(1) ERCOT shall charge a QSE for an IRR a Set Point Deviation Charge if the IRR telemetered generation is more than 5% above its AASP, the flag signifying that the IRR has received a Base Point below the HDL used by SCED has been received or the IRR has been instructed not to exceed its Base Point, and the IRR is not awarded Ancillary Service and is not part of an IRR Group in which at least one IRR is awarded Ancillary Service for at least one SCED interval within the 15-minute Settlement Interval.

(2) For instances in which an IRR is awarded Ancillary Service or is part of an IRR Group in which at least one IRR is awarded Ancillary Service for at least one SCED interval within the 15-minute Settlement Interval, Set Point Deviation Charges will be determined per Section 6.6.5.2, Set Point Deviation Charge for Over Generation, and Section 6.6.5.2.1, Set Point Deviation Charge for Under Generation.

(3) The charge to each QSE for non-excused over-generation of each IRR that is not included in an IRR Group at each Resource Node Settlement Point during a 15-minute Settlement Interval, is calculated as follows:

If the flag signifying that the IRR has received a Base Point below the HDL used by SCED or the IRR has been instructed not to exceed its Base Point is not set in all SCED intervals within the 15-minute Settlement Interval:

$$\mathbf{SPDAMT}_{q,r,p,i} = \mathbf{0}$$

Otherwise, if the flag signifying that the IRR has received a Base Point below the HDL used by SCED or the IRR has been instructed not to exceed its Base Point is set in all SCED intervals within the 15-minute Settlement Interval:

$$\mathbf{SPDAMT}_{q,r,p,i} = \mathbf{Max\ (PR1,\ RTSPP}_{p,i}\mathbf{)} * \mathbf{OGENIRR}_{q,r,p,i}$$

Where:

$$OGENIRR_{q,r,p,i} = Max\ [0,\ TWTG_{q,r,p,i} - ¼ * AASP_{q,r,p,i} * (1 + KIRR)]$$

$$TWTG_{q,r,p,i} = (\sum_{y} (AVGTG5M_{q,r,p,i,y}) / 3) * ¼$$

(4) The charge to each QSE for non-excused over-generation of each IRR that is included in an IRR Group, at each Resource Node Settlement Point, if the telemetered generation is greater than the upper tolerance during a 15-minute Settlement Interval, is calculated as follows:

If the flag signifying that the IRR has received a Base Point below the HDL used by SCED or the IRR has been instructed not to exceed its Base Point is not set in all SCED intervals within the 15-minute Settlement Interval for any of the IRRs within an IRR Group, then for all IRRs within an IRR Group:

$$\mathbf{SPDAMT}_{q,r,p} = \mathbf{0}$$

If the flag signifying that the IRR has received a Base Point below the HDL used by SCED or the IRR has been instructed not to exceed its Base Point is set in all SCED intervals within the

15-minute Settlement Interval for any of the IRRs within an IRR Group, then the deviation penalty is determined for the IRR Group and evenly allocated and charged to each IRR within that IRR Group:

$SPDAMT_{q,r,p} = Max(PR1, RTSPP_{p}) * OGENIRR_{q,r,i}$

Where:

$$OGENIRR_{q,r,i} = Max[0, TWTG_{q,wg,i} - \frac{1}{4} * AASP_{q,wg,i} * (1 + KIRR)] / N$$

$$TWTG_{q,wg,i} = \sum_{r} (TWTG_{q,r,p,i})$$

$$AASP_{q,wg,i} = \sum_{r} (AASP_{q,r,p,i})$$

The above variables are defined as follows:

Variable	Unit	Definition
$SPDAMT_{q,r,p,i}$	$	*Set Point Deviation Charge per QSE per Settlement Point per Resource*—The charge to QSE *q* for Generation Resource *r* at Resource Node *p*, for its deviation from AASP, for the 15-minute Settlement Interval *i*.
$RTSPP_{p,i}$	$/MWh	*Real-Time Settlement Point Price per Settlement Point*—The Real-Time Settlement Point Price at Resource Node *p*, for the 15-minute Settlement Interval *i*.
$TWTG_{q,r,p,i}$	MWh	*Time-Weighted Telemetered Generation per QSE per Settlement Point per Resource*—The telemetered generation of Generation Resource *r* represented by QSE *q* at Resource Node *p*, for the 15-minute Settlement Interval *i*.
$AASP_{q,r,p,i}$	MW	*Average Aggregated Set Point Generation per QSE per Settlement Point per Resource*—The average of the Average Five Minute Clock Interval Set Point (AVGSP5M) of Generation Resource *r* represented by QSE *q* at Settlement Point *p*, for the 15-minute Settlement Interval *i*.
$AVGTG5M_{q,r,p,i,y}$	MW	*Average Telemetered Generation for the 5 Minutes*—The average telemetered generation of Generation Resource *r* represented by QSE *q* at Resource Node *p*, for the five-minute clock interval *y*, within the 15-minute Settlement Interval *i*.
$OGENIRR_{q,r,p,i}$	MWh	*Over Generation Volumes per QSE per Settlement Point per IRR Generation Resource*—The amount over generated by the IRR *r* represented by QSE *q* at Resource Node *p* for the 15-minute Settlement Interval *i*.
PR1	$/MWh	The price to use for the charge calculation when RTSPP is less than $20/MWh, $20/MWh.
KIRR	none	The percentage tolerance for over-generation of an IRR, 5%.
N	none	The number of IRRs within an IRR Group.
q	none	A QSE.
p	none	A Settlement Point.
r	none	An IRR Generation Resource not awarded Ancillary Service or an IRR within an IRR Group where no member of the IRR Group was awarded Ancillary Service.
i	none	A 15-minute Settlement Interval.
y	none	A five-minute clock interval in the Settlement Interval.
wg	none	An IRR Group.

