



Balancing Operating Reserve (BOR) Eligibility

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What does it mean for a resource to be “eligible for BOR credits”?

- It means the Balancing Operating Reserve calculation will be performed for the unit in the intervals in which it is eligible.
- It does NOT guarantee the resource will be made whole for every MW provided.
- The level of make whole is defined by the BOR calculations
 - Definition of Segments
 - Costs to be made whole
 - Value (revenue) used to offset costs

Resources that are pool-scheduled (committed by PJM) are eligible for BOR credits

- The tariff also uses the term “operating as requested by PJM” when referring to pool-scheduled resources eligible for uplift.
- This term has been historically interpreted as coming online and offline consistent with PJM’s request

How do we know which resources are pool-scheduled?

- PJM's commitment tools and dispatchers log the time when units are called on and off as well as the reason for committing or releasing the unit
- The status of pool scheduled (eligible for BOR) or self-scheduled (ineligible for BOR) is derived from the log reason.
 - Log reasons therefore feed the determination of eligibility for operating reserve credits.
- PJM Settlements provides secondary review of dispatcher logs and recordings for consistency and verification of operating reserve eligibility as needed.

- It will be helpful to clarify eligibility for BOR as it relates to the following time periods:
 - Prior to the start time of the commitment
 - During the commitment
 - Once released from the commitment
- Include in this clarification whether following dispatch is a required condition for eligibility for BOR credits

Eligibility Prior to the Start of the Commitment

- Resources with a soak process are ineligible for BOR credits for all intervals prior to the start of their PJM-directed commitment
 - This applies to resources that come online prior to the start of their commitment, even if doing so in preparation to follow dispatch
 - Effective June 2023, all intervals from synchronization to the start of the commitment, which are used for initial ramping and soaking to meet the commitment may be included in startup costs.
 - If the resource starts at PJM's direction, startup costs are recoverable as part of the costs associated with the commitment period
- Resources without a soak process are eligible for ramping intervals prior to the start of the commitment (limited to 30 minutes).

Eligibility During the Commitment Period

- Resources are eligible from the start of the PJM commitment through the time when PJM releases the unit or the resource is taken over to run for company (becomes self-scheduled)
- For this purpose, the start of the commitment is the later of:
 - 1) The first interval of the commitment or
 - 2) The time at which the resource reaches its economic minimum MW output

Once released from the commitment:

- If the resource is released, it remains eligible during ramp down
 - Eligibility remains until breaker open, or 3 hours from release, whichever is sooner
- If the resource is taken over to run for company after PJM releases it, eligibility ends as soon as the unit was released

If the resource is taken over for company before PJM releases the unit, eligibility terminates as soon as it is taken over for company

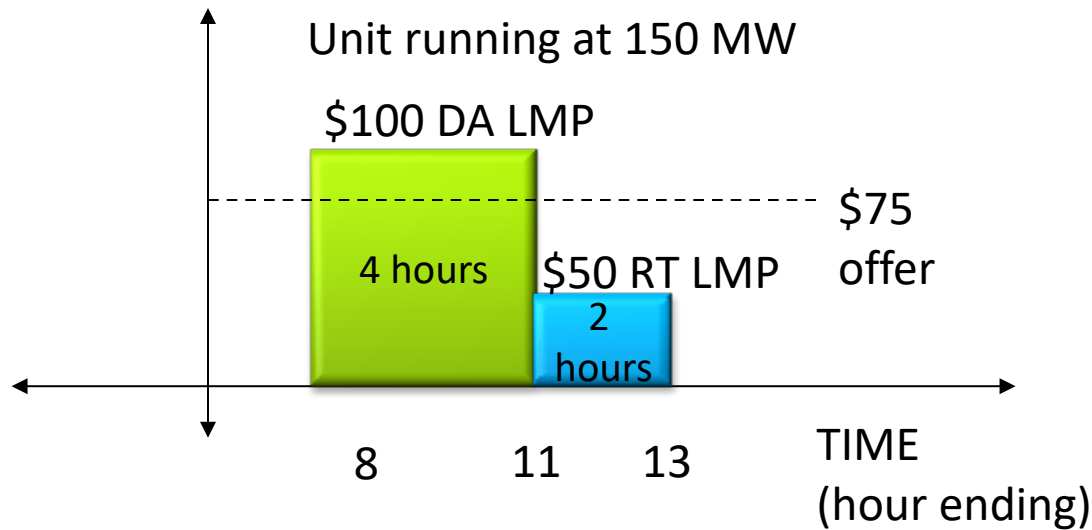
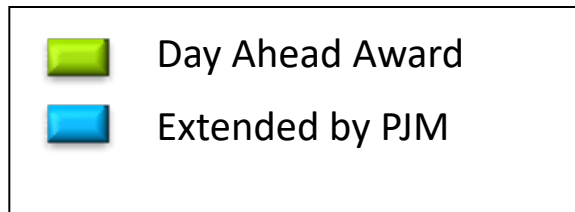
- Balancing Operating Reserve make whole credits are calculated by operating segment within an Operating Day
- A resource is made-whole for up to two segments for each synchronized start
 - **First Segment:** Greater of day ahead commitment and Min Run time at time of commitment
 - Startup costs are included in this segment
 - **Second Segment:** If a resource's commitment is extended, a second segment is created for all 5-minute intervals in excess of the first segment
- With 5-minute settlements, segments can start/stop during intervals within hour
- Segments do not “carry over” to the next day



