Board Report

NPRR Number	461	NPRR Title	Energy Storage Settlements Consistent With PUCT Project 39917	
Timeline	Urgent	**Action**		Approved
Date of Decision		December 11, 2012		
Effective Date		Upon system implementation.		
Priority and Rank Assigned		Priority – 2013; Rank – 60		
Nodal Protocol Sections Requiring Revision		1.3.1.1, Items Considered Protected Information 2.1, Definitions 2.2, Acronyms and Abbreviations 3.4, Load Zones 6.6.1.2, Real-Time Settlement Point Price for a Load Zone 6.6.3.1, Real-Time Energy Imbalance Payment or Charge at a Resource Node 9.17.1, Billing Determinant Data Elements 10.2.3, ERCOT-Polled Settlement Meters 10.3.2.3, Generation Netting for ERCOT-Polled Settlement Meters 11.1.6, ERCOT Polled Settlement Meter Netting 11.1.12, Treatment of ERCOT Polled Settlement Wholesale Storage Load Data (new) 11.4.6, Unaccounted for Energy Calculation and Allocation 11.5.1, Aggregate Retail Load Data 11.5.2.2, General Public Generation Data Posting/Availability		
Market Guide Section(s) Requiring Revision		None.		
Revision Description		This Nodal Protocol Revision Request (NPRR) modifies the Protocols to implement the process for Settlement of energy storage consistent with Public Utility Commission of Texas (PUCT) Project No. 39917, Rulemaking on Energy Storage Issues, as adopted in P.U.C. SUBST. R. 25.192, Transmission Service Rates, and P.U.C. SUBST. R. 25.501, Wholesale Market Design.		
Reason for Revision		This NPRR aligns ERCOT business practices with P.U.C. SUBST. R. 25.192 and P.U.C. SUBST. R. 25.501.		
Credit Impacts		ERCOT Credit Staff and the Credit Work Group (Credit WG) have reviewed NPRR461 and do not believe that it requires changes to credit monitoring activity or the calculation of liability.		
Procedural History		➢ On 5/2/12, NPRR461 and a preliminary Impact Analysis were posted. ➢ On 5/15/12, WMS comments were posted.		

Board Report

	- On 5/17/12, PRS considered NPRR461. - On 6/20/12, ERCOT comments were posted. - On 7/10/12, Chamisa Energy comments were posted. - On 7/10/12, Xtreme Power comments were posted. - On 7/12/12, a second set of WMS comments were posted. - On 10/5/12, a second set of ERCOT comments were posted. - On 10/17/12, Edison Mission Marketing & Trading comments were posted. - On 10/31/12, a third set of ERCOT comments were posted. - On 11/8/12, Duke Energy comments were posted. - On 11/9/12, a third set of WMS comments were posted. - On 11/12/12, a fourth set of ERCOT comments were posted. - On 11/15/12, PRS again considered NPRR461. - On 11/19/12, a fifth set of ERCOT comments were posted. - On 11/28/12, an Impact Analysis was posted. - On 11/29/12, TAC considered NPRR461. - On 12/3/12, a sixth set of ERCOT comments were posted. - On 12/11/12, the ERCOT Board considered NPRR461.
PRS Decision	On 5/17/12, PRS unanimously voted to table NPRR461 and to refer the issue to WMS. All Market Segments were present for the vote. On 11/15/12, PRS voted to grant NPRR461 Urgent status. There was one opposing vote from the Consumer Market Segment and one abstention from the Independent Generator Market Segment. PRS then voted to recommend approval of NPRR461 as amended by the 11/12/12 ERCOT comments and as revised by PRS with a recommended priority of 2013 and a rank of 60 and to forward to TAC. There was one opposing vote from the Consumer Market Segment and two abstentions from the Consumer and Independent Generator Market Segments. All Market Segments were present for the votes.
Summary of PRS Discussion	On 5/17/12, it was noted that WMS requested that NPRR461 be referred to the Qualified Scheduling Entity (QSE) Managers Working Group (QMWG). On 11/15/12, participants advocated for Urgent status of NPRR461 stating that until implemented, ERCOT will not be able to settle Wholesale Storage Load (WSL) in accordance with PUCT Substantive Rules; and that this will have a direct financial consequence on a Market Participant. Concerns were raised regarding unintended consequences resulting from a lack of specificity of parameters for WSLs; and how WSLs will be metered and settled. It was clarified that WSLs are required to comply with all applicable Protocols related to Generation Resources and Controllable Load Resources; and that Settlement of WSLs will be in

Board Report

	relation to the price of the bus.
TAC Decision	On 11/29/12, the motion to recommend approval of NPRR461 as amended by the 11/19/12 ERCOT comments as modified by TAC failed via roll call vote. There were 18 opposing votes from the Cooperative (4), Municipal (3), Investor Owned Utility (IOU) (4), Consumer (5), and Independent Power Marketer (IPM) (2) Market Segments and eight abstentions from the Independent Generator, Consumer, Independent Retail Electric Provider (IREP) (4) and IPM (2) Market Segments. TAC then voted via roll call vote to recommend approval of NPRR461 as recommended by PRS in the 11/15/12 PRS Report and as amended by the 11/19/12 ERCOT comments. There was one opposing vote from the Independent Generator Market Segment and five abstentions from the Consumer (2) and IREP (3) Market Segments. All Market Segments were present for the votes.
Summary of TAC Discussion	On 11/29/12, some participants were concerned that limiting the technologies eligible for energy storage Settlement discriminates as to which Market Participants are eligible to be settled as WSL and suggested that thermal storage associated with turbine inlet cooling at a generation Facility be included in the list of defined WSL. ERCOT Staff stated that eligible technologies were limited so as not to require ERCOT to determine whether or not the technology would be considered as efficiency or storage. Others suggested that further discussion was needed before adding additional technologies to the list of those eligible for Settlement of WSL and opined that a defined list was not discriminatory as there is a process for revising the list.
ERCOT Opinion	ERCOT supports approval of NPRR461.
Board Decision	On 12/11/12, the ERCOT Board approved NPRR461 as recommended by TAC in the 11/29/12 TAC Report and as amended by the 12/3/12 ERCOT comments.

