participation

- Individual Large Load participation of NCBL is at the discretion of the State/EDC/LSE.
- It is expected existing contractual relationships will be considered.
- Exclusion of critical load, BYOG, and Demand Response.
- Large Loads > 50 MW

NCBL Process



1 Load Forecast Process – Large Load Submissions



RPM: NCBL Determination - RTO

Determination of total required NCBL for RPM delivery year

Total NCBL (required) = min (RTO Shortage, Planned large loads)

- RTO shortage = RTO Reliability Requirement - RPM supply; If <0 then RTO shortage = 0
- Planned large loads are large loads that are in the Load Forecast and not in-service (excluding planned large loads that bring own supply (BYOG) and participate in Demand Response)

Example 1 :
RTO Reliability Requirement = 145,500 MWs
RPM Supply = 143,000 MWs
RTO Shortage = (145,500 – 143,000) = 2,500 MWs

Planned Large Loads = 500 MWs

Total NCBL (required) = min (2,500, 500) = 500 MWs

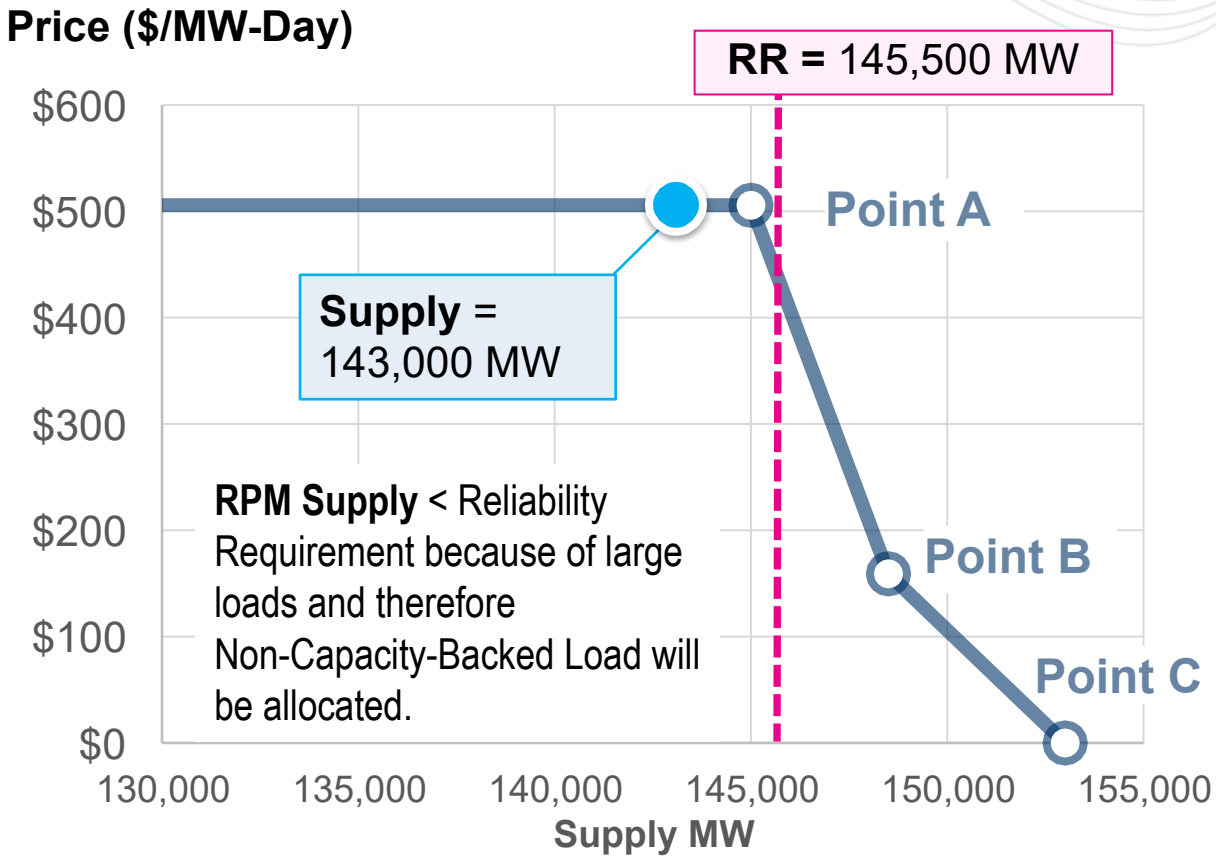
Example 2 :
RTO Reliability Requirement = 145,500 MWs
RPM Supply = 143,000 MWs
RTO Shortage = (145,500 – 143,000) = 2,500 MWs