[NPRR963, NPRR1010, NPRR1014, NPRR1029, and NPRR1111: Insert applicable portions of Section 6.6.5.5 below upon system implementation for NPRR963, NPRR1014, and NPRR1029; upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1010; or upon system implementation of SCR819 for NPRR1111; and renumber accordingly:]

6.6.5.5 Energy Storage Resource Set Point Deviation Charge for Over Performance

(1) ERCOT shall charge a QSE for an ESR a Set Point Deviation Charge for over-performance if the telemetered generation or consumption exceeds the specified tolerance.

(2) The tolerance is the greater of 3% of the AASP for the ESR in the Settlement Interval, or three MW above the AASP for the ESR in the Settlement Interval if the Resource meets the following conditions:

(a) The ESR is not a DC-Coupled Resource; or

(b) The ESR is a DC-Coupled Resource and meets the conditions to be treated in the same manner as an ESR as specified in paragraph (1) of Section 3.8.7, DC-Coupled Resources, anytime during the Settlement Interval.

(3) The tolerance will be 5% of the AASP for a DC-Coupled Resource in the Settlement Interval if the ESR meets the conditions to be treated in the same manner as an IRR as specified in paragraph (2) of Section 3.8.7.

(4) The deviation charge for over-performance for each QSE for each ESR at each Resource Node Settlement Point will be calculated as follows:

If the ESR meets the conditions of paragraph (3) above and a flag signifying that the DC-Coupled Resource has received a Base Point below the HDL used by SCED or it has been instructed not to exceed its Base Point is not set in all SCED intervals within the 15-minute Settlement Interval, then:

$$\mathbf{SPDAMT}_{q,r,p,i} = \mathbf{0}$$

Otherwise:

$$\mathbf{SPDAMT}_{q,r,p,i} = \mathbf{Max\ (PR3,\ RTSPP}_{p,i}\mathbf{)} * \mathbf{OPESR}_{q,r,p,i}$$

Where:

If the ESR meets the conditions of paragraph (2) above, then:

$$OPESR_{q,r,p,i} = \text{Max}\ [0,\ (TWTG_{q,r,p,i} - \tfrac{1}{4} * \text{Max}\ [(AASP_{q,r,p,i} + \text{ABS}\ (K3 * AASP_{q,r,p,i})),\ (AASP_{q,r,p,i} + Q3)])]$$

If the ESR meets the conditions of paragraph (3) above, then:

$$OPESR_{q,r,p,i} = Max [0, (TWTG_{q,r,p,i} - ¼ * (AASP_{q,r,p,i} + ABS (K5* AASP_{q,r,p,i})))]$$

Where:

$$TWTG_{q,r,p,i} = (\Sigma_{y} (AVGTG5M_{q,r,p,i,y}) / 3) * ¼$$

The above variables are defined as follows:

Variable	Unit	Definition
$SPDAMT_{q,r,p,i}$	$	*Set Point Deviation Charge per QSE per Settlement Point per Resource*—The charge to QSE *q* for Resource *r* at Resource Node *p*, for its deviation from AASP, for the 15-minute Settlement Interval *i*.
$RTSPP_{p,i}$	$/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 *i*.
$TWTG_{q,r,p,i}$	MWh	*Time-Weighted Telemetered Generation per QSE per Settlement Point per Resource*—The telemetered generation or consumption of Resource *r* represented by QSE *q* at Resource Node *p*, for the 15-minute Settlement Interval *i*.
$AASP_{q,r,p,i}$	MW	*Average Aggregated Set Point per QSE per Settlement Point per Resource*—The average of the Average Five Minute Clock Interval Set Point (AVGSP5M) of Resource *r* represented by QSE *q* at Settlement Point *p,* for the 15-minute Settlement Interval *i*.
$AVGTG5M_{q,r,p,i,y}$	MW	*Average Telemetered Generation for the 5 Minutes*—The average telemetered generation or consumption of Resource *r* represented by QSE *q* at Resource Node *p*, for the five-minute clock interval *y*, within the 15-minute Settlement Interval *i*.
$OPESR_{q,r,p,i}$	MWh	*Over-Performance Volumes per QSE per Settlement Point per Resource*—The amount the ESR *r* over-performed, represented by QSE *q* at Resource Node *p,* for the 15-minute Settlement Interval *i*.
PR3	$/MWh	The price to use for the Set Point Deviation Charge for over-performance when RTSPP is less than $20/MWh, $20/MWh.
K3	none	The percentage tolerance for over-performance per paragraph (2) above, 3%.
K5	none	The percentage tolerance for over-performance per paragraph (3) above, 5%.
Q3	MW	The MW tolerance for over-performance, three MW.
q	none	A QSE.
p	none	A Settlement Point.
r	none	An ESR.
y	none	A five-minute clock interval in the Settlement Interval.
i	none	A 15-minute Settlement Interval.

[NPRR963, NPRR1010, NPRR1014, and NPRR1029: Insert applicable portions of Section 6.6.5.5.1 below upon system implementation for NPRR963, NPRR1014, or NPRR1029; or upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1010:]

6.6.5.5.1 Energy Storage Resource Set Point Deviation Charge for Under Performance

(1) ERCOT shall charge a QSE for an ESR a Set Point Deviation Charge for under-performance if the telemetered generation or consumption is below the specified tolerance.

(2) The tolerance is the lesser of 3% of the AASP for the ESR in the Settlement Interval, or three MW below the AASP for the ESR in the Settlement Interval, if the Resource meets the following conditions:

(a) The ESR is not a DC-Coupled Resource; or

(b) The ESR is a DC-Coupled Resource and meets the conditions to be treated in the same manner as an ESR as specified in paragraph (1) of Section 3.8.7, DC-Coupled Resources, anytime during the Settlement Interval.

