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| NPRR Number | [1209](https://www.ercot.com/mktrules/issues/NPRR1209) | NPRR Title | Board Priority – State Of Charge Ancillary Service Failed Quantity Allocations under NPRR1149 |
| Date Posted | November 8, 2023 |
|  |  |
| Requested Resolution  | Urgent – This Nodal Protocol Revision Request (NPRR) has been deemed a Board Priority pursuant to Section 21.5, Urgent and Board Priority Nodal Protocol Revision Requests and System Change Requests |
| Nodal Protocol Sections Requiring Revision  | 6.7.3, Charges for Ancillary Service Capacity Replaced Due to Failure to Provide |
| Related Documents Requiring Revision/Related Revision Requests | NPRR1186, Improvements Prior to the RTC+B Project for Better ESR State of Charge Awareness, Accounting, and Monitoring |
| Revision Description | This NPRR makes updates to language introduced by NPRR1149, Implementation of Systematic Ancillary Service Failed Quantity Charges, by providing the equations and the priority order to be used to consider Energy Storage Resource (ESR) Real-Time State of Charge (SOC) data when determining Ancillary Service Failed Quantity Charges for a Qualified Scheduling Entity (QSE) after each Operating Day. Under this NPRR, SOC insufficiencies will be reflected in adjustments to the telemetered Ancillary Service Resource Responsibilities for the ESR. These adjusted values will then be used in Ancillary Service failed quantity calculations for a QSE’s portfolio when performing the after-the-fact analysis.The adjusted Ancillary Service Resource Responsibilities for a QSE’s ESRs due to SOC insufficiency will be calculated separately for ‘Up’ and ‘Down’ Ancillary Services by the Energy Management System (EMS). These calculations will be used by the Market Management System (MMS) to allocate failed quantity charges at the QSE level for individual Ancillary Services according to the following predetermined priority order: For ‘Up’ Ancillary Service Resource Responsibility reductions:* Non-Spinning Reserve (Non-Spin);
* ERCOT Contingency Reserve Service (ECRS);
* Responsive Reserve (RRS); and
* Regulation Up Service (Reg-Up)

For ‘Down’ Ancillary Service Resource Responsibility reductions:* Regulation Down Service (Reg-Down).
 |
| Reason for Revision |  Addresses current operational issues. Meets Strategic goals (tied to the [ERCOT Strategic Plan](https://www.ercot.com/files/docs/2018/12/13/ERCOT_Strategic_Plan_2019-2023.pdf) or directed by the ERCOT Board). Market efficiencies or enhancements Administrative Regulatory requirements Other: (explain)*(please select all that apply)* |
| Business Case | In June 2023, ERCOT filed NPRR1186, Improvements Prior to the RTC+B Project for Better ESR State of Charge Awareness, Accounting, and Monitoring. As discussions on the NPRR have progressed, compromises were made to what was originally proposed by ERCOT Staff in order to encourage ESR development. ERCOT believes that the changes made to NPRR1186 during the revision request process increase the risk that short-duration ESRs will not have the SOC necessary to fulfill Ancillary Service responsibilities, particularly in cases in which the ESR is carrying Ancillary Services across multiple consecutive hours. This NPRR helps mitigate that risk by supplementing the financial penalty mechanisms that have already been approved under NPRR1149 with consideration of SOC, due to the unique technical characterictics of ESRs and the direct impact of the SOC on the ability of those Resources to provide the Ancillary Services. It is worth noting that Ancillary Service failed quantity logic is applied at the QSE-level and considers all Resource technologies within a QSE’s portfolio. In evaluating how to incorporate SOC considerations into the concept approved under NPRR1149, ERCOT identified a need to separate some calculations for ESRs from other Resource technologies. This is required for two reasons:* An ESR’s modeled Generation Resource and Controllable Load Resource need to be modeled as an aggregated Resource in consideration of Ancillary Service provision. This concern does not exist for other types of Resources and is unique to how ESR’s are modeled; and
* For ESRs, reductions to Ancillary Service Resource Responsibility amounts need to be allocated to different Ancillary Service types according to a determined priority order so that the SOC can be appropriately allocated across the types of Ancillary Service the ESR is providing.

This NPRR addresses the above two issues and more accurately and transparently applies charges for failure to provide to QSEs that use ESRs within their portfolio of Resources to provide Ancillary Services.During the meeting of the ERCOT Board of Directors (Board) in October, ERCOT staff requested that the Board direct ERCOT to submit an NPRR implementing this additional control related to SOC monitoring. ERCOT submits this Board Priority NPRR in response to the Board’s direction. |

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| **Market Rules Notes** |

Please note that the following NPRR(s) also propose revisions to the following section(s):

* NPRR1196, Correction of NCLR Ancillary Service Failed Quantity Calculations under NPRR1149
	+ Section 6.7.3

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| Proposed Protocol Language Revision |

***6.7.3 Charges for Ancillary Service Capacity Replaced Due to Failure to Provide***

(1) A charge to each QSE that fails on its Ancillary Service Supply Responsibility, whether or not a SASM is executed due to its failure to supply, is calculated based on the greatest of the MCPC in the Day-Ahead Market (DAM) or any SASM for the same Operating Hour. Included in the failed quantity is the charge to each QSE that reduces its Ancillary Service Supply Responsibility by an RSASM, which is calculated based on the cleared MCPC associated with the RSASM. By service, the charge to each QSE for a given Operating Hour is calculated as follows:

(a) The total charge of failure on Ancillary Service Supply Responsibility for Reg-Up by QSE, if applicable:

**RUFQAMTQSETOT *q* = RUFQAMT *q +* RRUFQAMT *q***

Where:

RUFQAMT *q* = ((MCPCRU *m*) \* RUFQ *q*)

RRUFQAMT *q* = MCPCRU *rs* \* RRUFQ *q,* *rs*

The above variables are defined as follows:

|  |  |  |
| --- | --- | --- |
| **Variable** | **Unit** | **Description** |
| RUFQAMTQSETOT *q* | $ | *Reg-Up Failure Quantity Amount per QSE*—The total charge to QSE *q* for its total capacity associated with failures and reconfiguration reductions on its Ancillary Service Supply Responsibility for Reg-Up, for the hour. |
| RRUFQAMT *q* | $ | *Reconfiguration Reg-Up Failure Quantity Amount per QSE*—The charge to QSE *q* for its total capacity associated with reconfiguration reductions on its Ancillary Service Supply Responsibility for Reg-Up, for the hour. |
| RUFQAMT *q* | $ | *Reg-Up Failure Quantity Amount per QSE*—The charge to QSE *q* for its total capacity associated with failures on its Ancillary Service Supply Responsibility for Reg-Up, for the hour. |
| MCPCRU *m* | $/MW per hour | *Market Clearing Price for Capacity for Reg-Up by market—*The MCPC for Reg-Up in the market *m*, for the hour. |
| MCPCRU *rs* | $/MW per hour | *Market Clearing Price for Capacity for Reg-Up by RSASM—*The MCPC for Reg-Up in the RSASM *rs*, for the hour. |
| RUFQ *q* | MW | *Reg-Up Failure Quantity per QSE—*QSE *q* total capacity associated with failures on its Ancillary Service Supply Responsibility for Reg-Up, for the hour. |
| RRUFQ *q, rs* | MW | *Reconfiguration Reg-Up Failure Quantity per QSE—*QSE *q* total capacity associated with reconfiguration reductions on its Ancillary Service Supply Responsibility for Reg-Up, for the hour. |
| *rs* | none | The RSASM for the given Operating Hour. |
| *m* | none | The DAM, SASM, or RSASM for the given Operating Hour. |
| *q* | none | A QSE. |

(b) The total charge of failure on Ancillary Service Supply Responsibility for Reg-Down by QSE, if applicable:

**RDFQAMTQSETOT *q* = RDFQAMT *q +* RRDFQAMT *q***

Where:

