Consolidated BOR Credit Proposal Examples

December 2024

Purpose

This presentation consolidates the numerous spreadsheet and slide examples that were provided throughout the course of this stakeholder process.

The examples referenced herein are reflective of the latest PJM/IMM proposal.

BOR Calculation Examples

Example Spreadsheets

Topic	Examples Covering:	MIC Materials Link
Shift to Step 1 / Step 2 / Step 3 calculation	Calculation of net revenues under status quo vs. proposed calculations for a variety of not following dispatch scenarios	3/11/2024: https://www.pjm.com/-/media/committees-groups/committees/mic/2024/20240311-special/item-02---operating-reserve-with-day-ahead-reserves-example.ashx
Decreasing flexibility by clamping economic limits by more than 5%	• Demonstrating the impact of clamping economic limits; • Use of the new Company Responsible Losses calculation component to exclude buy back associated with reductions in the Eco Max parameter.	4/12/2024: See 'Component 4' tab https://www.pjm.com/-/media/committees-groups/committees/mic/2024/20240412-special/20240412-item-01---operating-reserve-clarification-examples---april.ashx
BOR Calculations when Manually Dispatched & Illustration of the connection between the PJM bill, Profit/Loss calculations and the Balancing Operating Reserve Calculation	• Adjustments to Tracking Desired MW • Inclusion of Energy LOC Credits in BOR calculations • Comparison of BOR credits to profit/loss	5/13/2024: https://www.pjm.com/-/media/committees-groups/committees/mic/2024/20240513-special/item-03---operating-reserve-clarification-examples---may.ashx

Example Spreadsheets

Topic	Contents	MIC Materials Link
Regulation Examples	• Adjustments to Tracking Desired MW for Regulation Assignments • Calculation and inclusion of regulation opportunity costs in BOR net revenues in Step 1 and Step 2 calculations	6/10/2024: https://www.pjm.com/-/media/committees-groups/committees/mic/2024/20240610-special/item-02---operating-reserve-clarifications-examples---june.ashx
Reserve Examples	• Adjustments to Tracking Desired MW for Reserve Assignments • Calculation and inclusion of DA and RT reserve opportunity costs in BOR net revenues in Step 1 and Step 2 calculations	7/15/2024: https://www.pjm.com/-/media/committees-groups/committees/mic/2024/20240715-special/item-03---operating-reserve-clarification-examples.ashx
Tracking Ramp Limited Desired	• Dynamic spreadsheet that will calculate tracking ramp limited desired values based on user-input data.	9/10/2024: https://www.pjm.com/-/media/committees-groups/committees/mic/2024/20240910-special/item-03---imm-tracking-ramp-limited-desired-calculation-example.ashx
Self-Scheduled Flexible Resources	• Calculation of BOR credits where resource self-schedules in RT during PJM DA commitment	11/15/2024: Item 02B

Uplift Eligibility Examples

The following slides contain a reminder of the proposed changes to eligibility for BOR Credits, as well as examples illustrating how these changes apply to a range of scenarios:

- Early start (PJM/company) for units w/ and without soak process
- Late start (PJM/company) for units w/ and without soak
- Early release (PJM/company) and Trip
- Taken over by company

These examples were originally presented at the 9/10/2024 special MIC meeting and have been amended to reflect proposal updates introduced in October.

Uplift Eligibility Start Time: Another Look at Status Quo

Status Quo Eligibility Start

- Interval of PJM-requested time to be dispatchable
  - Unit must be online
  - Soak unit must have reached eco min (Included in Startup Cost)
  - Start time for non-soak units is the interval the unit comes online, unless the unit is online too early.

Uplift Eligibility Start Time: Proposal

Similar to the start time of the tracking calculation, the proposed start time of eligibility for BOR credits hinges on the log type and characteristics of the resource

- **Log Type (PJM Requested)**
  - **Future Log**: PJM requests the unit dispatchable at a specified future point in time
  - **Now Log**: PJM requests the unit running as soon as possible
- **Characteristics**
  - **Soak – Future Log**
    - Resource is eligible at the time it is expected to follow cost
  - **No Soak – Future Log**
    - Resource may be eligible up to 30 minutes prior to the expected time to follow cost
  - **No Soak – Now Log**
    - Resource is eligible the earlier of (a) the log time plus notification plus startup time and (b) breaker close

End of BOR Credit Eligibility: Status Quo

The interval in which eligibility for BOR credits ends is dependent upon the log reason that triggers the end of eligibility.

Log Type	Status Quo End of Eligibility
PJM Release	Earlier of breaker open and 3 hours after release
Taken Over by Company	Interval of request
Trip	Interval of breaker open
Company Requested Release	Interval of request

End of BOR Credit Eligibility: Proposal

The interval in which eligibility for BOR credits ends will continue to be dependent upon the log reason that triggers the end of eligibility.

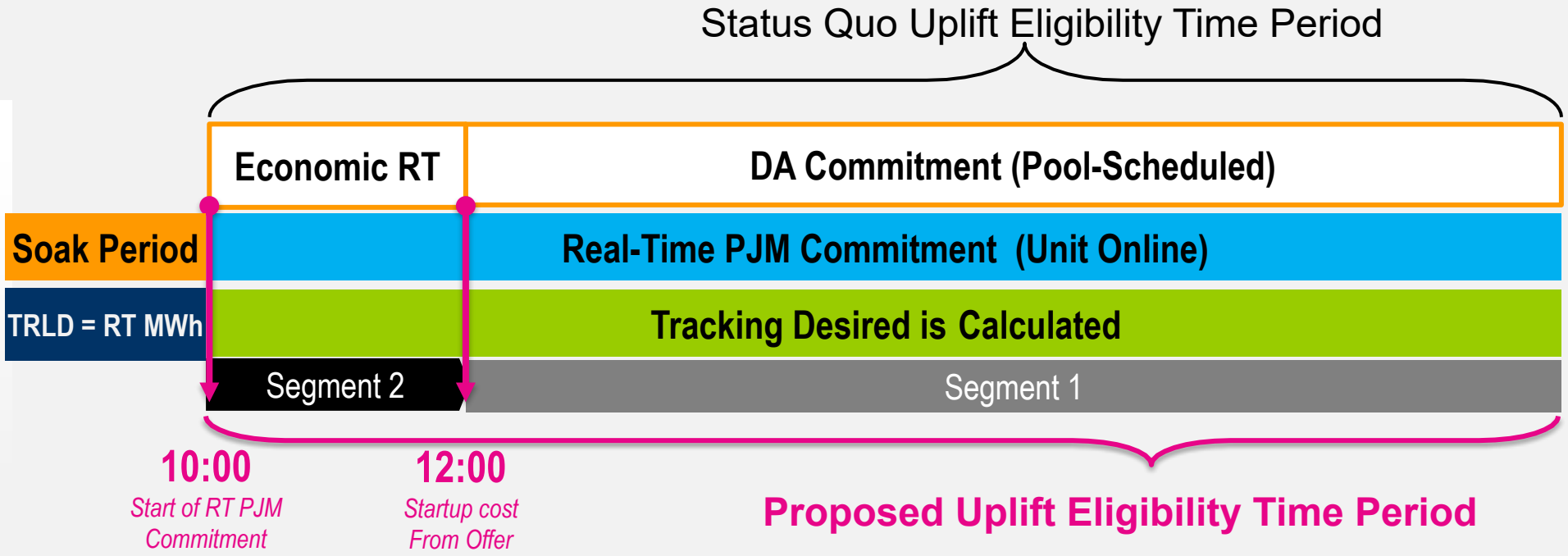
Log Type	Proposed End of Eligibility
PJM Release	Interval of the earlier of breaker open and the technology- specific expected ramp down time (see matrix item 1c)
Taken Over by Company	If log is effective before the end of the PJM Day-ahead Commitment or min run, then it ends at the end of the DA commitment/min run time.
Trip	
Company Requested Release	Else, eligibility ends at the interval of the request (effective time of the log)

Examples of resources coming online early (prior to original commitment)

Example 1:
Unit online Early due to PJM

SCENARIO:

- PJM schedules the unit in DA
- **PJM calls the unit to come on early in RT**
- This represents a change in the commitment period



TAKEAWAYS

Status Quo

*Eligibility is adjusted to 10:00 due to PJM calling on the resource early, **however** the startup costs used are still those for 12:00 because PJM assigns the startup cost with the original Day-ahead commitment. The lesser of the Committed and Final offer is used when determining the appropriate 12:00 startup cost to use.*

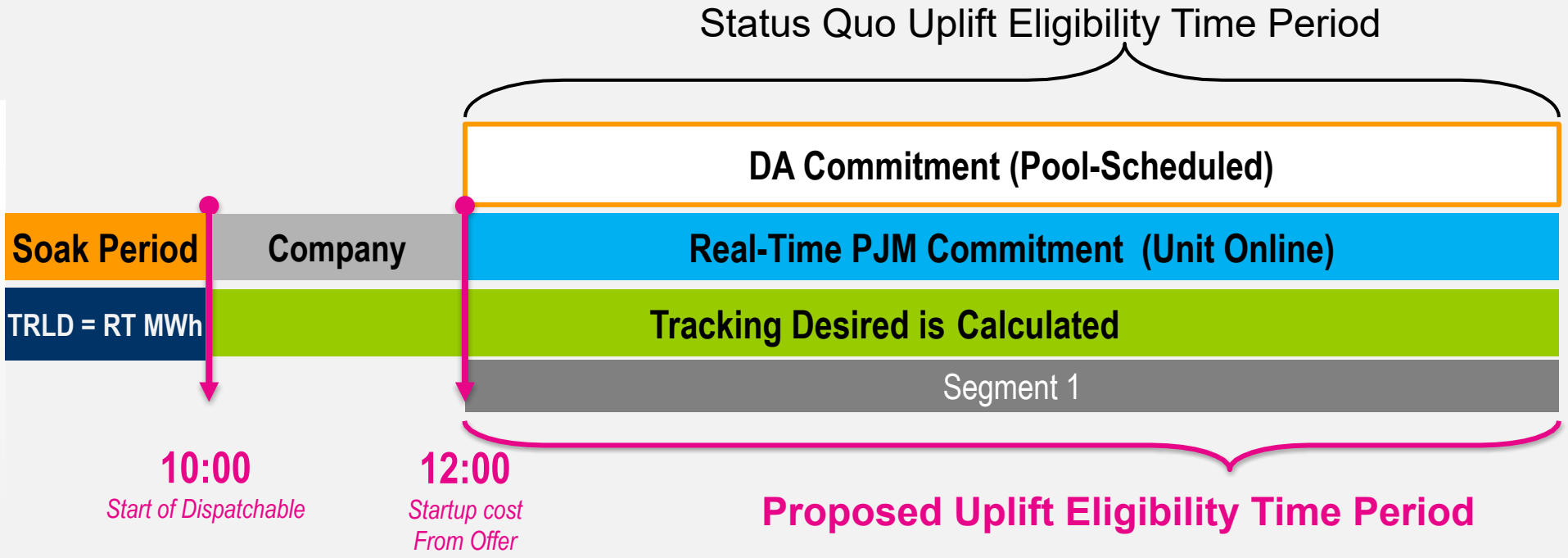
Proposal Solution

- **Step 1** – Startup Status Quo, Eligibility Status Quo, **Uses TRLD MWh**, Lesser of Committed and Final Offer
- **Step 2** – Startup Status Quo, Eligibility Status Quo, **Uses Actual MWh, Final Offer**