Planned Large Loads = 3000 MWs

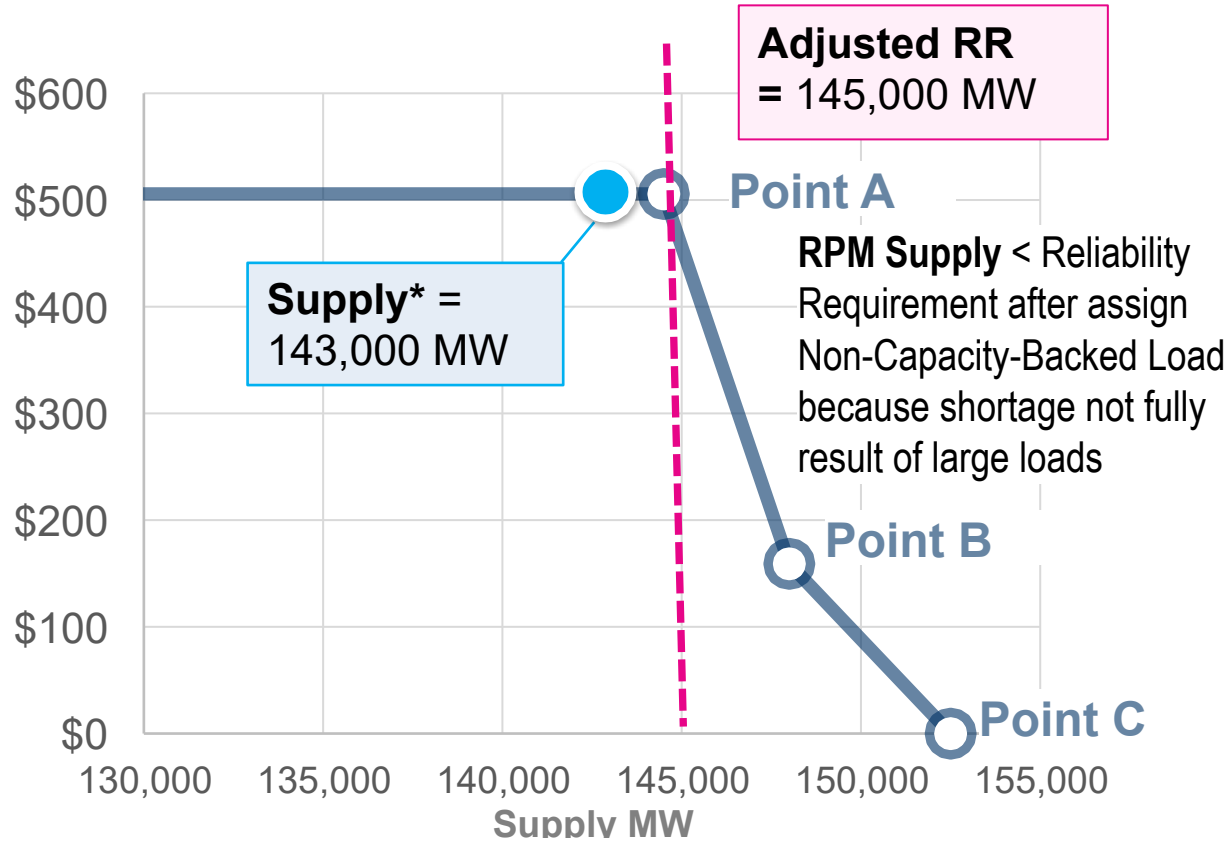
Total NCBL (required) = min (2,500, 3,000) = 2,500 MWs

Example 1: VRR Curve Impact (Large Loads < Shortage)