Segmented Make-Whole Payments

Example – Unit Extended Beyond DA Schedule

Unit was extended in real time for two hours beyond its day ahead schedule. (LMP is less than offer during extended period)



Explanation:

Segment 1: Day Ahead Schedule (hours 7 – 10)

- DA Energy = (4 hours * \$100 * 150 MW) = \$60,000
- DA Offer = (4 hours * \$75 * 150 MW) = \$45,000
- Day Ahead OR Credit: \$0 (revenue above cost = \$15,000)
- Balancing OR Credit: \$0 (unit produced no more or less than DA commitment)




Segment 2: Extended Period (hours 11-12)

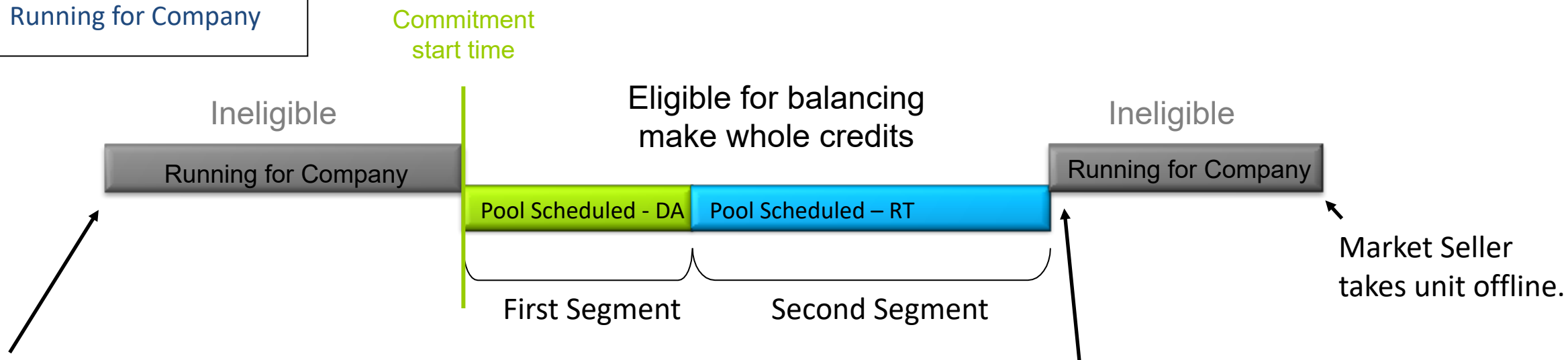
- RT Energy = (2 hours * \$50 * 150MW) = \$15,000
- RT Offer = (2 hours * \$75 * 150MW) = \$22,500
- Balancing OR Credit: \$7,500
- Additional revenue in Segment 1 does not offset the unrecovered costs in Segment 2

Segmented make whole payments are designed to maintain any profit the resource earns during its DA commitment / min run time. This removes any disincentive to continue operating during uneconomic periods beyond the DA commitment / min run time, if asked to do so by PJM.