Example 2:
Unit online Early for DA Commitment (w/ Soak)

SCENARIO:

- PJM schedules the unit in DA
- **Unit is early meeting DA Commitment; logged as running for company** when ready to follow dispatch @ 10:00



TAKEAWAYS

Status Quo

Unit is not eligible after soak period, because the unit is available to follow dispatch prior to DA/Real-Time Commitment. This was not at the request of PJM. The unit is online early for Company. The Startup is still provided at the start of the DA/Real-Time Commitment.

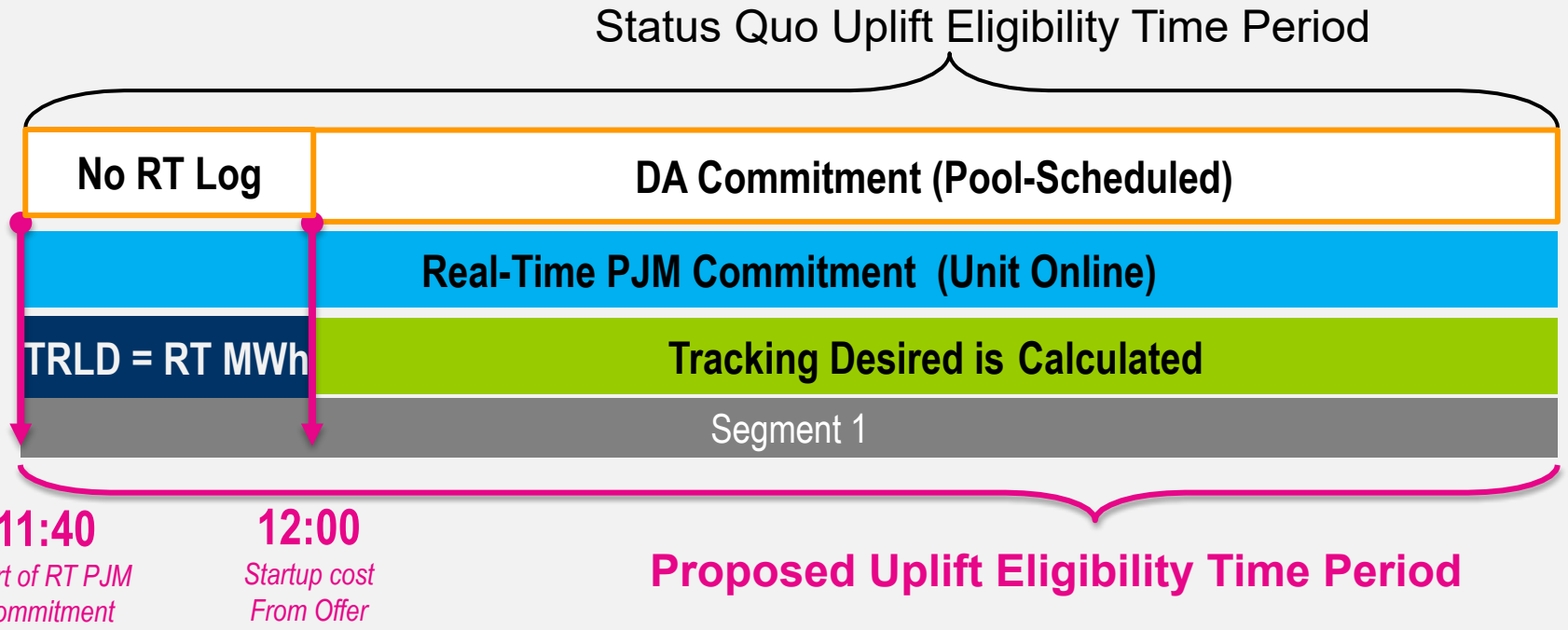
Proposal Solution

- **Step 1** – Startup Status Quo, Eligibility Status Quo, **Uses TRLD MWh**, Lesser of Committed and Final Offer
- **Step 2** – Startup Status Quo, Eligibility Status Quo, **Uses Actual MWh, Final Offer**

Example 3:
Unit online Early for DA Commitment (within 20 min)

SCENARIO:

- PJM schedules the unit in DA
- **Unit is 20 minutes early for DA Commitment** (no energy log for these intervals)
- Unit does not have a soak period



TAKEAWAYS

Status Quo

Early eligibility for uplift is a subjective review to determine unit online too early, within approximately 30 minutes of DA commitment is used as a guideline.

Proposal Solution

- Resources without a soak process are eligible for intervals prior to the start of the commitment in order to cover ramping costs associated with the commitment, however intervals are limited to 20 minutes and MW are limited to Eco Min.

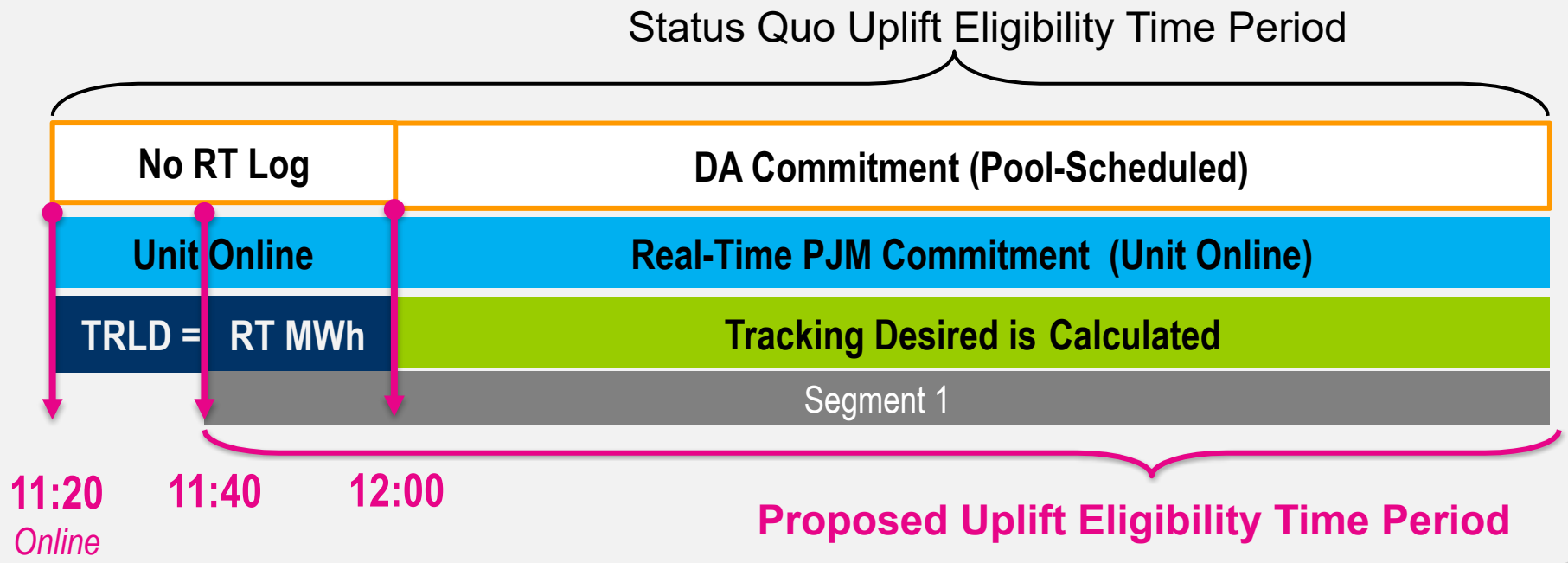
- **Step 1 –** reflect the expected revenue/losses following PJM dispatch
  - Within 20 minutes of DA commitment TRLD MWh will equal RTMWh, capped at Eco Min MW

- **Step 2 –** reflect revenue/losses from **actual performance** of following the PJM dispatch instructions
  - MW will equal 0 anytime unit is not online during the uplift eligibility period

Example 4:
Unit online Early for DA Commitment (greater than 20 min)

SCENARIO:

- PJM schedules the unit in DA
- **Unit is more than 30 minutes early for DA commitment (no energy log)**
- Unit does not have a soak period



TAKEAWAYS

Status Quo

Early eligibility for uplift is a subjective review to determine unit online too early, within approximately 30 minutes of DA commitment is used as a guideline.

Proposal Solution

- Resources without a soak process are eligible for intervals prior to the start of the commitment in order to cover ramping costs associated with the commitment, however intervals are limited to 20 minutes and MW are limited to Eco Min.