Business Case		
Business Case	1	*Describe qualitative benefits* • *Aligns ERCOT business practices with PUCT Project No. 39917.* • *Clearly defined process for energy storage Settlement.*

Sponsor	
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Phone Number	512-248-6455
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Market Segment	Not applicable.

Board Report

Market Rules Staff Contact	
Name	Sandra Tindall
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Comments Received	
Comment Author	**Comment Summary**
WMS 051512	Recommended that PRS table NPRR461 and refer NPRR461 to the QMWG.
ERCOT 062012	Aligned language with the intent of PUCT Project No. 39917 to allow an energy storage Resource to self-serve any generation auxiliary Load or associated Load for the generation site behind the Point of Interconnection (POI) and proposed that an Energy Storage Resource (ESR) may not be registered as a Split Generation Resource.
Chamisa Energy 071012	Proposed revisions to the definition of ESR to state that at times the energy storage Resource may simultaneously be withdrawing and injecting energy into the ERCOT System.
Xtreme Power 071012	Proposed revisions to clarify WSLs be treated in a manner similar to other Market Participant-specific Load data and recommended that Section 11.5.2.2 be grey-boxed until such a time that posting of total ESR WSL would not allow Market Participants to disaggregate the data to a QSE- or Resource-specific level.
WMS 071212	Recommended that PRS continue to table.
ERCOT 100512	Aligned NPRR with the intent of PUCT Project No. 39917 based on clarification received from PUCT Staff.
Edison Mission Marketing & Trading 101712	Submitted questions seeking clarification of the Settlement components.
ERCOT 103112	Proposed revisions to the definition of a WSL and the Settlement calculations for WSLs.
Duke Energy 110812	Requested Urgent status for NPRR461.
WMS 110912	Endorsed NPRR461 as amended by the 10/31/12 ERCOT comments.
ERCOT 111212	Proposed clarifying revisions based on feedback from the 11/2/12 Resource Cost Working Group (RCWG) meeting.
ERCOT 111912	Proposed clarifying language in response to questions asked at the 11/15/12 PRS meeting.
ERCOT 120312	Proposed revisions to add relevant language from NPRR385, Negative Price Floor (formerly "Security Violation Analysis and Reporting and Negative Price Floor"), into NPRR461.

Board Report

Comments

Please note that the following NPRRs also propose revisions to the following sections:

- NPRR385, Negative Price Floor (formerly "Security Violation Analysis and Reporting and Negative Price Floor")
    - Section 6.6.1.2
    - Section 6.6.3.1
- NPRR473, Process for Submission of Generation Resource Weatherization Information
    - Section 1.3.1.1
- NPRR475, EPS Metering Exception for ERS Generation
    - Section 10.2.3

Proposed Protocol Language Revision

1.3.1.1 Items Considered Protected Information

Subject to the exclusions set out in Section 1.3.1.2, Items Not Considered Protected Information, and in Section 3.2.5, Publication of Resource and Load Information, "Protected Information" is information containing or revealing any of the following:

    (a)   Base Points, as calculated by ERCOT. The Protected Information status of this information shall expire 60 days after the applicable Operating Day;

    (b)   Bids, offers, or pricing information identifiable to a specific Qualified Scheduling Entity (QSE) or Resource. The Protected Information status of part of this information shall expire 60 days after the applicable Operating Day, as follows:

        (i)   Ancillary Service Offers by Operating Hour for each Resource for all Ancillary Services submitted for the Day-Ahead Market (DAM) or any Supplemental Ancillary Services Market (SASM);

        (ii)   The quantity of Ancillary Service offered by Operating Hour for each Resource for all Ancillary Service submitted for the DAM or any SASM; and

        (iii)   Energy Offer Curve prices and quantities for each Settlement Interval by Resource. The Protected Information status of this information shall expire within seven days after the applicable Operating Day if required to be posted as part of paragraph (5) of Section 3.2.5 and within two days

Board Report

after the applicable Operating Day if required to be posted as part of paragraph (6) of Section 3.2.5;

(c)   Status of Resources, including Outages, limitations, or scheduled or metered Resource data. The Protected Information status of this information shall expire 60 days after the applicable Operating Day;

(d)   Current Operating Plans (COPs). The Protected Information status of this information shall expire 60 days after the applicable Operating Day;

(e)   Ancillary Service Trades, Energy Trades, and Capacity Trades identifiable to a specific QSE or Resource. The Protected Information status of this information shall expire 180 days after the applicable Operating Day;

(f)   Ancillary Service Schedules identifiable to a specific QSE or Resource. The Protected Information status of this information shall expire 60 days after the applicable Operating Day;

(g)   Dispatch Instructions identifiable to a specific QSE or Resource, except for Reliability Unit Commitment (RUC) commitments and decommitments as provided in Section 5.5.3, Communication of RUC Commitments and Decommitments. The Protected Information status of this information shall expire 180 days after the applicable Operating Day;

(h)   Raw and Adjusted Metered Load (AML) data (demand and energy) identifiable to a specific QSE, Load Serving Entity (LSE), or Customer. The Protected Information status of this information shall expire 180 days after the applicable Operating Day;

(i)   Wholesale Storage Load (WSL) data identifiable to a specific QSE. The Protected Information status of this information shall expire 180 days after the applicable Operating Day;

(ij)   Settlement Statements and Invoices identifiable to a specific QSE. The Protected Information status of this information shall expire 180 days after the applicable Operating Day;

(jk)   Number of Electric Service Identifiers (ESI IDs) identifiable to a specific LSE. The Protected Information status of this information shall expire 365 days after the applicable Operating Day;

(kl)   Information related to generation interconnection requests, to the extent such information is not otherwise publicly available. The Protected Information status of this information shall expire when the generation interconnection agreement is executed or a financial arrangement for transmission construction is completed with a Transmission Service Provider (TSP);

Board Report

(lm)   Resource-specific costs, design and engineering data;

(mn)   Congestion Revenue Right (CRR) credit limits, the identity of bidders in a CRR
         Auction, or other bidding information identifiable to a specific CRR Account
         Holder. The Protected Information status of this information shall expire as
         follows:

      (i)   The Protected Information status of the identities of CRR bidders that
            become CRR Owners and the number and type of CRRs that they each
            own shall expire at the end of the CRR Auction in which the CRRs were
            first sold; and

      (ii)   The Protected Information status of all other CRR information identified
            above in item (m) shall expire six months after the end of the year in
            which the CRR was effective.