RDFQAMT *q* = ((MCPCRD *m*) \* RDFQ *q*)

RRDFQAMT *q* = MCPCRD *rs* \* RRDFQ *q,* *rs*

The above variables are defined as follows:

|  |  |  |
| --- | --- | --- |
| **Variable** | **Unit** | **Description** |
| RDFQAMTQSETOT *q* | $ | *Reg-Down Failure Quantity Amount per QSE*—The total charge to QSE *q* for its total capacity associated with failures and reconfiguration reductions on its Ancillary Service Supply Responsibility for Reg-Down, for the hour. |
| RRDFQAMT *q* | $ | *Reconfiguration Reg-Down Failure Quantity Amount per QSE*—The charge to QSE *q* for its total capacity associated with reconfiguration reductions on its Ancillary Service Supply Responsibility for Reg-Down, for the hour. |
| RDFQAMT *q* | $ | *Reg-Down Failure Quantity Amount per QSE*—The charge to QSE *q* for its total capacity associated with failures on its Ancillary Service Supply Responsibility for Reg-Down, for the hour. |
| MCPCRD *m* | $/MW per hour | *Market Clearing Price for Capacity for Reg-Down by market—*The MCPC for Reg-Down in the market *m*, for the hour. |
| MCPCRD *rs* | $/MW per hour | *Market Clearing Price for Capacity for Reg-Down by RSASM—*The MCPC for Reg-Down in the RSASM *rs*, for the hour. |
| RDFQ *q* | MW | *Reg-Down Failure Quantity per QSE*—QSE *q*’s total capacity associated with failures on its Ancillary Service Supply Responsibility for Reg-Down, for the hour. |
| RRDFQ *q, rs* | MW | *Reconfiguration Reg-Down Failure Quantity per QSE*—QSE *q*’s total capacity associated with reconfiguration reductions on its Ancillary Service Supply Responsibility for Reg-Down, for the hour. |
| *rs* | none | The RSASM for the given Operating Hour. |
| *m* | none | The DAM, SASM, or RSASM for the given Operating Hour. |
| *q* | none | A QSE. |

(c) The total charge of failure on Ancillary Service Supply Responsibility for RRS by QSE, if applicable:

**RRFQAMTQSETOT *q* = RRFQAMT *q +* RRRFQAMT *q***

Where:

RRFQAMT *q* = ((MCPCRR *m*) \* RRFQ *q*)

RRRFQAMT *q* = MCPCRR *rs* \* RRRFQ *q,* *rs*

The above variables are defined as follows:

|  |  |  |
| --- | --- | --- |
| **Variable** | **Unit** | **Description** |
| RRFQAMTQSETOT *q* | $ | *Responsive Reserve Failure Quantity Amount per QSE*—The total charge to QSE *q* for its total capacity associated with failures and reconfiguration reductions on its Ancillary Service Supply Responsibility for RRS, for the hour. |
| RRRFQAMT *q* | $ | *Reconfiguration Responsive Reserve Failure Quantity Amount per QSE*—The charge to QSE *q* for its total capacity associated with reconfiguration reductions on its Ancillary Service Supply Responsibility for RRS, for the hour. |
| RRFQAMT *q* | $ | *Responsive Reserve Failure Quantity Amount per QSE*—The charge to QSE *q* for its total capacity associated with failures on its Ancillary Service Supply Responsibility for RRS, for the hour. |
| MCPCRR *m* | $/MW per hour | *Market Clearing Price for Capacity for Responsive Reserve per market—*The MCPC for RRS in the market *m*, for the hour. |
| MCPCRR *rs* | $/MW per hour | *Market Clearing Price for Capacity for Responsive Reserve per RSASM—*The MCPC for RRS in the RSASM *rs*, for the hour. |
| RRFQ *q* | MW | *Responsive Reserve Failure Quantity per QSE -* QSE *q*’s total capacity associated with failures on its Ancillary Service Supply Responsibility for RRS, for the hour. |
| RRRFQ *q, rs* | MW | *Reconfiguration Responsive Reserve Failure Quantity per QSE—*QSE *q*’s total capacity associated with reconfiguration reductions on its Ancillary Service Supply Responsibility for RRS, for the hour. |
| *rs* | none | The RSASM for the given Operating Hour. |
| *m* | none | The DAM, SASM, or RSASM for the given Operating Hour. |
| *q* | none | A QSE. |

(d) The total charge of failure on Ancillary Service Supply Responsibility for Non-Spin by QSE, if applicable:

**NSFQAMTQSETOT *q* = NSFQAMT *q +* RNSFQAMT *q***

Where:

NSFQAMT *q* = ((MCPCNS *m*) \* NSFQ *q*)

RNSFQAMT *q* = MCPCNS *rs* \* RNSFQ *q,* *rs*

The above variables are defined as follows:

|  |  |  |
| --- | --- | --- |
| **Variable** | **Unit** | **Description** |
| NSFQAMTQSETOT *q* | $ | *Non-Spin Failure Quantity Amount per QSE*—The total charge to QSE *q* for its total capacity associated with failures and reconfiguration reductions on its Ancillary Service Supply Responsibility for Non-Spin, for the hour. |
| RNSFQAMT *q* | $ | *Reconfiguration Non-Spin Failure Quantity Amount per QSE*—The charge to QSE *q* for its total capacity associated with reconfiguration reductions on its Ancillary Service Supply Responsibility for Non-Spin, for the hour. |
| NSFQAMT *q* | $ | *Non-Spin Failure Quantity Amount per QSE*—The charge to QSE *q* for its total capacity associated with failures on its Ancillary Service Supply Responsibility for Non-Spin, for the hour. |
| MCPCNS *m* | $/MW per hour | *Market Clearing Price for Capacity for Non-Spin by market—*The MCPC for Non-Spin in the market *m*, for the hour. |
| MCPCNS *rs* | $/MW per hour | *Market Clearing Price for Capacity for Non-Spin by RSASM—*The MCPC for Non-Spin in the RSASM *rs*, for the hour. |
| NSFQ *q* | MW | *Non-Spin Failure Quantity per QSE—*QSE *q*’s total capacity associated with failures on its Ancillary Service Supply Responsibility for Non-Spin, for the hour. |
| RNSFQ *q, rs* | MW | *Reconfiguration Non-Spin Failure Quantity per QSE—*QSE *q*’s total capacity associated with reconfiguration reductions on its Ancillary Service Supply Responsibility for Non-Spin, for the hour. |
| *rs* | None | The RSASM for the given Operating Hour. |
| *m* | None | The DAM, SASM, or RSASM for the given Operating Hour. |
| *q* | None | A QSE. |

(e) The total charge of failure on Ancillary Service Supply Responsibility for ECRS by QSE, if applicable:

**ECRFQAMTQSETOT *q* = ECRFQAMT *q +*RECRFQAMT *q***

Where:

ECRFQAMT *q* = ((MCPCECR *m*) \* ECRFQ *q*)

