

# Background Information: Parameter-Limited Schedules

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## ***ENERGY OFFERS INCLUDE...***

1. Economic components
  - Price-MW pairs (incremental curve)
  - Start-up
  - No-load
2. Operating parameters
  - Notification time
  - Startup time
  - Minimum run time



- Limitations are enforced at the time of offer submission.

Type of Offer/Schedule	Economic Component	Operating Parameters
Cost-based	Limited to cost + 10%	Must be at least as flexible as PLS
Price-based	Capped at \$1,000/MWh unless cost exceeds that	Does not need to confirm to PLS
Price PLS	Capped at \$1,000/MWh unless cost exceeds that  May be higher or lower than price-based offer	Must be at least as flexible as PLS

- Reserve Market Working Group produced a large proposal containing many components
- During that discussion, Monitoring Analytics raised concern regarding a generation owner's ability to exert market power through the use of inflexible parameters
- PLS was implemented on 12/1/2008 to address these concerns

- Excerpt from the original PLS filing in 2008 (ER08-1569)

In order to address these concerns, PJM is proposing that certain pre-determined limits (“parameter limited schedules”) that are based on the physical parameters of the units should be applied when certain system conditions exist and a unit has the potential to exhibit market power. **These conditions could exist when (i) the unit owner fails the three pivotal supplier test, and (ii) PJM declares a Maximum Generation Emergency, issues an alert that a Maximum Generation Emergency may be declared (“Maximum Generation Emergency Alert”), or schedules units based on the anticipation of a Maximum Generation Emergency or Maximum Generation Emergency Alert for part or all of an Operating Day.** The factors to be considered in determining the parameter limited schedules are Turn Down Ratio, Minimum Down Time, Minimum

## **6.6 Minimum Generator Operating Parameters – Parameter Limited Schedules**

**(a) Generation resources shall be subject to pre-determined limits on non-price offer parameters (“parameter limited schedules”) under the following circumstances:**

- (i) The Operating Reserve markets fail the three pivotal supplier test. When this subsection applies, the parameter limited schedule shall be the less limiting of the defined parameter limited schedules or the submitted offer parameters.**
- (ii) The Office of the Interconnection: (i) declares a Maximum Generation Emergency; (ii) issues an alert that a Maximum Generation Emergency may be declared (“Maximum Generation Emergency Alert”); or (iii) schedules units based on the anticipation of a Maximum Generation Emergency or a Maximum Generation Emergency Alert for all, or any part, of an Operating Day.**

- Manual 11 language at the time mirrored the Tariff/OA

- If the resource is **committed out of merit order** and the owner does not pass the TPS test they have been determined to possess **local market power**.
- PJM commits on the lesser of the submitted cost-based and price-based offers. (Romanette (i))

The lesser of...



Submitted cost-based offer

OR



Submitted price-based offer

- The existence of an emergency permits the use of a price PLS schedule.
- The owner passes the TPS test they **have been determined not to possess local market power**. The cost-based offer cannot be used.
- PJM commits on the lesser of the submitted cost-based and price-based offers. (Romanette (ii))

The lesser of...



Submitted price-based offer

OR



Submitted price PLS offer

The lesser of...

Price-MW Pairs Capped at cost+10%	Operating <u>Parameters</u> Conform to PLS
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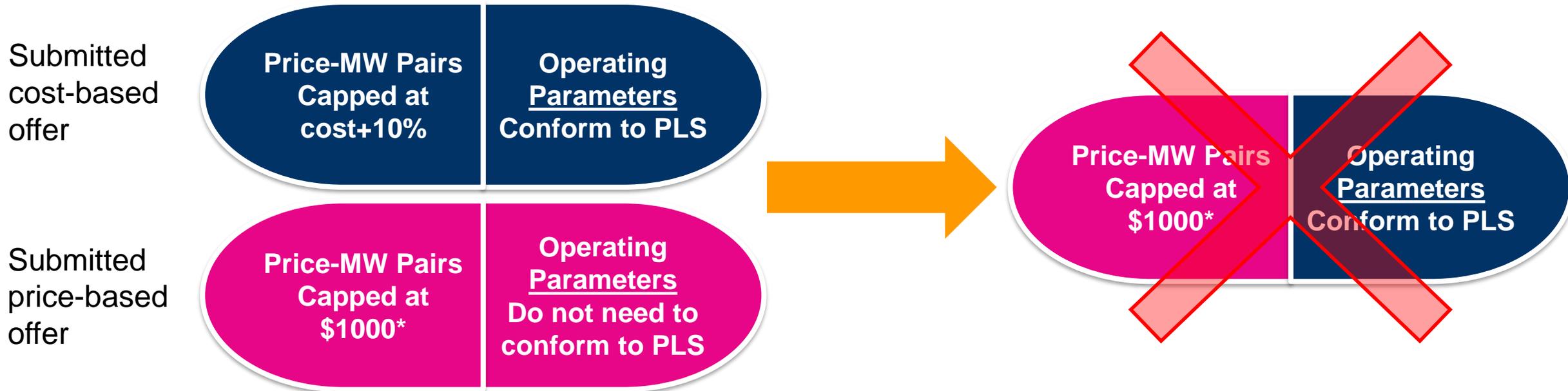
OR