(no)   Renewable Energy Credit (REC) account balances. The Protected Information
         status of this information shall expire three years after the REC Settlement period
         ends;

(op)   Credit limits identifiable to a specific QSE;

(pq)   Any information that is designated as Protected Information in writing by
         Disclosing Party at the time the information is provided to Receiving Party except
         for information:

      (i)   Submitted to or collected by ERCOT under the Protocols or Other Binding
            Documents; or

      (ii)   Provided to ERCOT in support of a Reliability Must-Run (RMR)
            application under Section 3.14.1, Reliability Must Run;

(qr)   Any information compiled by a Market Participant on a Customer that in the
         normal course of a Market Participant's business that makes possible the
         identification of any individual Customer by matching such information with the
         Customer's name, address, account number, type of classification service,
         historical electricity usage, expected patterns of use, types of facilities used in
         providing service, individual contract terms and conditions, price, current charges,
         billing record, or any other information that a Customer has expressly requested
         not be disclosed ("Proprietary Customer Information") unless the Customer has
         authorized the release for public disclosure of that information in a manner
         approved by the Public Utility Commission of Texas (PUCT). Information that is
         redacted or organized in such a way as to make it impossible to identify the
         Customer to whom the information relates does not constitute Proprietary
         Customer Information;

Board Report

(rs) Any software, products of software, or other vendor information that ERCOT is required to keep confidential under its agreements;

(st) QSE, TSP, and Distribution Service Provider (DSP) backup plans collected by ERCOT under the Protocols or Other Binding Documents;

(tu) Direct Current Tie (DC Tie) information provided to a TSP or DSP under Section 9.17.2, Direct Current Tie Schedule Information;

(uv) Any Texas Standard Electronic Transaction (TX SET) transaction submitted by an LSE to ERCOT or received by an LSE from ERCOT. This paragraph does not apply to ERCOT's compliance with:

    (i) PUCT Substantive Rules on performance measure reporting;

    (ii) These Protocols or Other Binding Documents; or

    (iii) Any Technical Advisory Committee (TAC)-approved reporting requirements;

(vw) Mothballed Generation Resource updates and supporting documentation submitted pursuant to Section 3.14.1.9, Generation Resource Return to Service Updates;

(wx) Information provided by Entities under Section 10.3.2.4, Reporting of Net Generation Capacity;

(xy) Alternative fuel reserve capability and firm gas availability information submitted pursuant to Section 6.5.9.3.1, Operating Condition Notice, Section 6.5.9.3.2, Advisory, and Section 6.5.9.3.3, Watch, and as defined by the Operating Guides;

(yz) Non-public financial information provided by a Counter-Party to ERCOT pursuant to meeting its credit qualification requirements as well as the QSE's form of credit support; or

(zaa) ESI ID, identity of Retail Electric Provider (REP), and MWh consumption associated with transmission-level Customers that wish to have their Load excluded from the Renewable Portfolio Standard (RPS) calculation consistent with Section 14.5.3, End-Use Customers, and subsection (j) of P.U.C. SUBST. R. 25.173, Goal for Renewable Energy.

[NPRR438: Insert the following item (aabb) on January 1, 2013:]

    (aabb) Information provided by a Counter-Party under Section 16.16.3, Verification of Risk Management Framework.

Board Report

2.1 DEFINITIONS

Load

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Energy Storage Load (ESL)

~~Electrical energy, including losses for the energy conversion process, that is separately metered from all other Facilities and used to charge an Energy Storage Resource (ESR).~~

Wholesale Storage Load (WSL)

Energy that is separately metered from all other Facilities ~~and withdrawn from the ERCOT System~~ to charge a technology that is capable of storing energy and releasing that energy at a later time to generate electric energy~~n Energy Storage Resource (ESR), including losses for the energy conversion process, where the energy will subsequently be discharged into the ERCOT System~~. WSL includes losses for the energy conversion process that are captured by the WSL EPS Meter. WSL is limited to the following technologies: batteries, flywheels, compressed air energy storage, pumped hydro-electric power, and electro chemical capacitors.

Load Zones

A group of Electrical Buses assigned to the same zone under Section 3.4, Load Zones. Every Electrical Bus in ERCOT with a Load~~, except an Electrical Bus associated with an ESR designated as Wholesale Storage Load,~~ must be assigned to a Load Zone for Settlement purposes. A NOIE Load Zone is a type of Load Zone.

~~Resource~~

~~. . .~~

~~Energy Storage Resource (ESR)~~

~~An All-Inclusive Resource with a capacity of one MW or greater that is capable of storing energy and may qualify to supply Ancillary Services. The ESR at times may be charging (withdrawing) energy from the ERCOT System (charging),and at other times may be discharging (injecting) energy into the ERCOT System (discharging), and at other times may be simultaneously withdrawing energy from the ERCOT System and injecting energy into the ERCOT System.~~

Board Report

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 Generation Resource's Settlement Point Price or Wholesale Storage Load's Settlement Point Price is calculated and used in Settlement. All Resource Nodes shall be identified in accordance with the document titled "Procedure for Identifying Resource Nodes," which shall be approved by the appropriate TAC subcommittee and posted to the MIS Public Area. For a Generation Resource that is connected to the ERCOT Transmission Grid only by one or more radial transmission lines that all originate at the Generation Resource and terminate in a single substation switchyard, the Resource Node is an Electrical Bus in that substation. For all other Generation Resources, the Resource Node is the Generation Resource's side of the Electrical Bus at which the Generation Resource is connected to the ERCOT Transmission Grid.