- **Step 1 –** reflect the expected revenue/losses following PJM dispatch instructions
  - Within 20 minutes of DA commitment TRLD MWh will equal RTMWh, capped at Eco Min MW

- **Step 2 –** reflect revenue/losses from **actual performance** of following the PJM dispatch instructions
  - MW will equal 0 anytime unit is not online during the uplift eligibility period

Key Changes from status quo:

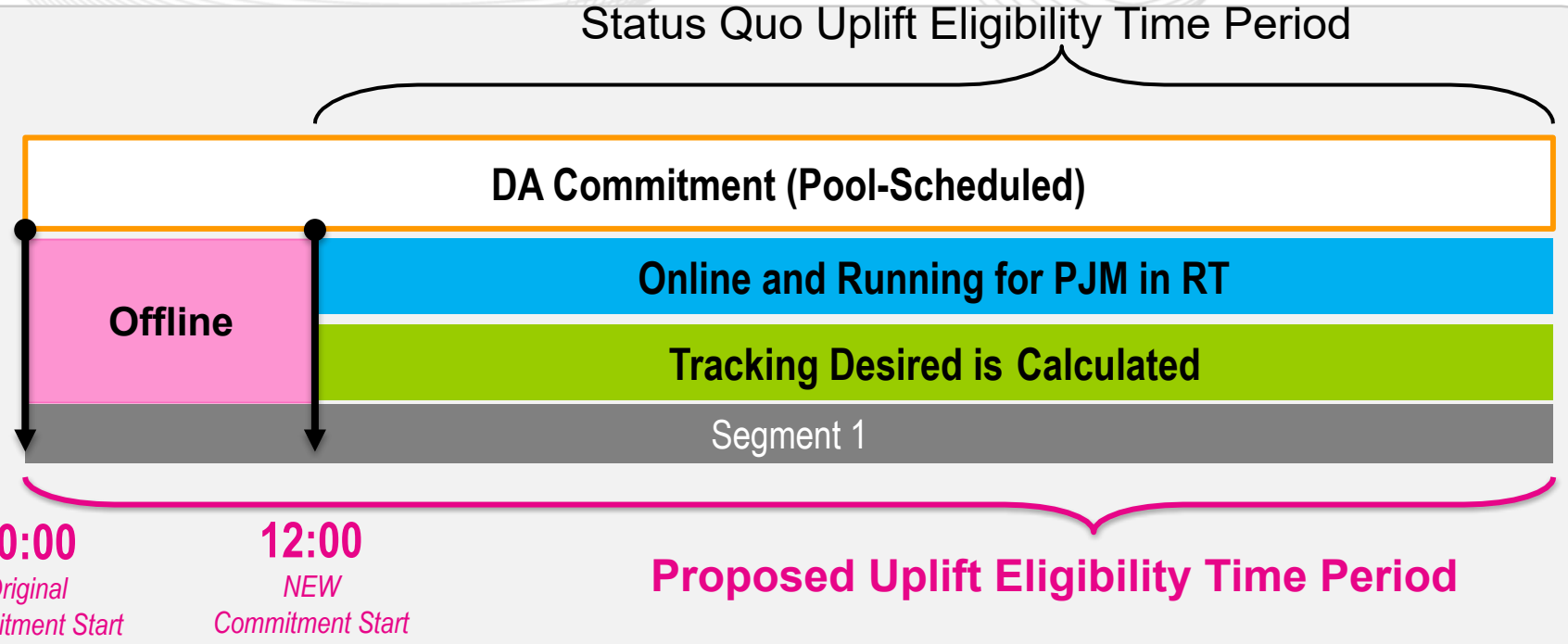
- PJM will move to two calculations from a single calculation that used the lesser of Actual MW or Desired for the Energy offer and the Greater of Actual MW or Desired for the Balancing Value calculation.
  - Step 1 will only use the Tracking Desired MW and **the lesser of Committed or Final Offer**
  - Step 2 will only use Actual MW and **the final offer**.
- In all of the examples above, the unit retained their startup costs, since the reason for coming online was due to a PJM commitment.
- Startup costs will be allocated across the commitment period that it is applied to (the Day-Ahead Commitment or Minimum Run Time).
- Example 4 the proposal will allow eligibility for a non-soak resource to be made whole for ramp by allowing eligibility for make whole up to Eco Min MW for a maximum of 20 minutes prior to a time that the resource has a future log where it is expected to be online and dispatchable for PJM.

Examples of resources coming online late (after original commitment start time)

Example 5:
Due to PJM, Unit Starts Late for its DA Commitment (No Soak)

SCENARIO:

- PJM schedules the unit in DA
- **Unit is late due to PJM Actions** (late release from prior commitment)
- RT unit commitment is shifted to 12:00
- **Unit does not have a soak**



TAKEAWAYS

Status Quo

Eligibility starts when unit is online. Unit is not eligible from 10 to 12, so is not made whole for DA buy back costs. Only DA revenue is included in uplift calculation.

Proposal

- Extend the uplift eligibility to the start of the DA commitment.
- TRLD begins at the start of the new RT Commitment at 12:00
- Eligibility begins at start of DA commitment, which allows any DA buy back between 10 and 12 to be made whole

- **Step 1** – reflects the expected revenue/losses using the TRLD MWh during the proposed uplift eligibility time period
  - TRLD MWh = RT MWh (0 MWh) prior to the start of the commitment, which ensures the DA buy back is included.

- **Step 2** – reflect revenue/losses from **actual performance** during the proposed uplift eligibility time period
  - MW will equal 0 anytime unit is not online during the uplift eligibility period. The full DA buy back will be included in the calculation.

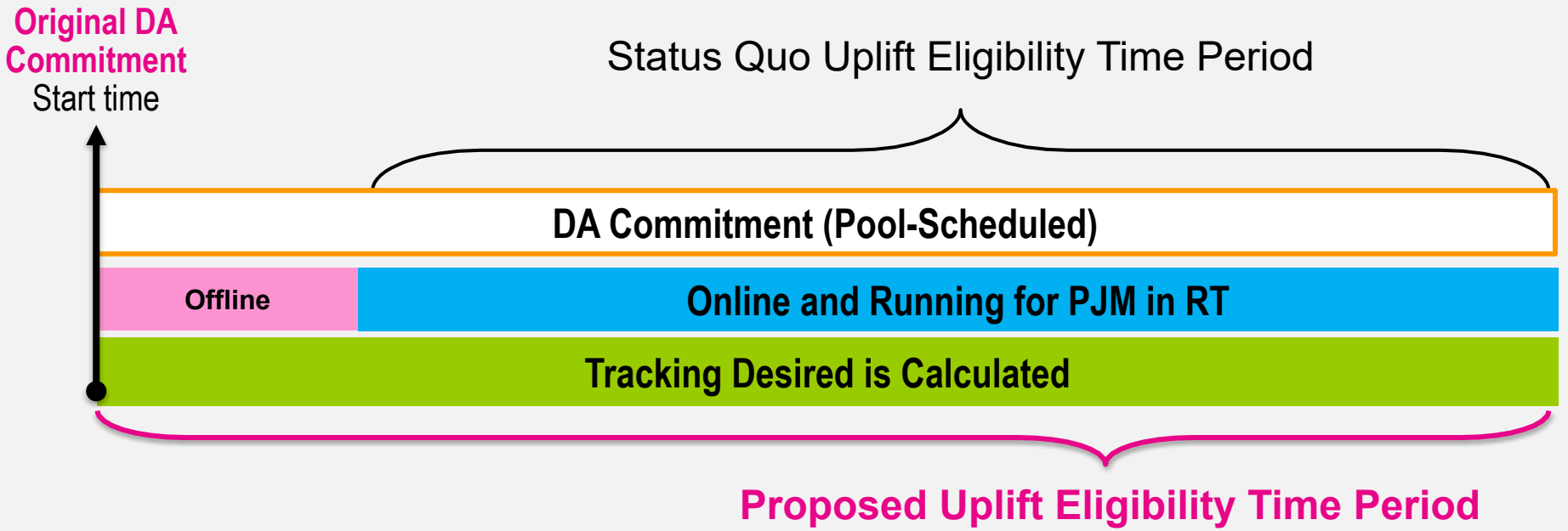
Example 5

- Why the change to eligibility?
  - Currently, when a unit is committed in DA but does not run in RT, the full DA revenue from the intervals where the unit wasn't running is included in the BOR calculation for the remainder of the DA commitment where the unit is eligible for BOR. However, the balancing revenue (or the DA buy back) from the intervals where the unit didn't run is not included. This can lead to an overstatement of the revenues available to offset costs in other intervals.
  - By keeping the unit eligible for BOR for the entire DA commitment, it will take into account the balancing revenue (DA buy back) for the resource. This will reduce the revenue amount used in the uplift calculation. When the unit is offline due to a PJM request, the losses due to the buy out of the Day-ahead Market will now be included in the uplift calculation.
  - This calculation is used in Step 1 and Step 2

Example 6:
Due to Participant, Unit Starts Late for its DA Commitment (No soak)

SCENARIO:

- PJM schedules the unit in DA
- **Unit is late due Market Participant Actions**
- Resource has **No Soak Time**



TAKEAWAYS

Status Quo
Eligibility starts when unit comes online

Proposal

Extend the uplift eligibility to the start of the DA commitment.

