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| NPRR Number | [1043](http://www.ercot.com/mktrules/issues/nprr1043) | NPRR Title | Clarification of NPRR986 Language Related to Wholesale Storage Load |
| Date of Decision | | December 8, 2020 | |
| Action | | Approved | |
| Timeline | | Normal | |
| Effective Date | | Upon system implementation of Nodal Protocol Revision Request (NPRR) 986, BESTF-2 Energy Storage Resource Energy Offer Curves, Pricing, Dispatch, and Mitigation | |
| Priority and Rank Assigned | | Not applicable | |
| Nodal Protocol Sections Requiring Revision | | 2.1, Definitions  3.6.1, Load Resource Participation  6.6.1.2, Real-Time Settlement Point Price for a Load Zone  6.6.1.4, Load Zone LMPs  6.6.3.1, Real-Time Energy Imbalance Payment or Charge at a Resource Node  6.6.3.2, Real-Time Energy Imbalance Payment or Charge at a Load Zone  10.2.3, ERCOT-Polled Settlement Metering  11.1.6, ERCOT Polled Settlement Meter Netting  11.1.12, Treatment of ERCOT-Polled Settlement Wholesale Storage Load Data | |
| Related Documents Requiring Revision/Related Revision Requests | | None | |
| Revision Description | | This NPRR provides necessary clarification regarding Settlement of Energy Storage Resources (ESRs) as developed in NPRR986, which was approved by the ERCOT Board on February 11, 2020, and is currently in the early phase of development. Specifically, this NPRR clarifies that the charging Load (excluding auxiliary Load) withdrawn by an ESR shall be settled based on the nodal price, similar to its injections, even if the ESR does not seek or cannot qualify for Wholesale Storage Load (WSL) treatment. It does so by replacing the term “ESR Load that is not WSL,” which appears in several places in the original NPRR986 language, replacing that term with a defined term, “Non-WSL ESR Charging Load.” The Non-WSL ESR Charging Load will be priced at nodal but, unlike ESRs receiving WSL treatment, will be subject to applicable Load Ratio Share (LRS)-based charges.  NPRR1020, Allow Some Integrated Energy Storage Designs to Calculate Internal Loads, which was approved by the ERCOT Board on August 11, 2020, allows for an alternative to traditional ERCOT-Polled Settlement (EPS) Metering as a way of determining an ESR’s charging Load — as distinct from its auxiliary Load.  This NPRR clarifies that in the event an ESR is unable to separate its charging Load from its auxiliary Load, either via traditional EPS Metering or via the sensor methodology approved in NPRR1020, the ESR’s auxiliary Load will be identified via a default percentage of its overall Load. This would allow the auxiliary Load to be settled using a zonal price and the charging Load to be settled using a nodal price, thus precluding the possibility of inappropriate zonal/nodal arbitrage. All of the ESR’s Load would be subject to applicable LRS-based charges. This NPRR includes ERCOT’s recommendation for establishing the auxiliary Load default percentage at 15% of total ESR Load. Establishing a high default percentage for auxiliary Load will incentivize ESRs to install proper metering. ERCOT seeks stakeholders’ feedback on the proposed 15%, and looks forward to discussing these issues with stakeholders.  This NPRR is applicable to the “combo model” era, in which ESRs are treated as two Resources — a Generation Resource and a Controllable Load Resource — in the ERCOT systems, and the concepts will also carry over to the “single model” era. | |
| Reason for Revision | | Addresses current operational issues.  Meets Strategic goals (tied to the [ERCOT Strategic Plan](http://www.ercot.com/content/wcm/lists/144926/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 | | All ESRs in ERCOT to date have qualified for WSL treatment and the financial savings associated with WSL will continue to provide an incentive for prospective ESRs to qualify for WSL. However, the preamble to Public Utility Commission (PUC) rulemaking Project No. 39917, Rulemaking on Energy Storage Issues (2012), which enabled WSL via amendments to P.U.C. Subst. R. 25.501, Wholesale Market Design for the Electric Reliability Council of Texas, contemplates that WSL treatment should be optional, rather than mandatory. Furthermore, NPRR1020 contemplates that an ESR may forfeit WSL treatment under certain conditions. This NPRR clarifies that an ESR that either does not seek or does not qualify for WSL treatment shall have its charging energy (determined by an EPS Meter or by a default calculation) settled using the appropriate nodal price.  The clarifications in this NPRR will provide certainty to the project team currently working to implement NPRR986. ERCOT encourages stakeholders to expedite approval of this NPRR to avoid delays in NPRR986 implementation. | |
| Credit Work Group Review | | ERCOT Credit Staff and the Credit Work Group (Credit WG) have reviewed NPRR1043 and do not believe that it requires changes to credit monitoring activity or the calculation of liability. | |
| PRS Decision | | On 10/15/20, PRS unanimously voted via roll call to recommend approval of NPRR1043 as submitted. All Market Segments were present for the vote.  On 11/11/20, PRS unanimously voted via roll call to endorse and forward to TAC the 10/15/20 PRS Report and Impact Analysis for NPRR1043. All Market Segments were present for the vote. | |
| Summary of PRS Discussion | | On 10/15/20, the sponsor provided an overview of NPRR1043, and participants noted prior reviews of NPRR1043 by the Battery Energy Storage Task Force (BESTF) and agreed with using 15% as the default auxiliary Load percentage.  On 11/11/20, there was no discussion. | |
| TAC Decision | | On 11/18/20, TAC unanimously voted via roll call to recommend approval of NPRR1043 as recommended by PRS in the 11/11/20 PRS Report as amended by the 11/17/20 ERCOT comments. All Market Segments were present for the vote. | |
| Summary of TAC Discussion | | On 11/18/20, participants reviewed the 11/17/20 ERCOT comments. | |
| ERCOT Opinion | | ERCOT supports approval of NPRR1043. | |
| Board Decision | | On 12/8/20, the ERCOT Board approved NPRR1043 as recommended by TAC in the 11/18/20 TAC Report. | |

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| Market Segment | Not applicable |

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| **Comments Received** | |
| Comment Author | **Comment Summary** |
| ERCOT 111720 | Proposed additional revisions to maintain consistency between the proposed revisions to the definition of “Resource Node” within NPRR1043 and revisions approved within NPRR1016, Clarify Requirements for Distribution Generation Resources (DGRs) and Distribution Energy Storage Resources (DESRs) |

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| **Market Rules Notes** |

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

* NPRR1007, RTC – NP 3: Management Activities for the ERCOT System
  + Section 3.6.1
* NPRR1010, RTC – NP 6: Adjustment Period and Real-Time Operations
  + Section 6.6.1.2
  + Section 6.6.3.1
* NPRR1014, BESTF-4 Energy Storage Resource Single Model
  + Section 6.6.3.1
* NPRR1039, Replace the Term MIS Public Area with ERCOT Website
  + Section 6.6.1.4
* NPRR1052, Load Zone Pricing for Settlement Only Storage Prior to NPRR995 Implementation
  + Section 6.6.3.2

Please note that the definition of “Resource Node” has been updated to reflect the incorporation of the following NPRR(s) into the Protocols:

* NPRR1016 (incorporated 9/1/20)

Please note that the following NPRR(s) also propose revisions to the definition of “Resource Node”:

* NPRR1014, BESTF-4 Energy Storage Resource Single Model

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| Proposed Protocol Language Revision |

**2.1 Definitions**

**Non-WSL ESR Charging Load**

The metered or calculated charging Load withdrawn by an Energy Storage Resource (ESR) that is not receiving Wholesale Storage Load (WSL) treatment.