RECRFQAMT *q* = MCPCECR *rs* \* RECRFQ *q,* *rs*

The above variables are defined as follows:

|  |  |  |
| --- | --- | --- |
| **Variable** | **Unit** | **Description** |
| ECRFQAMTQSETOT *q* | $ | *ERCOT Contingency Reserve Service Failure Quantity Amount per QSE*—The total charge to QSE *q* for its total capacity associated with failures and reconfiguration reductions on its Ancillary Service Supply Responsibility for ECRS, for the hour. |
| RECRFQAMT *q* | $ | *Reconfiguration ERCOT Contingency Reserve Service Failure Quantity Amount per QSE*—The charge to QSE *q* for its total capacity associated with reconfiguration reductions on its Ancillary Service Supply Responsibility for ECRS, for the hour. |
| ECRFQAMT *q* | $ | *ERCOT Contingency Reserve Service Failure Quantity Amount per QSE*—The charge to QSE *q* for its total capacity associated with failures on its Ancillary Service Supply Responsibility for ECRS, for the hour. |
| MCPCECR *m* | $/MW per hour | *Market Clearing Price for Capacity for ERCOT Contingency Reserve Service per market—*The MCPC for ECRS in the market *m*, for the hour. |
| MCPCECR *rs* | $/MW per hour | *Market Clearing Price for Capacity for ERCOT Contingency Reserve Service per RSASM—*The MCPC for ECRS in the RSASM *rs*, for the hour. |
| ECRFQ *q* | MW | *ERCOT Contingency Reserve Service Failure Quantity per QSE -* QSE *q*’s total capacity associated with failures on its Ancillary Service Supply Responsibility for ECRS, for the hour. |
| RECRFQ *q, rs* | MW | *Reconfiguration ERCOT Contingency Reserve Service Failure Quantity per QSE—*QSE *q*’s total capacity associated with reconfiguration reductions on its Ancillary Service Supply Responsibility for ECRS, for the hour. |
| *rs* | none | The RSASM for the given Operating Hour. |
| *m* | none | The DAM, SASM, or RSASM for the given Operating Hour. |
| *q* | none | A QSE. |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| ***[NPRR1149: Replace Section 6.7.3 above with the following upon system implementation:]******6.7.3 Charges for a Failure to Provide Ancillary Service***(1) For each hour, ERCOT will make negative adjustments to the Telemetered Ancillary Service Resource Responsibility values for each Energy Storage Resource (ESR), including the modeled Generation Resource and modeled Controllable Load Resource associated with that ESR, to account for any insufficiency in the telemetered State of Charge (SOC) or insufficiency in the headroom to charge, based on the telemetry of the Qualified Scheduling Entity (QSE) for the ESR. For all Ancillary Services other than Regulation Down Service (Reg-Down), ERCOT will allocate the total amount of any SOC insufficiency to the Telemetered Ancillary Service Resource Responsibility for the Generation Resource associated with the ESR in priority order, as follows:TELNSRC *q, r* = Max(0, TELNSR *q, esr* – ASUINSSOC *q, esr*)TELECRRC *q, r* = Max(0, TELECRR *q, esr* – Max(0, ASUINSSOC *q, esr* – TELNSR *q, esr*))TELRRSRC *q, r* = Max(0, TELRRSR *q, esr* – Max(0, ASUINSSOC *q, esr* – TELNSR *q, esr* – TELECRR *q, esr*))TELRURC *q, r* = Max(0, TELRUR *q, esr* – Max(0, ASUINSSOC *q, esr* – TELNSR *q, esr* – TELECRR *q, esr* – TELRRSR *q, esr*))Where : TELNSR *q, esr* = TELNSR *q, esr-gr* + TELNSR *q,esr-clr*  TELECRR *q, esr* = TELECRR *q, esr-gr* + TELECRR *q,esr-clr* TELRRSR *q, esr* = TELRRSR *q, esr-gr* + TELRRSR *q, esr-clr* TELRUR *q, esr* = TELRUR *q, esr-gr* + TELRUR *q, esr-clr*For Reg-Down, ERCOT will allocate the amount of any insufficiency of the ESR’s head room to charge to the Telemetered Ancillary Service Resource Responsibility for the Controllable Load Resource associated with the ESR as follows:TELRDRC *q, r* = Max(0, TELRDR *q, esr-gr* + TELRDR *q, esr-clr* – ASDINSSOC *q, esr*) The above variables are defined as follows:

|  |  |  |
| --- | --- | --- |
| **Variable** | **Unit** | **Description** |
| TELNSR *q, esr*TELNSR *q, esr-gr*TELNSR *q, esr-clr* | MW | *Telemetered Non-Spinning Reserve Responsibility for the Resource*—The time-weighted average telemetered Non-Spin Ancillary Service Resource Responsibility for the ESR *esr*, its modeled Generation Resource *esr-gr,* and its modeled Controllable Load Resource *esr-clr* represented by QSE *q* for the hour. The time-weighted average value is rounded to 0.1 MW. |
| TELNSRC *q, r* | MW | *Telemetered Non-Spinning Reserve Responsibility for the Resource as Calculated*—The time-weighted average calculated telemetered Non-Spin Ancillary Service Resource Responsibility adjusted to account for any SOC insufficiency, for the ESR’s modeled Generation Resource *r* represented by QSE *q* for the hour. |
| TELECRR *q, esr*TELECRR *q, esr-gr*TELECRR *q, esr-clr* | MW | *Telemetered ERCOT Contingency Reserve Service Responsibility for the Resource*—The time-weighted average telemetered ECRS Ancillary Service Resource Responsibility for the ESR *esr*, its modeled Generation Resource *esr-gr,* and its modeled Controllable Load Resource *esr-clr* represented by QSE *q* for the hour. The time-weighted average value is rounded to 0.1 MW. |
| TELECRRC *q, r* | MW | *Telemetered ERCOT Contingency Reserve Service Responsibility for the Resource as Calculated*—The time-weighted average telemetered ECRS Ancillary Service Resource Responsibility adjusted to account for any SOC insufficiency, for the ESR’s modeled Generation Resource *r* represented by QSE *q* for the hour. |
| TELRRSR *q, esr*TELRRSR *q, esr-gr*TELRRSR *q, esr-clr* | MW | *Telemetered Responsive Reserve Responsibility for the Resource*—The average time-weighted telemetered RRS Ancillary Service Resource Responsibility for the ESR *esr*, its modeled Generation Resource *esr-gr,* and its modeled Controllable Load Resource *esr-clr* represented by the QSE *q* for the hour. The time-weighted average value is rounded to 0.1 MW. |
| TELRRSRC *q, r* | MW | *Telemetered Responsive Reserve Responsibility for the Resource as Calculated*—The calculated comparison of the time-weighted average telemetered RRS Ancillary Service Resource Responsibility, adjusted to account for any SOC insufficiency, for the ESR’s modeled Generation Resource *r* represented by the QSE *q* for the hour. |
| TELRUR *q, esr*TELRUR *q, esr-gr*TELRUR *q, esr-clr* | MW | *Telemetered Reg-Up Responsibility for the Resource—*The time-weighted average telemetered Reg-Up Ancillary Service Resource Responsibility for the ESR *esr*, its modeled Generation Resource *esr-gr,* and its modeled Controllable Load Resource *esr-clr*, represented by QSE *q* for the hour. The time-weighted average value is rounded to 0.1 MW. |
| TELRURC *q, r* | MW | *Telemetered Reg-Up Responsibility for the Resource as Calculated—*The calculated comparison of the time-weighted average telemetered Reg-Up Ancillary Service Resource Responsibility, adjusted to account for any SOC insufficiency, for the ESR’s modeled Generation Resource *r* represented by QSE *q* for the hour. The time-weighted average value is rounded to 0.1 MW. |
| TELRDR *q, esr-gr*TELRDR *q, esr-clr* | MW | *Telemetered Reg-Down Responsibility for the Resource*—The time-weighted average telemetered Reg-Down Ancillary Service Resource Responsibility for the ESR’s modeled Generation Resource *esr-gr* and Controllable Load Resource *esr-clr* represented by QSE *q* for the hour. The time-weighted average value is rounded to 0.1 MW. |
| TELRDRC *q, r* | MW | *Telemetered Reg-Down Responsibility for the Resource as Calculated—*The calculated comparison of the time-weighted average telemetered Reg-Down Ancillary Service Resource Responsibility, adjusted to account for any SOC headroom insufficiency, for the ESR’s modeled Controllable Load Resource *r* represented by QSE *q* for the hour. The time-weighted average value is rounded to 0.1 MW. |
| ASUINSSOC *q, esr* | MW | *Ancillary Service Up Responsibility for Insufficient State of Charge—*The average insufficient Up Ancillary Service MW amount converted from the insufficient SOC MWh amount for the ESR *esr* represented by QSE *q* for the hour, as received from the Energy Management System, per paragraph (4)(a) of Section 8.1, QSE and Resource Performance Monitoring. |
| ASDINSSOC *q, esr* | MW | *Ancillary Service Down Responsibility for Insufficient State of Charge —*The insufficient Down Ancillary Service MW amount converted from the insufficient SOC headroom MWh amount for the ESR es*r* represented by QSE *q* for the hour, as received from the Energy Management System, per paragraph (4)(b) of Section 8.1, QSE and Resource Performance Monitoring. |
| *q* | None | A QSE. |
| *r* | None | A modeled Generation Resource or Controllable Load Resource associated with an ESR. |
| *esr* | None | An ESR. |
| *esr-gr* | None | A modeled Generation Resource associated with an ESR. |
| *esr-clr* | None | A modeled Controllable Load Resource associated with an ESR. |