2.1   ACRONYMS AND ABBREVIATIONS

ESL	Energy Storage Load
ESR	Energy Storage Resource
WSL	Wholesale Storage Load

3.4   Load Zones

ERCOT shall assign every Electrical Bus, except an Electrical Bus associated with an Energy Storage Resource (ESR) designated as Wholesale Storage Load, to a Load Zone for Settlement purposes. ERCOT shall calculate a Settlement Point Price for each Load Zone as the Load-weighted average of the Locational Marginal Prices (LMPs) at all Electrical Buses assigned to that Load Zone. The Load-weighting must be determined using the Load, if any, from the State Estimator at each Electrical Bus.

6.6.1.2   Real-Time Settlement Point Price for a Load Zone

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:

$$\textbf{RTSPP} \quad = \quad (\sum_{y} \textbf{TLMP}_{y} * \textbf{LZLMP}_{y}) / \sum_{y} \textbf{TLMP}_{y}$$

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

$$\text{LZLMP}_{y} \quad = \quad \sum_{b} (\text{RTLMP}_{b,y} * \text{SEL}_{b,y}) / \sum_{b} \text{SEL}_{b,y}$$

Board Report

For a DC Tie Load Zone:

$$\text{LZLMP}_y \qquad = \qquad \text{RTLMP}_{b,\,y}$$

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:

$$\text{RTSPPEW} \qquad = \qquad \sum_y \sum_b (\text{RTLMP}_{b,\,y} * \text{LZWF}_{b,\,y})$$

For all Load Zones except DC Tie Load Zones:

$$\text{LZWF}_{b,\,y} \qquad = \qquad (\text{SEL}_{b,\,y} * \text{TLMP}_y) \,\big/\, [\,\sum_y \sum_b (\text{SEL}_{b,\,y} * \text{TLMP}_y)]$$

For a DC Tie Load Zone:

$$\text{LZWF}_{b,\,y} \qquad = \qquad (\text{SEL}_{b,\,y} * \text{TLMP}_y) \,\big/\, [\,\sum_y \sum_b (\text{SEL}_{b,\,y} * \text{TLMP}_y)]$$

$$\text{SEL}_{b,\,y} \qquad = \qquad 1$$

The above variables are defined as follows:

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.
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 excluding Wholesale Storage Load (WSL) 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.

Board Report

| 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~~, or consumed as Wholesale Storage Load (WSL),~~ by all its Generation Resources or consumed as WSL ~~Energy Storage Resources (ESRs)~~ 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:

~~If the Generation Resources at the Resource Node Settlement Point p are involved with a net metering scheme:~~

$$RTEIAMT_{q,p} = (-1) * \{ \sum_{gsc} (\sum_{r} (GSPLITPER_{q,r,gsc,p} * NMSAMTTOT_{gsc}) +$$
$$(\sum_{r} \text{~~ESS~~WSLAMTTOT}_{q,r,p}) + RTSPP_p * [(SSSK_{q,p} * \tfrac{1}{4}) +$$
$$(DAEP_{q,p} * \tfrac{1}{4}) + (RTQQEP_{q,p} * \tfrac{1}{4}) - (SSSR_{q,p} * \tfrac{1}{4}) -$$
$$(DAES_{q,p} * \tfrac{1}{4}) - (RTQQES_{q,p} * \tfrac{1}{4})] \}$$

> **Field Code Changed**

~~Otherwise~~

Board Report

$$\text{RTEIAMT}_{q,p} = (\text{-1}) * \text{RTSPP}_p * \{\sum_r \text{RTMG}_{q,p,r} + (\text{SSSK}_{q,p} * \tfrac{1}{4}) + (\text{DAEP}_{q,p} * \tfrac{1}{4}) + (\text{RTQQEP}_{q,p} * \tfrac{1}{4}) - (\text{SSSR}_{q,p} * \tfrac{1}{4}) - (\text{DAES}_{q,p} * \tfrac{1}{4}) - (\text{RTQQES}_{q,p} * \tfrac{1}{4})\}$$

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$_p$	$/MWh	*Real-Time Settlement Point Price per Settlement Point*—The Real-Time Settlement Point Price at Settlement Point *p*, for the 15-minute Settlement Interval.
~~RTMG$_{q, p, r}$~~	~~MWh~~	~~*Real-Time Metered Generation per QSE per Settlement Point per Resource*—The Real-Time energy produced by the Generation Resource r represented by QSE q at Resource Node p, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource r is the Combined Cycle Train.~~
SSSK$_{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.
NMSAMTTOT$_{gsc}$	$	*Net Metering Settlement ~~Payment~~*—The total payment <u>or charge</u> to <u>a generation site</u>~~the entire facility~~ with a net metering arrangement ~~excluding payment associated with ESR generation~~.
<u>~~ESS~~WSLAMTTOT$_{q, r, p}$</u>	<u>$</u>	*~~Energy~~<u>Wholesale Storage Load</u> Settlement ~~Payment or Charge~~*— The total payment or charge to QSE *q*, ~~ES~~<u>Resource *r*</u>~~,~~ at Settlement Point *p*, for ~~Wholesale Storage Load~~<u>WSL</u> and ESR generation ~~at the Settlement Point where the ESR is located,~~ for each 15-minute Settlement Interval.

Board Report

Variable	Unit	Description
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~~ESR~~.
gsc	none	A generation site code.