(3) The deviation charge for under-performance for each QSE for each ESR at each Resource Node Settlement Point will be calculated as follows:

$$\mathbf{SPDAMT}_{q,r,p,i} = \mathbf{(-1) * Min\ (PR4, RTSPP}_{p,i}\mathbf{) * Min\ (1, KP2) * UPESR}_{q,r,p,i}$$

Where:

If the ESR meets the conditions of paragraph (2) above, then:

$$UPESR_{q,r,p,i} = Max\ [0, \tfrac{1}{4} * Min\ [(AASP_{q,r,p,i} - ABS\ (K4 * AASP_{q,r,p,i})), (AASP_{q,r,p,i} - Q4)] - TWTG_{q,r,p,i}]$$

Else:

$$UPESR_{q,r,p,i} = 0$$

Where:

$$TWTG_{q,r,p,i} = (\sum_{y} (AVGTG5M_{q,r,p,i,y}) / 3) * \tfrac{1}{4}$$

The above variables are defined as follows:

Variable	Unit	Definition
$SPDAMT_{q,r,p,i}$	$	*Set Point Deviation Charge per QSE per Settlement Point per Resource*—The charge to QSE *q* for Resource *r* at Resource Node *p*, for its deviation from AASP, for the 15-minute Settlement Interval *i*.
$RTSPP_{p,i}$	$/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 *i*.
$TWTG_{q,r,p,i}$	MWh	*Time-Weighted Telemetered Generation per QSE per Settlement Point per Resource*—The telemetered generation or consumption of Resource *r* represented by QSE *q* at Resource Node *p*, for the 15-minute Settlement Interval *i*.

$AASP_{q, r, p, i}$	MW	*Average Aggregated Set Point per QSE per Settlement Point per Resource*—The average of the Average Five Minute Clock Interval Set Point (AVGSP5M) of Resource *r* represented by QSE *q* at Settlement Point *p,* for the 15-minute Settlement Interval *i*.
$AVGTG5M_{q, r, p, i, y}$	MW	*Average Telemetered Generation for the 5 Minutes*—The average telemetered generation or consumption of Resource *r* represented by QSE *q* at Resource Node *p*, for the five-minute clock interval *y*, within the 15-minute Settlement Interval *i*.
$UPESR_{q, r, p, i}$	MWh	*Under-Performance Volumes per QSE per Settlement Point per Resource*—The amount the ESR *r* under-performed represented by QSE *q* at Resource Node *p,* for the 15-minute Settlement Interval *i*.
PR4	$/MWh	The price to use for the Set Point Deviation Charge for under-performance when RTSPP is greater than -$20/MWh, -$20/MWh.
K4	none	The percentage tolerance for under-performance, 3%.
Q4	MW	The MW tolerance for under-performance, three MW.
KP2	none	The coefficient applied to the Settlement Point Price for under-performance charge, 1.0.
q	none	A QSE.
p	none	A Settlement Point.
r	none	An ESR.
y	none	A five-minute clock interval in the Settlement Interval.
i	none	A 15-minute Settlement Interval.

6.6.5.3 Resources Exempt from Deviation Charges

(1) Resource Base Point Deviation Charges do not apply to the following:

(a) Reliability Must-Run (RMR) Units;

(b) Dynamically Scheduled Resources (DSRs) (except as described in Section 6.4.2.2, Output Schedules for Dynamically Scheduled Resources);

(c) Qualifying Facilities (QFs) that do not submit an Energy Offer Curve for the Settlement Interval;

(d) Quick Start Generation Resources (QSGRs) during the 15-minute Settlement Interval after the start of the first SCED interval in which the QSGR is deployed; or

(e) Settlement Intervals in which Emergency Base Points were issued to the Resource.

[NPRR863, NPRR963, NPRR1000, NPRR1010, NPRR1014, NPRR1046, NPRR1058, and NPRR1111: Replace applicable portions of Section 6.6.5.3 above with the following upon system implementation for NPRR863, NPRR963, NPRR1014, or NPRR1058; upon system implementation of NPRR1000 for NPRR1000 and NPRR1046; upon system implementation of the Real-Time Co-

Optimization (RTC) project for NPRR1010; or upon system implementation of SCR819 for NPRR1111; and renumber accordingly:]

6.6.5.6 Resources Exempt from Deviation Charges

(1) Set Point Deviation Charges do not apply to any QSE for the 15-minute Settlement Interval during the following events:

(a) Responsive Reserve (RRS) was manually deployed by ERCOT;

(b) ERCOT Contingency Reserve Service (ECRS) was deployed; or

(c) ERCOT System Frequency deviation is both greater than +0.05 Hz and less than -0.05 Hz within the same Settlement Interval.

(2) Set Point Deviation Charges do not apply to the QSE for the Resource for the 15-minute Interval for the following:

(a) The deviation of the Resource over the 15-minute Settlement Interval is in a direction that contributes to frequency corrections that resolve an ERCOT System frequency deviation and ERCOT System frequency deviation is greater than +/-0.05 Hz at any time during the 15-minute Settlement Interval;

(b) The Resource is a Reliability Must-Run (RMR) Unit;

(c) Emergency Base Points were issued to the Resource; or

(d) Resource is operating in Constant Frequency Control (CFC) mode.

(3) In addition to the exemptions listed in paragraph (1) and (2) of this Section, Set Point Deviation Charges do not apply to the QSE for a Generation Resource for the 15-minute Settlement Interval for the following:

(a) AASP is less than the Resource's average telemetered LSL;

(b) The Generation Resource is telemetering a status of ONTEST or STARTUP anytime during the Settlement Interval;

(c) Qualifying Facilities (QFs) that do not submit an Energy Offer Curve prior to the end of the Adjustment Period for the Settlement Interval;

(d) Quick Start Generation Resources (QSGRs) during the 15-minute Settlement Interval after the start of the first SCED interval in which the QSGR is deployed; or

(e) The flag signifying that an IRR has received a Base Point below the HDL used by SCED or the IRR has been instructed not to exceed its Base Point is not set in all SCED intervals within the 15-minute Settlement Interval. For IRR Groups, the flag signifying that an IRR has received a Base Point below the HDL used by SCED or the

IRR has been instructed not to exceed its Base Point is not set in all SCED intervals within the 15-minute Settlement Interval for any of the IRRs within the IRR Group.