(2) A charge to each QSE that fails to provide its Ancillary Service Supply Responsibility, whether or not a SASM is executed due to its failure to provide, is calculated by service for a given Operating Hour, as follows: (a) The total charge of failure on Ancillary Service Supply Responsibility for Reg-Up by QSE, if applicable:**RUFQAMTQSETOT *q* = RUFQAMT *q +*RRUFQAMT *q***Where:RUFQAMT *q* = Max(MCPCRU *m*, AVGRTASIP) \* (RUFQ *q*+TRUFQ *q*)RRUFQAMT *q* = MCPCRU *rs* \* RRUFQ *q,* *rs*AVGRTASIP = (RTRSVPOR *i* + RTRDP *i*) / 4Where for all Resources:TRUFQ *q* =Max ([(SARUQ *q* + RUTRSQ *q* + (RTPCRU *q, m*) + PCRU *q* + RUCRUQ *q*) – (RUTRPQ *q* + RUFQ *q* + RRUFQ *q, rs* + RUINFQ *q*)] – TELRURC *q, r*, 0)SARUQ *q* = DASARUQ *q* + RTSARUQ *q*Where for all Resources other than ESRs:TELRURC *q, r* = TELRUR *q, r* The above variables are defined as follows:

|  |  |  |
| --- | --- | --- |
| **Variable** | **Unit** | **Description** |
| RUFQAMTQSETOT *q* | $ | *Reg-Up Failure Quantity Amount per QSE*—The total charge to QSE *q* for its total capacity associated with failures and reconfiguration reductions on its Ancillary Service Supply Responsibility for Reg-Up, for the hour. |
| RRUFQAMT *q* | $ | *Reconfiguration Reg-Up Failure Quantity Amount per QSE*—The charge to QSE *q* for its total capacity associated with reconfiguration reductions on its Ancillary Service Supply Responsibility for Reg-Up, for the hour. |
| RUFQAMT *q* | $ | *Reg-Up Failure Quantity Amount per QSE*—The charge to QSE *q* for its total capacity associated with failures on its Ancillary Service Supply Responsibility for Reg-Up, for the hour. |
| MCPCRU *m* | $/MW per hour | *Market Clearing Price for Capacity for Reg-Up by market—*The MCPC for Reg-Up in the market *m*, for the hour. |
| MCPCRU *rs* | $/MW per hour | *Market Clearing Price for Capacity for Reg-Up by RSASM—*The MCPC for Reg-Up in the RSASM *rs*, for the hour. |
| RUFQ *q* | MW | *Reg-Up Failure Quantity per QSE—*QSE *q* total capacity associated with failures on its Ancillary Service Supply Responsibility for Reg-Up, for the hour. |
| RRUFQ *q, rs* | MW | *Reconfiguration Reg-Up Failure Quantity per QSE—*QSE *q* total capacity associated with reconfiguration reductions on its Ancillary Service Supply Responsibility for Reg-Up, for the hour. |
| RTRDP *i* | $/MWh | *Real-Time On-Line Reliability Deployment Price—*The Real-Time price for the 15-minute Settlement Interval *i*, reflecting the impact of reliability deployments on energy prices that is calculated from the Real-Time On-Line Reliability Deployment Price Adder. |
| RTRSVPOR *i* | $/MWh | *Real-Time Reserve Price for On-Line Reserves—*The Real-Time Reserve Price for On-Line Reserves for the 15-minute Settlement Interval *i*. |
| AVGRTASIP | $/MW per hour | *Average Real-Time Ancillary Service Imbalance Price—*The average of the sum of the Real-Time On-Line Reliability Deployment Price and the Real-Time Reserve Price for On-Line Reserves used in the calculation of Real-Time Ancillary Service Imbalance Amount per Section 6.7.5, Real-Time Ancillary Service Imbalance Payment or Charge, for the Operating Hour. |
| SARUQ *q* | MW | *Total Self-Arranged Reg-Up Quantity per QSE for all markets*—The sum of all self-arranged Reg-Up quantities submitted by QSE *q* for DAM and all SASMs. |
| RUTRSQ *q* | MW | *Reg-Up Trade Sale per QSE—*QSE *q*’s total time-weighted average capacity Trade Sale for Reg-Up, for the hour. The time-weighted average value is rounded to 0.1 MW. |
| RTPCRU *q, m* | MW | *Procured Capacity for Reg-Up by QSE by market—*The MW portion of QSE *q*’s Ancillary Service Offers cleared in the market *m* (SASM or RSASM) to provide Reg-Up, for the hour. |
| PCRU *q* | MW | *Procured Capacity for Reg-Up per QSE in DAM*—The total Reg-Up Service capacity quantity awarded to QSE *q* in the DAM for all the Resources represented by the QSE, for the hour. |
| RUCRUQ *q* | MW | *RUC-committed for Reg-Up per QSE—*The total quantity of Reg-Up Service committed by the RUC Process for Resources represented by QSE *q*, for the hour. |
| RUTRPQ *q* | MW | *Reg-Up Trade Purchases per QSE—*QSE *q*’s total time-weighted average capacity Trade Purchasefor Reg-Up, for the hour. The time-weighted average value is rounded to 0.1 MW. |
| RUINFQ *q* | MW | *Reg-Up Infeasible Quantity per QSE—*QSE *q*’s total capacity associated with infeasibleAncillary Service Supply Responsibilitiesfor Reg-Up, for the hour. |
| TELRUR *q, r* | MW | *Telemetered Reg-Up Responsibility for the Resource—*The time-weighted average telemetered Reg-Up Ancillary Service Resource Responsibility for the Resource *r*, represented by QSE *q*, for the hour. The time-weighted average value is rounded to 0.1 MW. |
| TELRURC *q, r* | MW | *Telemetered Reg-Up Responsibility for the Resource as Calculated—*The calculated comparison of the time-weighted average telemetered Reg-Up Ancillary Service Resource Responsibility as compared to the available capacity for the Resource *r* represented by QSE *q* for the hour. The time-weighted average value is rounded to 0.1 MW. |
| DASARUQ *q* | MW | *Day-Ahead Self-Arranged Reg-Up Quantity per QSE*—The self-arranged Reg-Up quantity submitted by QSE *q* before 1000 in the Day-Ahead. |
| RTSARUQ *q* | MW | *Self-Arranged Reg-Up Quantity per QSE for all SASMs*—The sum of all self-arranged Reg-Up quantities submitted by QSE *q* for all SASMs due to an increase in the Ancillary Service Plan per Section 4.4.7.1, Self-Arranged Ancillary Service Quantities. |
| TRUFQ *q* | MW | *Telemetered Reg-Up Failure Quantity per QSE—*Calculated failure quantity for QSE *q* by comparing its average telemetered Reg-Up Responsibility sum to its Ancillary Service Supply Responsibility for Reg-Up as calculated per paragraph (1) of Section 4.4.7.4, Ancillary Service Supply Responsibility, for the hour. |
| *i* | None | A 15-minute Settlement Interval within the Operating Hour. |
| *rs* | None | The RSASM for the given Operating Hour. |
| *m* | None | The DAM, SASM, or RSASM for the given Operating Hour. |
| *q* | None | A QSE. |
| *r* | None | A Resource that is qualified to provide Reg-Up. |