[NPRR419: Replace paragraph (2) above with the following upon system implementation:]

(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:

~~If the Generation Resources at the Resource Node Settlement Point p are involved with a net metering scheme:~~

$$\text{RTEIAMT}_{q,p} = (-1) * \left\{ \sum_{gsc} \left(\sum_{r} (\text{RESREV}_{q,r,gsc,p}) \right) + \left(\sum_{r} \textbf{ESSWSLAMTTOT}_{q,r,p} \right) \right.$$

$$+$$

$$\text{RTSPP}_{p} * [(\text{SSSK}_{q,p} * \tfrac{1}{4}) + (\text{DAEP}_{q,p} * \tfrac{1}{4}) + (\text{RTQQEP}_{q,p} * \tfrac{1}{4}) - (\text{SSSR}_{q,p} * \tfrac{1}{4}) - (\text{DAES}_{q,p} * \tfrac{1}{4}) - (\text{RTQQES}_{q,p} * \tfrac{1}{4})] \Big\}$$

Where:

$$\text{RESREV}_{q,r,gsc,p} = \text{GSPLITPER}_{q,r,gsc,p} * \text{NMSAMTTOT}_{gsc}$$

$$\text{RESMEB}_{q,r,gsc,p} = \text{GSPLITPER}_{q,r,gsc,p} * \text{NMRTETOT}_{gsc}$$

$$\textbf{RESESMEB}~~\text{WSLTOT}~~_{q,p} = \sum_{r} ~~(\text{GSPLITPER}_{q,r,gsc,p} * \text{MEBVG}_{gsc,b} +~~ (\sum_{r} ~~(\text{MEBVSG}_{q,r,b} + (\text{MEBVSL}_{q,r,b})~~ \sum_{r} \left(\sum_{b} \textbf{MEBL}_{q,r,b} \right)$$

$$\text{RNIMBAL}_{q,p} = \sum_{gsc} \left(\sum_{r} \text{RESMEB}_{q,r,gsc,p} \right) + \textbf{RESESMEB}~~\text{WSLTOT}~~_{q,p} + (\text{SSSK}_{q,p} * \tfrac{1}{4}) + (\text{DAEP}_{q,p} * \tfrac{1}{4}) + (\text{RTQQEP}_{q,p} * \tfrac{1}{4}) - (\text{SSSR}_{q,p} * \tfrac{1}{4}) - (\text{DAES}_{q,p} * \tfrac{1}{4}) - (\text{RTQQES}_{q,p} * \tfrac{1}{4})$$

~~Otherwise~~

Board Report

$$RTEIAMT_{q,p} = (-1) * RTSPP_p * \{\sum_r RTMG_{q,p,r} + (SSSK_{q,p} * ¼) + (DAEP_{q,p} * ¼) + (RTQQEP_{q,p} * ¼) - (SSSR_{q,p} * ¼) - (DAES_{q,p} * ¼) - (RTQQES_{q,p} * ¼)\}$$

And:

$$RNIMBAL_{q,p} = (\sum_r RTMG_{q,p,r}) + (SSSK_{q,p} * ¼) + (DAEP_{q,p} * ¼) + (RTQQEP_{q,p} * ¼) - (SSSR_{q,p} * ¼) - (DAES_{q,p} * ¼) - (RTQQES_{q,p} * ¼)$$

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.
RTMG $_{q,p,r}$	MWh	*Real-Time Metered Generation per QSE per Settlement Point per Resource*—The Real-Time energy produced by the Generation Resource *r* represented by QSE *q* at Resource Node *p*, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
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*.

Board Report

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*.
~~RESESMEB~~WSLTOT $_{q, p}$	MWh	*~~Energy Storage Site Real-Time Energy~~WSL Total*—The ~~share of the net sum for all~~ total WSL energy metered by the Settlement Meters which measure WSL~~associated with a generation site where ESRs are located~~ for the QSE *q* at Settlement Point *p*.
MEBL $_{q,r,b}$	MWh	*Metered Energy for Wholesale 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*.
NMSAMTTOT $_{gsc}$	$	*Net Metering Settlement ~~Payment~~*—The total payment or charge to ~~the entire facility~~facility a generation site with a net metering arrangement~~, excluding payment associated with ESR generation~~.
~~ESS~~WSLAMTTOT $_{q, r, p}$	$	*~~Energy~~Wholesale Storage Load Settlement ~~Payment or Charge~~*—The total payment or charge to QSE *q*, ~~ESR~~Resource *r*, at Settlement Point *p*, for ~~Wholesale Storage Load~~WSL ~~and ESR generation at the Settlement Point where the ESR is located,~~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 ~~ESR~~an energy storage Load Resource 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:

$$\text{WSLAMTTOT}_{q, r, p} = \sum_b (\text{RTRMPRWSL}_b * \text{MEBL}_{q, r, b})$$

Field Code Changed

Where the price for Settlement Meter is determined as follows:

$$\text{RTRMPRWSL}_b = \sum_y (\text{RNWFL}_{b, y} * \text{RTLMP}_{b, y})$$

Board Report

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

$$\text{RNWFL}_{b,y} = [\text{Max}(0.001, \sum_r \text{TL}_{r,y})) * \text{TLMP}_y] / $$

$$[\sum_y \text{Max}(0.001, \sum_r \text{TL}_{r,y})) * \text{TLMP}_y]$$

[NPRR385: Insert the following paragraph upon system implementation:]

For every SCED LMP calculated at each Settlement Meter, there shall be an administrative price floor of -$251/MWh.

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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
$\text{RTLMP}_{b,y}$	$/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.
$\text{MEBL}_{q,r,b}$	MWh	*Metered Energy for Wholesale 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.
$\text{WSLAMTTOT}_{q,r,p}$	$	*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.
$\text{RNWFL}_{b,y}$	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.
$\text{TL}_{r,y}$	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.