Example VRR Curve
Supply < Reliability Requirement



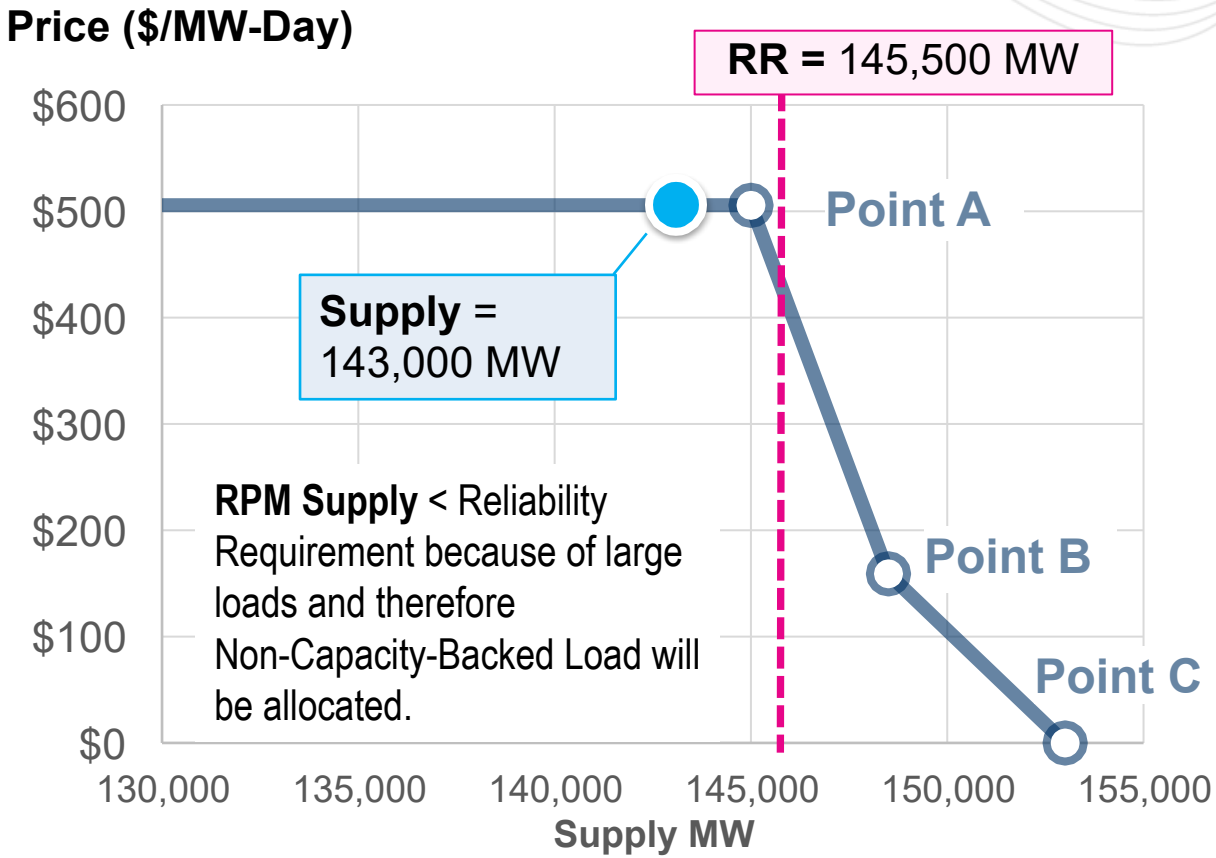
Example VRR Curve
Supply < Reliability Requirement
Large Loads (500 MWs) < Shortage (2,500 MWs)