(b) The total charge of failure on Ancillary Service Supply Responsibility for Reg-Down by QSE, if applicable:**RDFQAMTQSETOT *q* = RDFQAMT *q +*RRDFQAMT *q***Where:RDFQAMT *q* = Max (MCPCRD *m*, AVGRTASIP) \* (RDFQ *q* + TRDFQ *q*)RRDFQAMT *q* = MCPCRD *rs* \* RRDFQ *q,* *rs*AVGRTASIP = (RTRSVPOR *i* + RTRDP *i*) / 4Where for all Resources:TRDFQ *q* =Max ([(SARDQ *q* + RDTRSQ *q* + (RTPCRD *q, m*) + PCRD *q* + RUCRDQ *q*) – (RDTRPQ *q* + RDFQ *q* + RRDFQ *q* + RDINFQ *q*)] –  TELRDRC *q, r*, 0)SARDQ *q* = DASARDQ *q* + RTSARDQ *q*Where for all Resources other than ESRs:TELRDRC *q, r* = TELRDR *q, r* The above variables are defined as follows:

|  |  |  |
| --- | --- | --- |
| **Variable** | **Unit** | **Description** |
| RDFQAMTQSETOT *q* | $ | *Reg-Down Failure Quantity Amount per QSE*—The total charge to QSE *q* for its total capacity associated with failures and reconfiguration reductions on its Ancillary Service Supply Responsibility for Reg-Down, for the hour. |
| RRDFQAMT *q* | $ | *Reconfiguration Reg-Down Failure Quantity Amount per QSE*—The charge to QSE *q* for its total capacity associated with reconfiguration reductions on its Ancillary Service Supply Responsibility for Reg-Down, for the hour. |
| RDFQAMT *q* | $ | *Reg-Down Failure Quantity Amount per QSE*—The charge to QSE *q* for its total capacity associated with failures on its Ancillary Service Supply Responsibility for Reg-Down, for the hour. |
| MCPCRD *m* | $/MW per hour | *Market Clearing Price for Capacity for Reg-Down by market—*The MCPC for Reg-Down in the market *m*, for the hour. |
| MCPCRD *rs* | $/MW per hour | *Market Clearing Price for Capacity for Reg-Down by RSASM—*The MCPC for Reg-Down in the RSASM *rs*, for the hour. |
| RDFQ *q* | MW | *Reg-Down Failure Quantity per QSE*—QSE *q*’s total capacity associated with failures on its Ancillary Service Supply Responsibility for Reg-Down, for the hour. |
| RRDFQ *q, rs* | MW | *Reconfiguration Reg-Down Failure Quantity per QSE*—QSE *q*’s total capacity associated with reconfiguration reductions on its Ancillary Service Supply Responsibility for Reg-Down, for the hour. |
| RTRDP *i* | $/MWh | *Real-Time On-Line Reliability Deployment Price—*The Real-Time price for the 15-minute Settlement Interval *i*, reflecting the impact of reliability deployments on energy prices that is calculated from the Real-Time On-Line Reliability Deployment Price Adder. |
| RTRSVPOR *i* | $/MWh | *Real-Time Reserve Price for On-Line Reserves—*The Real-Time Reserve Price for On-Line Reserves for the 15-minute Settlement Interval *i*. |
| AVGRTASIP | $/MW per hour | *Average Real-Time Ancillary Service Imbalance Price*—The average of the sum of the Real-Time On-Line Reliability Deployment Price and the Real-Time Reserve Price for On-Line Reserves used in the calculation of Real-Time Ancillary Service Imbalance Amount per Section 6.7.5 for the Operating Hour. |
| SARDQ *q* | MW | *Total Self-Arranged Reg-Down Quantity per QSE for all markets*—The sum of all self-arranged Reg-Down quantities submitted by QSE *q* for DAM and all SASMs. |
| RDTRSQ *q* | MW | *Reg-Down Trade Sale per QSE*—QSE *q*’s total time-weighted average capacity Trade Sale for Reg-Down, for the hour. The time-weighted average value is rounded to 0.1 MW. |
| RTPCRD *q, m* | MW | *Procured Capacity for Reg-Down by QSE by market—*The MW portion of QSE *q*’s Ancillary Service Offers cleared in the market *m* (SASM or RSASM) to provide Reg-Down, for the hour. |
| PCRD *q* | MW | *Procured Capacity for Reg-Down per QSE in DAM*—The total Reg-Down capacity quantity awarded to QSE *q* in the DAM for all the Resources represented by the QSE, for the hour. |
| RUCRDQ *q* | MW | *RUC-committed for Reg-Down per QSE*—The total quantity of Reg-Down committed by the RUC Process for Resources represented by QSE *q*, for the hour. |
| RDTRPQ *q* | MW | *Reg-Down Trade Purchases per QSE*—QSE *q*’s total time-weighted average capacity Trade Purchasefor Reg-Down, for the hour. The time-weighted average value is rounded to 0.1 MW. |
| RDINFQ *q* | MW | *Reg-Down Infeasible Quantity per QSE—*QSE *q*’s total capacity associated with infeasibleAncillary Service Supply Responsibilitiesfor Reg-Down, for the hour. |
| TELRDR *q, r* | MW | *Telemetered Reg-Down Responsibility for the Resource*—The time-weighted average telemetered Reg-Down Ancillary Service Resource Responsibility for the Resource *r* that is qualified to provide Reg-Down Ancillary Service, represented by QSE *q,* for the hour. The time-weighted average value is rounded to 0.1 MW. |
| TELRDRC *q, r* | MW | *Telemetered Reg-Down Responsibility for the Resource as Calculated—*The calculated comparison of the time-weighted average telemetered Reg-Down Ancillary Service Resource Responsibility as compared to the available capacity for the Resource *r*, represented by QSE *q*, for the hour. The time-weighted average value is rounded to 0.1 MW. |
| DASARDQ *q* | MW | *Day-Ahead Self-Arranged Reg-Down Quantity per QSE*—The self-arranged Reg-Down quantity submitted by QSE *q* before 1000 in the Day-Ahead. |
| RTSARDQ *q* | MW | *Self-Arranged Reg-Down Quantity per QSE for all SASMs*—The sum of all self-arranged Reg-Down quantities submitted by QSE *q* for all SASMs due to an increase in the Ancillary Service Plan per Section 4.4.7.1. |
| TRDFQ *q* | MW | *Telemetered Reg-Down Failure Quantity per QSE—*Calculated failure quantity for QSE *q* by comparing its average telemetered Reg-Down Responsibility sum to its Ancillary Service Supply Responsibility for Reg-Down as calculated per paragraph (1) of Section 4.4.7.4, for the hour. |
| *i* | None | A 15-minute Settlement Interval within the Operating Hour. |
| *rs* | None | The RSASM for the given Operating Hour. |
| *m* | None | The DAM, SASM, or RSASM for the given Operating Hour. |
| *q* | None | A QSE. |
| *r* | None | A Resource that is qualified to provide Reg-Down. |