Start Tracking Desired at the time the Unit was expected to be online and following dispatch. (DA Commitment start time)

- **Step 1 –** reflect the expected revenue/losses following PJM dispatch instructions when PJM committed, **using the Tracking desired which started calculating from the start of the DA Commitment Period.**
- **Step 2 –** reflect revenue/losses from actual performance of following the PJM dispatch instructions
  - RT MWh will equal 0 anytime unit is not online during the uplift eligibility period

Example 6

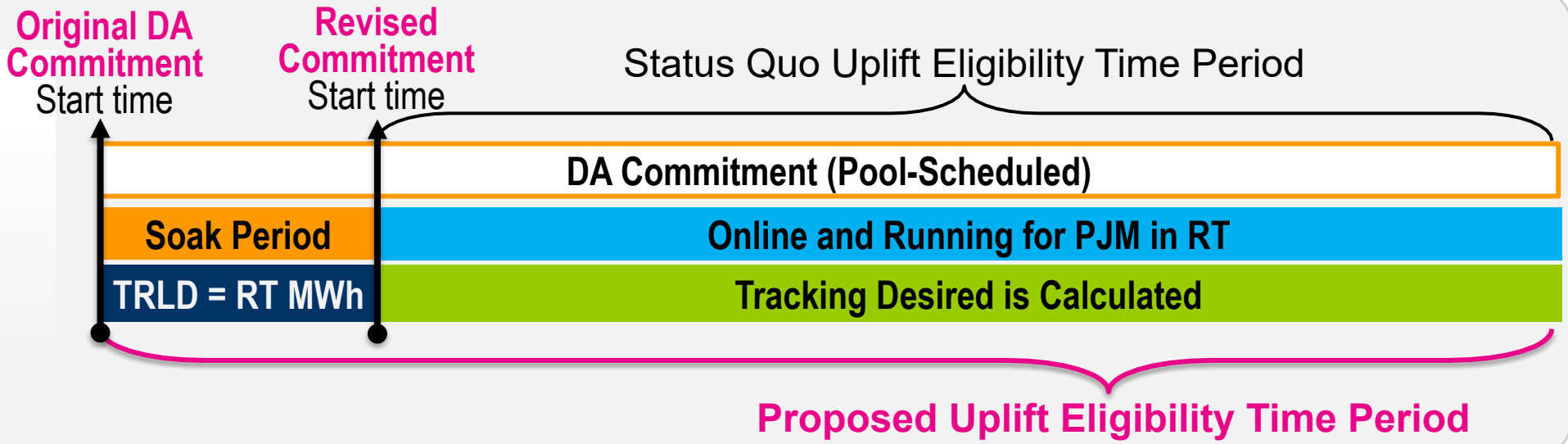
Why does tracking start at the Day-Ahead commitment and why is the eligibility extended to the start of the Day-Ahead commitment?

- Tracking desired begins calculating at the start of the Day-Ahead commitment, because the unit was expected to be online and following cost at that point in time.
- Step 1 calculation will use the tracking desired to start calculating the uplift amount that would have been paid if the unit followed dispatch. **That is, the uplift that would have been paid if the unit was online and following cost at the expected time.**
- Step 2 calculation will be based off of the actual MW. In some intervals, the actual MW will be zero. This will result in the DA Revenue and Balancing Revenue being used in the uplift calculation for intervals where the unit is offline.

Example 7:
Due to PJM, Unit Starts Late for its DA Commitment (Soak)

SCENARIO:

- PJM schedules the unit in DA
- **Unit is late due PJM Actions** (late release from prior commitment)
- Resource has a **Soak Time**



TAKEAWAYS

Status Quo

Eligibility will start at the new time the resource is expected to start following cost.

Proposal: Extend the uplift eligibility to the start of the DA commitment.

- TRLD begins when the unit is expected to be dispatchable based on the revised commitment.
- Costs and Revenues associated with the MW's produced during the soak period are excluded from the BOR credit calculations due to those cost/revenues already included in startup costs. (status quo)
- When unit is soaking, only the revenues/losses from the DA buy back for MW not produced over and above the DA revenues for those same MWs are included in the calculation.

- **Step 1** – reflect the expected revenue/losses using the TRLD MWh during proposed uplift eligibility time period
  - TRLD MWh be equal to RTMW MWh at the start of the uplift eligibility period before the unit is online
  - Any DA buy back associated with MW's not produced during Soak period based on TRLD MWh are included (full DA buy back in this case because TRLD MWh = RT MWh)

- **Step 2** – reflect revenue/losses from the **actual performance** of the unit during the proposed uplift eligibility time period
  - Any DA buy back associated with MW's not produced during Soak period based on RT MWh are included

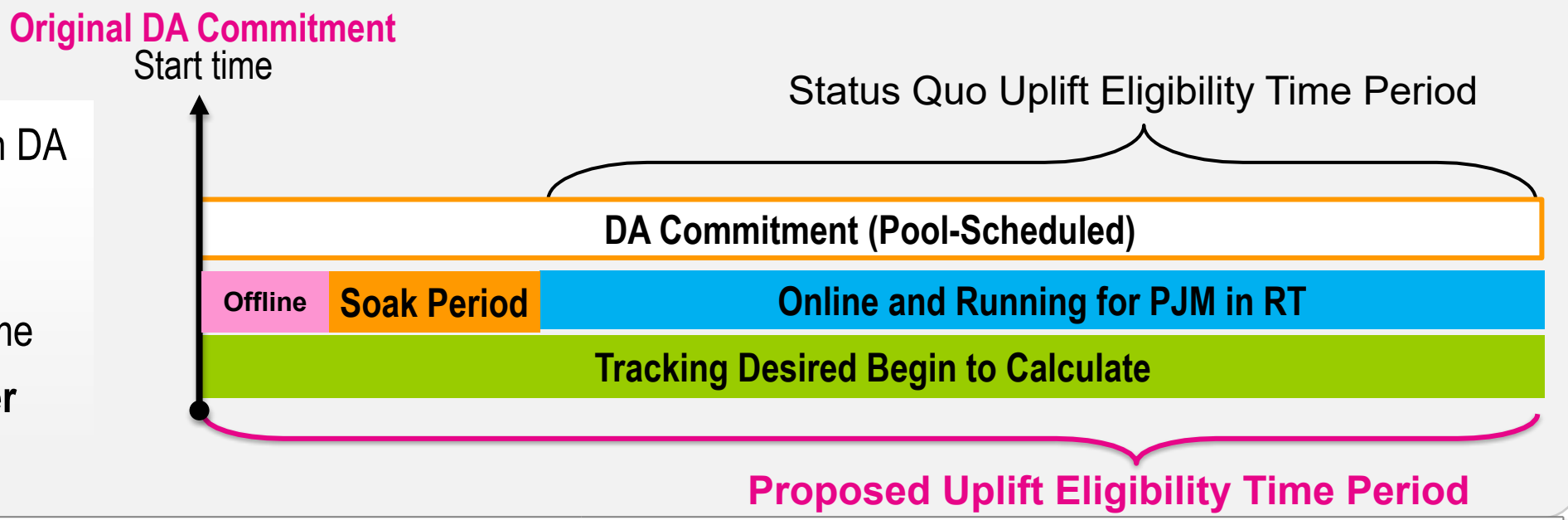
Example 7

- Why the new calculation when the resource is within it's Day-ahead commitment, while soaking due to PJM actions?
  - The net soak costs (costs minus expected revenues) are included in the startup cost of the resource
    - Because of this, Step 1 and Step 2 will not include any no load and incremental energy costs from MWh produced during the soak period
  - However, there may be additional profit/losses from the buyout (DA MW > RT MW) of the Day-ahead market that were not included within the estimate of the net soak costs. The net DA and Balancing revenues/losses for these buy out MWh will be included in the uplift calculation for both Step 1 and Step 2 to ensure all revenues and losses are fully captured.

Example 8:
Due to Participant, Unit starts late for its DA commitment (With Soak)

SCENARIO:

- PJM schedules the unit in DA
- **Unit is late due Market Participant Actions**
- Resource **has** a Soak Time
- **Soak period begins after DA commitment start**



TAKEAWAYS

Status Quo

Eligible at the time the resource is dispatchable

Proposal

Extend the uplift eligibility to the start of the DA commitment.

Start Tracking desired at the time the Unit was expected to be online and dispatch (DA Commitment) even if the unit is offline.

- **Step 1** – reflect the expected revenue/losses using the Tracking Desired when PJM committed
  - TRLD will have the unit at Eco Min MW at the start of the uplift eligibility period.
  - Based on TRLD, unit is not soaking so no special logic to exclude costs or revenues and prevent double counting is needed
- **Step 2** – reflect revenue/losses from **actual performance** during uplift eligibility period
  - Costs and Revenues associated with the MW's produced during the soak period are excluded from BOR credit calculations due those cost/revenues already included in startup costs
  - Any DA buy back associated with MW's not produced during Soak period are included
  - Partial DA buy back when unit is in the soak process, Full DA buyback when unit is not online

Example 8

Why does tracking start at the Day-Ahead commitment and why is the eligibility extended to the start of the Day-Ahead commitment?

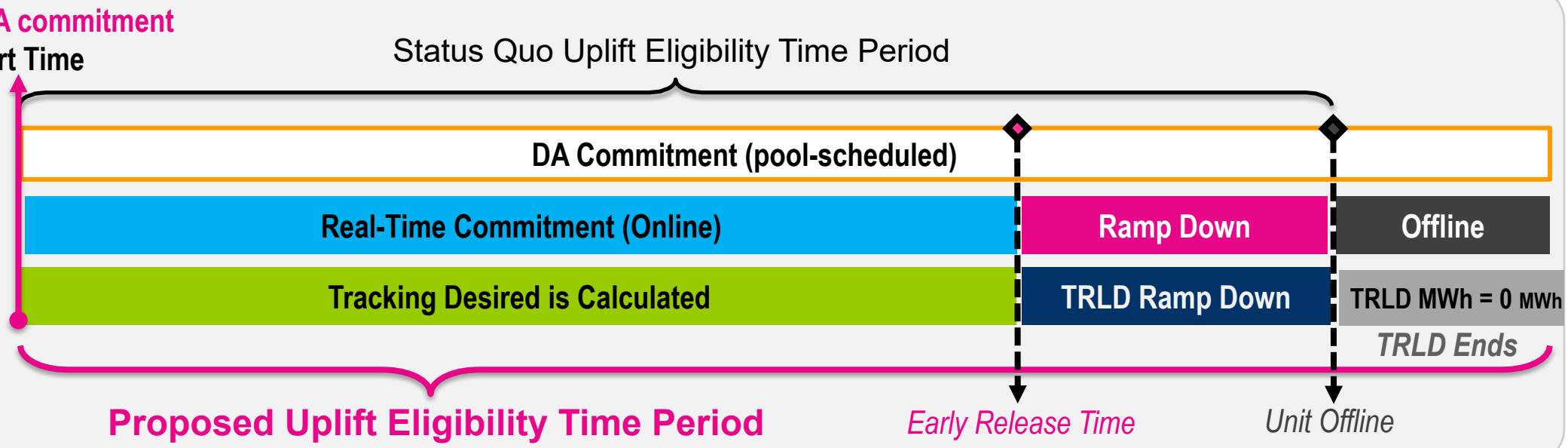
- Tracking desired begins calculating at the start of the Day-Ahead commitment, because the unit was expected to be online and following cost at that point in time.
- Step 1 calculation will use the tracking desired to start calculating the uplift amount that would have been paid if the unit following dispatch. **That is, the uplift that would have been paid if the unit was online and following cost at the expected time.**
- **Step 2** will not include any no load and incremental energy costs during the soak period in order to prevent double recovery of the costs already included in startup cost.
- The additional profit/loss of the deviations from the buyout will be used in Step 2 during the soak period.
- Step 2 calculation will be based off of the actual MW. In some intervals, the actual MW will be zero. This will result in the DA Revenue and Balancing Revenue being used in the uplift calculation for intervals where the unit is offline.