Board Report

Variable	Unit	Description
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 payments or charge to a ~~facility~~Facility with a net metering arrangement ~~that is not associated with a generation site where an ESR is located,~~ for each 15-minute Settlement Interval, shall be calculated as follows:

$$\text{NMRTETOT}_{gsc} = \textbf{Max(0,}(\sum_{me}\sum_{b}(\text{MEB}_{gsc,b} + \textbf{MEB}\text{VC}_{gsc,b})))$$

If $\text{NMRTETOT}_{gsc} = 0$ 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.

Otherwise, when $\text{NMRTETOT}_{gsc} > 0$ for a 15-minute Settlement Interval, then

$$\text{NMSAMTTOT}_{gsc} = \sum_{b}[(\text{RTRMPR}_{b} * \text{MEB}_{gsc,b}) + (\text{RTRMPR}_{b} * \text{MEB}\text{VC}_{gsc,b})]$$

Where the price for Settlement Meter is determined as follows:

$$\text{RTRMPR}_{b} = \sum_{y}(\text{RNWF}_{b,y} * \text{RTLMP}_{b,y})$$

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

$$\text{RNWF}_{b,y} = [\text{Max}(0.001, \sum_{r}\text{BP}_{r,y}) * \text{TLMP}_{y}] /$$

$$[\sum_{y}\text{Max}(0.001, \sum_{r}\text{BP}_{r,y}) * \text{TLMP}_{y}]$$

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 ~~me~~ included in generation site code gsc. A positive value indicates an injection of power to the ERCOT System.

Board Report

Variable	Unit	Description
NMSAMTTOT $_{gsc}$	$	*Net Metering Settlement ~~Payment~~*—The total payment or charge to a generation site with a net metering arrangement~~, excluding payment associated with ESR generation~~~~the entire facility 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 ~~me~~ 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.
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.
MEB~~V~~C $_{gsc, b}$	MWh	*Metered Energy at bus (~~Virtual~~Calculated)* —The ~~virtual~~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.
gsc	none	A generation site code.
~~me~~	~~none~~	~~A Settlement Meter.~~
r	none	A Generation Resource that is located at the ~~facility~~Facility with net metering. ~~The summation is over all the Generation Resources at the facility~~Facility.
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.

~~(34)   The total payment or charge for Wholesale Storage Load and ESR generation calculated for a QSE, ESR, and Settlement Point for a Settlement Point where the ESR is located, for each 15-minute Settlement Interval:.~~

$$\textbf{ESSAMTTOT}_{q, r, p} = \textbf{ESWLODTOT}_{q, r, p} + \textbf{ESGENTOT}_{q, r, p}$$

Board Report

The retail Load that is associated with a generation site where an ESR is located will be included in the Real-Time Adjusted Metered Load (AML) per QSE and is included in the Real-Time energy imbalance payment or charge at a Load Zone.

The Wholesale Storage LoadWSL associated with an ESR is settled as follows:

$$ESWLODWSLAMTTOT_{g,r,p} = \sum_b (RTRMPRES_b * MEBVSL_{g,r,b})$$

Where the price for Settlement Meter is determined as follows:

$$RTRMPRES_b = \sum_y (RNWFVSL_{b,y} * RTLMP_{b,y})$$

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

$$RNWFVSL_{b,y} = [Max(0.001, TL_{b,y}) * TLMP_y] /$$
$$[\sum_y Max(0.001, TL_{b,y}) * TLMP_y]$$

The generation associated with an ESR is settled as follows:

$$ESGENTOT_{g,r,p} = \sum_b \sum_d (RTRMPR_b * MEBVSG_{g,r,b})$$

Where the price for Settlement Meter is determined as follows:

$$RTRMPR_b = \sum_y (RNWF_{b,y} * RTLMP_{b,y})$$

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

$$RNWF_{b,y} = [Max(0.001, \sum_r BP_{r,y}) * TLMP_y] /$$
$$[\sum_y Max(0.001, \sum_r BP_{r,y}) * TLMP_y]$$

The generation associated with a non-ESR located at a generation site where an ESR is located for a 15-minute Settlement Interval is settled as follows:

$$NMSAMTTOT_{gsc} = \sum_b \sum_d (RTRMPR_b * MEBVG_{gsc,b})$$

Where the price for Settlement Meter is determined as follows:

$$RTRMPR_b = \sum_y (RNWF_{b,y} * RTLMP_{b,y})$$

Board Report

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

$$RNWF_{b,y} = [Max(0.001, \sum_r BP_{r,y}) * TLMP_y] /$$

$$[\sum_y Max(0.001, \sum_r BP_{r,y}) * TLMP_y]$$

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
NMSAMTTOT $_{gsc}$	$	*Net Metering Settlement Payment* — The total payment to a generation site with a net metering arrangement, excluding payment associated with ESR generation.
ESSWSLAMTTOT $_{q, r, p}$	$	*EnergyWholesale Storage Load Settlement Payment or Charge* — The total payment or charge to QSE q, ESR r, at Settlement Point p, for Wholesale Storage LoadWSL and ESR generation at the Settlement Point where the ESR is located, for each 15-minute Settlement Interval.
ESGENTOT $_{q, r, p}$	$	*Energy Storage Generation Settlement Payment* — The total payment to the ESR located at a generation site where an ESR is located, for the 15-minute Settlement Interval.
ESWLODTOT $_{q, r, p}$	$	*Energy Storage Wholesale Storage Load Settlement Charge* — The total charge to the ESR located at a generation site where an ESR is located, for the 15-minute Settlement Interval.
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 *d*, for the 15-minute Settlement Interval.
RTRMPRES $_b$	$/MWh	*Real Time Price for the Energy Metered as Wholesale Storage Load located at Energy Storage site Resource meter at bus* — The Real-Time price for the Settlement Meter at Electrical Bus *d* when the output for the ESR is Wholesale Storage LoadWSL, for the 15-minute Settlement Interval.
MEBVG $_{gsc, b}$	MWh	*Metered Energy for a Virtual Generator at bus* — The metered energy by the Settlement Meter *me* for the 15-minute Settlement Interval for a Generating Resource associated with a generation site where an ESR is located.
MEBVSG $_{q, r, b}$	MWh	*Metered Energy for Virtual Storage Generation at bus* — The metered energy by the Settlement Meter *me* for the 15-minute Settlement Interval for the generation (positive) associated with an ESR located at a generation site.
MEBVSL $_{q, r, b}$	MWh	*Metered Energy for Virtual Storage Load at bus* — The metered energy by the Settlement Meter *me* for the 15-minute Settlement Interval for the Wholesale Storage LoadWSL (negative) associated with an ESR located at a generation site.