**Resource Node**

Either a logical construct that creates a virtual pricing point required to model a Combined-Cycle Configuration or an Electrical Bus defined in the Network Operations Model, at which a Settlement Point Price for a Generation Resource or Energy Storage Resource (ESR) is calculated and used in Settlement. All Resource Nodes shall be identified in accordance with the Other Binding Document titled “Procedure for Identifying Resource Nodes.”

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| [NPRR1016: Replace the definition “Resource Node” above with the following upon system implementation:]  **Resource Node**  Either a logical construct that creates a virtual pricing point required to model a Combined-Cycle Configuration or an Electrical Bus defined in the Network Operations Model, at which a Settlement Point Price for a Generation Resource or Energy Storage Resource (ESR) is calculated and used in Settlement. All Resource Nodes shall be identified in accordance with the Other Binding Document titled “Procedure for Identifying Resource Nodes.” |

***3.6.1 Load Resource Participation***

(1) A Load Resource may participate by providing:

(a) Ancillary Service:

(i) Regulation Up (Reg-Up) Service as a Controllable Load Resource capable of providing Primary Frequency Response;

(ii) Regulation Down (Reg-Down) Service as a Controllable Load Resource capable of providing Primary Frequency Response;

(iii) Responsive Reserve (RRS) as a Controllable Load Resource qualified for Security-Constrained Economic Dispatch (SCED) Dispatch and capable of providing Primary Frequency Response, or as a Load Resource controlled by high-set under-frequency relay; and

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| ***[NPRR863: Insert paragraph (iv) below upon system implementation and renumber accordingly:]***  (iv) ERCOT Contingency Reserve Service (ECRS) as a Controllable Load Resource qualified for SCED Dispatch and capable of providing Primary Frequency Response, or as a Load Resource that may or may not be controlled by high-set under-frequency relay; and |

(iv) Non-Spinning Reserve (Non-Spin) Service as a Controllable Load Resource qualified for SCED Dispatch;

(b) Energy in the form of Demand response from a Controllable Load Resource in Real-Time via SCED;

(c) Emergency Response Service (ERS) for hours in which the Load Resource does not have an Ancillary Service Resource Responsibility; and

(d) Voluntary Load response in Real-Time.

(2) Except for voluntary Load response and ERS, loads participating in any ERCOT market must be registered as a Load Resource and are subject to qualification testing administered by ERCOT.

(3) All ERCOT Settlements resulting from Load Resource participation are made only with the Qualified Scheduling Entity (QSE) representing the Load Resource.

(4) A QSE representing a Load Resource and submitting a bid to buy for participation in SCED, as described in Section 6.4.3.1, RTM Energy Bids, must represent the Load Serving Entity (LSE) serving the Load of the Load Resource. If the Load Resource is an Aggregate Load Resource (ALR), the QSE must represent the LSE serving the Load of all sites within the ALR.

(5) The Settlement Point for a Controllable Load Resource with a Real-Time Market (RTM) Energy Bid is its Load Zone Settlement Point.

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| ***[NPRR986: Replace paragraph (5) above with the following upon system implementation:]***  (5) The Settlement Point for a Controllable Load Resource is its Load Zone Settlement Point. For an Energy Storage Resource (ESR), the Settlement Point for the charging Load withdrawn by the modeled Controllable Load Resource associated with the ESR is the Resource Node of the modeled Generation Resource associated with the ESR. |

(6) QSEs shall not submit offers for Load Resources containing sites associated with a Dynamically Scheduled Resource (DSR).

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| ***[NPRR1000: Delete paragraph (6) above upon system implementation.]*** |

6.6.1.2 Real-Time Settlement Point Price for a Load Zone

(1) The Real-Time Settlement Point Price for a Load Zone Settlement Point is based on the state-estimated Load in MW and the time-weighted average Real-Time LMPs at Electrical Buses that are included in the Load Zone. The Real-Time Settlement Point Price for a Load Zone Settlement Point for a 15-minute Settlement Interval is calculated as follows:

RTSPP = Max (-$251, ((TLMP *y* \* LZLMP *y*) / TLMP*y*) + RTRSVPOR + RTRDP)

For all Load Zones except Direct Current Tie (DC Tie) Load Zones:

LZLMP *y* =  (RTLMP *b, y* \* SEL *b, y*) / SEL*b, y*

For a DC Tie Load Zone:

LZLMP *y* = RTLMP *b, y*

Where:

RTRSVPOR = image010(RNWF *y* \* RTORPA *y*)

RTRDP = (RNWF *y* \* RTORDPA *y*)

RNWF *y*= TLMP *y* / TLMP *y*

(2) For all Settlement calculations in which a 15-minute Real-Time Settlement Point Price for a Load Zone is required in order to perform Settlement for a 15-minute quantity that is represented as one value (the integrated value for the 15-minute interval) but varies with each SCED interval within the 15-minute Settlement Interval, an energy-weighted Real-Time Settlement Point Price shall be used and is calculated as follows:

**RTSPPEW = Max [-$251, ((RTLMP*b, y* \* LZWF *b, y*) + RTRSVPOR + RTRDP)]**

For all Load Zones except DC Tie Load Zones:

LZWF *b, y* = (SEL*b, y* \* TLMP *y*) **/** [(SEL*b, y* \* TLMP*y*)]

For a DC Tie Load Zone:

LZWF *b, y* = (SEL*b, y* \* TLMP *y*) **/** [(SEL*b, y* \* TLMP*y*)]

SEL*b, y* = 1

Where:

RTRSVPOR = image010(RNWF *y* \* RTORPA *y*)

RTRDP = (RNWF *y* \* RTORDPA *y*)

RNWF *y* = TLMP *y* /TLMP *y*

The above variables are defined as follows:

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| Variable | Unit | Description |
| RTSPP | $/MWh | *Real-Time Settlement Point Price*⎯The Real-Time Settlement Point Price at the Settlement Point, for the 15-minute Settlement Interval. |
| RTSPPEW | $/MWh | *Real-Time Settlement Point Price Energy-Weighted*⎯The Real-Time Settlement Point Price at the Settlement Point *p*, for the 15-minute Settlement Interval that is weighted by the state-estimated Load of the Load Zone of each SCED interval within the 15-minute Settlement Interval. |
| RTLMP *b, y* | $/MWh | *Real-Time Locational Marginal Price at bus per interval*⎯The Real-Time LMP at Electrical Bus *b* in the Load Zone, for the SCED interval *y*. |
| RTRSVPOR | $/MWh | *Real-Time Reserve Price for On-Line Reserves*⎯The Real-Time Reserve Price for On-Line Reserves for the 15-minute Settlement Interval. |
| RTORPA*y* | $/MWh | *Real-Time On-Line Reserve Price Adder per interval*⎯The Real-Time Price Adder for On-Line Reserves for the SCED interval *y*. |
| RTRDP | $/MWh | *Real-Time On-Line Reliability Deployment Price* ⎯The Real-Time price for the 15-minute Settlement Interval, reflecting the impact of reliability deployments on energy prices that is calculated from the Real-time On-Line Reliability Deployment Price Adder. |
| RTORDPA*y* | $/MWh | *Real-Time On-Line Reliability Deployment Price Adder* ⎯The Real-Time Price Adder that captures the impact of reliability deployments on energy prices for the SCED interval *y*. |
| RNWF *y* | none | *Resource Node Weighting Factor per interval*⎯The weight used in the Resource Node Settlement Point Price calculation for the portion of the SCED interval *y* within the Settlement Interval. |
| LZWF *b, y* | none | *Load Zone Weighting Factor per bus per interval*⎯The weight used in the Load Zone Settlement Point Price calculation for Electrical Bus *b*, for the portion of the SCED interval *y* within the 15-minute Settlement Interval. |
| LZLMP *y* | $/MWh | *Load Zone Locational Marginal Price*⎯The Load Zone LMP for the Load Zone for the SCED Interval *y*. |
| SEL *b, y* | MW | *State Estimator Load at bus per interval*⎯The Load from State Estimator, including a calculated net Load value at each Private Use Network, excluding Wholesale Storage Load (WSL) and Non-WSL ESR Charging Load, for Electrical Bus *b* in the Load Zone, for the SCED interval *y*.   |  | | --- | | [NPRR1016: Replace the description above with the following upon system implementation:]  *State Estimator Load at bus per interval*⎯The Load value from State Estimator, including a calculated net Load value at each Private Use Network and adjustments to account for Distribution Generation Resource (DGR) and Distribution Energy Storage Resource (DESR) injections and withdrawals that are settled at a Resource Node, excluding Wholesale Storage Load (WSL) and Non-WSL ESR Charging Load, for Electrical Bus *b* in the Load Zone, for the SCED interval *y*. | |
| TLMP *y* | second | *Duration of SCED interval per interval*⎯The duration of the portion of the SCED interval *y* within the Settlement Interval. |
| *y* | none | A SCED interval in the 15-minute Settlement Interval. The summation is over the total number of SCED runs that cover the 15-minute Settlement Interval. |
| *b* | none | An Electrical Bus in the Load Zone. The summation is over all of the Electrical Buses in the Load Zone. |

6.6.1.4 Load Zone LMPs

(1) The Load Zone LMPs shall be posted on the Market Information System (MIS) Public Area. The Load Zone LMP is based on the state-estimated Loads in MW and the Real-Time LMPs at the Electrical Buses included in the Load Zone. The Load Zone LMP for a Load Zone for a SCED Interval is calculated as follows:

LZLMP *y* =  (RTLMP*b, y* \* LZWF *b, y*)

For all Load Zones except DC Tie Load Zones:

LZWF *b, y* = SEL*b, y* / (SEL*b, y*)

For a DC Tie Load Zone:

LZWF *b, y* = [Max (0.001, SEL b, y)] / [Max (0.001, SEL b, y)]

The above variables are defined as follows:

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| Variable | Unit | Description |
| LZLMP *y* | $/MWh | *Load Zone Locational Marginal Price*⎯The Load Zone LMP for the Load Zone for the SCED Interval *y*. |
| RTLMP *b, y* | $/MWh | *Real-Time Locational Marginal Price at bus per SCED interval*⎯The Real-Time LMP at Electrical Bus *b* in the Load Zone, for the SCED interval *y*. |
| LZWF *b, y* | None | *Load Zone State Estimator Load Weighting Factor per bus per SCED interval*⎯The weight used in the Load Zone LMP calculation for Electrical Bus *b* for the SCED interval *y*. |
| SEL *b, y* | MW | *State Estimator Load at bus per SCED interval*⎯The Load from the State Estimator, including a calculated net Load value at each Private Use Network, and excluding Wholesale Storage Load (WSL) and Non-WSL ESR Charging Load, for Electrical Bus *b* in the Load Zone, for the SCED interval *y*.   |  | | --- | | [NPRR1016: Replace the description above with the following upon system implementation:]  *State Estimator Load at bus per SCED interval*⎯The Load from the State Estimator, including a calculated net Load value at each Private Use Network and adjustments to account for DGR and DESR injections and withdrawals that are settled at a Resource Node, excluding WSL and Non-WSL ESR Charging Load for Electrical Bus *b* in the Load Zone, for the SCED interval *y*. | |
| *y* | None | A SCED interval. |
| *b* | None | An Electrical Bus in the Load Zone. The summation is over all of the Electrical Buses in the Load Zone. |

6.6.3.1 Real-Time Energy Imbalance Payment or Charge at a Resource Node

(1) The payment or charge to each QSE for Energy Imbalance Service is calculated based on the Real-Time Settlement Point Price for the following amounts at a particular Resource Node Settlement Point:

(a) The energy produced by all its Generation Resources or consumed as WSL at the Settlement Point; plus

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| [NPRR986: Replace item (a) above with the following upon system implementation:]  (a) The energy produced by all its Generation Resources, consumed as WSL, or consumed as Non-WSL ESR Charging Load at the Settlement Point; plus |

(b) The amount of its Self-Schedules with sink specified at the Settlement Point; plus

(c) The amount of its Day-Ahead Market (DAM) Energy Bids cleared in the DAM at the Settlement Point; plus

(d) The amount of its Energy Trades at the Settlement Point where the QSE is the buyer; minus

(e) The amount of its Self-Schedules with source specified at the Settlement Point; minus

(f) The amount of its energy offers cleared in the DAM at the Settlement Point; minus

(g) The amount of its Energy Trades at the Settlement Point where the QSE is the seller.

(2) The payment or charge to each QSE for Energy Imbalance Service at a Resource Node Settlement Point for a given 15-minute Settlement Interval is calculated as follows:

RTEIAMT *q, p* = (-1) \* {((RESREV *q, r, gsc, p*)) + (WSLAMTTOT *q, r, p*) + RTSPP *p* \* [(SSSK *q, p* \* ¼) + (DAEP *q, p* \* ¼) + (RTQQEP *q, p* \* ¼) – (SSSR *q, p* \* ¼) – (DAES *q, p* \* ¼) – (RTQQES *q, p* \* ¼)]}

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| [NPRR986: Replace the formula “RTEIAMT q, p” above with the following upon system implementation:]  RTEIAMT *q, p* = (-1) \* {((RESREV *q, r, gsc, p*)) + (WSLAMTTOT *q, r, p*) + (ESRNWSLAMTTOT *q, r, p*) + RTSPP *p* \* [(SSSK *q, p* \* ¼) + (DAEP *q, p* \* ¼) + (RTQQEP *q, p* \* ¼) – (SSSR *q, p* \* ¼) – (DAES *q, p* \* ¼) – (RTQQES *q, p* \* ¼)]} |

Where:

RESREV *q, r, gsc, p* = GSPLITPER *q, r, gsc, p* \* NMSAMTTOT *gsc*

RESMEB *q, r, gsc, p* = GSPLITPER *q, r, gsc, p* \* NMRTETOT *gsc*

WSLTOT *q, p* =  ( MEBL *q,r,b*)

RNIMBAL *q, p =* (RESMEB *q, r, gsc, p*) + WSLTOT *q, p* + (SSSK *q, p* \* ¼) + (DAEP *q, p* \* ¼) + (RTQQEP *q, p* \* ¼) – (SSSR *q, p* \* ¼) – (DAES *q, p* \* ¼) – (RTQQES *q, p* \* ¼)

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| [NPRR986: Replace the formula “RNIMBAL q, p” above with the following upon system implementation:]  ESRNWSLTOT *q, p* =  ( MEBR *q, r, b*)  RNIMBAL *q, p =* (RESMEB *q, r, gsc, p*) + WSLTOT *q, p* + ESRNWSLTOT *q, p* + (SSSK *q, p* \* ¼) + (DAEP *q, p* \* ¼) + (RTQQEP *q, p* \* ¼) – (SSSR *q, p* \* ¼) – (DAES *q, p* \* ¼) – (RTQQES *q, p* \* ¼) |

