

Following Dispatch

MMUAC

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Background

- **“Following dispatch” is a generic term used to describe how well resources follow PJM’s instructions in the Energy Market.**
- **Following dispatch includes:**
 - **Commitment instructions: Starting, shutting down**
 - **Dispatch instructions: Ramping up or down, operating at economic minimum or maximum.**

Background

- **PJM has the authority to direct any Market Seller to adjust the output of any pool-scheduled resource. OA Schedule 1 Section 1.11.1.**
- **Generators must follow PJM's dispatch instructions based on the submitted ramp rate. OA Schedule 1 Section 1.7.19.**
- **PJM promotes following dispatch by ensuring that units that follow dispatch receive uplift payments and that units that do not follow dispatch pay uplift charges.**

Uplift

- **PJM makes two “following dispatch” determinations regarding uplift.**
 - **Units are eligible to receive uplift payments if they follow dispatch.**
 - **Units are assessed uplift charges if they do not follow dispatch.**
- **These two determinations are different and in some cases they contradict each other.**
 - **For example, a unit can receive a make whole payment and pay uplift charges at the same time.**

Following dispatch to receive uplift payments

- **PJM does not have a metric for defining “following dispatch” for the purpose of uplift payments.**
- **All pool-scheduled resources are eligible for uplift payments if they operate as requested by PJM. OA Schedule 1 Section 3.2.3 (e).**
- **PJM relies on dispatcher logs.**
 - **For example, dispatchers log units “for economics” if called on by PJM or “for company” if unit was self scheduled.**
 - **“For economics” units are eligible for uplift, “for company” units are not.**

Following dispatch to receive uplift payments

- **In some situations, dispatchers identify units that are logged as running for PJM but are not responding to the dispatch signals.**
- **After discussion with the generator, the unit can start responding or can request to be logged for company.**
- **After the fact, analysis done by the IMM or PJM can result in uplift payment resettlements if review shows that the unit was not following dispatch.**
- **These are inefficient methods to identify incorrect uplift payments.**

Following dispatch to avoid uplift charges

- **PJM has several metrics used to determine if units are following dispatch for the purpose of assessing uplift charges.**
- **These metrics are:**
 - **Ramp Limited Desired MW**
 - **UDS Basepoint MW**
 - **UDS LMP Desired MW**

Following dispatch to avoid uplift charges

- **Ramp Limited Desired MW (RLD):** Output level that a resource should have achieved between dispatch signals.
- **UDS Basepoint MW:** Output level instructed by PJM. This is also known as the dispatch signal. UDS was replaced by SCED in 2010.
- **UDS LMP Desired MW:** Output level based on the RT LMP and the incremental offer curve. Value is not ramp limited.

Following dispatch to avoid uplift charges

- **A unit is following dispatch, for the purpose of not paying uplift charges, if:**
 - $RLD\ MW \leq Actual\ MW \leq UDS\ Basepoint$ or
 - $UDS\ Basepoint\ MW \leq Actual\ MW \leq RLD\ MW$ or
 - $Percent\ Off\ Dispatch \leq 10\%$ or
 - $abs\left[\frac{Actual\ MW - RLD\ MW}{RLD\ MW}\right] \leq 5\%$

Example

- **Unit**
 - **Ramp Rate = 1 MW per minute**
 - **State Estimator Timestamp = 10:00**
 - **State Estimator MW = 90 MW**
 - **SCED Execution Time = 10:01**
 - **SCED Approval Time = 10:04**
 - **SCED Target Time = 10:15**
 - **SCED Signal MW = 100 MW**
 - **Next SCED Case Approval Time = 10:09**

Example

- **Unit**
 - **Ramp Request = (SCED Target – SE MW) / (Look Ahead Time)**
 - **Ramp Request = (100 MW – 90 MW) / (10 minutes)**
 - **Ramp Request = 1 MW / min**
 - **RLD = SE MW + (Ramp Request x Case Effective Time)**
 - **RLD = 90 MW + (1 MW/min x (10:09 – 10:04))**
 - **RLD = 95 MW**

Example

- **What happens if the unit does not move? If the unit stays at 90 MW?**
 - **The unit output will be outside of the RLD MW (95 MW) and UDS Basepoint (100 MW).**
 - **The unit's deviation is 5 MW or 5.3 percent.**
 - **The unit will be flagged as not following dispatch and it will be assessed uplift charges based on 5 MW.**

Example

- **What happens if the unit does not move but we change the SE MW from 90 to 150?**
 - **The unit output will be outside of the RLD MW (155 MW) and UDS Basepoint (160 MW).**
 - **The unit's deviation is 5 MW or 3.2 percent.**
 - **The unit will be flagged as following dispatch and it will not be assessed uplift charges based on 5 MW.**

Following dispatch to avoid uplift charges

- **The current metric rewards slow and large units in comparison to fast and smaller units.**
- **The SCED MW signal sent to generators is adjusted down to include how well the generator has performed (followed dispatch) as a result of PJM's use of DGP (degree of generator performance).**
- **In some situations, SCED will stop dispatching the unit and the SCED signal will equal the SE MW. Based on the equations, this means the unit will be defined to be following the signal perfectly.**

Summary

- **PJM does not have an accurate metric to determine whether generators are following dispatch for the purpose of paying uplift.**
- **PJM's current metric to determine if generators are following dispatch for the purpose of charging uplift is flawed and inaccurate.**

Summary

- **The PJM proposed ORDC does not fix the current problem with the definition of following dispatch; PJM's proposed ORDC will make the problem worse.**
- **The PJM proposed fast start pricing does not fix the current problem with the definition of following dispatch; PJM's proposed fast start pricing will make the problem worse.**
- **Improvements to generator modeling would fix some of the current flaws; generator modeling needs to be prioritized.**

MMU Recommendations

- **The PJM uplift market design was created to provide an incentive to generators to follow dispatch.**
- **PJM needs to pay more attention to the details of uplift payments including:**
 - **accurately tracking whether units are following dispatch;**
 - **identifying the actual need for units to be dispatched out of merit; and**
 - **determining whether local reserve zones or better definitions of constraints would be a more market based approach.**

MMU Recommendations

- **The MMU recommends that PJM develop and implement an accurate metric to define when a unit is following dispatch:**
 - **to determine eligibility to receive balancing operating reserve credits; and**
 - **for assessing generator deviations.**

MMU Recommendations

- **Other needed improvements:**
 - **Alignment of dispatch signal with prices. They are currently misaligned.**
 - **Consequences for poor DGP (degree of generator performance) scores.**
 - **Review of use of DGP.**
 - **Model peaking operation (e.g. duct burners, peak firing, pagging, etc.)**
 - **Model operating discontinuities (e.g. CC transitions, mill operation, cofire operation).**

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