(4) In addition to the exemptions listed in paragraph (1) and (2) of this Section, Set Point Deviation Charges do not apply to the QSE for the Controllable Load Resource for the 15-minute Settlement Interval if the following occur:

(a) The UDSP is equal to the snapshot of its telemetered power consumption for all SCED runs during the Settlement Interval; or

(b) The Controllable Load Resource is telemetering a status of OUTL anytime during the Settlement Interval.

(5) In addition to the exemptions listed in paragraph (1) and (2) of this Section, Set Point Deviation Charges do not apply to the QSE for the ESR for the 15-minute Settlement Interval if the following occur:

(a) The ESR is telemetering a status of ONTEST anytime during the Settlement Interval; or

(b) The AASP is less than its average telemetered LSL.

6.6.5.4 Base Point Deviation Payment

(1) ERCOT shall pay the Base Point Deviation Charges collected from the QSEs representing Resources to the QSEs representing Load based on LRS. The payment to each QSE for a given 15-minute Settlement Interval is calculated as follows:

$$\mathbf{LABPDAMT}_q = \mathbf{(-1) * BPDAMTTOT * LRS}_q$$

Where:

$$BPDAMTTOT = \sum_{q} BPDAMTQSETOT_q$$

$$BPDAMTQSETOT_q = \sum_{p} \sum_{r} BPDAMT_{q,r,p}$$

The above variables are defined as follows:

Variable	Unit	Definition
$LABPDAMT_q$	$	*Load-Allocated Base Point Deviation Amount per QSE*—QSE *q*'s share of the total charge for all Resources' Base Point deviations, based on LRS for the 15-minute Settlement Interval.
BPDAMTTOT	$	*Base Point Deviation Amount Total*—The total of Base Point Deviation Charges to all QSEs for all Resources, for the 15-minute Settlement Interval.

Variable	Unit	Definition
BPDAMTQSETOT $_q$	$	*Base Point Deviation Amount QSE Total per QSE*—The total of Base Point Deviation Charges to QSE *q* for all Resources represented by this QSE, for the 15-minute Settlement Interval.
BPDAMT $_{q, r, p}$	$	*Base Point Deviation Charge per QSE per Settlement Point per Resource*—The charge to QSE *q* for Generation Resource or Controllable Load Resource *r* at Settlement Node *p*, for its deviation from Base Point, for the 15-minute Settlement Interval. A Base Point Deviation Charge is charged to the Combined Cycle Train for all Combined Cycle Generation Resources.
LRS $_q$	none	The LRS calculated for QSE *q* for the 15-minute Settlement Interval. See Section 6.6.2.2, QSE Load Ratio Share for a 15-Minute Settlement Interval.
q	none	A QSE.
p	none	A Settlement Point.
r	none	A Generation Resource or Controllable Load Resource.

[NPRR1010: Replace Section 6.6.5.4 above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project:]

6.6.5.4 Set Point Deviation Payment

(1) ERCOT shall pay the Set Point Deviation Charges collected from the QSEs representing Resources to the QSEs representing Load based on LRS. The payment to each QSE for a given 15-minute Settlement Interval is calculated as follows:

LASPDAMT $_q$ = (-1) * SPDAMTTOT * LRS $_q$

Where:

$$\text{SPDAMTTOT} = \sum_{q} \text{SPDAMTQSETOT}_q$$

$$\text{SPDAMTQSETOT}_q = \sum_{p}\sum_{r} \text{SPDAMT}_{q, r, p}$$

The above variables are defined as follows:

Variable	Unit	Definition
LASPDAMT $_q$	$	*Load-Allocated Set Point Deviation Amount per QSE*—QSE *q*'s share of the total charge for all Resources' Set Point deviations, based on LRS for the 15-minute Settlement Interval.
SPDAMTTOT	$	*Set Point Deviation Amount Total*—The total of Set Point Deviation Charges to all QSEs for all Resources, for the 15-minute Settlement Interval.
SPDAMTQSETOT $_q$	$	*Set Point Deviation Amount QSE Total per QSE*—The total of Set Point Deviation Charges to QSE *q* for all Resources represented by this QSE, for the 15-minute Settlement Interval.

SPDAMT $_{q, r, p}$	$	*Set Point Deviation Charge per QSE per Settlement Point per Resource*—The charge to QSE *q* for Generation Resource or Controllable Load Resource *r* at Settlement Node *p*, for its deviation from AASP, for the 15-minute Settlement Interval. A Set Point Deviation Charge is charged to the Combined Cycle Train for all Combined Cycle Generation Resources.
LRS $_{q}$	none	The LRS calculated for QSE *q* for the 15-minute Settlement Interval. See Section 6.6.2.2, QSE Load Ratio Share for a 15-Minute Settlement Interval.
q	none	A QSE.
p	none	A Settlement Point.
r	none	A Generation Resource or Controllable Load Resource.

6.6.6 Reliability Must-Run Settlement

[NPRR885: Replace Section 6.6.6 above with the following upon system implementation:]

6.6.6 Reliability Must-Run and Must-Run Alternative Settlement

6.6.6.1 RMR Standby Payment

(1) The Standby Payment for RMR Service is paid to each QSE representing an RMR Unit for each RMR Unit for each contracted hour under performance requirements set forth in Section 22, Attachment B, Standard Form Reliability Must-Run Agreement, and other performance requirements in these Protocols. For Initial Settlement, the Standby Payment is either the "Initial Standby Cost" stated in the RMR Agreement or the revised Standby Cost calculated in accordance with paragraph (2) of Section 3.14.1.13, Updated Budgets During the Term of an RMR Agreement. For Final and True-Up Settlements, the Standby Payment is based on the RMR Unit's actual Eligible Cost, if available.