(c) The total charge of failure on Ancillary Service Supply Responsibility for RRS by QSE, if applicable:**RRFQAMTQSETOT *q* = RRFQAMT *q +*RRRFQAMT *q***Where:RRFQAMT *q* = Max(MCPCRR *m*, AVGRTASIP) \* (RRFQ *q* + TRRFQ *q*)RRRFQAMT *q* = MCPCRR *rs* \* RRRFQ *q,* *rs*AVGRTASIP = (RTRSVPOR *i* + RTRDP *i*) / 4 Where for all Resources:TRRFQ *q =* Max([(SARRQ *q* + RRTRSQ *q* + (RTPCRR *q, m*) + PCRR *q* + RUCRRQ *q*) – (RRTRPQ *q* + RRFQ *q* + RRRFQ *q* + RRINFQ *q*)] –  TELRRSRC *q, r*, 0)Where for all Resources other than ESRs and Non-Controllable Load Resources:TELRRSRC *q, r* = TELRRSR *q, r* Where for Load Resources, other than Controllable Load Resources, during an RRS deployment event:TELRRSRC *q, r* =Min (NPF *q, r* – LPC *q, r*, TELRRSR *q, r*) snapshot to be used will be from the time of deployment until 180 minutes after recall or if the time between a recall of Load Resources and a redeployment is less than 180 minutes, the snapshot to be used will be the time of the first deploymentWhere for Load Resources, other than Controllable Load Resources, prior to an RRS deployment event:TELRRSRC *q, r* =Min (NPF *q, r* – LPC *q, r*, TELRRSR *q, r*) SARRQ *q* = DASARRQ *q* + RTSARRQ *q*The above variables are defined as follows:

|  |  |  |
| --- | --- | --- |
| **Variable** | **Unit** | **Description** |
| RRFQAMTQSETOT *q* | $ | *Responsive Reserve Failure Quantity Amount per QSE*—The total charge to QSE *q* for its total capacity associated with failures and reconfiguration reductions on its Ancillary Service Supply Responsibility for RRS, for the hour. |
| RRRFQAMT *q* | $ | *Reconfiguration Responsive Reserve Failure Quantity Amount per QSE*—The charge to QSE *q* for its total capacity associated with reconfiguration reductions on its Ancillary Service Supply Responsibility for RRS, for the hour. |
| RRFQAMT *q* | $ | *Responsive Reserve Failure Quantity Amount per QSE*—The charge to QSE *q* for its total capacity associated with failures on its Ancillary Service Supply Responsibility for RRS, for the hour. |
| MCPCRR *m* | $/MW per hour | *Market Clearing Price for Capacity for Responsive Reserve per market—*The MCPC for RRS in the market *m*, for the hour. |
| MCPCRR *rs* | $/MW per hour | *Market Clearing Price for Capacity for Responsive Reserve per RSASM—*The MCPC for RRS in the RSASM *rs*, for the hour. |
| RRFQ *q* | MW | *Responsive Reserve Failure Quantity per QSE*—QSE *q*’s total capacity associated with failures on its Ancillary Service Supply Responsibility for RRS, for the hour. |
| RRRFQ *q, rs* | MW | *Reconfiguration Responsive Reserve Failure Quantity per QSE—*QSE *q*’s total capacity associated with reconfiguration reductions on its Ancillary Service Supply Responsibility for RRS, for the hour. |
| RTRDP *i* | $/MWh | *Real-Time On-Line Reliability Deployment Price—*The Real-Time price for the 15-minute Settlement Interval *i*, reflecting the impact of reliability deployments on energy prices that is calculated from the Real-Time On-Line Reliability Deployment Price Adder. |
| RTRSVPOR *i* | $/MWh | *Real-Time Reserve Price for On-Line Reserves—*The Real-Time Reserve Price for On-Line Reserves for the 15-minute Settlement Interval *i*. |
| AVGRTASIP | $/MW per hour | *Average Real-Time Ancillary Service Imbalance Price*—The average of the sum of the Real-Time On-Line Reliability Deployment Price and the Real-Time Reserve Price for On-Line Reserves used in the calculation of Real-Time Ancillary Service Imbalance Amount per Section 6.7.5 for the Operating Hour. |
| SARRQ *q* | MW | *Total Self-Arranged Responsive Reserve Quantity per QSE for all markets*—The sum of all self-arranged RRS quantities submitted by QSE *q* for DAM and all SASMs. |
| RRTRSQ *q* | MW | *Responsive Reserve Trade Sale per QSE*—QSE *q*’s total time-weighted average capacity Trade Sale for RRS, for the hour. The time-weighted average value is rounded to 0.1 MW. |
| RTPCRR *q, m* | MW | *Procured Capacity for Responsive Reserve per QSE by market—*The MW portion of QSE *q*’s Ancillary Service Offers cleared in the market *m* (SASM or RSASM) to provide RRS, for the hour. |
| PCRR *q* | MW | *Procured Capacity for Responsive Reserve per QSE in DAM*—The total RRS capacity quantity awarded to QSE *q* in the DAM for all the Resources represented by the QSE, for the hour. |
| RUCRRQ *q* | MW | *RUC-committed for Responsive Reserve per QSE*—The total quantity of RRS committed by the RUC Process for Resources represented by QSE *q*, for the hour. |
| RRTRPQ *q* | MW | *Responsive Reserve Trade Purchases per QSE*—QSE *q*’s total time-weighted average capacity Trade Purchasefor RRS, for the hour. The time-weighted average value is rounded to 0.1 MW. |
| RRINFQ *q* | MW | *Responsive Reserve Infeasible Quantity per QSE—*QSE *q*’s total capacity associated with infeasibleAncillary Service Supply Responsibilitiesfor RRS, for the hour. |
| TELRRSR *q, r* | MW | *Telemetered Responsive Reserve Responsibility for the Resource*—The average time-weighted telemetered RRS Ancillary Service Resource Responsibility for the Resource *r*, represented by the QSE *q,* for the hour. The time-weighted average value is rounded to 0.1 MW. |
| TELRRSRC *q, r* | MW | *Telemetered Responsive Reserve Responsibility for the Resource as Calculated*—The calculated comparison of the time-weighted average telemetered RRS Ancillary Service Resource Responsibility as compared to the available capacity for the Resource *r*, represented by the QSE *q,* for the hour. |
| NPF *q, r* | MW | *Non-Controllable Load Resource Net Power Consumption for the QSE*—The average NPF from Load Resource other than Controllable Load Resources *r*, represented by QSE *q,* for the hour. |
| LPC *q, r* | MW | *Non-Controllable Load Resource Low Power Consumption for the QSE*—The average Low Power Consumption (LPC) from Load Resource other than Controllable Load Resources *r*, represented by QSE *q,* for the hour. |
| DASARRQ *q* | MW | *Day-Ahead Self-Arranged Responsive Reserve Quantity per QSE*—The self-arranged RRS quantity submitted by QSE *q* before 1000 in the Day-Ahead. |
| RTSARRQ *q* | MW | *Self-Arranged Responsive Reserve Quantity per QSE for all SASMs*—The sum of all self-arranged RRS quantities submitted by QSE *q* for all SASMs due to an increase in the Ancillary Service Plan per Section 4.4.7.1. |
| TRRFQ *q* | MW | *Telemetered Responsive Reserve Failure Quantity per QSE—*Calculated failure quantity for QSE *q* by comparing its average telemetered Responsive Reserve Responsibility sum to its Ancillary Service Supply Responsibility for RRS as calculated per paragraph (1) of Section 4.4.7.4, for the hour. |
| *i* | None | A 15-minute Settlement Interval within the Operating Hour. |
| *rs* | None | The RSASM for the given Operating Hour. |
| *m* | None | The DAM, SASM, or RSASM for the given Operating Hour. |
| *q* | None | A QSE. |
| *r* | None | A Resource that is qualified to provide RRS. |