The above variables are defined as follows:

| Variable | Unit | Description |
| --- | --- | --- |
| RTEIAMT *q, p* | $ | *Real-Time Energy Imbalance Amount per QSE per Settlement Point*—The payment or charge to QSE *q* for Real-Time Energy Imbalance Service at Settlement Point *p*, for the 15-minute Settlement Interval. |
| RNIMBAL *q, p* | MWh | *Resource Node Energy Imbalance per QSE per Settlement Point*—The Resource Node volumetric imbalance for QSE *q* for Real-Time Energy Imbalance Service at Settlement Point *p*, for the 15-minute Settlement Interval. |
| RTSPP *p* | $/MWh | *Real-Time Settlement Point Price per Settlement Point*—The Real-Time Settlement Point Price at Settlement Point *p*, for the 15-minute Settlement Interval. |
| SSSK *q, p* | MW | *Self-Schedule with Sink at Settlement Point per QSE per Settlement Point*—The QSE *q*’s Self-Schedule with sink at Settlement Point *p*, for the 15-minute Settlement Interval. |
| DAEP *q, p* | MW | *Day-Ahead Energy Purchase per QSE per Settlement Point*—The QSE *q*’s DAM Energy Bids at Settlement Point *p* cleared in the DAM, for the hour that includes the 15-minute Settlement Interval. |
| RTQQEP *q, p* | MW | *Real-Time QSE-to-QSE Energy Purchase per QSE per Settlement Point*⎯The amount of MW bought by QSE *q* through Energy Trades at Settlement Point *p*, for the 15-minute Settlement Interval. |
| SSSR *q, p* | MW | *Self-Schedule with Source at Settlement Point per QSE per Settlement Point*—The QSE *q*’s Self-Schedule with source at Settlement Point *p*, for the 15-minute Settlement Interval. |
| DAES *q, p* | MW | *Day-Ahead Energy Sale per QSE per Settlement Point*—The QSE *q*’s energy offers at Settlement Point *p* cleared in the DAM, for the hour that includes the 15-minute Settlement Interval. |
| RTQQES *q, p* | MW | *Real-Time QSE-to-QSE Energy Sale per QSE per Settlement Point*⎯The amount of MW sold by QSE *q* through Energy Trades at Settlement Point *p*, for the 15-minute Settlement Interval. |
| RESREV *q, r, gsc, p* | $ | *Resource Share Revenue Settlement Payment*—The Resource share of the total payment to the entire Facility with a net metering arrangement attributed to Resource *r* that is part of a generation site code *gsc* for the QSE *q* at Settlement Point *p*. |
| RESMEB *q, r, gsc, p* | MWh | *Resource Share Net Meter Real-Time Energy Total*—The Resource share of the net sum for all Settlement Meters attributed to Resource *r* that is part of a generation site code *gsc* for the QSE *q* at Settlement Point *p*. |
| WSLTOT *q, p* | MWh | *WSL Total*—The total WSL energy metered by the Settlement Meters which measure WSL for the QSE *q* at Settlement Point *p*. |
| |  |  |  |  | | --- | --- | --- | --- | | [NPRR986: Insert the variable “ESRNWSLTOT q, p” below upon system implementation:]   |  |  |  | | --- | --- | --- | | ESRNWSLTOT *q, p* | MWh | *ESR Non-WSL Total*—The total energy metered by the Settlement Meters which measures Non-WSL ESR Charging Load for the QSE *q* at Settlement Point *p.* | | | | |
| MEBL *q,r,b* | MWh | *Metered Energy for Wholesale Storage Load at bus*⎯The WSL energy metered by the Settlement Meter which measures WSL for the 15-minute Settlement Interval represented as a negative value, for the QSE *q*, Resource *r*, at bus *b*. |
| |  |  |  |  | | --- | --- | --- | --- | | [NPRR986: Insert the variable “MEBR q, r, b” below upon system implementation:]   |  |  |  | | --- | --- | --- | | MEBR *q, r, b* | MWh | *Metered Energy for Energy Storage Resource Load at Bus* - The energy metered by the Settlement Meter which measures Non-WSL ESR Charging Load for the 15-minute Settlement Interval represented as a negative value, for the QSE *q*, Resource *r*, at bus *b*. | | | | |
| NMSAMTTOT *gsc* | $ | *Net Metering Settlement*—The total payment or charge to a generation site with a net metering arrangement. |
| WSLAMTTOT*q, r, p* | $ | *Wholesale Storage Load Settlement*—The total payment or charge to QSE *q*, Resource *r*, at Settlement Point *p*, for WSL for each 15-minute Settlement Interval. |
| |  |  |  |  | | --- | --- | --- | --- | | [NPRR986: Insert the variable “ESRNWSLAMTTOT q, r, p” below upon system implementation:]   |  |  |  | | --- | --- | --- | | ESRNWSLAMTTOT*q, r, p* | $ | *Energy Storage Resource Non-WSL Settlement*—The total payment or charge to QSE *q*, Resource *r*, at Settlement Point *p*, for Non-WSL ESR Charging Load for each 15-minute Settlement Interval. | | | | |
| NMRTETOT *gsc* | MWh | *Net Meter Real-Time Energy Total*—The net sum for all Settlement Meters included in generation site code *gsc*. A positive value indicates an injection of power to the ERCOT System. |
| GSPLITPER *q, r, gsc, p* | none | *Generation Resource SCADA Splitting Percentage*—The generation allocation percentage for Resource *r* that is part of a net metering arrangement. GSPLITPER is calculated by taking the Supervisory Control and Data Acquisition (SCADA) values (GSSPLITSCA) for a particular Generation Resource *r* that is part of a net metering configuration and dividing by the sum of all SCADA values for all Resources that are included in the net metering configuration for each interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| *q* | none | A QSE. |
| *p* | none | A Resource Node Settlement Point. |
| *r* | none | A Generation Resource or an energy storage Load Resource that is located at the Facility with net metering.   |  | | --- | | [NPRR986: Replace the Description above with the following upon system implementation:]  A Generation Resource or a Controllable Load Resource that is part of an ESR that is located at the Facility with net metering. | |
| *gsc* | none | A generation site code. |
| *b* | none | An Electrical Bus. |

(3) For a facility with Settlement Meters that measure WSL, the total payment or charge for WSL is calculated for a QSE, energy storage Load Resource, and Settlement Point for each 15-minute Settlement Interval.

The WSL is settled as follows:

**WSLAMTTOT *q, r, p* =**  **(RTRMPRWSL *b* \* MEBL** ***q, r, b*)**

Where the price for Settlement Meter is determined as follows:

**RTRMPRWSL *b* = Max [-$251, (image010(RNWFL *b, y* \* RTLMP *b, y*) + RTRSVPOR + RTRDP)]**

Where the weighting factor for the Electrical Bus associated with the meter is:

**RNWFL *b, y* = [Max (0.001,** image001 **TL *r, y*)) \* TLMP *y*] /**

**[image010Max (0.001,** image001 **TL *r, y*)) \* TLMP *y*]**

Where:

RTRSVPOR = image010(RNWF  *y* \* RTORPA *y*)

RTRDP = (RNWF  *y* \* RTORDPA *y*)

RNWF *y* = TLMP *y* / TLMP *y*

The summation is over all WSL *r* associated to the individual meter. The determination of which Resources are associated to an individual meter is static and based on the normal system configuration of the generation site code, *gsc*.