(2) The Standby Payment to each QSE for each RMR Unit for each hour is calculated as follows:

$$\mathbf{RMRSBAMT}_{q, r} = \mathbf{(-1) * RMRSBPR}_{q, r}$$

The above variables are defined as follows:

Variable	Unit	Definition
RMRSBAMT $_{q, r}$	$	*Reliability Must Run Standby Payment per QSE per Resource by hour*—The Standby Payment to QSE *q* for RMR Unit *r*, for the hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RMRSBPR $_{q, r}$	$ per hour	*Reliability Must Run Standby Price per QSE per Resource by hour*—The hourly standby cost for RMR Unit *r* represented by QSE *q*, for the hour. See item (3) below. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
q	none	A QSE.
r	none	An RMR Unit.

(3) For the Initial Settlement and resettlements executed before true-up and before actual cost data is submitted, the standby price of an RMR Unit is either the "Initial Standby Cost" stated in the RMR Agreement or the revised Standby Cost calculated in accordance with paragraph (2) of Section 3.14.1.13. For other resettlements, the standby price of an RMR Unit for each hour is calculated as follows:

$$\mathbf{RMRSBPR}_{q,r} = \mathbf{(RMRMNFNCC}_{q,r} \mathbf{* (1 + RMRIF * RMRCRF}_{q,r} \mathbf{* RMRARF}_{q,r}\mathbf{) + RMRMNFCC}_{q,r}\mathbf{) / MH}_{q,r}$$

Where:

RMR Capacity Reduction Factor

If $(RMRTCAPA_{q,r} + RMRTCAP_{q,r} \geq RMRCCAP_{q,r})$, then $RMRCRF_{q,r} = 1$

Otherwise

$$RMRCRF_{q,r} = Max (0, 1 - 2 * (RMRCCAP_{q,r} - RMRTCAP_{q,r}) / RMRCCAP_{q,r})$$

RMR Availability Reduction Factor

If $(RMRHREAF_{q,r} \geq RMRTA_{q,r})$, then $RMRARF_{q,r} = 1$

Otherwise

$$RMRARF_{q,r} = Max (0, 1 - (RMRTA_{q,r} - RMRHREAF_{q,r}) * 2)$$

RMR Hourly Rolling Equivalent Availability Factor

$$RMRHREAF_{q,r} = Min \left(1, \sum_{hr=h-4379}^{h} (RMRAFLAG_{q,r,hr} * HSL_{q,r,hr}) / \sum_{hr=h-4379}^{h} RMRCCAP_{q,r}\right)$$

Availability for a Combined Cycle Train will be determined pursuant to contractual terms but no more than once per hour.

The above variables are defined as follows:

Variable	Unit	Definition
$RMRSBPR_{q,r}$	$ per hour	*Reliability Must-Run Standby Price per QSE per Resource by hour*—The hourly standby cost for RMR Unit *r* represented by QSE *q*, for the hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$RMRARF_{q,r}$	none	*Reliability Must-Run Availability Reduction Factor per QSE per Resource by hour*—The availability reduction factor of RMR Unit *r* represented by QSE *q*, for the hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$RMRCRF_{q,r}$	none	*Reliability Must-Run Capacity Reduction Factor per QSE per Resource by hour*—The capacity reduction factor of the RMR Unit *r* represented by QSE *q*, for the hour. See paragraph (2) of Section 3.14.1.17, Incentive Factor. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.

Variable	Unit	Definition
RMRCCAP $_{q, r}$	MW	*Reliability Must-Run Contractual Capacity per QSE per Resource*—The seasonal capacity of RMR Unit *r* represented by QSE *q* as specified in the RMR Agreement. The monthly value is allocated evenly across all hours for all days in the month. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RMRTCAP $_{q, r}$	MW	*Reliability Must-Run Testing Capacity by hour*—The testing capacity of RMR Unit *r* represented by QSE *q*, for the hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RMRTA $_{q, r}$	none	*Reliability Must-Run Target Availability per QSE per Resource*—The Target Availability of RMR Unit *r* represented by QSE *q*, as specified in the RMR Agreement and divided by 100 to convert a percentage to a fraction. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RMRHREAF $_{q, r}$	none	*Reliability Must-Run Hourly Rolling Equivalent Availability Factor per QSE per Resource by hour*—The equivalent availability factor of RMR Unit *r* represented by QSE *q* over the current hour plus the prior 4379 hours for which availability is required under the RMR Agreement, for the hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. The available capacity is calculated in accordance with paragraph (3) of Section 3.14.1.17.
RMRMNFNCC $_{q, r}$	$	*Reliability Must-Run Monthly Non-Fuel Non-Capital Cost per QSE per Resource*—The actual non-capital and non-fuel Eligible Cost of RMR Unit *r* represented by QSE *q*, for the month. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RMRMNFCC $_{q, r}$	$	*Reliability Must-Run Monthly Non-Fuel Capital Cost per QSE per Resource*—The actual non-fuel and capital Eligible Cost of RMR Unit *r* represented by QSE *q*, for the month. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. Notwithstanding the above, reservation and transportation costs associated with firm fuel supplies as described in paragraph (1)(a)(vi) of Section 3.14.1.10, Eligible Costs, shall be included herein.
MH $_{q, r}$	hour	*Number of Hours in the Month per QSE per Resource*—The total number of hours of the month, when RMR Unit *r* represented by QSE *q* is under an RMR Agreement. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RMRIF	none	*Reliability Must Run Incentive Factor*—The Incentive Factor of RMR Units under RMR Agreement.
RMRARF $_{q, r}$	none	*Reliability Must-Run Availability Reduction Factor per QSE per Resource by hour*—The availability reduction factor of RMR Unit *r* represented by QSE *q*, as calculated for the hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
HSL $_{q, r, hr}$	MW	*High Sustained Limit*—The High Sustained Limit (HSL) of a Generation Resource as defined in Section 2.1, Definitions, for the hour that includes the Settlement Interval *i*. Where for a combined cycle Resource, *r* is a Combined Cycle Generation Resource.
RMRAFLAG $_{q, r, hr}$	none	*RMR Availability Flag per QSE per Resource by hour*—The flag of the availability of RMR Unit *r* represented by QSE *q* as determined by the Current Operating Plan (COP), 1 for available and 0 for unavailable, for the hour. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.