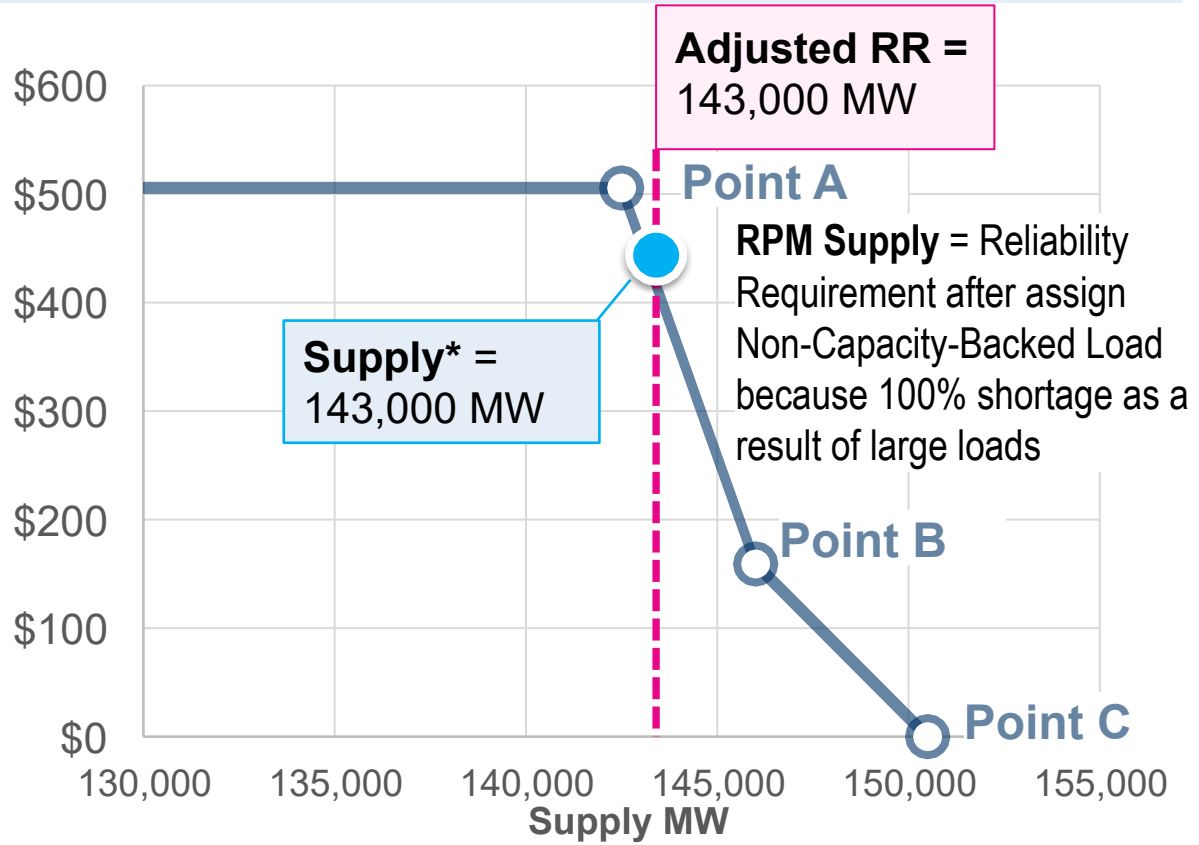
Key Point: VRR shift only 500 MWs and RPM price at cap

Example 2 VRR Curve Impact (Large Loads > Shortage)

Example VRR Curve
Supply < Reliability Requirement



Example VRR Curve
Supply = Reliability Requirement
Large Loads (3,000 MWs) > Shortage (2,500 MWs)



Key Point: VRR curve shift 2,500 MWs and RPM price at Reliability Requirement

*RPM supply that cleared before the inclusion of NCBL will continue to clear and if necessary be made whole to their offer.

Determination of NCBL Area Assignment for RPM delivery year

Area NCBL = Total NCBL (required) * (Area planned Large Loads / planned large loads)

Total NCBL (required) = min (RTO Shortage, Planned large loads) (See previous slides)

Example 1 (cont.) :
Planned Large Loads = 500 MWs
RTO Shortage = 2,500 MWs
Total NCBL (required) = 500 MWs

Area Large Loads
EDC 1 = 100 MW; EDC 2 = 200 MW; EDC 3 = 150 MW;
EDC 4 = 50 MW

Area NCBL (EDC1) = (500) * (100/500) = 100 MWs

Example 2 (cont.) :
Planned Large Loads = 3,000 MWs
RTO Shortage = 2,500 MWs
Total NCBL (required) = 2,500 MWs

Area Large Loads
EDC 1 = 600 MW; EDC 2 = 1,200 MW; EDC 3 = 900 MW;
EDC 4 = 300 MW