Board Report

~~Variable~~	~~Unit~~	~~Description~~
~~TL $_{b, y}$~~	~~MW~~	~~*Telemetered Energy Storage Load at bus per interval* — The telemetered Load at Eenergy storage Electrical Bus *b*, for the SCED interval *y*.~~
~~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.~~
~~RNWFVSL $_{b, y}$~~	~~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 Wholesale Storage LoadWSL (negative) associated with an Energy Storage ResourceESR. 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.~~
~~*gsc*~~	~~none~~	~~A generation site code.~~
~~*me*~~	~~none~~	~~A Settlement Meter.~~
~~*p*~~	~~none~~	~~A Resource Node Settlement Point.~~
~~*r*~~	~~none~~	~~A Generation or Energy Storage ResourceESR 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.~~

(4<u>5</u>) The Generation Resource SCADA Splitting Percentage for each ~~non-ESR~~<u>Resource</u> ~~Resource~~ within a net metering arrangement for the 15-minute Settlement Interval is calculated as follows:

$$\text{GSPLITPER}_{q, r, gsc, p} = \text{~~non-ESR~~ GSSPLITSCA}_r \, / \, \sum_r \text{~~non-ESR~~ GSSPLITSCA}_r$$

The above variables are defined as follows:

Variable	Unit	Definition

Board Report

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~~ Facility with net metering. ~~The summation is over all the Generation Resources at the facility~~Facility.
q	none	A QSE.
p	none	A Resource Node Settlement Point.

(~~5~~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:

$$\text{RTEIAMTQSETOT}_{q} = \sum_{p} \text{RTEIAMT}_{q, p}$$

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.

9.17.1   Billing Determinant Data Elements

(1) ERCOT shall calculate and provide to Market Participants on the Market Information System (MIS) Public Area the following data elements annually to be used by TSPs and DSPs as billing determinants for transmission access service. This data must be provided by December first of each year. This calculation must be made under the requirements of

Board Report

the P.U.C. S<small>UBST</small>. R. Public Utility Commission of Texas (PUCT) §25.192, Transmission Service Rates. The data that is used to perform these calculations must come from the same systems used to calculate Settlement-billing determinants used by ERCOT.

    (a)   The 4-Coincident Peak (4-CP) for each DSP, as applicable;

    (b)   The ERCOT average 4-CP;

    (c)   The average 4-CP for each DSP, as applicable, coincident to the ERCOT average 4-CP.

-(2)   Average 4-CP is defined as, "the average Settlement Interval coincidental MW peak occurring during the months of June, July, August, and September."

(3)   Settlement Interval MW coincidental MW peak is defined as, "the highest monthly 15-minute MW peak for the entire ERCOT Transmission Grid as captured by the ERCOT Settlement system, excluding Block Load Transfer (BLT) and Direct Current Tie (DC Tie) exports and Wholesale Storage Load (WSL)."

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;

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

    (c)   Generation delivering 10 MW or more to the ERCOT System;

    (d)   Generation participating in any Ancillary Service market;

    (e)   NOIE points connected bi-directionally to the ERCOT system; and

    (f)   Direct Current Ties.;

    (g)   DG where there is an Eenergy Sstorage Load Resource (ESR) that has associated WholesaleEnergyWholesale Storage Load (EWSL); and

    (h)   Wholesale Storage LoadEWSL associated to a generation siten ESR.

(2)   Additionally, ERCOT shall poll any All-Inclusive Generator 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 meterMeter.

Board Report

10.3.2.3   Generation Netting for ERCOT-Polled Settlement Meters

(1)   At Generation Resource Facilities, generation and associated Loads, including
construction and maintenance Load that is netted with existing generation auxiliaries,
must be metered at their POIs to the ERCOT Transmission Grid. Interval Data Recorders
(IDRs) must be used to determine generator output or Load usage. In the intervals where
the generation output exceeds the Load, the net must be settled as generation. In the
intervals where the Load exceeds the generation output, the net must be settled as Load
and carry any applicable Load shared charges and credits.

(2)   For Settlement purposes, at generation sites that do not include Wholesale Storage Load,
generation netting is not allowed except under one of the following conditions:

   (a)   Single POI with delivered and received metering data channels;

   (b)   Multiple POIs where the Loads and generator output are electrically connected to
a common switchyard, as defined in paragraph (6) below, except that,
EnergyWholesale Storage Load (EWSL) for a compressed air Eenergy Sstorage
Load Resource (ESR) is exempt from the requirement to be electrically connected
to a common switchyard. In addition, there must be sufficient generator capacity
to serve all plant Loads for netting to occur;

   (c)   A Qualifying Facility (QF) with POI(s) where the QF is selling to the QF's
thermal host(s) may net the Load meters of the thermal host with its generation
meters when the Load and generation are electrically connected to a common
switchyard. In instances in which Load is served by new on-site generation
through a common switchyard, the TSP or DSP may install monitoring equipment
necessary for measuring Load to determine stranded cost charges, if any are
applicable, as determined under the Public Utility Regulatory Act (PURA) and
applicable Public Utility Commission of Texas (PUCT) rules. If the PUCT
requires other Load served by onsite generators to pay the system benefit fund
charges, then, in instances in which Load is served by generation through a
common switchyard, the TSP or DSP may install metering equipment solely for
purposes of the TSP's or DSP's calculation of system benefit fund charges, as
provided by PURA, if any is applicable. For purposes of this Section, new on-site
generation has the meaning as contained in Public Utility Regulatory Act, TEX.
UTIL. CODE ANN. §§ 39.252 and 39.262(k) (Vernon 1998 & Supp. 2007) (PURA);
or

   (d)   For Generation Resources and/or Load with flow-through on a private, contiguous
transmission system (not included in a TSP or DSP rate base) and in a
configuration existing as of October 1, 2000, the meters at the interconnections
with the ERCOT Transmission Grid may be netted for the purpose of determining
Generation Resources or Load. For Settlement purposes, when the net is a Load,
the metered interconnection points must be assigned to the same Load Zone and
Unaccounted For Energy (UFE) zone.

