



Minimum Operating Parameters Matrix Update

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DISRS

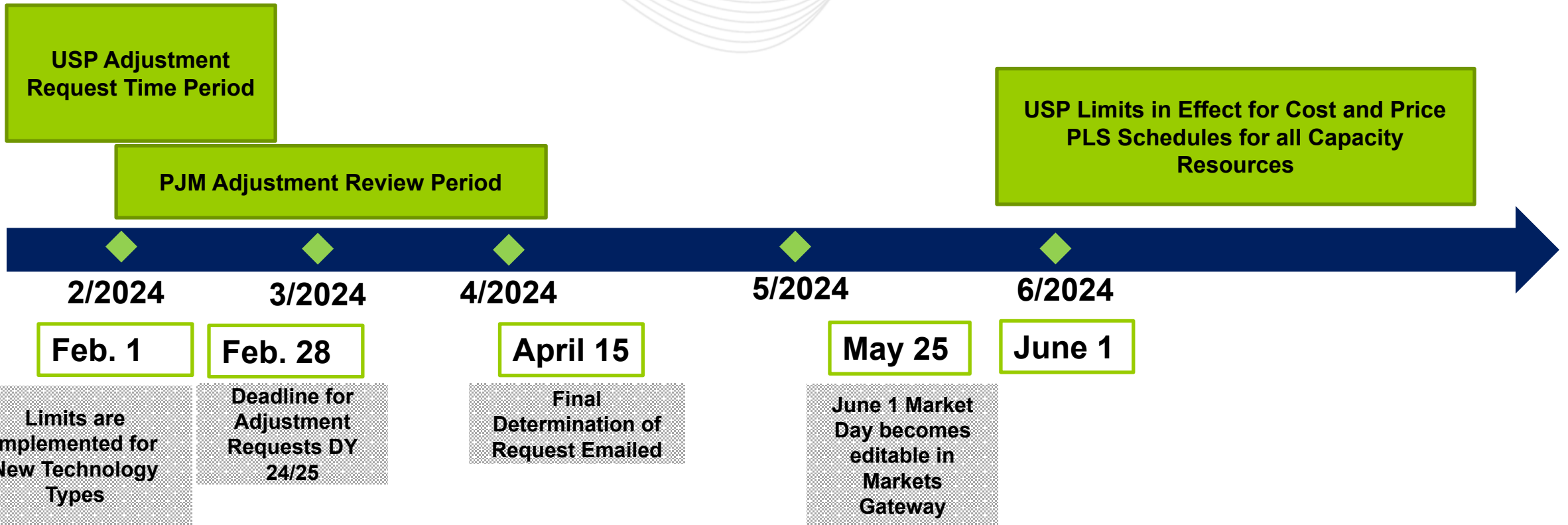
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1. Unit specific parameter limits are applied to all Capacity Resources regardless of commitment status or type (RPM vs FRR)
 - Unit specific parameter limits apply to Cost and Price Based PLS schedules
 - Price Based PLS schedules are only considered in DA and RT Dispatch when certain Emergency Conditions are in effect*
2. If the unit can not meet the proxy parameters due to an actual constraint, you may submit an adjustment request using the **Unit Specific Parameter Adjustment Process SharePoint site (PJM Connect)** by February 28
3. Approved parameters will remain in place unless a change is communicated to PJM
 - Parameters which were approved and implemented in previous years do NOT have to be submitted each year

*Refer to OATT, Attachment K Appendix, Sec 6.6 Minimum Generator Operating Parameters



DY 2024/25 Unit Specific Parameter (USP) Timeline



Tariff, Attachment K-Appendix, Section 6.6 and Operating Agreement Schedule 1

For the 2018/2019 and 2019/2020 Delivery Years for Base Capacity Resources, and for the 2016/2017 Delivery Year and subsequent Delivery Years for Capacity Performance Resources, the Office of the Interconnection shall determine the unit-specific achievable operating parameters for each individual unit on the basis of its operating design characteristics and other constraints, recognizing that remedial and ongoing investment and maintenance may be required to perform on the basis of those characteristics, for the following parameters:

- (i) Turn Down Ratio;
- (ii) Minimum Down Time;
- (iii) Minimum Run Time;
- (iv) Maximum Daily Starts;
- (v) Maximum Weekly Starts;
- (vi) Maximum Run Time;
- (vii) Start-up Time; and
- (viii) Notification Time.