The above variables are defined as follows:

| Variable | Unit | Description |
| --- | --- | --- |
| RTLMP *b, y* | $/MWh | *Real-Time Locational Marginal Price at bus per interval*⎯The Real-Time LMP for the meter at Electrical Bus *b*, for the SCED interval *y*. |
| TLMP *y* | second | *Duration of SCED interval per interval*⎯The duration of the SCED interval *y*. |
| RTRSVPOR | $/MWh | *Real-Time Reserve Price for On-Line Reserves*⎯The Real-Time Reserve Price for On-Line Reserves for the 15-minute Settlement Interval. |
| RTORPA*y* | $/MWh | *Real-Time On-Line Reserve Price Adder per interval*⎯The Real-Time On-Line Reserve Price Adder for the SCED interval *y*. |
| RTRDP | $/MWh | *Real-Time On-Line Reliability Deployment Price* ⎯The Real-Time price for the 15-minute Settlement Interval, reflecting the impact of reliability deployments on energy prices that is calculated from the Real-time On-Line Reliability Deployment Price Adder. |
| RTORDPA*y* | $/MWh | *Real-Time On-Line Reliability Deployment Price Adder* ⎯The Real-Time Price Adder that captures the impact of reliability deployments on energy prices for the SCED interval *y*. |
| RNWF *y* | none | *Resource Node Weighting Factor per interval*⎯The weight used in the Resource Node Settlement Point Price calculation for the portion of the SCED interval *y* within the Settlement Interval. |
| MEBL*q,r,b* | MWh | *Metered Energy for Wholesale Storage Load at bus*⎯The WSL energy metered by the Settlement Meter which measures WSL for the 15-minute Settlement Interval represented as a negative value, for the QSE *q*, Resource *r*, at bus *b*. |
| WSLAMTTOT*q, r, p* | $ | *Wholesale Storage Load Settlement*—The total payment or charge to QSE *q*, Resource *r*, at Settlement Point *p*, for WSL for each 15-minute Settlement Interval. |
| RNWFL*b, y* | none | *Net meter Weighting Factor per interval for the Energy Metered as Wholesale Storage Load*The weight factor used in net meter price calculation for meters in Electrical Bus *b*, for the SCED interval *y*, for the WSL associated with an energy storage Load Resource. The weighting factor used in the net meter price calculation shall not be recalculated after the fact due to revisions in the association of Resources to Settlement Meters. |
| RTRMPRWSL*b* | $/MWh | *Real-Time Price for the Energy Metered as Wholesale Storage Load at bus*⎯The Real-Time price for the Settlement Meter which measures WSL at Electrical Bus *b*, for the 15-minute Settlement Interval. |
| TL *r, y* | MW | *Telemetered WSL charging per interval*⎯The telemetered Load associated with the energy storage Load Resource *r* for the SCED interval *y*. |
| *gsc* | none | A generation site code. |
| *r* | none | An energy storage Load Resource. |
| *y* | none | A SCED interval in the 15-minute Settlement Interval. The summation is over the total number of SCED runs that cover the 15-minute Settlement Interval. |
| *b* | none | An Electrical Bus. |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| [NPRR986: Replace paragraph (3) above with the following upon system implementation:]  (3) For a facility with Settlement Meters that measure ESR Load, the total payment or charge for ESR Load is calculated for a QSE, ESR, and Settlement Point for each 15-minute Settlement Interval.  The WSL is settled as follows:  **WSLAMTTOT *q, r, p* =**  **(RTRMPRESR *b* \* MEBL** ***q, r, b*)**  The Non-WSL ESR Charging Load is settled as follows:  **ESRNWSLAMTTOT *q, r, p* =**  **(RTRMPRESR *b* \* MEBR** ***q, r, b*)**  Where the price for Settlement Meter is determined as follows:  **RTRMPRESR *b* = Max [-$251, (image010(RNWFL *b, y* \* RTLMP *b, y*) + RTRSVPOR + RTRDP)]**  Where the weighting factor for the Electrical Bus associated with the meter is:  **RNWFL *b, y* = [Max (0.001,** image001**BP *r, y*) \* TLMP *y*] /**  **[image010Max (0.001,** image001 **BP *r, y*) \* TLMP *y*]**  Where:  RTRSVPOR = image010(RNWF  *y* \* RTORPA *y*)  RTRDP = (RNWF  *y* \* RTORDPA *y*)  RNWF *y* = TLMP *y* / TLMP *y*  The summation is over all ESR Load *r* associated to the individual meter. The determination of which Resources are associated to an individual meter is static and based on the normal system configuration of the generation site code, *gsc*.  The above variables are defined as follows:   | Variable | Unit | Description | | --- | --- | --- | | RTLMP *b, y* | $/MWh | *Real-Time Locational Marginal Price at bus per interval*⎯The Real-Time LMP for the meter at Electrical Bus *b*, for the SCED interval *y*. | | TLMP *y* | second | *Duration of SCED interval per interval*⎯The duration of the SCED interval *y*. | | RTRSVPOR | $/MWh | *Real-Time Reserve Price for On-Line Reserves*⎯The Real-Time Reserve Price for On-Line Reserves for the 15-minute Settlement Interval. | | RTORPA*y* | $/MWh | *Real-Time On-Line Reserve Price Adder per interval*⎯The Real-Time On-Line Reserve Price Adder for the SCED interval *y*. | | RTRDP | $/MWh | *Real-Time On-Line Reliability Deployment Price* ⎯The Real-Time price for the 15-minute Settlement Interval, reflecting the impact of reliability deployments on energy prices that is calculated from the Real-time On-Line Reliability Deployment Price Adder. | | RTORDPA*y* | $/MWh | *Real-Time On-Line Reliability Deployment Price Adder* ⎯The Real-Time Price Adder that captures the impact of reliability deployments on energy prices for the SCED interval *y*. | | RNWF *y* | none | *Resource Node Weighting Factor per interval*⎯The weight used in the Resource Node Settlement Point Price calculation for the portion of the SCED interval *y* within the Settlement Interval. | | MEBL*q,r,b* | MWh | *Metered Energy for Wholesale Storage Load at bus*⎯The WSL energy metered by the Settlement Meter which measures WSL for the 15-minute Settlement Interval represented as a negative value, for the QSE *q*, Resource *r*, at bus *b*. | | MEBR *q, r, b* | MWh | *Metered Energy for Energy Storage Resource Load at Bus* - The energy metered by the Settlement Meter which measures Non-WSL ESR Charging Load for the 15-minute Settlement Interval represented as a negative value, for the QSE *q*, Resource *r*, at bus *b*. | | WSLAMTTOT*q, r, p* | $ | *Wholesale Storage Load Settlement*—The total payment or charge to QSE *q*, Resource *r*, at Settlement Point *p*, for WSL for each 15-minute Settlement Interval. | | ESRNWSLAMTTOT*q, r, p* | $ | *Energy Storage Resource Non-WSL Settlement*—The total payment or charge to QSE *q*, Resource *r*, at Settlement Point *p*, for Non-WSL ESR Charging Load for each 15-minute Settlement Interval. | | RNWFL*b, y* | none | *Net meter Weighting Factor per interval for the Energy Metered as Energy Storage Resource Load*The weight factor used in net meter price calculation for meters in Electrical Bus *b*, for the SCED interval *y*, for the ESR Load associated with an ESR. The weighting factor used in the net meter price calculation shall not be recalculated after the fact due to revisions in the association of Resources to Settlement Meters. | | RTRMPRESR*b* | $/MWh | *Real-Time Price for the Energy Metered as Energy Storage Resource Load at bus*⎯The Real-Time price for the Settlement Meter which measures ESR Load at Electrical Bus *b*, for the 15-minute Settlement Interval. | | BP *r, y* | MW | *Base Point per Resource per interval* - The Base Point of Resource *r*, for the SCED interval *y*. | | *q* | none | A QSE. | | *gsc* | none | A generation site code. | | *r* | none | The Controllable Load Resource that is part of an ESR. | | *p* | none | A Resource Node Settlement Point. | | *y* | none | A SCED interval in the 15-minute Settlement Interval. The summation is over the total number of SCED runs that cover the 15-minute Settlement Interval. | | *b* | none | An Electrical Bus. | |