Price-MW Pairs Capped at \$1000*	Operating <u>Parameters</u> Do not need to conform to PLS
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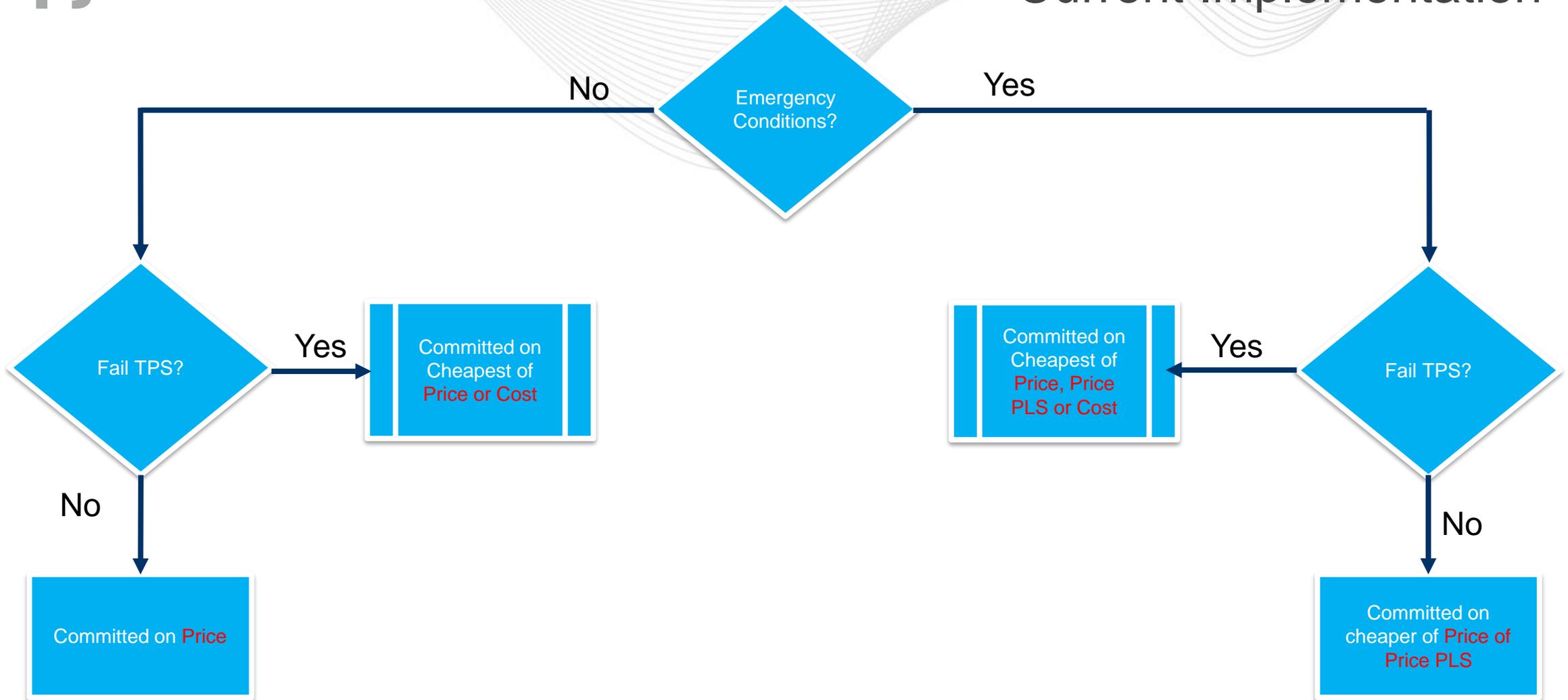
OR

Price-MW Pairs Capped at \$1000*	Operating <u>Parameters</u> Conform to PLS
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- When a resource is committed in PJM, the offer, as submitted by the market participant is committed.
- PJM does not separate price-MW pairs from operating parameters to create composite offers.