Variable	Unit	Definition
RMRTCAPA $_{q, r}$	MW	*Reliability Must-Run Testing Capacity Adjustment by hour*—The testing capacity adjustment factor, in the event an ERCOT Operator has deemed that a RMR Unit's Tested Capacity did not materially affect the reliability of the ERCOT System, of an RMR Unit *r* represented by QSE *q*, for the hour. See paragraph (2) of Section 3.14.1.17. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
q	none	A QSE.
r	none	An RMR Unit.
hr	none	The index for a given hour and all the previous 4379 hours for which availability is required under the RMR Agreement.
4380	none	The number of hours in a six-month period.

(4) The total of the Standby Payments to each QSE for all RMR Units represented by this QSE for a given hour is calculated as follows:

$$\mathbf{RMRSBAMTQSETOT}_{q} = \sum_{r} \mathbf{RMRSBAMT}_{q, r}$$

The above variables are defined as follows:

Variable	Unit	Definition
RMRSBAMTQSETOT $_{q}$	$	*Reliability Must-Run Standby Amount QSE Total per QSE*—The total of the Standby Payments to QSE *q* for all RMR Units represented by this QSE for the hour.
RMRSBAMT $_{q, r}$	$	*Reliability Must-Run Standby Payment per QSE per Resource*—The Standby Payment to QSE *q* for RMR Unit *r*, for the hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
q	none	A QSE.
r	none	An RMR Unit.

6.6.6.2 RMR Payment for Energy

(1) Payment for energy on the Initial Settlement and settlements executed before true-up and before actual cost data is submitted must be calculated using the estimated input/output curve and startup fuel as specified in the RMR Agreement, the actual energy produced and the FIP. The payment for energy for all other settlements must be based on actual fuel costs for the RMR Unit. The payment for energy for each hour is calculated as follows:

$$\mathbf{RMREAMT}_{q, r} = \mathbf{(-1) * (((FIP + RMRCEFA}_{q, r}\mathbf{) * RMRSUFQ}_{q, r}\mathbf{ / RMRH}_{q, r}\mathbf{)} * \mathbf{RMRALLOCFLAG}_{q, r} + \sum_{i=1}^{4} \mathbf{(((FIP + RMRCEFA}_{q, r}\mathbf{) * RMRHR}_{q, r, i}\mathbf{ + RMRVCC}_{q, r}\mathbf{) * RTMG}_{q, r, i}\mathbf{))}$$

The above variables are defined as follows:

Variable	Unit	Definition
RMREAMT $_{q, r}$	$	*Reliability Must-Run Energy Amount per QSE per Resource by hour*—The energy payment to QSE *q* for RMR Unit *r*, for the hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
FIP	$/MMBtu	*Fuel Index Price*—The FIP for the Operating Day.
RMRSUFQ $_{q, r}$	MMBtu	*Reliability Must-Run Startup Fuel Quantity per QSE per Resource*—The Estimated Start Up Fuel specified in the RMR Agreement for RMR Unit *r* represented by QSE *q*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RMRH $_{q, r,h}$	hour	*Reliability Must-Run Hours*—The number of hours during which RMR Unit *r* represented by QSE *q* is instructed On-Line for the Operating Day. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RMRALLOCFLAG $_{q, r}$	none	*Reliability Must-Run Startup Flag per QSE per Resource by hour*—The number that indicates whether or not the startup fuel cost of RMR Unit *r* represented by QSE *q* is allocated to the hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. The startup fuel cost will be allocated equally to all contiguous intervals for which there is an eligible start. The RMRALLOCFLAG $_{q, r}$ value is 1 if the startup fuel cost is allocated; otherwise, its value is 0. The RMRALLOCFLAG $_{q, r}$ for eligibility is determined in Sections 5.6.2, RUC Startup Cost Eligibility, and 5.6.3, Forced Outage of a RUC-Committed Resource, for start-up payments and commitments in either the Reliability Unit Commitment (RUC) or DAM.
RMRHR $_{q, r, i}$	MMBtu /MWh	*Reliability Must-Run Heat Rate per QSE per Resource by Settlement Interval by hour*—The multiplier determined based on the input/output curve and the Real-Time generation of RMR Unit *r* represented by QSE *q*, for the 15-minute Settlement Interval *i* in the hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RMRVCC $_{q, r}$	$/MWh	*Reliability Must-Run Variable Cost Component per QSE per Resource*—The monthly cost component that is used to adjust the energy cost calculation to reflect the actual fuel costs of RMR Unit *r* represented by QSE *q*. The value is initially set to zero. For resettlements, see item (2) below. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTMG $_{q, r, i,}$	MWh	*Real-Time Metered Generation per QSE per Resource by Settlement Interval by hour*—The Real-Time energy from RMR Unit *r* represented by QSE *q*, for the 15-minute Settlement Interval *i* in the hour *h*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RMRCEFA $_{q, r}$	$/MMBtu	*Reliability Must-Run Contractual Estimated Fuel Adder*—The Estimated Fuel Adder that is contractually agreed upon in Section 22, Attachment B, Standard Form Reliability Must-Run Agreement. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. The fuel adder will be subsequently trued up to reflect actual fuel costs as set forth in item (1) above.
q	none	A QSE.
r	none	An RMR Unit.
i	none	A 15-minute Settlement Interval.