(4) The total payment or charge to a Facility with a net metering arrangement for each 15-minute Settlement Interval shall be calculated as follows:

**NMRTETOT *gsc* = Max (0, ( (MEB *gsc, b +* MEBC *gsc, b*)))**

If NMRTETOT *gsc* = 0 for a 15-minute Settlement Interval, then

The Load that is not WSL is included in the Real-Time AML per QSE and is included in the Real-Time energy imbalance payment or charge at a Load Zone.

|  |
| --- |
| [NPRR986: Replace the language above with the following upon system implementation:]  The Load that is not WSL is included in the Real-Time AML per QSE. |

Otherwise, when NMRTETOT *gsc* **>** 0 for a 15-minute Settlement Interval, then

NMSAMTTOT *gsc* =  [(RTRMPR *b* \* MEB *gsc, b*) + (RTRMPR *b* \* MEBC *gsc, b*)]

Where the price for Settlement Meter is determined as follows:

RTRMPR *b* = Max [-$251, (image010(RNWF *b, y* \* RTLMP *b, y*) + RTRSVPOR + RTRDP)]

Where the weighting factor for the Electrical Bus associated with the meter is:

**RNWF *b, y* = [Max (0.001,** **BP *r, y*) \* TLMP *y*] /**

**[image010Max (0.001,** **BP *r, y*) \* TLMP *y*]**

Where:

RTRSVPOR = image010(RNWF  *y* \* RTORPA *y*)

RTRDP = (RNWF  *y* \* RTORDPA *y*)

RNWF *y* = TLMP *y* / TLMP *y*

The summation is over all Resources *r* associated to the individual meter. The determination of which Resources are associated to an individual meter is static and based on the normal system configuration of the generation site code, *gsc*.

The above variables are defined as follows:

| Variable | Unit | Description |
| --- | --- | --- |
| NMRTETOT *gsc* | MWh | *Net Meter Real-Time Energy Total*—The net sum for all Settlement Meters included in generation site code *gsc*. A positive value indicates an injection of power to the ERCOT System. |
| NMSAMTTOT*gsc* | $ | *Net Metering Settlement*—The total payment or charge to a generation site with a net metering arrangement. |
| RTRMPR *b* | $/MWh | *Real-Time Price for the Energy Metered for each Resource meter at bus*⎯The Real-Time price for the Settlement Meter at Electrical Bus *b*, for the 15-minute Settlement Interval. |
| MEB *gsc, b* | MWh | *Metered Energy at bus*⎯The metered energy by the Settlement Meter which is not upstream from another Settlement Meter which measures WSL for the 15-minute Settlement Interval. A positive value represents energy produced, and a negative value represents energy consumed.   |  | | --- | | [NPRR986: Replace the Description above with the following upon system implementation:]  *Metered Energy at bus*⎯The metered energy by the Settlement Meter which is not upstream from another Settlement Meter which measures ESR Load for the 15-minute Settlement Interval. A positive value represents energy produced, and a negative value represents energy withdrawn. | |
| RTRSVPOR | $/MWh | *Real-Time Reserve Price for On-Line Reserves*⎯The Real-Time Reserve Price for On-Line Reserves for the 15-minute Settlement Interval. |
| RTORPA*y* | $/MWh | *Real-Time On-Line Reserve Price Adder per interval*⎯The Real-Time On-Line Reserve Price Adder for the SCED interval *y*. |
| RTRDP | $/MWh | *Real-Time On-Line Reliability Deployment Price* ⎯The Real-Time price for the 15-minute Settlement Interval, reflecting the impact of reliability deployments on energy prices that is calculated from the Real-time On-Line Reliability Deployment Price Adder. |
| RTORDPA*y* | $/MWh | *Real-Time On-Line Reliability Deployment Price Adder* ⎯The Real-Time Price Adder that captures the impact of reliability deployments on energy prices for the SCED interval *y*. |
| RNWF *y* | none | *Resource Node Weighting Factor per interval*⎯The weight used in the Resource Node Settlement Point Price calculation for the portion of the SCED interval *y* within the Settlement Interval. |
| RTLMP *b, y* | $/MWh | *Real-Time Locational Marginal Price at bus per interval*⎯The Real-Time LMP for the meter at Electrical Bus *b*, for the SCED interval *y*. |
| TLMP *y* | second | *Duration of SCED interval per interval*⎯The duration of the SCED interval *y*. |
| RNWF *b, y* | none | *Net meter Weighting Factor per interval*The weight factor used in net meter price calculation for meters in Electrical Bus *b*, for the SCED interval *y*. The weighting factor used in the net meter price calculation shall not be recalculated after the fact due to revisions in the association of Resources to Settlement Meters. |
| BP *r, y* | MW | *Base Point per Resource per interval*The Base Point of Resource *r,* for the SCED interval *y*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| MEBC*gsc, b* | MWh | *Metered Energy at bus (Calculated)*⎯The calculated energy for the 15-minute Settlement Interval for a Settlement Meter which is upstream from another Settlement Meter which measures WSL. A positive value represents energy produced, and a negative value represents energy consumed.   |  | | --- | | [NPRR986: Replace the Description above with the following upon system implementation:]  *Metered Energy at bus (Calculated)* ⎯ The calculated energy for the 15-minute Settlement Interval for a Settlement Meter which is upstream from another Settlement Meter which measures ESR Load. A positive value represents energy produced, and a negative value represents energy withdrawn. | |
| *gsc* | none | A generation site code. |
| *r* | none | A Generation Resource that is located at the Facility with net metering. |
| *y* | none | A SCED interval in the 15-minute Settlement Interval. The summation is over the total number of SCED runs that cover the 15-minute Settlement Interval. |
| *b* | none | An Electrical Bus. |

(5) The Generation Resource SCADA Splitting Percentage for each Resource within a net metering arrangement for the 15-minute Settlement Interval is calculated as follows:

**GSPLITPER *q, r, gsc, p* = GSSPLITSCA *r* /** **GSSPLITSCA *r***

The above variables are defined as follows:

| Variable | Unit | Definition |
| --- | --- | --- |
| GSPLITPER *q, r, gsc, p* | none | *Generation Resource SCADA Splitting Percentage*—The generation allocation percentage for Resource *r* that is part of a generation site code *gsc* for the QSE *q* at Settlement Point *p*. GSPLITPER is calculated by taking the SCADA values (GSSPLITSCA) for a particular Generation Resource *r* that is part of a net metering configuration and dividing by the sum of all SCADA values for all Resources that are included in the net metering configuration for each interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| GSSPLITSCA *r* | MWh | *Generation Resource SCADA Net Real Power provided via Telemetry*—The net real power provided via telemetry per Resource within the net metering arrangement, integrated for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| *gsc* | none | A generation site code. |
| *r* | none | A Generation Resource that is located at the Facility with net metering. |
| *q* | none | A QSE. |
| *p* | none | A Resource Node Settlement Point. |