Area NCBL (EDC1) = (2,500) * (600/3,000) = 500 MWs

3 Example 1: NCBL Area Assignment (Large Loads < Shortage)

Large Loads by EDC includes planned

*excludes BYOG and DR

% of total Large Loads*
EDC 1 = 20%
EDC 2 = 40%
EDC 3 = 30%
EDC 4 = 10%

Total Large Loads = 500 MWs
RTO Shortage = 2500 MWs
NCBL assigned = 500 MWs
Impact: RPM price at Cap (short 2000 MWs)

PJM Assignment of NCBL (RPM)

EDC 1: 100 MWs | EDC 2: 200 MWs | EDC 3: 150 MWs | EDC 4: 50 MWs

Example 2: NCBL Area Assignment (Large Loads > Shortage)

Large Loads by EDC (LAS)* includes planned and existing

*excludes BYOG and DR

% of total Large Loads*
EDC 1 = 20%
EDC 2 = 40%
EDC 3 = 30%
EDC 4 = 10%

Total Large Loads = 3000 MWs
RTO Shortage = 2500 MWs
NCBL assigned = 2500 MWs
Impact: RPM price at RR

PJM Assignment of NCBL (RPM)

EDC 1: 500 MWs | EDC 2: 1000 MWs | EDC 3: 750 MWs | EDC 4: 250 MWs

Pre-delivery year: EDC/LSE Assignment to Individual Large Loads

Pre-Delivery Year

EDC/LSE determines Individual Large Load participation for NCBL

- May include any (planned or existing) large load as specified by EDC.
- Allows for recognition of existing contractual relationships, state arrangements, critical load, voluntary participation, etc.

EDC/LSE

Large Load

PJM does not identify the actual Large Loads who are allocated

Example 1 (cont.): EDC 1 assignment 100 MWs

Large Load (EDC 1)	Quantity	Type	Assignment
LL1	500 MWs	Existing	0
LL2	1000 MWs	Existing	50
LL3	50 MWs	Planned	0
LL4	50 MWs	Planned	50

Example 2 (cont.): EDC 1 assignment 500 MWs

Large Load (EDC 1)	Quantity (MWs)	Type	Assignment (MWs)
LL1	500 MWs	Existing	0
LL2	1000 MWs	Existing	50
LL3	400 MWs	Planned	350
LL4	200 MWs	Planned	100

Pre-delivery year: Incremental Auctions and Operations

Pre-Delivery Year

- Incremental RPM Auctions provide opportunity for adjustments to NCBL obligations.

- Operations: Transmission Owner, EDC/LSE, and Individual Large Load coordinate to ensure readiness before delivery year.
  - Modeling
  - Metering
  - Operating Procedures

Delivery year: Operations and Settlements

Operations: New Emergency Action Step

- The **Curtailment of Non-Capacity-Backed Large Load** Action is issued by PJM **to the member transmission dispatcher** when the PJM RTO cannot provide adequate capacity to meet the PJM RTO's load, reserves and firm exports or when critically overloaded transmission lines or equipment cannot be relieved in any other way.
- This is a **PJM Operational Instruction** to the member transmission dispatcher to reduce load by the specified amount to effectuate the curtailment.

Settlements: NCBL will not be included in the RPM auction and will not pay for capacity.

- **PJM will remove this load** from the respective zone's forecasted peak load when determining zonal cost responsibility for the capacity procured in the RPM auctions.
- **EDCs will be responsible for excluding** this load from the associated LSE's daily Obligation Peak Load, which is used by PJM to calculate the LSE's UCAP obligation.

Non-Capacity-Backed Load (NCBL) will be considered PJM Network Load for all transmission-related and settlement purposes.

- NCBL receives the benefit of being served from the transmission system without having to schedule transmission service.
- NCBL is in planning studies and network upgrades are identified to reliably serve the load long term.

NCBL that is curtailed during peak days used in the determination of Network Service Peak Loads (NSPL) will be added back for the NSPL determinations.