Board Report

(e3)   For generation sites with ~~Settlement~~EPS Meters that ~~include~~measure E~~W~~holesale Storage Load (WSL), each energy storage Load Resource must be separately metered from all other Loads and generation~~(s) and ESR(s)~~:

    (i)   ~~EWSL for each energy storage Load Resource must be separately metered from all other Loads and generation.; and~~

    (~~ii~~a)   For configurations where the WSL is not at the POI, it must be separately metered behind a single POI metering point~~, such WSL must flow through the single POI.Non-ESR generation must be separately metered from all other Loads and generation; and~~; and

    (b)   WSL for a compressed air energy storage Load Resource is exempt from the requirement to be electrically connected to a common switchyard, as defined in paragraph (6) below.

    ~~(iii)   All generation units and associated Load, except ESL for a compressed air ESR, must be located behind a single Point of Interconnection.~~

~~(23)   For Settlement purposes, at generation sites with Wholesale Storage Load, generation netting is not allowed except under one of the following conditions:~~

    ~~(a)   Single POI with delivered and received metering data channels; where the metering configuration conforms to the Energy Storage Resource (ESR) metering configurations defined in the SMOG; or~~

    ~~(b)   Multiple POIs where the Wholesale Storage Load and generator output for the ESR are part of the same storage Facility and the metering configuration conforms to the ESR metering configurations defined in the SMOG.~~

~~(4)   For Settlement purposes, at Distributed Generation (DG) sites with Wholesale Storage Load, a nodal price will be calculated at the associated transmission substation.~~

(~~53~~4~~e~~) ERCOT shall maintain descriptions of the Metering Facilities of all common switchyards that contain multiple POIs of Loads (ESI IDs) and generation meters (EPS). The description is limited to identifying the Entities within a common switchyard and a simplified diagram showing the metering configuration of all Supervisory Control and Data Acquisition (SCADA) and Settlement Metering points.

(~~64~~5~~f~~) All Load(s) included in the netting arrangement for an EPS Metering Facility shall only be electrically connected to the ERCOT Transmission Grid through the EPS metering point(s) for such Facility. Such Loads shall not be electrically connected to the ERCOT Transmission Grid through electrical connections that are not metered by the EPS metering point(s) for the Facility.

(~~75~~6~~3~~) For purposes of this Section, a common switchyard is defined as an electric substation Facility where the POI for Load and Generation Resources are located at the same

Board Report

Facility but where the interconnection points are physically not greater than 400 yards apart. The physical connections of the Load to its POI and the Generation Resource to its POI cannot be Facilities that have been placed in a TSP's or DSP's rate base.

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.

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

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

    (a)   WSL is ~~captured~~measured ~~from~~by the corresponding EPS Meter~~Non-Energy Storage Resource (ESR) generation output is netted with ESL~~;

    (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.~~ESR generation output is not netted with ESL~~

    (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.

    ~~(c)   Remaining non-ESR generation output and ESR generation output is netted with associated Load~~

    ~~(d)   Remaining generation output, after netting occurs, is site generation;~~

    ~~(e)   ESL greater than the non-ESR generation output is site Wholesale Storage Load (WSL);~~

    ~~(f)   If there is more than one ESL delivery point and the WSL is less than the total metered ESL, the WSL will be allocated to the ESL delivery points based upon a metered ESL load ratio share.~~

    ~~(g)   Associated Load greater than the remaining generation output, after netting occurs, is populated to the generation site ESI ID~~

11.1.12   Treatment of ERCOT Polled Settlement ~~Energy~~Wholesale Storage Load Data

For EPS ~~E~~WSL data, ERCOT will :

    (a)   Be identified as the MRE; and

Board Report

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

11.4.6   Unaccounted for Energy Calculation and Allocation

The DAS shall adjust the net loss adjusted Load for each aggregated retail Load group for UFE. The Data Aggregation process will calculate the difference between net loss adjusted Load for the entire ERCOT System, which has been adjusted for Distribution Losses and Transmission Losses, and the total system Load (generation) in order to determine the total UFE. The calculated UFE for each Settlement Interval is then allocated to Loads. For the purpose of the UFE calculation, scheduled flow out of ERCOT on a Direct Current Tie (DC Tie) will be deemed as Load, and scheduled flow into ERCOT on a DC Tie will be deemed as generation.

11.5.1   Aggregate ~~Retail~~ Load Data

~~Adjusted Metered Load (AML), defined as retail Load data that has been adjusted for Unaccounted For Energy (UFE) and Transmission Losses and/or Distribution Losses,~~Load data will be aggregated into distinct grouping and segments such as Load Serving Entity (LSE), Qualified Scheduling Entity (QSE), and Settlement Point, and provided to Settlement.

11.5.2.2   General Public ~~Generation~~ Data Posting/Availability

(1)   The following general market ~~generation~~ information will be posted to the MIS Secure Area:

(a)   Total generation; ~~and~~

(b)   Total Adjusted Meter Load (AML); and

(c)   Total ~~Energy Storage Resource (ESR)~~ Wholesale Storage Load (WSL).

(2)   ERCOT will make the aforementioned data for each Settlement run type available to Market Participants via the MIS Certified Area within 48 hours of finalizing the data for Settlement statements.