(2) If the RMR actual fuel cost is filed in accordance with the timeline in these Protocols, the monthly RMR variable cost component is calculated for the subsequent resettlements as follows:

$$\mathbf{RMRVCC}_{q,r} = (\mathbf{RMRMFCOST}_{q,r} + \sum_{h} \mathbf{RMREAMT}_{q,r,f,h}) / (\sum_{i} \mathbf{RTMG}_{q,r,i})$$

The above variables are defined as follows:

Variable	Unit	Definition
RMRVCC $_{q, r}$	$/MWh	*Reliability Must-Run Variable Cost Component per QSE per Resource*—The monthly cost component that is used to adjust the energy cost calculation to reflect the actual fuel costs of RMR Unit *r* represented by QSE *q*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RMRMFCOST $_{q, r}$	$	*Reliability Must-Run Monthly actual Fuel Cost per QSE per Resource*—The monthly actual fuel cost of RMR Unit *r* represented by QSE *q*, for the month. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTMG $_{q, r, i}$	MWh	*Real-Time Metered Generation per QSE per Resource by Settlement Interval*—The Real-Time energy from RMR Unit *r* represented by QSE *q* for the 15-minute Settlement Interval *i*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RMREAMT $_{q, r, f, h}$	$	*Reliability Must-Run Energy Amount per QSE per Resource by hour*—The energy payment to QSE *q* for RMR Unit *r*, for the hour *h,* from the former Settlement Statement *f*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
q	none	A QSE.
r	none	An RMR Unit.
h	none	An hour in the month.
i	none	A 15-minute Settlement Interval in the month.
f	none	Amount from former settlement run.

(3) The total of the payments for energy to each QSE for all RMR Units represented by this QSE for a given hour is calculated as follows:

$$\mathbf{RMREAMTQSETOT}_{q} = \sum_{r} \mathbf{RMREAMT}_{q,r}$$

The above variables are defined as follows:

Variable	Unit	Definition
RMREAMTQSETOT $_{q}$	$	*Reliability Must-Run Energy Amount QSE Total per QSE*—The total of the energy payments to QSE *q* for all RMR Units represented by this QSE for the hour.
RMREAMT $_{q, r}$	$	*Reliability Must-Run Energy Amount per QSE per Resource by hour*—The energy payment to QSE *q* for RMR Unit *r*, for the hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
q	none	A QSE.
r	none	An RMR Unit.

6.6.6.3 RMR Adjustment Charge

(1) Each QSE that represents an RMR Unit shall pay a charge designed to recover the net total revenues from RUC settlements, and from Real-Time settlements received by that QSE for all RMR Units that it represents, except that the charge does not include net revenues received by the QSE for the RMR Standby Payments calculated under Section 6.6.6.1, RMR Standby Payment, and the RMR energy payments calculated under Section 6.6.6.2, RMR Payment for Energy.

(2) The charge for each QSE representing an RMR Unit for a given Operating Hour is calculated as follows:

$$\mathbf{RMRAAMT}_{q} = \mathbf{(-1)} * [\sum_{p} \sum_{r} (\mathbf{(-1)} * \sum_{i=1}^{4} \mathbf{RESREV}_{q,r,gsc,p} + \sum_{i=1}^{4} \mathbf{EMREAMT}_{q,r,p,i} + \mathbf{RUCMWAMT}_{q,r,p} + \mathbf{RUCCBAMT}_{q,r,p} + \mathbf{RUCDCAMT}_{q,r,p} + \sum_{i=1}^{4} \mathbf{VSSEAMT}_{q,r,p,i} + \sum_{i=1}^{4} \mathbf{VSSVARAMT}_{q,r,i})]$$

The above variables are defined as follows:

Variable	Unit	Definition
$RMRAAMT_{q}$	$	*RMR Adjustment Charge per QSE*—The adjustment from QSE *q* Standby Payments and energy payments for all RMR Units represented by this QSE, for the revenues received for the same RMR Units from RUC and Real-Time operations, for the hour.
$EMREAMT_{q,r,p,i}$	$	*Emergency Energy Amount per QSE per Settlement Point per unit per interval*—The payment to QSE *q* for the additional energy produced by RMR Unit *r* at Resource Node *p* in Real-Time during the Emergency Condition, for the 15-minute Settlement Interval *i*. Payment for emergency energy is made to the Combined Cycle Train. ***[NPRR1010 and NPRR1014: Replace applicable portions of the definition above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1010; or upon system implementation for NPRR1014:]*** *Emergency Energy Amount per QSE per Settlement Point per unit per interval*—The payment to QSE *q* as additional compensation for the additional energy or Ancillary Services produced or consumed by Resource *r* at Resource Node *p* in Real-Time during the Emergency Condition, for the 15-minute Settlement Interval *i*. Payment for emergency energy is made to the Combined Cycle Train.
$RESREV_{q,r,gsc,p}$	$	*Resource Share Revenue Settlement Payment*—The RMR 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*.

Variable	Unit	Definition
RUCMWAMT $_{q, r, p}$	$	*RUC Make-Whole Amount per QSE per Settlement Point per unit*—The amount calculated for RMR Unit *r* committed in RUC at Resource Node *p* to make whole the Startup Cost and minimum-energy cost of this unit, for the hour. See Section 5.7.1, RUC Make-Whole Payment. When one or more Combined Cycle Generation Resources are committed by RUC, payment is made to the Combined Cycle Train for all RUC-committed Combined Cycle Generation Resources.
RUCCBAMT $_{q, r}$	$	*RUC Clawback Charge per QSE per unit*—The RUC Clawback Charge to QSE *q* for RMR Unit *r*, for the hour. See Section 5.7.2, RUC Clawback Charge. When one or more Combined Cycle Generation Resources are committed by RUC, a charge is made to the Combined Cycle Train for all RUC-committed Combined Cycle Generation Resources.
RUCDCAMT $_{q, r, p}$	$	*RUC Decommitment Amount per QSE per Settlement Point per unit*—The amount calculated for RMR Unit *r* at Resource Node *p* represented by QSE *q* due to ERCOT de-commitment, for the hour. When one or more Combined Cycle Generation Resources are decommitted by RUC, payment is made to the Combined Cycle Train for all RUC-decommitted Combined Cycle Generation Resources.
VSSEAMT $_{q, r, p, i}$	$	*Voltage Support Service Energy Amount per QSE per Settlement Point per unit per interval* —The compensation to QSE *q* for ERCOT-directed power reduction from RMR Unit *r* at Resource Node *p* to provide Voltage Support Service (VSS), for the 15-minute Settlement Interval *i*. Payment for VSS is made to the Combined Cycle Train.
VSSVARAMT $_{q, r, i}$	$	*Voltage Support Service VAr Amount per QSE per Unit*—The payment to QSE *q* for the VSS provided by RMR Unit *r*, for the 15-minute Settlement Interval *i*. Payment for VSS is made to the Combined Cycle Train.
q	none	A QSE.
gsc	none	A generation site code.
p	none	A Resource Node Settlement Point.
r	none	An RMR Unit.
i	none	A 15-minute Settlement Interval in the hour.