- Additions:
 - Nuclear Resources
 - Run-of-River Resources
 - Solar Resources
 - Wind Resources
- Modifications:
 - Intermittent-Storage Hybrid Resources
 - Capacity Storage Resource
 - Battery
 - Pumped Hydro

- **Nuclear**: A generating resource which uses nuclear fission as a fuel. This includes both Boiling Water Reactors (BWR) and Pressurized Water Reactors (PWR).
- **Run-of-River**: A generating resource which uses topographic elevation difference on a river to generate.
- **Solar**: An intermittent generating resource that generates using solar radiation.
- **Wind**: An intermittent generating resource which generates using wind
- **Battery**: A resource that stores energy as electrical energy in a battery or mechanical energy in a spinning flywheel.
- **Pumped Hydro**: An generating/pumping resource which pumps water to an elevated pond/basin and generates by discharging the water to a lower pond or basin.



Matrix Update - Parameters

| Technology Classification ² | Min Down Time Hrs | Min Run Time Hrs | Max Daily Starts | Max Weekly Starts | Start-up Time | | | Notification Time Cold/Warm/Hot Hrs | Turn Down Ratio | Max Run Time |
|--|------------------------|------------------|--------------------------|--------------------------|---|-----------|-----------|-------------------------------------|--------------------|----------------|
| | | | | | Hot Hrs. | Warm Hrs. | Cold Hrs. | | | |
| Capacity Pumped HydroStorage Resource | Shall not exceed 1 hr. | 1 | 12 | 84 | Start Time + Notification Time shall not exceed 1 hr. | | | N/A | 24 hrs. | |
| Battery | <u>0</u> | <u>0</u> | <u>Unlimited</u> | <u>Unlimited</u> | <u>0</u> | | | <u>N/A</u> | <u>24 hrs.</u> | |
| Intermittent-Storage Hybrid | 0 | 0 | <u>No limitUnlimited</u> | <u>No limitUnlimited</u> | 0 | 0 | 0 | 0 | N/A | 24 hrs. |
| Solar Units | <u>0</u> | <u>0</u> | <u>Unlimited</u> | <u>Unlimited</u> | <u>0</u> | <u>0</u> | <u>0</u> | <u>0</u> | <u>N/A</u> | <u>24 hrs.</u> |
| Wind Units | <u>0</u> | <u>0</u> | <u>Unlimited</u> | <u>Unlimited</u> | <u>0</u> | <u>0</u> | <u>0</u> | <u>0</u> | <u>N/A</u> | <u>24 hrs.</u> |
| Run-of-River Hydro Units | <u>0</u> | <u>0</u> | <u>Unlimited</u> | <u>Unlimited</u> | <u>0</u> | <u>0</u> | <u>0</u> | <u>0</u> | <u>N/A</u> | <u>24 hrs.</u> |
| Nuclear Units | <u>48</u> | <u>24</u> | <u>1</u> | <u>1</u> | <u>48</u> | <u>72</u> | <u>96</u> | <u>1</u> | <u>1.0 or more</u> | <u>24 hrs.</u> |

Appendix: Unit Specific Parameter and Adjustment Process Reference Material

Reference Materials:

- **Minimum Operating Parameter Matrix-** <https://www.pjm.com/-/media/committees-groups/committees/elc/postings/20150612-june-2015-capacity-performance-parameter-limitations-informational-posting.ashx?la=en>
- **Tariff-** OATT Attachment K Appendix Section 6.6
- **Manual 11-** Section 2.3.4 <https://www.pjm.com/~media/documents/manuals/m11.ashx>
- **FAQs-** <https://www.pjm.com/-/media/committees-groups/committees/elc/postings/20150715-cp-unit-specific-adjustment-request-faqs.ashx?la=en>
- **Request Template-** <https://www.pjm.com/-/media/committees-groups/committees/elc/postings/cp-unit-specific-adjustment-process-template.ashx?la=en>
- **Parameter Definitions-** <http://www.pjm.com/~media/documents/manuals/m11.ashx>
- **PJM Connect Site-** <https://connect.pjm.com/adjustments/SitePages/Home.aspx>



Unit Specific Parameter Adjustment Process Overview

Unit Specific Operating Parameter Adjustment Process Details

| | |
|---|--|
| Why was the process implemented? | PJM was directed by FERC in ER15-623-000, EL15-29-000, ER15-623-001 (CP Order) to implement unit specific parameter limitations for Generation Capacity Resources |
| What is the Unit Specific Operating Parameter Adjustment Process? | Capacity Market Sellers that do not believe their individual resources can meet the proxy operating parameters due to actual operating constraints may submit adjustment requests for the parameters for their cost based and price-based parameter limited schedules to the PJM team for review. The team includes IMM team members |
| What parameters are included in the unit specific operating parameter adjustments? | Turn Down Ratio, Minimum Down Time, Minimum Run Time, Maximum Daily Starts, Maximum Weekly Starts, *Hot Start, *Warm Start, *Cold Start, *Notification Time, and *Maximum Run Time <i>* Additional Parameters for Capacity Performance Resources</i> |



Unit Specific Parameter Adjustment Process Overview

Unit Specific Operating Parameter Adjustment Process Details

| | |
|---|--|
| Who should use the process? | <ul style="list-style-type: none">• Capacity Performance resources for DY 2024/25 and Uncommitted Capacity Resources for DY 2024/25• Replacement Capacity Performance resources for DY 2024/25• Re-submitted adjustments for the same parameters if there is physical change or updated/changed information or documentation |
| What are adjustments used for? | <ul style="list-style-type: none">• Make whole payments• Do not excuse a unit for not performing during a Performance Assessment Interval |
| How long are the parameters effective for? | Parameters will remain in place until PJM determines a change is needed based on changed operational capabilities of the resource |
| When must adjustments be submitted by? | The requests must be submitted by the February 28 and will be evaluated by April 15 (prior to the applicable delivery year). |
| When are adjustments effective? | June 1 for the applicable delivery year |
| How do you submit adjustments? | Submit requests in the template with documentation and data to the Unit Specific Parameter Adjustment Process SharePoint Site. |

| Acronym | Term & Definition |
|---------|---|
| RPM | <p>Reliability Pricing Model is defined as PJM’s capacity market design that includes a series of auctions to satisfy the reliability requirements of the PJM region for a Delivery Year.</p> |
| FRR | <p>Fixed Resource Requirement Capacity Plan is defined as an FRR entity's advance commitment of capacity resources to satisfy their unforced capacity obligation and any specific locational or product-type resource requirements for a delivery year.</p> |
| PLS | <p>Parameter Limited Schedules are defined as schedules containing pre-determined limits that could be imposed on the parameters in generation offers when certain operational circumstances exist. Cost based offers are parameter limited. Price based offers can be parameter limited or not.</p> |
| DA | <p>Day-Ahead Energy Market is defined as a day-ahead hourly forward market in which PJM market participants may submit offers to sell and bids to buy energy. The results of the Day-Ahead Energy Market are posted daily by 1:30 p.m. and are financially binding. The Day-Ahead Energy Market is based on the concept of Locational Marginal Pricing and is cleared using least price security-constrained unit commitment and dispatch programs.</p> |
| RT | <p>Real-Time Energy Market is defined as a balancing market in which the clearing prices are calculated every five minutes based on the actual system operations security-constrained economic dispatch. The Real-Time Energy Market is based on the concept of Locational Marginal Pricing and is settled based on actual hourly (integrated) quantity deviations from day-ahead scheduled quantities and on real-time prices integrated over the hour.</p> |

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