Examples of early release (before end of DA commitment / min run time) and unit trips

Example 9:
Due to PJM, Unit Released Early

SCENARIO:

- PJM schedules the unit in DA
- **Unit released early by PJM**



TAKEAWAYS

Status Quo

If a resource is released early by PJM, eligibility terminates once the resource is offline. The resource is responsible for the buy out of the DA position for the remainder of their DA commitment. This eligibility rule provides an ***incorrect*** incentive for following PJM instruction

Proposal

- Extend the uplift eligibility to End of DA commitment.
- Any DA buy back associated with MW's not produced after PJM release are now included in both Step 1 and Step 2
- **Step 1 –** reflect the expected revenue/losses using the Tracking Desired when PJM committed
  - Costs and Revenues associated with the TRLD MWh produced during the ramp down period are included in BOR credit calculations
  - TRLD will begin ramping the unit down to economic minimum when the unit is released by PJM. Once the unit output is below economic minimum, TRLD MWh will equal RTMWh output including when unit is offline
- **Step 2 –** reflect revenue/losses from ***actual performance*** during the uplift eligibility time period
  - Costs and Revenues associated with the RT MWh produced during the ramp down period are included in BOR credit calculations

Example 9
Early Release

Why change the eligibility rules for a unit released early prior to the end of its Day-ahead Commitment? What does it impact?

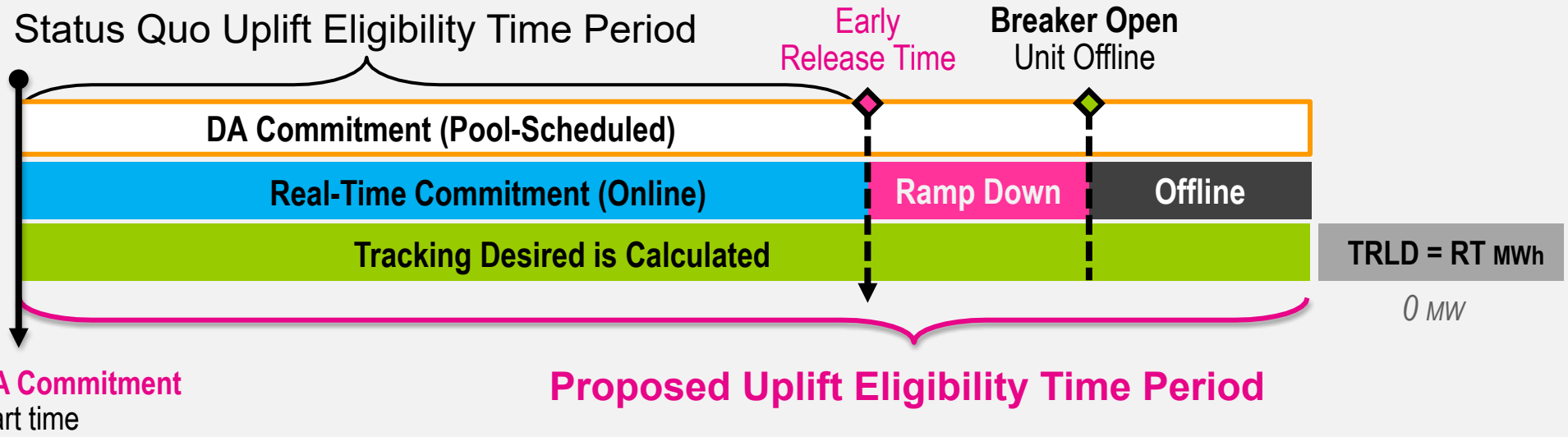
- Currently, eligibility ends once the unit ramps offline when a unit is released early by PJM.
  - This results in the unit being responsible for any buy out of their Day-ahead position, while the uplift calculation uses all of the Day-ahead revenue from the offline intervals. This means the net revenues for that time period are overstated and reduces the likelihood the resource will be made whole for costs it incurred while following dispatch directives.
  - This creates a disincentive to follow PJM dispatch and increases the likelihood the resource will be taken over to run for company once released by PJM in order to minimize losses due to the DA buy back.
- The proposed change would keep the unit eligible until the end of the Day-ahead commitment. The impact is on the revenue side of the calculation. It will use the DA revenue and the Balancing revenue (DA buy back) in the uplift calculation. This will result in the use of the correct profit/loss in the uplift calculation for following a PJM instruction.

Example 10:
Due to Company action, Unit Released Early (Economic De-commitment)

SCENARIO:

- PJM schedules the unit in DA
- **Unit released** early by Company

** *This looks like a unit trip from a logging perspective as it immediately terminates eligibility. today*



TAKEAWAYS

Status Quo

If a resource is released early by company, eligibility terminates at the time of release. The resource is responsible for the cost of buying out of the DA position for the remainder of their DA commitment (or retains possession of revenue from it).

Proposal

- Extend uplift eligibility until the end of the DA ahead commitment
- **Step 1** – reflect the expected revenue/losses using tracking desired when PJM committed
  - TRLD will continue to be calculated until the end of the DA commitment. TRLD MWh = RT MWh beyond end of DA.
- **Step 2 –** reflect revenue/losses from **actual performance** during the uplift eligibility time period

Example 10

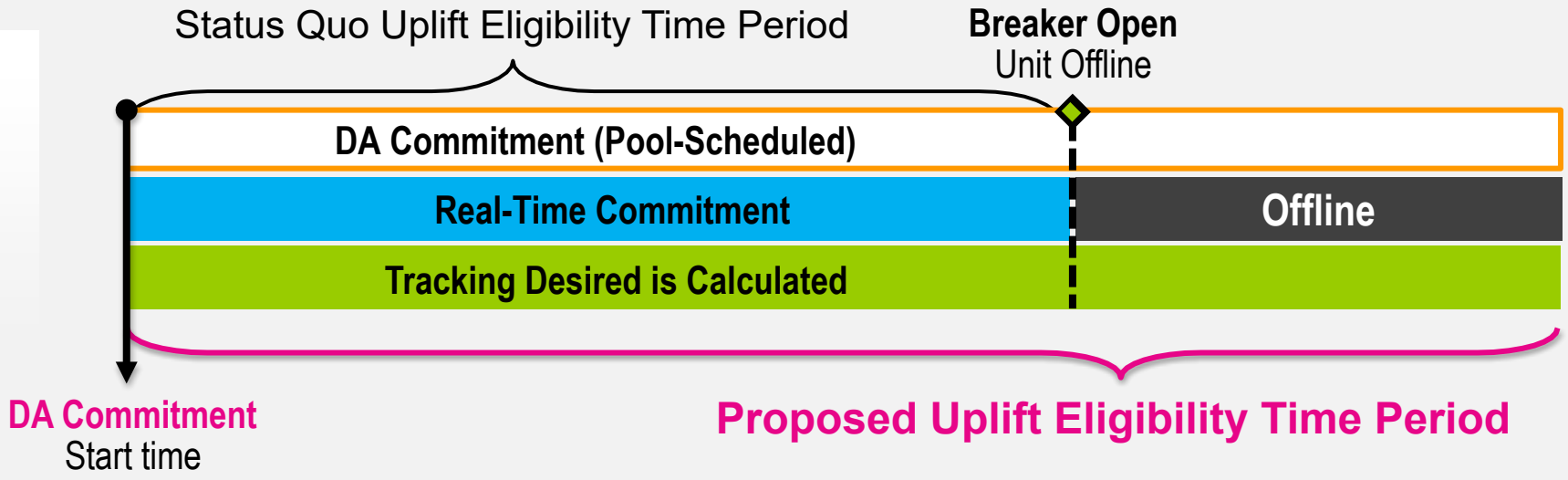
The company requested the unit be taken offline prior to the end of its Day-ahead commitment. How is this different from the scenario where PJM releases the unit early?

- Eligibility is extended to the end of the DA commitment in both scenarios. This means the both the DA and Balancing revenue will be used in the BOR calculation after the unit is released.
  - If the unit makes a profit from buying out of the DA commitment, those profits will now be available to offset costs in the remainder of the DA commitment. If the unit loses money from buying out of the DA commitment, the unit has an opportunity to recover those costs, but the buy back will be limited to the amount that would have resulted from following PJM dispatch.
- However, when the company requests the unit to be released early, Tracking Desired will continue to be calculated until the end of the Day-Ahead Commitment rather than ending when the unit comes offline. This represents the amount of MW the unit should have been producing if it operated consistent with the PJM commitment.
  - Step 1 will continue to use the tracking desired as if the unit was operating through the end of the DA commitment. This represents the unit following dispatch, since PJM did not release the unit. This will establish the amount of uplift that PJM is willing to pay.
  - Step 2 will use the actual MW. This includes the intervals that the unit ramped down and was offline. This will account for the actual performance of the unit.
  - The unit will be paid the uplift of the lesser of Step1 and Step 2.

Example 11:
Unit Trip

SCENARIO:

- PJM schedules the unit in DA
- **Unit Trips prior to end of DA commitment**



TAKEAWAYS

Status Quo

Eligibility terminates at the time the unit comes offline. If a resource Trips before the end of the DA commitment, the resource is responsible for the buy out of the DA position for the remainder of their DA commitment.