(6) The total net payments and charges to each QSE for Energy Imbalance Service at all Resource Node Settlement Points for the 15-minute Settlement Interval is calculated as follows:

RTEIAMTQSETOT *q* =  RTEIAMT *q, p*

The above variables are defined as follows:

| Variable | Unit | Definition |
| --- | --- | --- |
| RTEIAMTQSETOT *q* | $ | *Real-Time Energy Imbalance Amount QSE Total per QSE*⎯The total net payments and charges to QSE *q* for Real-Time Energy Imbalance Service at all Resource Node Settlement Points for the 15-minute Settlement Interval. |
| RTEIAMT *q, p* | $ | *Real-Time Energy Imbalance Amount per QSE per Settlement Point*—The payment or charge to QSE *q* for Real-Time Energy Imbalance Service at Settlement Point *p*, for the 15-minute Settlement Interval. |
| *q* | none | A QSE. |
| *p* | none | A Resource Node Settlement Point. |

6.6.3.2 Real-Time Energy Imbalance Payment or Charge at a Load Zone

(1) The payment or charge to each QSE for Energy Imbalance Service is calculated based on the Real-Time Settlement Point Price for the following amounts at a particular Load Zone Settlement Point:

(a) The amount of its Self-Schedules with sink specified at the Settlement Point; plus

(b) The amount of its DAM Energy Bids cleared in the DAM at the Settlement Point; plus

(c) The amount of its Energy Trades at the Settlement Point where the QSE is the buyer; minus

(d) The amount of its Self-Schedules with source specified at the Settlement Point; minus

(e) The amount of its energy offers cleared in the DAM at the Settlement Point; minus

(f) The amount of its Energy Trades at the Settlement Point where the QSE is the seller; minus

(g) Its AML at the Settlement Point; plus

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| [NPRR986: Replace item (g) above with the following upon system implementation:]  (g) Its AML at the Settlement Point excluding Non-WSL ESR Charging Load; plus |

(h) The aggregated generation of its Settlement Only Generators (SOGs) in the Load Zone.

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| [NPRR917: Replace item (h) above with the following upon system implementation:]  (h) The aggregated generation of its Settlement Only Transmission Self-Generators (SOTSGs) at the Settlement Point. SOTSG sites will be represented as a single unit in the ERCOT Settlement system.  (i) The aggregated generation of its Settlement Only Distribution Generators (SODGs) and Settlement Only Transmission Generators (SOTGs) that have elected to retain Load Zone pricing in accordance with Section 6.6.3.9, Real-Time Payment or Charge for Energy from a Settlement Only Distribution Generator (SODG) or a Settlement Only Transmission Generator (SOTG). SODG and SOTG sites will be represented as a single unit in the ERCOT Settlement system. |

(2) The payment or charge to each QSE for Energy Imbalance Service at a Load Zone for a given 15-minute Settlement Interval is calculated as follows:

RTEIAMT *q, p* = (-1) \* {[RTSPP *p* \* [(SSSK *q, p* \* ¼) + (DAEP *q, p* \* ¼) + (RTQQEP *q, p* \* ¼) – (SSSR *q, p* \* ¼) – (DAES *q, p* \* ¼) – (RTQQES *q, p* \* ¼)]] + [RTSPPEW *p* \* (RTMGNM *q, p* – RTAML *q, p*)]}

|  |
| --- |
| [NPRR917 and NPRR986: Replace applicable portions of the formula “RTEIAMT q, p” above with the following upon system implementation:]  **RTEIAMT *q, p* = (-1) \* {[RTSPP *p* \* [(SSSK *q, p* \* ¼) + (DAEP *q, p* \* ¼) + (RTQQEP *q, p* \* ¼) – (SSSR *q, p* \* ¼) – (DAES *q, p* \* ¼) – (RTQQES *q, p* \* ¼)]] + [RTSPPEW *p* \* (RTMGSOGZ *q, p* – (RTAML *q, p* – RTAMLESRNW *q, p*))]}** |

And

LZIMBAL *q, p =* (SSSK *q, p* \* ¼) + (DAEP *q, p* \* ¼) + (RTQQEP *q, p* \* ¼) – (SSSR *q, p* \* ¼) – (DAES *q, p* \* ¼) – (RTQQES *q, p* \* ¼) – RTAML *q, p* + RTMGNM *q, p*

|  |
| --- |
| [NPRR917 and NPRR986: Replace applicable portions of the formula “LZIMBAL q, p” above with the following upon system implementation:]  **LZIMBAL *q, p =* (SSSK *q, p* \* ¼) + (DAEP *q, p* \* ¼) + (RTQQEP *q, p* \* ¼) – (SSSR *q, p* \* ¼) – (DAES *q, p* \* ¼) – (RTQQES *q, p* \* ¼) – (RTAML *q, p* –RTAMLESRNW *q, p*) + RTMGSOGZ *q, p*** |

The above variables are defined as follows:

| Variable | Unit | Description |
| --- | --- | --- |
| RTEIAMT *q, p* | $ | *Real-Time Energy Imbalance Amount per QSE per Settlement Point*—The payment or charge to QSE *q* for Real-Time Energy Imbalance Service at Settlement Point *p*, for the 15-minute Settlement Interval. |
| RTSPP *p* | $/MWh | *Real-Time Settlement Point Price per Settlement Point*—The Real-Time Settlement Point Price at Settlement Point *p*, for the 15-minute Settlement Interval. |
| LZIMBAL *q, p* | MWh | *Load Zone Energy Imbalance per QSE per Settlement Point*—The Load Zone volumetric imbalance for QSE *q* for Real-Time Energy Imbalance Service at Settlement Point *p*, for the 15-minute Settlement Interval. |
| RTSPPEW *p* | $/MWh | *Real-Time Settlement Point Price Energy-Weighted*⎯The Real-Time Settlement Point Price at the Settlement Point *p*, for the 15-minute Settlement Interval that is weighted by the State Estimated Load for the Load Zone of each SCED interval within the 15-minute Settlement Interval. |
| RTAML *q, p* | MWh | *Real-Time Adjusted Metered Load per QSE per Settlement Point*—The sum of the AML at the Electrical Buses that are included in Settlement Point *p* represented by QSE *q* for the 15-minute Settlement Interval. |
| |  |  |  |  | | --- | --- | --- | --- | | [NPRR986: Insert the variable “RTAMLESRNW q, p” below upon system implementation:]   |  |  |  | | --- | --- | --- | | RTAMLESRNW *q, p* | MWh | *Real-Time Adjusted Metered Load for ESR Non-WSL per QSE per Settlement Point*—The sum of the AML for the Non-WSL ESR Charging Load at the Electrical Buses that are included in Settlement Point *p* represented by QSE *q* for the 15-minute Settlement Interval, represented as a positive value. | | | | |
| SSSK *q, p* | MW | *Self-Schedule with Sink at Settlement Point per QSE per Settlement Point*—The QSE *q*’s Self-Schedule with sink at Settlement Point *p*, for the 15-minute Settlement Interval. |
| DAEP *q, p* | MW | *Day-Ahead Energy Purchase per QSE per Settlement Point*—The QSE *q*’s DAM Energy Bids at Settlement Point *p* cleared in the DAM, for the hour that includes the 15-minute Settlement Interval. |
| RTQQEP *q, p* | MW | *Real-Time QSE-to-QSE Energy Purchase per QSE per Settlement Point*⎯The amount of MW bought by QSE *q* through Energy Trades at Settlement Point *p*, for the 15-minute Settlement Interval. |
| SSSR *q, p* | MW | *Self-Schedule with Source at Settlement Point per QSE per Settlement Point*—The QSE *q*’s Self-Schedule with source at Settlement Point *p*, for the 15-minute Settlement Interval. |
| DAES *q, p* | MW | *Day-Ahead Energy Sale per QSE per Settlement Point*—The QSE *q*’s energy offers at Settlement Point *p* cleared in the DAM, for the hour that includes the 15-minute Settlement Interval. |
| RTQQES *q, p* | MW | *Real-Time QSE-to-QSE Energy Sale per QSE per Settlement Point*⎯The amount of MW sold by QSE *q* through Energy Trades at Settlement Point *p*, for the 15-minute Settlement Interval. |
| RTMGNM *q, p* | MWh | *Real-Time Metered Generation from Settlement Only Generators per QSE per Settlement Point*—The total Real-Time energy produced by SOGs represented by QSE *q* in Load Zone Settlement Point *p*, for the 15-minute Settlement Interval. |
| |  |  |  |  | | --- | --- | --- | --- | | [NPRR917: Replace the variable “RTMGNM q, p” above with the following upon system implementation:]   |  |  |  | | --- | --- | --- | | RTMGSOGZ *q, p* | MWh | *Real-Time Metered Generation from Settlement Only Generators Zonal per QSE per Settlement Point*—The total Real-Time energy produced by SOTSGs represented by QSE *q* in Load Zone Settlement Point *p*, for the 15-minute Settlement Interval. MWh quantities for SODGs and SOTGs that have opted out of nodal pricing pursuant to Section 6.6.3.9 will also be included in this value. | | | | |
| *q* | none | A QSE. |
| *p* | none | A Load Zone Settlement Point. |