(d) The total charge of failure on Ancillary Service Supply Responsibility for Non-Spin by QSE, if applicable:**NSFQAMTQSETOT *q* = NSFQAMT *q +*RNSFQAMT *q***Where:NSFQAMT *q* = Max (MCPCNS *m*, AVGRTASIP) \* (NSFQ *q* + TNSFQ *q*)RNSFQAMT *q* = MCPCNS *rs* \* RNSFQ *q,* *rs*AVGRTASIP = (RTRSVPOR *i* + RTRDP *i*) / 4 Where for all Resources:TNSFQ *q =* Max([(SANSQ *q* + NSTRSQ *q* + (RTPCNS *q, m*) + PCNS *q* + RUCNSQ *q*) – (NSTRPQ *q* + NSFQ *q* + RNSFQ *q* + NSINFQ *q*)] –TELNSRC *q, r*, 0)Where for all Resources other than ESRs and Non-Controllable Load Resources:TELNSRC *q, r* = TELNSR *q, r* Where for Load Resources, other than Controllable Load Resources, during a Non-Spin deployment event:TELNSRC *q, r* = Min(NPF *q, r* – LPC *q, r* – TELECRRC *q, r*, TELNSR *q, r*) snapshot to be used will be from the time of deployment until 180 minutes after recall or if the time between a recall of Load Resources and a redeployment is less than 180 minutes, the snapshot to be used will be the time of the first deploymentWhere for Load Resources, other than Controllable Load Resources, prior to a Non-Spin deployment event:TELNSRC *q, r* = Min(NPF *q, r* – LPC *q, r* – TELECRRC *q, r*, TELNSR *q, r*) SANSQ *q* = DASANSQ *q* + RTSANSQ *q*The above variables are defined as follows:

|  |  |  |
| --- | --- | --- |
| **Variable** | **Unit** | **Description** |
| NSFQAMTQSETOT *q* | $ | *Non-Spin Failure Quantity Amount per QSE*—The total charge to QSE *q* for its total capacity associated with failures and reconfiguration reductions on its Ancillary Service Supply Responsibility for Non-Spin, for the hour. |
| RNSFQAMT *q* | $ | *Reconfiguration Non-Spin Failure Quantity Amount per QSE*—The charge to QSE *q* for its total capacity associated with reconfiguration reductions on its Ancillary Service Supply Responsibility for Non-Spin, for the hour. |
| NSFQAMT *q* | $ | *Non-Spin Failure Quantity Amount per QSE*—The charge to QSE *q* for its total capacity associated with failures on its Ancillary Service Supply Responsibility for Non-Spin, for the hour. |
| MCPCNS *m* | $/MW per hour | *Market Clearing Price for Capacity for Non-Spin by market—*The MCPC for Non-Spin in the market *m*, for the hour. |
| MCPCNS *rs* | $/MW per hour | *Market Clearing Price for Capacity for Non-Spin by RSASM—*The MCPC for Non-Spin in the RSASM *rs*, for the hour. |
| NSFQ *q* | MW | *Non-Spin Failure Quantity per QSE—*QSE *q*’s total capacity associated with failures on its Ancillary Service Supply Responsibility for Non-Spin, for the hour. |
| RNSFQ *q, rs* | MW | *Reconfiguration Non-Spin Failure Quantity per QSE—*QSE *q*’s total capacity associated with reconfiguration reductions on its Ancillary Service Supply Responsibility for Non-Spin, for the hour. |
| RTRDP *i* | $/MWh | *Real-Time On-Line Reliability Deployment Price—*The Real-Time price for the 15-minute Settlement Interval *i*, reflecting the impact of reliability deployments on energy prices that is calculated from the Real-Time On-Line Reliability Deployment Price Adder. |
| RTRSVPOR *i* | $/MWh | *Real-Time Reserve Price for On-Line Reserves—*The Real-Time Reserve Price for On-Line Reserves for the 15-minute Settlement Interval *i*. |
| AVGRTASIP | $/MW per hour | *Average Real-Time Ancillary Service Imbalance Price*—The average of the sum of the Real-Time On-Line Reliability Deployment Price and the Real-Time Reserve Price for On-Line Reserves used in the calculation of Real-Time Ancillary Service Imbalance Amount per Section 6.7.5 for the Operating Hour. |
| SANSQ *q* | MW | *Total Self-Arranged Non-Spin Quantity per QSE for all markets*—The sum of all self-arranged Non-Spin quantities submitted by QSE *q* for DAM and all SASMs. |
| NSTRSQ *q* | MW | *Non-Spinning Reserve Trade Sale per QSE*—QSE *q*’s total time-weighted average capacity Trade Sale for Non-Spin, for the hour. The time-weighted average value is rounded to 0.1 MW. |
| RTPCNS *q, m* | MW | *Procured Capacity for Non-Spin Reserve per QSE by market—*The MW portion of QSE *q*’s Ancillary Service Offers cleared in the market *m* (SASM or RSASM) to provide Non-Spin, for the hour. |
| PCNS *q* | MW | *Procured Capacity for Non-Spin Reserve per QSE in DAM*—The total Non-Spin capacity quantity awarded to QSE *q* in the DAM for all the Resources represented by the QSE, for the hour. |
| RUCNSQ *q* | MW | *RUC-committed for Non-Spin Reserve per QSE*—The total quantity of Non-Spin committed by the RUC Process for Resources represented by QSE *q*, for the hour. |
| NSTRPQ *q* | MW | *Non-Spin Reserve Trade Purchases per QSE*—QSE *q*’s total time-weighted average capacity Trade Purchasefor Non-Spin, for the hour. The time-weighted average value is rounded to 0.1 MW. |
| NSINFQ *q* | MW | *Non-Spin Reserve Infeasible Quantity per QSE—*QSE *q*’s total capacity associated with infeasibleAncillary Service Supply Responsibilitiesfor Non-Spin, for the hour. |
| TELNSR *q, r* | MW | *Telemetered Non-Spin Reserve Responsibility for the Resource*—The time-weighted average telemetered Non-Spin Ancillary Service Resource Responsibility for the Resource, for the hour. The time-weighted average value is rounded to 0.1 MW. |
| TELNSRC *q, r* | MW | *Telemetered Non-Spin Reserve Responsibility for the Resource as Calculated*—The time-weighted average calculated telemetered Non-Spin Ancillary Service Resource Responsibility as compared to the available capacity for the Resource *r*, represented by the QSE *q*, for the hour. |
| NPF *q, r* | MW | *Non-Controllable Load Resource Net Power Consumption for the QSE*—The average NPF from Load Resource other than Controllable Load Resources *r*, represented by QSE *q,* for the hour. |
| LPC *q, r* | MW | *Non-Controllable Load Resource Low Power Consumption for the QSE*—The average LPC from Load Resource other than Controllable Load Resources *r*, represented by QSE *q,* for the hour. |
| DASANSQ *q* | MW | *Day-Ahead Self-Arranged Non-Spin Reserve Quantity per QSE*—The self-arranged Non-Spin quantity submitted by QSE *q* before 1000 in the Day-Ahead. |
| RTSANSQ *q* | MW | *Self-Arranged Non-Spinning Reserve Quantity per QSE for all SASMs*—The sum of all self-arranged Non-Spin quantities submitted by QSE *q* for all SASMs due to an increase in the Ancillary Service Plan per Section 4.4.7.1. |
| TELECRRC *q, r* | MW | *Telemetered ERCOT Contingency Reserve Service Responsibility for the Resource as Calculated*—The time-weighted average telemetered ECRS Ancillary Service Resource Responsibility as compared to the available capacity for the Resource *r*, represented by QSE *q,* for the hour. |
| TNSFQ *q* | MW | *Telemetered Non-Spin Failure Quantity per QSE—*Calculated failure quantity for QSE *q* by comparing its average telemetered Non-Spin Responsibility to its Ancillary Service Supply Responsibility for Non-Spin as calculated per paragraph (1) of Section 4.4.7.4, for the hour. |
| *i* | None | A 15-minute Settlement Interval within the Operating Hour. |
| *rs* | None | The RSASM for the given Operating Hour. |
| *m* | None | The DAM, SASM, or RSASM for the given Operating Hour. |
| *q* | None | A QSE. |
| *r* | None | A Resource that is qualified to provide Non-Spin. |