Proposal

- Extend uplift eligibility until the end of the DA ahead commitment.
- **Step 1** – reflect the expected revenue/losses using tracking desired when PJM committed
  - TRLD will continue to be calculated until the end of the DA commitment.
- **Step 2** – reflect revenue/losses from the actual performance

Example 11

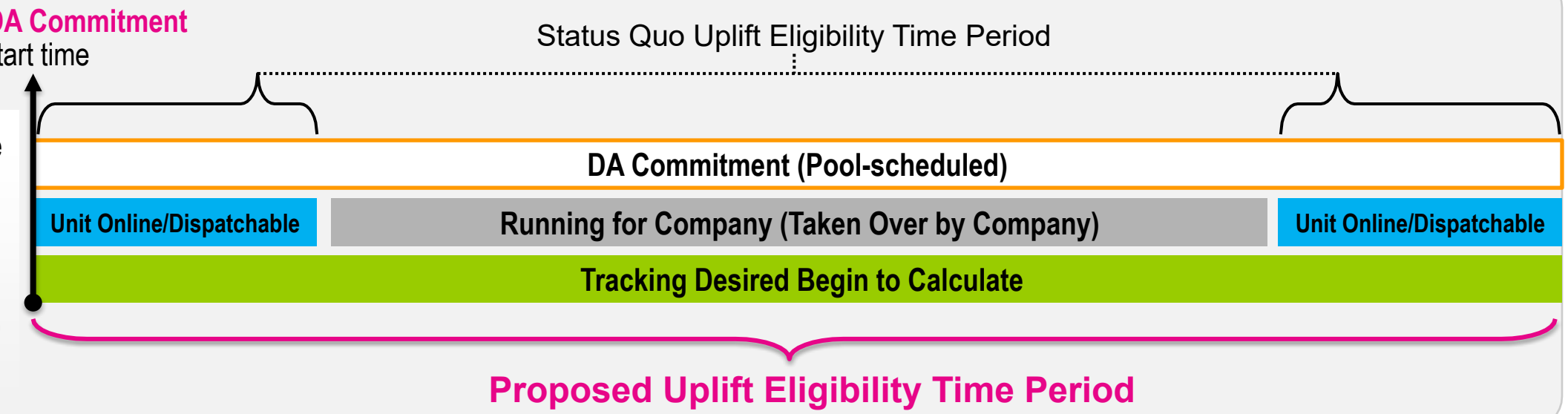
- Unit Trips offline. This is treated the same as if the company had requested the unit be released prior to the end of the Day-ahead Commitment.
- If the unit makes a profit from buying out of the DA commitment, those profits will now be available to offset costs in the remainder of the DA commitment. If the unit loses money from buying out of the DA commitment, the unit has an opportunity to recover those costs, but the buy back will be limited to the amount that would have resulted from following PJM dispatch.
- Step 1 will continue to use the tracking desired as if the unit was operating through the end of the DA commitment. This represents the unit following dispatch, since PJM did not release the unit. This will calculate the amount of uplift that PJM is willing to pay.
- Step 2 will use the actual MW. This includes the intervals that the unit ramped down and was offline. This will account for the actual performance of the unit.
- The unit will be paid the uplift of the lesser of Step1 and Step 2.

Examples of unit taken over to run for company

Example 12:
Unit Taken Over for Company in the Middle of DA Commitment

SCENARIO:

- PJM schedules the unit in DA
- Runs for PJM in RT, then t**aken over by company,** then turned back over to PJM



TAKEAWAYS

Status Quo

- A resource is ineligible for BOR credits in any interval it is running for company. The resource is responsible any losses in those intervals, and any profits earned do not offset other costs during the PJM commitment period.
- All of the DA revenue is used in the "Dispatchable" (blue boxes) and none of the balancing revenue is used in the "Running for company" period (gray box)

Proposal:

- Extend eligibility to the entire DA Commitment period (including self-scheduled intervals)
- Any profits gained during the entirety of the resource operations will offset the start-up expenses throughout the entire first segment thus reducing potential uplift.
- There are no differences between the Step 1 and Step 2 calculations other than the MW utilized. The TRLD MW calculated while the unit is self-scheduled will assume the unit was following dispatch throughout that period

Example 12

Why change the eligibility rules for a unit taken over by company in the middle of the Day-ahead Commitment? What does it impact?

- Currently, eligibility ends during the periods the unit taken over by company.
  - This results in the unit being responsible for any buy out of their Day-ahead position, while the uplift calculation uses all of the Day-ahead revenue from the taken over by company intervals. This means the net revenues for that time period are overstated and reduces the likelihood the resource will be made whole for costs it incurred.
- The proposed change would keep the unit eligible until the end of the Day-ahead commitment.
- Step 1 calculation will use the tracking desired which reflects where PJM would have dispatched the unit. This will include all costs and revenue of that dispatch period and will eliminate the overestimation of revenue from only including the day ahead revenue. This will result in the use of the correct profit/loss in the uplift calculation.
- Step 2 calculation will use actual mw.

Example 13:
Unit Taken Over for Company All of Day

SCENARIO:

- PJM schedules the unit in DA
- **Taken over to run for company in RT for the entire day**

TAKEAWAYS

Status Quo

- Resource is not eligible for BOR credits

Proposal

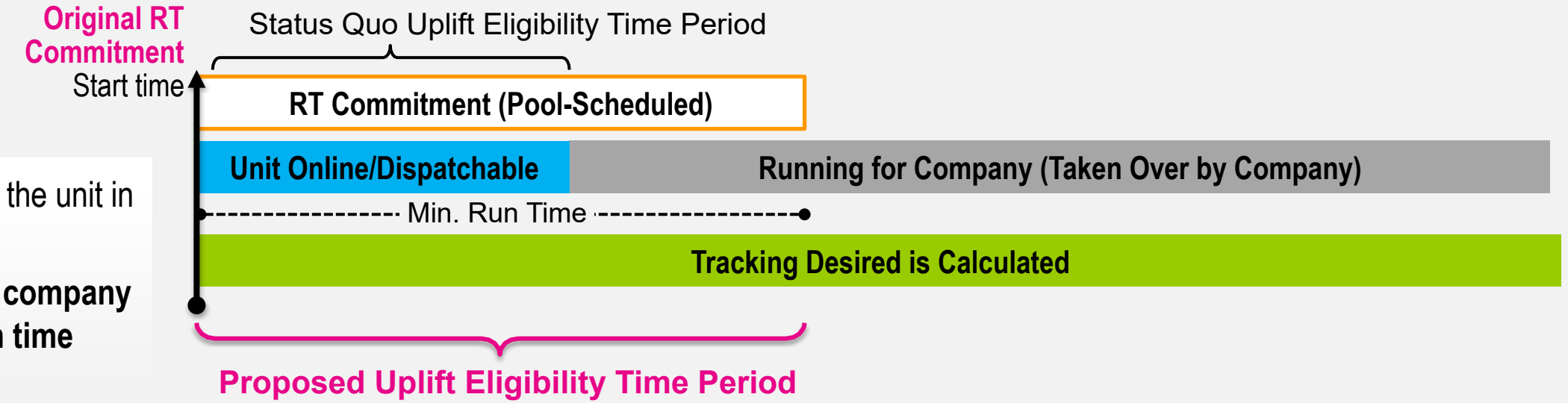
- Status quo, no change to eligibility
- Unit must be running for PJM for at least 1 interval in Real-Time in order to be eligible for BOR credits.

Examples of Units dispatched in Real-Time Only

Example 14:
Resource taken over for company in the middle of RT commitment

SCENARIO:

- PJM schedules the unit in RT
- **Taken over by company before min run time elapses**



TAKEAWAYS

Status Quo

The uplift eligibility time period ends at the time the unit was taken over by company

Proposal

Eligibility is extended until the end of the minimum run time of the unit

- STEP 1 - reflect the expected revenue/losses using the **TRLD MWh** when PJM committed**. The PJM commitment is considered to be the entire minimum run time, since PJM called the unit online.**
- STEP 2 - reflect the **revenue/losses** from actual performance **during the uplift eligibility time period. The uplift eligibility time period is for the entire minimum run time, since PJM called the unit online.**

Example 14

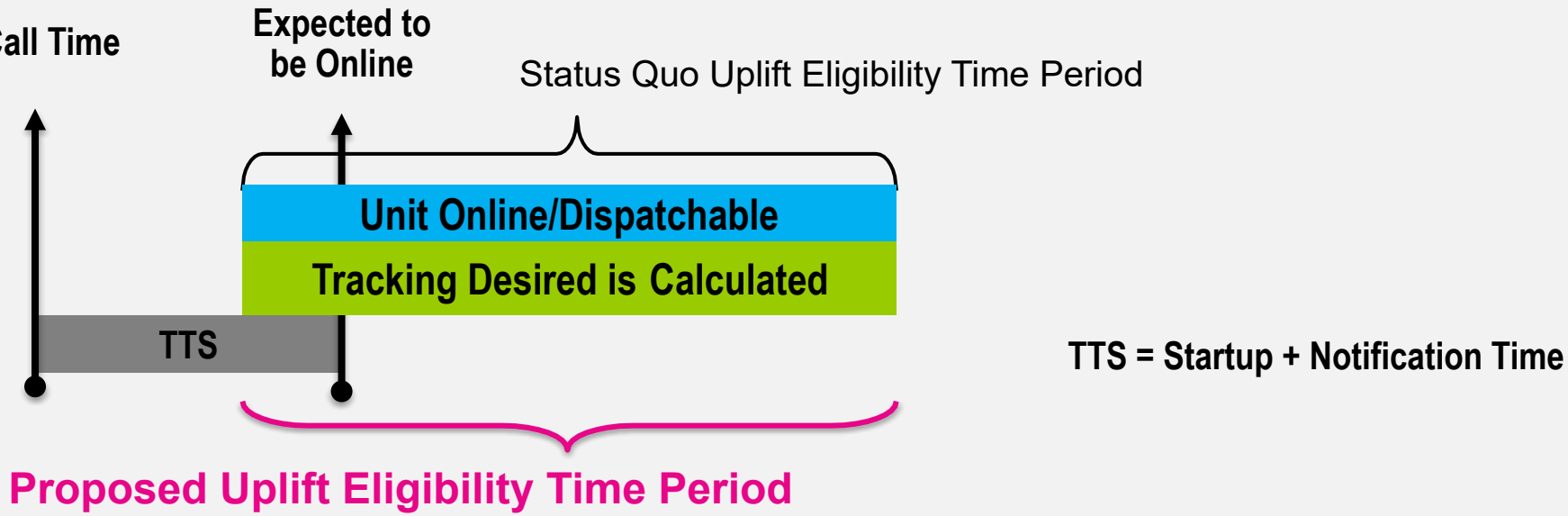
Why change the eligibility rule for a company taking over a unit during the minimum run time, when the commitment is real-time only (no DA commitment)?