Non-Capacity-Backed Load (NCBL) will not be included in the RPM auction and will not pay for capacity for the transition period. To ensure it does not pay for capacity:

- PJM will remove this load from the respective zone's forecasted peak load when determining zonal cost responsibility for the capacity procured in the RPM auctions.
  - Status quo: Each zone with RPM load is responsible for paying for a share of the RTO-procured UCAP based on its share of forecasted peak load.
- EDCs will be responsible for excluding this load from the associated LSE's daily Obligation Peak Load, which is used by PJM to calculate the LSE's UCAP obligation.

Non-Capacity-Backed Load (NCBL) – Responsibilities

Action	Responsibility	Timing
Identification of BYOG and DR	EDC/LSE/LL	Pre-RPM
Reliability check (RR vs. Supply)	PJM	RPM
Identification of quantity and area assigned NCBL	PJM	RPM clearing
VRR and RR shift	PJM	RPM clearing
NCBL individual determinations and contracts between Large Load and EDC/LSE	EDC/LSE/LL	Pre-DY
Operational procedures	TO/PJM/LL	Pre-DY
Adjustment to Obligation Peak Load for Capacity Settlements	EDC/LSE/PJM	Pre-DY
Real-Time Curtailment if necessary	TO/LL/PJM	Real-time

Load Product Comparisons

	Status Quo:		
	Capacity-Backed-Load	**Demand Response**	**Proposed Non-Capacity-Backed Load**
Participant	EDC/LSE	Load via CSP	LSE/Large Load via EDC/LSE
Load Forecast	Included	Included	Included (with the exception of allocating capacity costs)
RTEP Planning	Included	Included	Included
RPM	Included	Included (supply side)	Not Included
Operations Curtailment Priority	Manual Load Dump	Pre-Emergency	Pre-Emergency before DR
PJM Dispatch Notification of Curtailment	Emergency Procedures website and curtailment directive given to TO for area.	Via the DR Hub System and Emergency Procedures website.	Emergency Procedures website and directive given to TO for curtailment of large load that is NCBL.
Verification	• Part of Operating procedure (Open Breaker) • Telemetry before and after	Measurements	• Part of Operating procedure (Open Breaker) • Telemetry before and after
Type	Permanent	Permanent	Transitional; only available if forecasted resource inadequacy
Quantity	No limit	No limit	Capped at megawatts of shortage
Cost Allocation	Load	DR Participant	EDC/LSE allocates savings (RPM savings) to NCBL

Non-Capacity-Backed Load Proposal – Advantages

Risk of manual load shed significantly reduced

Significant costs savings to participating customers

Coordinated curtailment procedures with Non-Capacity-Backed Load ensures reliable operations

Back-up resources, if available, can ensure zero downtime

No change to RTEP Planning

Provides incentives for participation in BYOG and DR to support Reliability

PJM implementation can be made as early as the 2028/29 RPM auction

(Operation portion effective June 1, 2028)

Large Load Additions

Alternatives considered for core areas

(see matrix for full list of alternatives considered)

PJM Proposal: Large Load Additions- NCBL

Options	Description	Rationale
Status Quo	EDC/LSE submits large load additions. Equivalent service priority level for all types of load.	Risk of manual load shed higher.
PJM Option: Non-Capacity-backed load (NCBL)	Non-Capacity-Backed Load is defined as large load (> 50 MWs) that is not part of capacity market and is curtailable before pre-emergency capacity-backed load/DR. Potential mandatory allocation to each area if RTO shortage. Exemptions for large load participation in BYOG and DR.	PJM is responsible for limiting load shed events and ensuring grid reliability, despite lacking the authority to directly control new load interconnections or mandate new generation additions. NCBL allows for PJM operations to manage the grid proactively with a different service priority for large loads while providing large loads options to first participate in BYOG or DR. Mandatory requirement ensures enough participation but no more than necessary to meet Reliability Requirement.
Option 2	Offer voluntary NCBL only to each area.	Allows the States/EDC/LSEs to determine own risk and cost profile. • If less voluntary participation then higher risk of manual load shed. • RPM price impacted by quantity of NCBL. More participation results in lower price (same impact as if had more supply).

PJM Proposal: Large Load Additions- NCBL (cont.)