# When PLS Schedules Are Used in Commitment: Current Implementation



1. A resource may fail the TPS test and not committed on a parameter limited schedule.
2. An emergency could occur and a resource is not committed on a parameter limited schedule.

These scenarios can occur when a parameter-limited schedule is not the least expensive offer submitted.

PJM understands this to be Monitoring Analytics concern.

## Price Offer

Offer Price = \$40/MWh

Min=Max = 100 MW

Start-up Cost = \$500

No-Load = \$100/h

Minimum Run Time = 5 h

Cheaper Offer

Total Cost = \$21,000

## Cost Offer

Offer Price = \$51/MWh

Min=Max = 100 MW

Start-up Cost = \$500

No-Load = \$100/h

Minimum Run Time = 4 h

Total Cost = \$21,300

## Price Offer

Offer Price = \$55/MWh

Min=Max = 100 MW

Start-up Cost = \$500

No-Load = \$100/h

Minimum Run Time = 3 h

Cheaper Offer

Total Cost = \$17,300

## Cost Offer

Offer Price = \$51/MWh

Min=Max = 100 MW

Start-up Cost = \$500

No-Load = \$100/h

Minimum Run Time = 4 h

Total Cost = \$21,300

- The Initial filing (2008) letter does not
  - state that the use of parameter limits is required under stated conditions. They “could” under specified conditions.
  - discuss how composite offers would be determined if they were supposed to be.
- The term “schedule” is used in the 2008 Tariff/OA language.
  - This term has never been used solely to describe a set of operating parameters.
  - PJM Manuals contain the use of the term “schedule” in a manner that is inclusive of the economic and operating parameters.
    - Section 2.3.3.2 of Manual 11 is titled “Generator Schedules” and discusses all components of an offer collectively as a “schedule”
    - eMarket and Markets Gateway use the same convention
- Day-ahead Market Training and other training
  - Generation ITP for example (<https://www.pjm.com/-/media/training/nerc-certifications/markets-exam-materials/generation-ity/day-ahead-energy-market.ashx?la=en>)

- While this language is not entirely correct, it reflects a reasonably accurate understanding of the implementation
- It also contains recommendations for enhancements consistent with SOM recommendations
- There are no statements concerning compliance with the Tariff/OA.

## *Parameter-Limited Schedules*

According to current rules, units are required to submit schedules with parameter limits consistent with the parameter limited schedule matrix for cost-based schedules and price-based parameter-limited schedules.<sup>131</sup> Units are placed on cost-based schedules when they are called on for transmission constraints and fail the TPS test, in which case they are then required to follow their parameter limits, as submitted with their cost-based schedules. In the case of a Maximum Generation Emergency alert, units are placed on a parameter-limited price-based schedule, in which the energy offers of their schedule may still be market based, but the operating parameters must adhere to their pre-defined parameter limits.

Price-based schedules are not required to follow any pre-defined parameter limits. This could allow participants to use price-based schedule parameters to exercise market power in order to receive additional operating reserve credits. A generation owner could extend the minimum runtime of a unit prior to every weekend in order to ensure that the unit was running for PJM and receiving operating reserve credits rather than shutting down or self scheduling.

Units also offer more flexible parameters on the price-based schedule than the cost-based schedule at times. When this occurs it demonstrates that, contrary to the intent of parameter limited schedules, the unit is more flexible than reflected in its parameter limits.

The MMU also recommends that startup and notification time parameters for both cost based and price based offers be added to the list of parameters with required levels. This will prevent the submission of artificially long start and notification parameters which are designed to address economic issues with units rather than the physical issues that parameters are intended to address. Limits on these parameters will help ensure that capacity resources, paid for in RPM, meet their obligation to make legitimate and competitive offers in the Day-Ahead Market every day.

- The current implementation is consistent with PJM's recollection of the intent of the PLS as it was discussed and designed at the RMWG.
- PJM has not found evidence that supports an implementation where offer prices and parameters are separate from each other and used in a manner to create composite offers consisting of a set of offer prices and parameters that were not submitted together by a participant.

# Questions?

The next slides will explain the issue PJM raised at the MRC in more detail.

- CP filing (EL15-29) discusses changes to several things regarding the PLS
  - The level of the parameters
  - The applicability of the price PLS schedule
- It does not discuss a proposed change to the applicability of the cost-based offer or the price PLS offer.
- Unfortunately, the filed and accepted language does change this.
  - This is PJM's concern that was raised at the MRC.