- The current rule terminates the eligibility for uplift at the interval the unit is taken over by company. This could result in uplift payments for the startup cost, as the calculation would not use any profits from the remaining intervals of the minimum run time to help offset those startup costs.
- When evaluating the unit to be called online, PJM uses the minimum run time during that evaluation to determine if the unit will be economic. When the decision is made, the expectation is that the unit will be online for at least the minimum run time. The proposed change would keep the unit eligible until the end of that original commitment period (the end of the unit's minimum run time).
- Step 1 will use the tracking desired. The BOR calculation will use any net revenues that would have been available to the resource if it remained PJM-scheduled through the end of the min run time and followed dispatch. This will ensure that the uplift that PJM is willing to pay will only be based on the MW quantity that is consistent with following dispatch.
- Step 2 will use actual MW. This is the uplift that will be needed to make the unit whole based on how it operated.
- **Even though this uplift calculation includes intervals where the unit was self-scheduled, and may make a unit whole for losses in self-scheduled intervals, the uplift paid to the unit will be no greater than what is calculated under Step 1, which is the uplift that would have been owed if the resource had remained running for PJM and followed dispatch.**

Example 15:
Real-Time Commitment (Now Log); online within TTS

SCENARIO:

- PJM schedules the unit in RT to come on as soon as possible
- Resource online prior to TTS elapsing



TAKEAWAYS

Status Quo

- Eligibility begins when resource is online

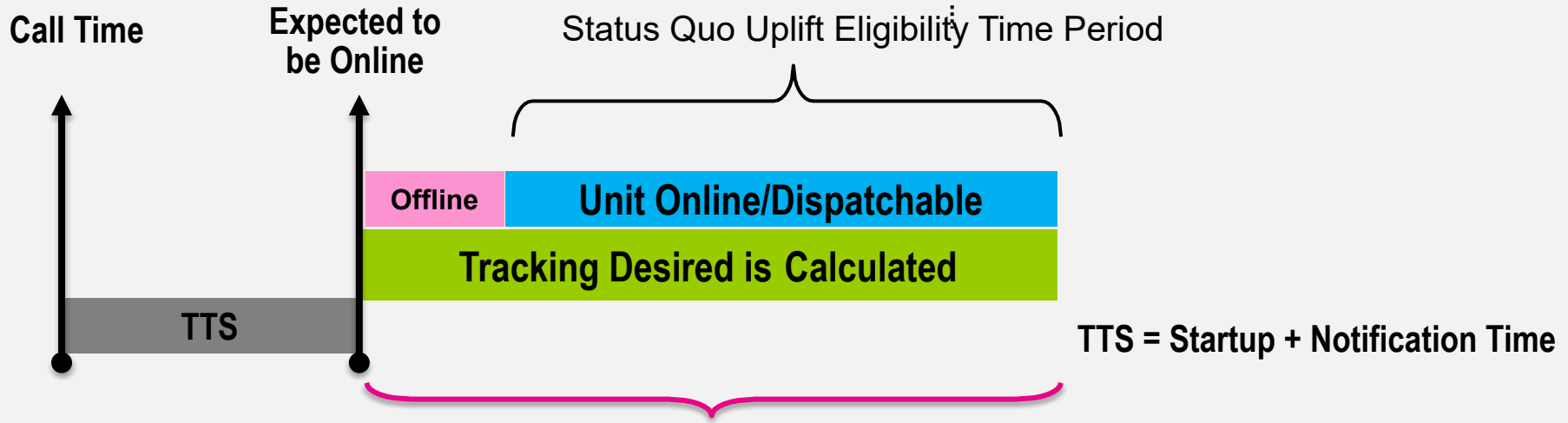
Proposal:

- Tracking begins the earlier of (t0 log effective time + Notification Time + Start Time, time unit comes online) – in this case, when the unit comes online
- Eligibility begins when resource is online
- Except for the use of tracking desired, this is the same as Status Quo

Example 16:
Real-Time Commitment (Now Log): online beyond TTS

SCENARIO:

- PJM schedules the unit in RT to come on as soon as possible (now log)
- Resource online after TTS elapses



TAKEAWAYS

Status Quo

- Eligibility begins when resource is online

Proposal:

- Tracking begins when the unit was expected to be online (based on log time + Startup Time + Notification Time)
- Eligibility begins when TRLD begins

Example 15 and 16

Why change the eligibility rule for a RT committed unit that is online before or after it's TTS?

- Example 15 - The Status quo for eligibility will remain today therefore a unit will continue to be eligible when coming online before it's TTS
- Example 16 - When evaluating the unit to be called online, PJM uses the TTS to determine the expected time the unit is to be online. The proposed change will honor the TTS and make the unit eligible at the time the unit was expected to be online. In addition, the evaluation process for committed the unit determined this was the most economical decision.
- Step 1 will use the tracking desired. The BOR calculation will use any net revenues that would have been available to the resource if it had come online within the TTS. This will ensure that the uplift that PJM is willing to pay will only be based on the MW quantity that is consistent with following dispatch. **That is, the uplift that would have been paid if the unit was online and following cost at the expected time.**
- Step 2 will use actual MW. This is the uplift that will be needed to make the unit whole based on how it operated. Zero mw will be utilized in the period in which the unit is offline.

Eligibility and Calculation Considerations for Flexible Resources

Flexible Resource Expectations

- Flexible Resources are not expected to automatically run in real-time for their entire DA schedule. Instead, they should wait to be committed by PJM or self-schedule in real-time.
  - If they are not committed by PJM to run in real-time, they are paid Lost Opportunity Cost Credits to cover losses in excess of DA revenues from DA buy back and/or forgone profits
- These resources are more likely to cycle on and off more than once in an operating day.

Proposal for Flexible Resources

- Because the overall proposal will make resources eligible for BOR credits for the entire DA commitment anytime the unit runs for PJM for at least 1 interval in real-time, special consideration needs to be given to intervals where the unit also came online for company rather than PJM within that same DA commitment window.
  - When a Flexible Resource that was PJM committed in DA self-schedules in RT before or after a RT PJM commitment period (min run time), the Step 1 calculation will use the net revenues the resource would have received if it had followed PJM commitment instructions and remained offline during the intervals where the unit was self-scheduled.
    - Balancing revenues will reflect 0 MW in RT and LOC will be calculated for use in Step 1 only
  - The Step 2 calculation will reflect the unit's actual operation.

Examples

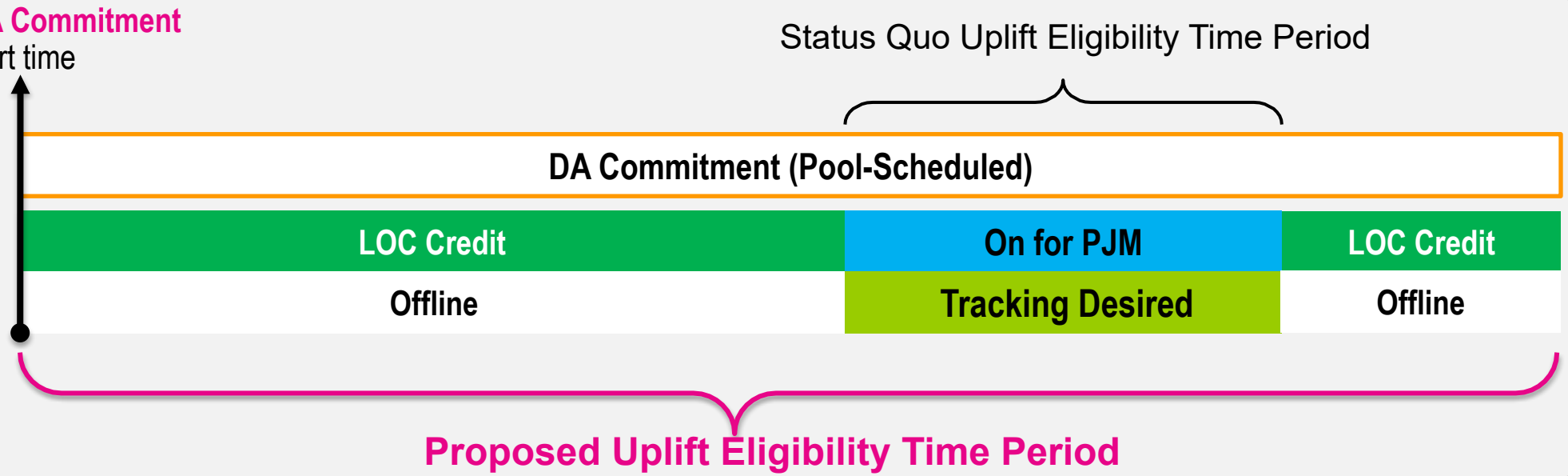
1. Committed by PJM in RT
2. Committed by both company and PJM in RT
3. Taken over for company in the middle of PJM RT commitment

These examples were originally presented at the 10/11/2024 special MIC meeting and have been amended to reflect flexible resource proposal updates introduced in November.

Example 1:
Flexible CT Committed by PJM in RT

SCENARIO:

- PJM schedules the unit in DA
- **Brought on by PJM in RT**



TAKEAWAYS

Status Quo

- Unit is only eligible for BOR when running for PJM in RT
- All of the DA revenue is used in the "Dispatchable" (blue boxes) and none of the balancing revenue is used in the "Offline" period (white box)
- **This causes an overstatement of revenue in the BOR credit calculation during the period the unit is running for PJM.**

Proposal

- Unit is now eligible for BOR for the entire DA Commitment period
- For the offline periods, the balancing revenue for buying out of the DA commitment and the any LOC credit that is provided will be included in the BOR credit calculation.
- **Step 1 and 2** will produce the same result for the offline periods.

Example 1

Why include Balancing revenue and LOC credits when the resource is offline?