Options	Description	Rationale
Option 3	Require Large Load to bid (via LSE/EDC) into RPM Auction (with cost commitment) or will be excluded from load forecast. NCBL only voluntary, if necessary.	Improves certainly of load forecast by requiring large load financial commitments. Voluntary NCBL participation allows States/EDC/LSEs to determine risk and cost profile. (see option 2). The large loads will either need to become an LSE or the LSE submits on behalf of the large load. This could create jurisdictional challenges. The risk of manual load shed still higher unless NCBL required.
Option 4	Update to Manual Load shed allocation process	Changes to the load shed allocation method could be made regardless of whether the other options are implemented. There appears to be substantial stakeholder opinion that the current method is outdated and misaligned with the current market mechanism. There may be benefits to aligning this method with the outcome of this CIFP process. RPM backstop auction is likely to be triggered if no other changes are made beyond the load shed allocation method. Some stakeholder feedback suggested triggering the backstop auction, or something similar, sooner than the current Tariff would provide.

PJM Proposal: Generation Interconnection

Options	Description	Rationale
PJM Option	Enhance transparency and partnership opportunities between tentatively planned resources that have not provided a Notice of Intent (NOI) and Large Loads wishing to connect to the system quickly. These are incremental or new resources not yet considered in the Reliability Requirement determination but further along in the queue process; Provide step-by-step guidelines to facilitate most efficient path for interconnection.	Provides for more transparency and opportunities for accelerated interconnection.
Option 2	Provisional interconnection service	Not included in initial PJM package because currently part of Planning Committee initiative
Option 3	Expedited interconnection process	See next Slide Significant enhancements have been made in the interconnection process. Additional opportunities for accelerated interconnection to be considered separate from the CIFP.

Summary of the Alternative Solution Package – Expedited Interconnection

Solution package proposes to create a new expedited interconnection procedures for sponsored generation.

- This proposal would be standalone outside of the PJM Cycle Process and operate in parallel
- The goal is to have a minimal impact on the existing Cycle Process
- Limited in volume and strict entry requirements.

- Timeline estimated at 10 months
- Projects pay for all network upgrades and must be in service in 3 years.

- Expedited timing allows shovel ready resources to execute GIA sooner and address resource adequacy issues that could not be achieved in the standard process.

PJM Proposal: NCBL Quantity

Options	Description	Rationale
PJM Option	Total NCBL (required) = min (RTO Shortage, Planned large loads)	• Reliability initiative to minimize shortage • Out of market solution • Grandfathers existing large loads to recognize existing agreements/contracts.
Option 2	Total NCBL (required) = min (RTO Shortage, Planned + Existing large loads)	• Including existing large loads provides potential increased reliability.

Option 3	No requirement: NCBL 100% voluntary	• Voluntary participation may not be enough to reduce risk of manual load shed.
		• Responsibility on the EDC/LSE/State to determine risk profile.
		  ◦ If less voluntary participation then higher risk of manual load shed.
		  ◦ RPM Price impacted by quantity of NCBL. More participation results in lower price.

PJM Proposal: NCBL Trigger

Options	Description	Rationale
PJM Option	Triggered if RTO shortage: RTO shortage = RTO Reliability Requirement - RPM supply; If <0 then RTO shortage = 0	Reliability initiative to minimize shortage Transitional solution
Option 2	No Trigger - If there is large load in forecast then eligible	This option allows for participation in NCBL regardless of any RTO shortage and makes it a permanent product.
Option 3	Yes, triggered if Supply < Point A on VRR curve	This option only requires NCBL if short at maximum point on curve, which has no impact on RPM price but increases risk of manual load shed.
Option 4	Yes, triggered if Supply < XX% of RR on VRR curve	This option only requires NCBL if short the Reliability Requirement by a determined percentage, which has smaller impact on RPM price but increases risk of manual load shed.