(3) The total net payments and charges to each QSE for Energy Imbalance Service at all Load Zones for the 15-minute Settlement Interval is calculated as follows:

RTEIAMTQSETOT *q* = RTEIAMT *q, p*

The above variables are defined as follows:

|  |  |  |
| --- | --- | --- |
| Variable | Unit | Definition |
| RTEIAMTQSETOT *q* | $ | *Real-Time Energy Imbalance Amount QSE Total per QSE*⎯The total net payments and charges to QSE *q* for Real-Time Energy Imbalance Service at all Load Zone Settlement Points for the 15-minute Settlement Interval. |
| RTEIAMT *q, p* | $ | *Real-Time Energy Imbalance Amount per QSE per Settlement Point*—The charge to QSE *q* for Real-Time Energy Imbalance Service at Settlement Point *p*, for the 15-minute Settlement Interval. |
| *q* | none | A QSE. |
| *p* | none | A Load Zone Settlement Point. |

10.2.3 ERCOT-Polled Settlement Meters

(1) ERCOT shall poll Metering Facilities that meet any one of the following criteria:

(a) Generation connected directly to the ERCOT Transmission Grid, unless the generation is participating in a current ERS Contract Period and the generation only exports energy to the ERCOT Transmission Grid during equipment testing, an ERS deployment, or an ERS test;

(b) Auxiliary meters used for generation netting by ERCOT;

(c) Generation delivering 10 MW or more to the ERCOT System, unless the generation is participating in a current ERS Contract Period and the generation only exports energy to the ERCOT System during equipment testing, an ERS deployment, or an ERS test;

(d) Generation participating in any Ancillary Service market;

(e) NOIE points connected bi-directionally to the ERCOT System, unless the bi-directional energy flows are the sole result of generation interconnected to a TDSP owned Distribution System behind a NOIE point of delivery metering point;

(f) Direct Current Ties (DC Ties);

(g) DG where there is an energy storage Load Resource that has associated Wholesale Storage Load (WSL)

(h) WSL associated to a generation site; and

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| ***[NPRR1002 and NPRR1020: Replace applicable portions of item (h) above with the following upon system implementation of NPRR1002; or upon implementation of NPRR1020 and upon implementation of necessary revisions to the SMOG, respectively:]***  (h) Metering required to determine WSL associated with an Energy Storage Resource (ESR); and |

(i) Metering required to determine the Non-WSL ESR Charging Load.

(2) Additionally, ERCOT shall poll any SODG or NOIE metering point at the request of such Entity, provided the Metering Facility meets all requirements and approvals associated with EPS metering requirements of this Section and the SMOG. Load Resources of 10 MW or more on the ERCOT System, may, at their option have an EPS Meter.

11.1.6 ERCOT Polled Settlement Meter Netting

(1) As allowed by Section 10, Metering, of these Protocols, ERCOT will perform the approved netting schemes, which sum the meters at a given Generation Resource site.

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| ***[NPRR1002: Replace paragraph (1) above with the following upon system implementation:]***  (1) As allowed by Section 10, Metering, of these Protocols, ERCOT will perform the approved netting schemes, which sum the meters at a given Generation Resource, or Energy Storage Resource (ESR) site. |

(2) Both Load consumption and Generation Resource production meters will be combined together to obtain a total amount of Load or Resource.

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| ***[NPRR1002: Replace paragraph (2) above with the following upon system implementation:]***  (2) Both Load consumption and generation production meters will be combined together to obtain a total amount of Load or generation. |

(3) For a Generation Resource site with Wholesale Storage Load (WSL):

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| ***[NPRR1002: Replace paragraph (3) above with the following upon system implementation:]***  (3) For an ESR site with Wholesale Storage Load (WSL): |

(a) WSL is measured by the corresponding EPS Meter.

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| ***[NPRR1020: Replace paragraph (a) above with the following upon system implementation and upon*** ***implementation of necessary revisions to the Settlement Metering Operating Guide (SMOG):]***  (a) WSL is measured by the corresponding EPS Meter, except that when a Resource Entity for an Energy Storage Resource (ESR) communicates its auxiliary Load value to the EPS Meter, WSL is calculated by subtracting the auxiliary Load from the total Load measured by the corresponding EPS meter. If the calculated auxiliary Load is greater than the total Load, WSL shall be zero. |

(b) For WSL that is metered behind the POI metering point, the WSL will be added back into the POI metering point to determine the net flows for the POI metering point.

(c) For WSL that is separately metered at the POI, the WSL will not be included in the determination of whether the generation site is net generation or net Load for the purpose of Settlement.

(4) For an ESR that has separately metered its charging Load, but elects not to receive WSL treatment, the Non-WSL ESR Charging Load for the 15-minute interval shall be determined using the metered ESR charging Load.

(5) For an ESR that has not separately metered its charging Load, or has forfeited WSL treatment pursuant to paragraph (3) of Section 10.2.4, Resource Entity Calculation and Telemetry of ESR Auxiliary Load Values, the Non-WSL ESR Charging Load for the 15-minute interval shall be equal to the total metered ESR Load minus auxiliary Load, where auxiliary Load is calculated as the greater of the following:

(a) The lesser of the total metered ESR Load or X MWh, where X is calculated as 15% of the ESR’s nameplate capacity multiplied by 0.25; or

(b) 15% of the total metered ESR Load for the 15-minute interval.

***11.1.12 Treatment of ERCOT-Polled Settlement Energy Storage Resource Load Data***

(1) For EPS data associated with WSL and Non-WSL ESR Charging Load, ERCOT will:

(a) Be identified as the MRE; and

(b) Model and populate data to appropriate channels such that netting and aggregation conform to the ERCOT Protocol requirements.