(e) The total charge of failure on Ancillary Service Supply Responsibility for ECRS by QSE, if applicable:**ECRFQAMTQSETOT *q* = ECRFQAMT *q +*RECRFQAMT *q***Where:ECRFQAMT *q* = Max(MCPCECR *m*, AVGRTASIP) \* (ECRFQ *q* + TECRFQ *q*)RECRFQAMT *q* = MCPCECR *rs* \* RECRFQ *q,* *rs*AVGRTASIP = (RTRSVPOR *i* + RTRDP *i*) / 4 Where for all Resources:TECRFQ *q =* Max ([(SAECRQ *q* + ECRTRSQ *q* +  (RTPCECR *q, m*) + PCECR *q* + RUCECRQ *q*) – (ECRTRPQ *q* + ECRFQ *q* + RECRFQ *q* + ECRINFQ *q*)] – TELECRRC *q, r*, 0)Where for all Resources other than ESRs and Non-Controllable Load Resources:TELECRRC *q, r* = TELECRR *q, r* Where for Load Resources, other than Controllable Load Resources, during an ECRS deployment event:TELECRRC *q, r =* Min(NPF *q, r* – LPC *q, r*, TELECRR *q, r*) snapshot to be used will be from the time of deployment until 180 minutes after recall or if the time between a recall of Load Resources and a redeployment is less than 180 minutes, the snapshot to be used will be the time of the first deploymentWhere for Load Resources, other than Controllable Load Resources, prior to an ECRS deployment event:TELECRRC *q, r =* Min(NPF *q, r* – LPC *q, r*, TELECRR *q, r*) SAECRQ *q* = DASAECRQ *q* + RTSAECRQ *q*The above variables are defined as follows:

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| **Variable** | **Unit** | **Description** |
| ECRFQAMTQSETOT *q* | $ | *ERCOT Contingency Reserve Service Failure Quantity Amount per QSE*—The total charge to QSE *q* for its total capacity associated with failures and reconfiguration reductions on its Ancillary Service Supply Responsibility for ECRS, for the hour. |
| RECRFQAMT *q* | $ | *Reconfiguration ERCOT Contingency Reserve Service Failure Quantity Amount per QSE*—The charge to QSE *q* for its total capacity associated with reconfiguration reductions on its Ancillary Service Supply Responsibility for ECRS, for the hour. |
| ECRFQAMT *q* | $ | *ERCOT Contingency Reserve Service Failure Quantity Amount per QSE*—The charge to QSE *q* for its total capacity associated with failures on its Ancillary Service Supply Responsibility for ECRS, for the hour. |
| RTRDP *i* | $/MWh | *Real-Time On-Line Reliability Deployment Price—*The Real-Time price for the 15-minute Settlement Interval *i*, reflecting the impact of reliability deployments on energy prices that is calculated from the Real-Time On-Line Reliability Deployment Price Adder. |
| RTRSVPOR *i* | $/MWh |

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| *Real-Time Reserve Price for On-Line Reserves—*The Real-Time Reserve Price for On-Line Reserves for the 15-minute Settlement Interval *i*.  |

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| AVGRTASIP | $/MW per hour | *Average Real-Time Ancillary Service Imbalance Price*—The average of the sum of the Real-Time On-Line Reliability Deployment Price and the Real-Time Reserve Price for On-Line Reserves used in the calculation of Real-Time Ancillary Service Imbalance Amount per Section 6.7.5 for the Operating Hour. |
| SAECRQ *q* | MW | *Total Self-Arranged ERCOT Contingency Reserve Service Quantity per QSE for all markets—*The sum of all self-arranged ECRS quantities submitted by QSE *q* for DAM and all SASMs. |
| ECRTRSQ *q* | MW | *ERCOT Contingency Reserve Service Trade Sale per QSE*—QSE *q’s* total time-weighted average capacity Trade Sale for ECRS, for the hour. The time-weighted average value is rounded to 0.1 MW. |
| RTPCECR *q, m* | MW | *Procured Capacity for ERCOT Contingency Reserve Service per QSE by market*—The MW portion of QSE *q’s* Ancillary Service Offers cleared in the market *m* (SASM or RSASM) to provide ECRS, for the hour. |
| PCECR *q* | MW | *Procured Capacity for ERCOT Contingency Reserve Service per QSE in DAM—*The total ECRS capacity quantity awarded to QSE *q* in the DAM for all the Resources represented by the QSE, for the hour. |
| RUCECRQ *q* | MW | *RUC-committed for ERCOT Contingency Reserve Service per QSE*—The total quantity of ECRS committed by the RUC Process for Resources represented by QSE *q*, for the hour. |
| ECRTRPQ *q* | MW | *ERCOT Contingency Reserve Service Trade Purchases per QSE*—QSE *q’s* total time-weighted average capacity Trade Purchase for ECRS, for the hour. The time-weighted average value is rounded to 0.1 MW. |
| ECRINFQ *q* | MW | *ERCOT Contingency Reserve Service Infeasible Quantity per QSE—*QSE *q’s* total capacity associated with infeasible Ancillary Service Supply Responsibilities for ECRS, for the hour. |
| TELECRR *q, r* | MW | *Telemetered ERCOT Contingency Reserve Service Responsibility for the Resource*—The time-weighted average telemetered ECRS Ancillary Service Resource Responsibility for the Resource *r*, represented by QSE *q,* for the hour. The time-weighted average value is rounded to 0.1 MW. |
| TELECRRC *q, r* | MW | *Telemetered ERCOT Contingency Reserve Service Responsibility for the Resource as Calculated*—The time-weighted average telemetered ECRS Ancillary Service Resource Responsibility as compared to the available capacity for the Resource *r*, represented by QSE *q,* for the hour. |
| NPF *q, r* | MW | *Non-Controllable Load Resource Net Power Consumption for the QSE*—The average NPF from Load Resource other than Controllable Load Resources *r*, represented by QSE *q,* for the hour. |
| LPC *q, r* | MW | *Non-Controllable Load Resource Low Power Consumption for the QSE*—The average LPC from Load Resource other than Controllable Load Resources *r*, represented by QSE *q,* for the hour. |
| DASAECRQ *q* | MW | *Day-Ahead Self-Arranged ERCOT Contingency Reserve Service Quantity per QSE*—The self-arranged ECRS quantity submitted by QSE *q* before 1000 in the Day-Ahead. |
| RTSAECRQ *q* | MW | *Self-Arranged ERCOT Contingency Reserve Service Quantity per QSE for all SASMs*—The sum of all self-arranged ECRS quantities submitted by QSE *q* for all SASMs due to an increase in the Ancillary Service Plan per Section 4.4.7.1. |
| MCPCECR *m* | $/MW per hour | *Market Clearing Price for Capacity for ERCOT Contingency Reserve Service per market—*The MCPC for ECRS in the market *m*, for the hour. |
| MCPCECR *rs* | $/MW per hour | *Market Clearing Price for Capacity for ERCOT Contingency Reserve Service per RSASM—*The MCPC for ECRS in the RSASM *rs*, for the hour. |
| ECRFQ *q* | MW | *ERCOT Contingency Reserve Service Failure Quantity per QSE—*QSE *q*’s total capacity associated with failures on its Ancillary Service Supply Responsibility for ECRS, for the hour. |
| RECRFQ *q, rs* | MW | *Reconfiguration ERCOT Contingency Reserve Service Failure Quantity per QSE—*QSE *q*’s total capacity associated with reconfiguration reductions on its Ancillary Service Supply Responsibility for ECRS, for the hour. |
| TECRFQ *q* | MW | *Telemetered ERCOT Contingency Reserve Service Failure Quantity per QSE—*Calculated failure quantity for QSE *q* by comparing its average telemetered ECRS Responsibility to its Ancillary Service Supply Responsibility for ECRS as calculated per paragraph (1) of Section 4.4.7.4, for the hour. |
| *i* | none | A 15-minute Settlement Interval within the Operating Hour. |
| *rs* | none | The RSASM for the given Operating Hour. |
| *m* | none | The DAM, SASM, or RSASM for the given Operating Hour. |
| *q* | none | A QSE. |
| *r* | none | A Resource that is qualified to provide ECRS. |

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| ***[NPRR1010: Delete Section 6.7.3 above upon system implementation of the Real-Time Co-Optimization (RTC) project.]*** |