BOR Eligibility and Segments

Example 1: Unit extended after DA commitment

-  Day Ahead Award
-  Extended by PJM
-  Running for Company

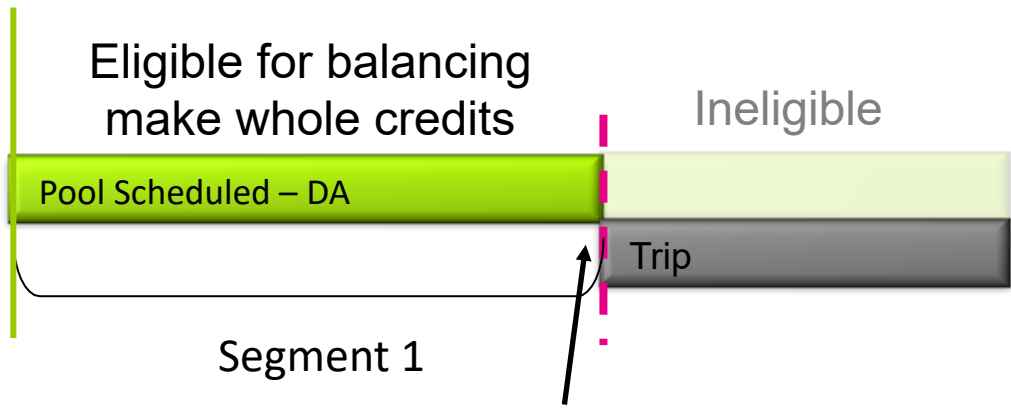


Market Seller brings unit online prior to DA commitment for ramping purposes and is ready to follow dispatch 15 min prior to commitment start time

PJM releases the unit. Market Seller continues running the resource for their own reasons. Unit is treated as self-scheduled starting at this time.

	Day Ahead Award
	Extended by PJM
	Running for Company

Commitment start time

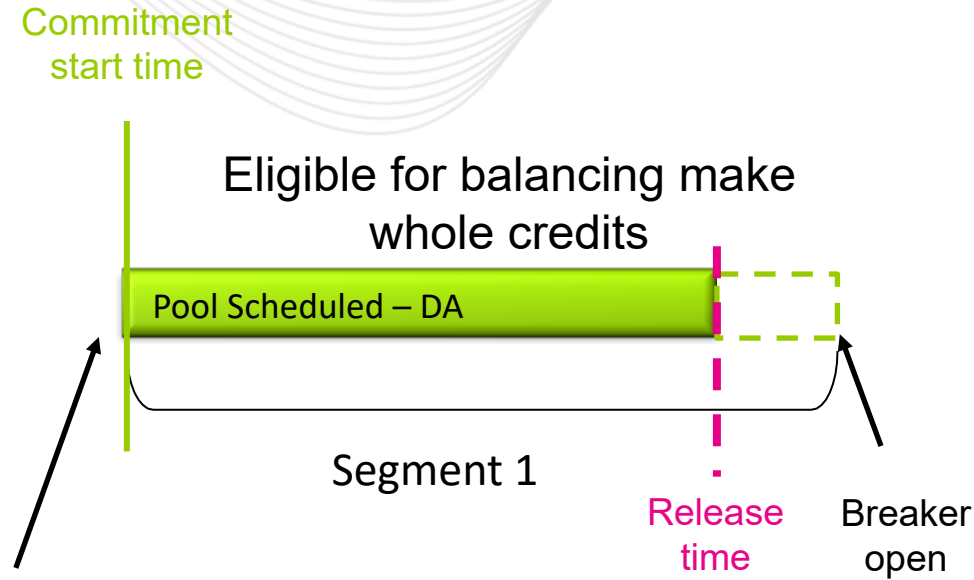


PJM schedules the unit and it is ready to follow dispatch at the desired start time.

The unit trips offline and does not return. Will be responsible for buying out of their DA commitment.

Example 3: Unit released at end of DA commitment

	Day Ahead Award
	Extended by PJM
	Running for Company



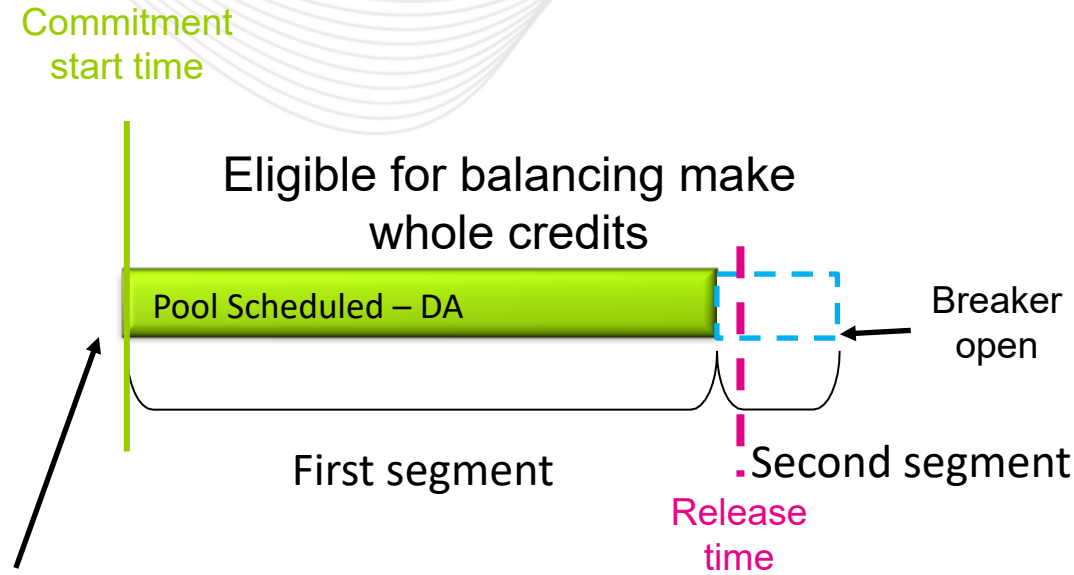
PJM schedules the unit and it is ready to follow dispatch at the desired start time.