- Currently, when a unit is committed in DA but does not run in RT, the full DA revenue from the intervals where the unit wasn't running is included in the BOR calculation for the subset of intervals where the unit was running. However, the balancing revenue (or the DA buy back) from the intervals where the unit didn't run is excluded. It also does not include any LOC payments. This can lead to an overstatement of the revenues available to offset costs in other intervals. **This currently reduces the opportunity for the unit to receive BOR Credits.**

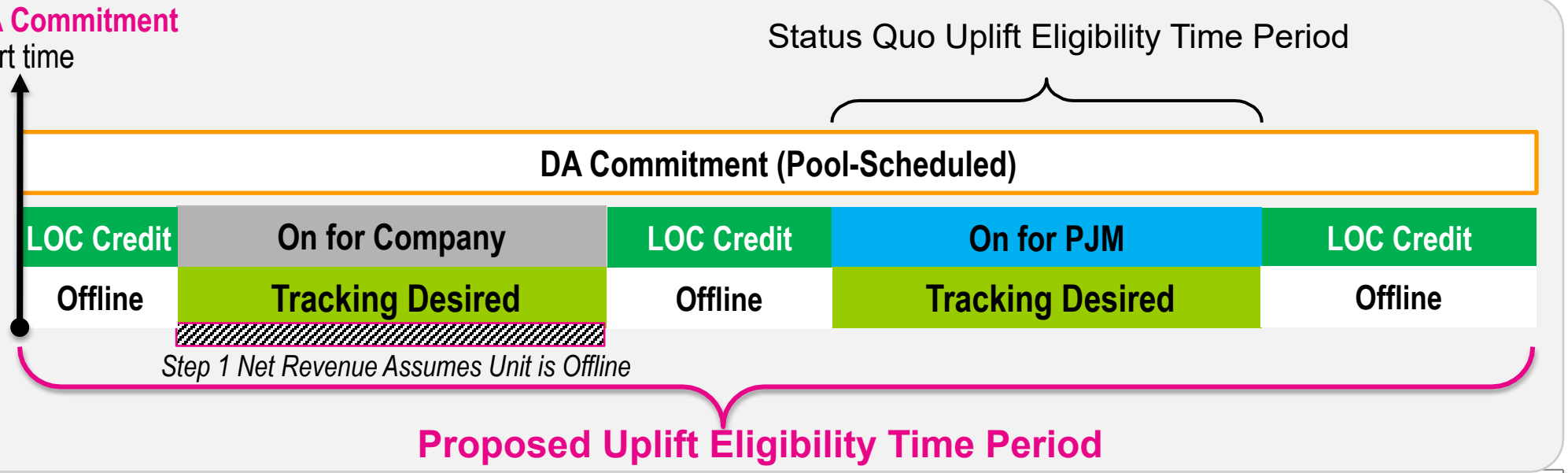
- Keeping the unit eligible for BOR for the entire DA commitment under the proposal will take into account the DA buy back the unit was subject to while offline. This more accurately captures the unit's revenues.

- The calculation for the Net Balancing Revenue in STEP 1 and 2 for the offline period will be the DA Revenue + Balancing Revenue (or DA Buy Back) + LOC Credit. The end result is that net revenues will equal either zero or the profit the unit made by not running in RT due to PJM instructions for the offline periods.

Example 2:
Flexible CT Committed by Company and PJM in RT

SCENARIO:

- PJM schedules the unit in DA
- **Brought on by Company and later by PJM in RT**



TAKEAWAYS

Status Quo

- If a resource is on for company, the resource is responsible for any losses while running for company. Any profits earned do not offset other costs during the PJM commitment period.
- All of the DA revenue for the entire DA commitment period is used in the "On for PJM" intervals (blue box) and none of the balancing revenue is used in the "On for Company" period (gray box) or Offline periods (white boxes)
- **This overstates the total revenue of the unit by including all of the DA revenue, for the on for Company period and offline periods, without any of the associated costs**

Proposal

- Unit is now eligible for BOR for the entire DA Commitment period
- For flexible resources, any self-scheduled log during the DA commitment period, where the interval does not overlap with the min run time of the RT PJM-commitment for the unit has balancing net revenues calculated assuming the unit is offline (MW = 0 and LOC is credited) in Step 1. This means the MW used in Step 1 are 0 MW for both the On for Company and the Offline periods. Tracking Desired MW will be used for the On for PJM periods in Step 1.
- Step 2 will use RT MW for all periods (On for Company, Offline and On for PJM).

Example 2

Why is the unit now eligible for BOR credits during self-committed periods?

- Example 1 illustrated why the unit should remain eligible for the entire DA commitment period, rather than just the intervals where the unit is running for PJM. This helps avoid overstating revenues (and potentially lowering make whole) by using all of the DA revenues and none of the associated balancing revenues.

- This is true for self-scheduled periods as well. Because the DA revenue from these periods is already being accounted for in the calculation, the unit should remain eligible for the BOR credit calculation so that the full costs can be accounted for.

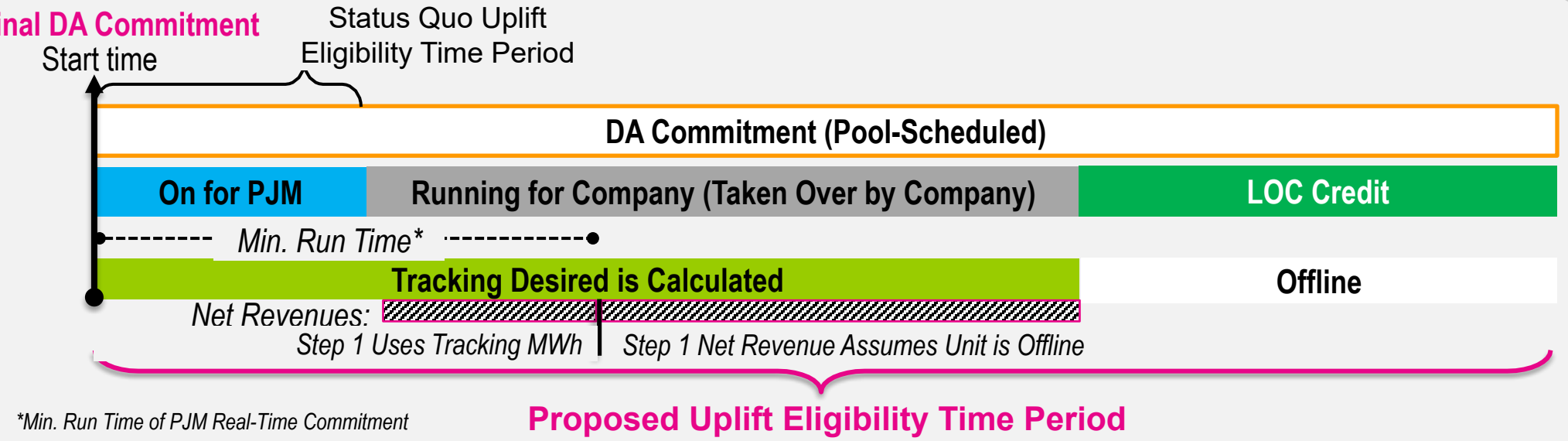
- However, because the unit was self-committed and running for company, rather than PJM, the unit should not be made whole for more than what would have been owed had the resource stayed offline consistent with PJM's commitment instructions. This is the reason Step 1 treats the resource as offline during these self-scheduled periods.

- Any incremental net revenues earned from self-scheduled periods above and beyond what would have been realized by staying offline are excluded from the calculation in Step 1. That is, additional profits will not be used to offset losses in other intervals within the segment.

Example 3:
Flexible Resource Taken over for company in the middle of PJM RT commitment

SCENARIO:

- PJM schedules the unit in DA
- **Taken over by company before end of min run time**



*Min. Run Time of PJM Real-Time Commitment

TAKEAWAYS

Status Quo

- If a resource is taken over by company, the resource is responsible any losses while running for company. Any profits earned do not offset other costs during the PJM commitment period.
- All of the DA revenue is used in the "Dispatchable" (blue boxes) and none of the balancing revenue is used in the "Running for company" period (gray box)

Proposal

- Unit is now eligible for BOR for the entire DA Commitment period
- Treatment of self-scheduled flexible resources:
  - During periods where a flexible unit is self-scheduled in RT, the unit is treated as offline in Step 1 so that it is not made whole for more than what would have been necessary if the resource had remained offline consistent with PJM commitment instructions.
  - To the extent that the unit is taken over as self-scheduled during the min run time of a PJM RT commitment, Step 1 will not assume the resource is offline and will calculate as normal using Tracking Desired until the end of the min run time. This is because while still in the min run time, the commitment decision was PJM's and the unit is therefore eligible to recover losses in that period. This only applies if the PJM commitment comes first and the unit is taken over for self-scheduling while still within the min run time of the PJM RT commitment. The unit will be treated as offline only after the min run time elapses.
  - Step 2 will use RT MW for all periods (On for PJM, Taken Over by Company and Offline).

Example 3

- Why is the resource eligible to recover losses for self-scheduled intervals within the min run time of the PJM commitment?

– Example 2 delineated the reasoning for keeping the unit eligible during periods that the unit was self-committed. Since the DA revenue from these periods is already being accounted for in the calculation, the unit should remain eligible for the BOR credit calculation so that the full costs of the self-committed period can be accounted for as well. However, any uplift should be limited to what would have been owed if the unit remained offline consistent with PJM commitment instructions. This is the reason Step 1 treats the resource as offline.

– Unlike non-flexible units, flexible units are not called on to meet their DA commitment. In this example, after the min run time, with the unit taken over by company, PJM has lost the ability to economically de-commit the unit. There isn't an expectation that the unit would remain online for PJM for their DA commitment, as with non-flexible units. This is the reason the unit is treated as offline beyond the min run time of the RT PJM commitment in the Step 1 calculation when it is self-scheduled.

– To the extent that the unit is self-scheduled during the min run time of a PJM RT commitment, Step 1 will not assume the resource is offline and will calculate as normal using Tracking Desired until the end of the min run time. This is because while still in the min run time, the commitment decision was PJM's and the unit is therefore eligible to recover losses in that period. This only applies if the PJM commitment comes first and the unit is taken over for self-scheduling while still in the min run time of the PJM RT commitment.

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