PJM Proposal: Load Forecasting for Large Loads

Options	Description	Rationale
Status quo (PJM Option)	Process • PJM requests information on potential load adjustments (includes Large Loads). • PJM receives information on load adjustments and begins evaluation • EDC/LSEs present on load adjustments to Load Analysis Subcommittee • PJM continues evaluation and presents preliminary accepted requests to Load Analysis Subcommittee. • PJM presents and posts official PJM Load Forecast. (Total large loads by area identified and posted on pjm.com)	Multiple paths to enhance Load Forecast at Load Analysis Committee (LAS) including the following: 2023: Manual 19 Attachment B updates to reflect more transparency in data needs and documentation from requesting EDCs/LSEs. 2024: Added template to report large load adjustment request data. 2025: Collaboration with stakeholders to create implementation document including financial backing for large load adjustment requests.
Option 2	Include an additional step to allow for state utility commission review of large load adjustments in forecast.	Provides an optional opportunity for state to review and opine on large load adjustments in their given state, and discuss with PJM and EDC any particular requested adjustment based upon state knowledge of project(s).

Appendix A
Additional Examples

Detailed Example of NCBL Assignment

Example of Allocation Process for Non-Capacity-Backed Load by Area

	EDC1	EDC2	EDC3	EDC4	EDC5	Total
Large Loads (MW)	2,000	500	1,000	2,000	2,000	7,500
BYOG or DR	500	0	0	0	0	500
NCBL eligible	1,500	500	1,000	2,000	2,000	7,000

	RTO
Reliability Requirement (MW)	135,000
Supply (MW)	130,000
Excess (MW) *	-5,000

STEP:

1	Determine if there is an RTO-wide shortage by comparing the RTO Reliability Requirement vs. RPM supply.	**RTO Shortage** = 5,000 MW
2	Is the shortage associated with Large Loads? How much NCBL needed?	**Large Loads (removing BYOG and LL DR) = 7,000** **RTO shortage = 5,000** **Large Loads > RTO Shortage; Yes** **NCBL needed = 5,000**

Example of Allocation Process for Non-Capacity-Backed-Load by Area

STEP:	Assign pro-rata as follows:
4 Assign NCBL.	**EDC1** = 5,000*(1,500/7,000) = 1071 MW
	EDC2 = 5,000*(500/7,000) = 357 MW
	EDC3 = 5,000*(1,000/7,000) = 714 MW
	EDC4= 5,000*(2,000/7,000) = 1428 MW
	EDC5= 5,000*(2,000/7,000) = 1428 MW
	Total assigned= 5,000 MW
5 Is there still an RTO shortage?	**No**
6 PJM lower the RTO Reliability Requirement and shift VRR Curve by the awarded Non-Capacity-Backed Load.	**Total Allocated Non-Capacity-Backed Load** = 5,000 MW
	RTO Reliability Requirement reduced from 135,000 to 130,000 MW
	RTO Reliability Requirement = RPM supply

Example of Large Load RPM Revenue Impact

Non-Capacity-Backed Load Example – Market Impacts

Markets Example: L1 500 MW Non-Capacity-Backed Load

Forecasted Supply
= 146,000 MW

Reliability Requirement
= 150,000 MW

Total System Non-Capacity-Backed Load
= 4,000 MW

L1 Non-Capacity-Backed Load
= 500 MW

Updated Reliability Requirement
= 150,000 MW – 4,000 MW
= 146,000 MW

RPM Results:

RTO clearing Price = $325/MW-day

Cost to Load = $325/MW-day * 365 days * 146,000 MW = $17.3 billion

Cost Savings to L1 Non-Capacity-Backed Load

RPM savings:
= $325/MW-day
= $13.54/MW-hr.
= $118,625/MW-year

Total system yearly RPM savings (4,000 MW non-capacity backed)
= $475 million

Cost▲ to run back-up diesel units:
= $4/gal * 71 gal/MW-hr.
= $284/MW-hr.

Maximum run hr./year of backup unit before loss: = $118,625 / $284
= 417 hr./year

L1 savings if back-up runs 50 hr./year = $104,425/MW-year; Total savings (500 MW Non-Capacity-Backed Load) **= $52 million**

▲ *Assumes back-up diesel average fuel price = $4/gallon and average consumption = 71 gallon/MW-hr. Additional costs to run back-up units costs may apply and not included in this example*

Key Point: At a $325/MW-day RPM clearing price a large load that chooses Non-Capacity-Backed Load could run its back-up diesel units up to 417 hours per year and still be profitable.