Can be read to say that the cost-based offer and price PLS schedule can be used in a uniform set of circumstances.

1. Failure of TPS test
2. Emergency condition

No rationale provided in the filing for these changes.

Not consistent with the intent or manual language.

## **6.6 Minimum Generator Operating Parameters – Parameter Limited Schedules.**

- (a) Market Sellers submitting Offer Data for Generation Capacity Resources shall submit and be subject to pre-determined limits on cost-based offers, which are always parameter limited. Market Sellers submitting Offer Data for Generation Capacity Resources shall submit and be subject to pre-determined limits on market-based offers conforming to parameter limitations (“parameter limited schedules”) under the following circumstances:
- (i) The Market Seller fails the three pivotal supplier test. When this subsection applies, the parameter limited schedule shall be the less limiting, i.e. more flexible, of the defined parameter limited schedules or the submitted offer parameters.
  - (ii) For the 2014/2015 through 2017/2018 Delivery Years, the Office of the Interconnection: (i) declares a Maximum Generation Emergency; (ii) issues a Maximum Generation Emergency Alert; or (iii) schedules units based on the anticipation of a Maximum Generation Emergency or a Maximum Generation Emergency Alert for all, or any part, of an Operating Day.

- (iii) For Capacity Performance Resources, the Office of the Interconnection: (i) declares a Maximum Generation Emergency; (ii) issues a Maximum Generation Emergency Alert, Hot Weather Alert, Cold Weather Alert; or (iii) schedules units based on the anticipation of a Maximum Generation Emergency, Maximum Generation Emergency Alert, Hot Weather Alert or Cold Weather Alert for all, or any part, of an Operating Day.
  
- (iv) For Base Capacity Resources, the Office of the Interconnection: (i) declares a Maximum Generation Emergency during hot weather operations during the period of June 1 through September 30; (ii) issues a Maximum Generation Emergency Alert or Hot Weather Alert during hot weather operations during the period of June 1 through September 30; or (iii) schedules units based on the anticipation of a Hot Weather Alert, or a Maximum Generation Emergency or Maximum Generation Emergency Alert during hot weather operations during the period of June 1 through September 30, for all, or any part, of an Operating Day.

- From Capacity Performance 206 Filing (EL15-29)

In sections 6.6(a)(iii) and (iv), PJM defines the circumstances when parameter limited schedules are to be applied for Base Capacity Resources as the time when PJM, during hot weather operations, declares a Maximum Generation Emergency, issues a Maximum Generation Emergency Alert or Hot Weather Alert, or schedules units based on the anticipation of the occurrence of any of these events for any portion of an Operating Day. For Capacity Performance Resources, PJM defines the circumstances as the time when PJM declares a Maximum Generation Emergency, issues a Maximum Generation Emergency Alert, Hot Weather Alert, or Cold Weather Alert, or schedules units based on the anticipation of the occurrence of any of these events for any portion of an Operating Day.<sup>17</sup>

- Prior language states the price PLS could be used during a Max Generation Emergency, an alert for a Max Generation Emergency, or the scheduling of a resource in anticipation of one
- CP language ONLY intended to include Hot Weather and Cold Weather Alerts in the set of circumstances when the price PLS can be used
- Manual 11 was updated on March 31, 2016 to reflect these changes but also added significantly more detail to the commitment of resources on their PLS (<https://www.pjm.com/-/media/committees-groups/committees/mrc/20160331/20160331-item-02c-draft-manual-11-revisions.ashx>)

- The Manual 11 language implemented with CP is the version that added the detail on exactly when certain PLS offers are used
- That language is consistent with using the least cost submitted offer from market participants based on specific conditions. This is consistent with the implementation of PLS dating back to 2008
- These changes were endorsed by acclimation with no objections and one abstention (<https://www.pjm.com/-/media/committees-groups/committees/mrc/20160418-special/20160418-item-01-draft-minutes-mrc.ashx> -- MRC minutes from the March 31, 2016 meeting)
- There is no record of any concern raised by the membership or MA regarding the additional detail added

- PJM agrees that the Tariff/OA can be written more clearly with regard to the implementation of the PLS.
- PJM believes that the compliance issue it raised at the December 5, 2019 MRC needs to be addressed.
- PJM has reported this issue to the FERC.
  - PJM notified the FERC that it has implemented what was intended and that the Tariff/OA are incorrect.