PJM releases the unit at the end of the DA commitment

When unit is released at or before the end of the day-ahead commitment, the ramp down intervals (end of day-ahead commitment to breaker open) are included in segment 1.

Example 4: Late release at end of DA commitment

	Day Ahead Award
	Extended by PJM
	Running for Company



PJM schedules the unit and it is ready to follow dispatch at the desired start time.

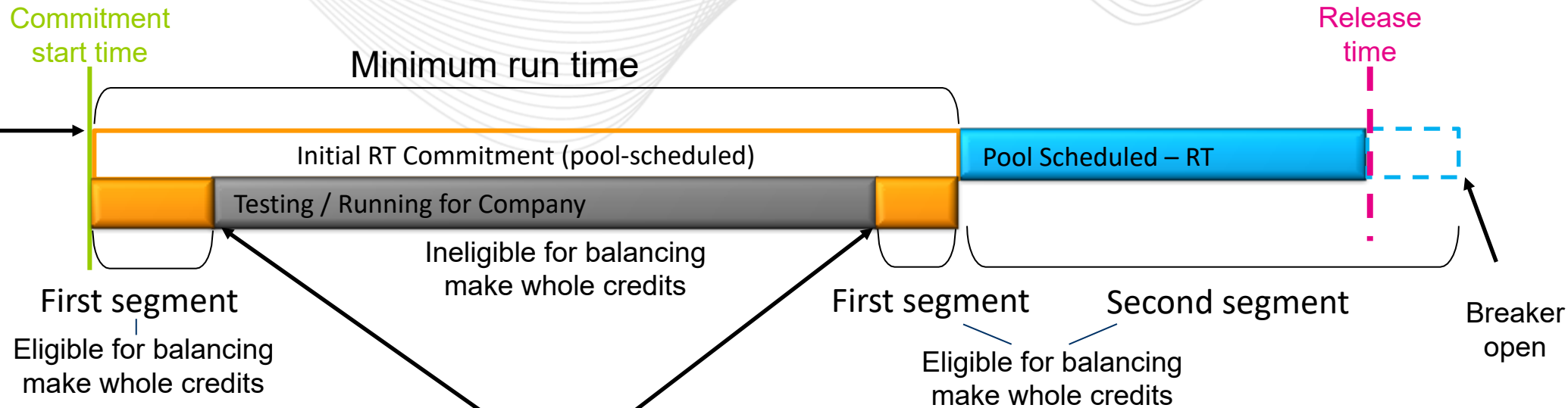
PJM releases the unit 15 minutes after the end of the DA commitment due need to stagger releases.

When unit is released after the end of the day-ahead commitment, this is treated as an extension of the day-ahead commitment and segment 2 is created. The ramp down intervals (end of day-ahead commitment to breaker open) are included in segment 2 and do not offset the BOR credits in segment 1 (and vice versa).




Should such staggered releases be treated as an extension? This affects the level of BOR credit a resource may receive.

Example 4: Unit taken over for company during min run time

PJM schedules the unit in RT and it is ready to follow dispatch at the desired start time.



Unit is taken over by company before the minimum run time expires, then turned back over to PJM

-  RT commitment (Pool-scheduled)
-  Extended by PJM
-  Running for Company

When the resource is taken over for company after being called on by PJM, it shortens the number of intervals included in the first segment, which is where startup costs are recovered. This means less revenues are available to offset startup costs and may increase BOR credits to levels beyond what the resource would have received if it was not taken over for company.

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