6.6.6.4 RMR Charge for Unexcused Misconduct

(1) If a Misconduct Event, as defined in the RMR Agreement, is not excused as provided in the RMR Agreement, then ERCOT shall charge the QSE that represents the RMR Unit an unexcused misconduct amount of $10,000 for each unexcused Misconduct Event as follows:

$$\mathbf{RMRNPAMT}_{q, r} = \mathbf{\$10{,}000 * RMRNPFLAG}_{q,r}$$

The above variable is defined as follows:

Variable	Unit	Definition
RMRNPAMT $_{q, r}$	$	*Reliability Must-Run Unexcused Misconduct Charge per QSE per Resource*—The charge to QSE *q* for the unexcused Misconduct Event of RMR Unit *r* for an Operating Day. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.

Variable	Unit	Definition
RMRNPFLAG $_{q, r}$	$	*Reliability Must-Run Non-Performance Flag per QSE per Resource*—A flag for the QSE *q* for the unexcused Misconduct Event of RMR Unit *r* for an Operating Day. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
q	none	A QSE.
r	none	An RMR Unit.

(2) The total of the charges to each QSE for unexcused Misconduct Events of all RMR Units represented by this QSE for a given Operating Day is calculated as follows:

$$\mathbf{RMRNPAMTQSETOT}_{q} = \sum_{r} \mathbf{RMRNPAMT}_{q, r}$$

The above variables are defined as follows:

Variable	Unit	Definition
RMRNPAMTQSETOT $_{q}$	$	*Reliability Must-Run Unexcused Misconduct Amount QSE Total per QSE*—The total of the charges to QSE *q* for unexcused Misconduct Events of the RMR Units represented by this QSE for the Operating Day.
RMRNPAMT $_{q, r}$	$	*Reliability Must-Run Unexcused Misconduct Charge per QSE per Resource*—The charge to QSE *q* for the unexcused Misconduct Event of RMR Unit *r* for the Operating Day. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
q	none	A QSE.
r	none	An RMR Unit.

6.6.6.5 RMR Service Charge

(1) The total RMR cost for all RMR Units is allocated to the QSEs representing Loads based on LRS. The RMR Service charge to each QSE for a given hour is calculated as follows:

$$\mathbf{LARMRAMT}_{q} = \mathbf{(-1) * (RMRSBAMTTOT + RMREAMTTOT + RMRAAMTTOT + RMRNPAMTTOT / H) * HLRS}_{q}$$

Where:

RMR Standby Amount Total

$$\text{RMRSBAMTTOT} = \sum_{q} \text{RMRSBAMTQSETOT}_{q}$$

RMR Energy Amount Total

$$\text{RMREAMTTOT} = \sum_{q} \text{RMREAMTQSETOT}_{q}$$

RMR Adjustment Charge Total

$$\text{RMRAAMTTOT} = \sum_{q} \text{RMRAAMT}_{q}$$

RMR Non-Performance Amount Total

$$RMRNPAMTTOT = \sum_{q} RMRNPAMTQSETOT_{q}$$

The above variables are defined as follows:

Variable	Unit	Definition
$LARMRAMT_{q}$	$	*Load-Allocated Reliability Must-Run Amount per QSE*—The amount charged to QSE *q* based on its LRS of the difference between the amount paid to all QSEs for RMR Service under Section 6.6.6, Reliability Must-Run Settlement, and the amount that would have been paid to the QSEs for the same RMR Units if they were not providing RMR Service under the other parts of this Section 6, Adjustment Period and Real-Time Operations, and Section 5, Transmission Security Analysis and Reliability Unit Commitment.
RMRSBAMTTOT	$	*RMR Standby Amount Total*—The total of the Standby Payments to all QSEs for all RMR Units, for the hour.
RMREAMTTOT	$	*RMR Energy Amount Total*—The total of the energy cost payments to all QSEs for all RMR Units, for the hour.
RMRAAMTTOT	$	*RMR Adjusted Amount Total*—The total of the adjusted amounts from all QSEs representing RMR Units for the revenues received for these units from RUC, Real-Time operations and Ancillary Service markets, for the hour.
RMRNPAMTTOT	$	*RMR Non-Performance Amount Total*—The total of the charges to all QSEs for unexcused Misconduct Events of all RMR Units, for the Operating Day.
$HLRS_{q}$	none	The hourly LRS calculated for QSE *q* for the hour. See Section 6.6.2.4, QSE Load Ratio Share for an Operating Hour.
$RMRSBAMTQSETOT_{q}$	$	*Reliability Must-Run Standby Amount QSE Total per QSE*—The total of the Standby Payments to QSE *q* for the RMR Units represented by the same QSE for the hour.
$RMREAMTQSETOT_{q}$	$	*Reliability Must-Run Energy Amount QSE Total per QSE*—The total of the energy payments to QSE *q* for the RMR Units represented by the same QSE for the hour.
$RMRAAMT_{q}$	$	*RMR Adjusted Amount per QSE*—The adjustment from QSE *q* Standby Payments and energy payments for all RMR Units represented by this QSE, for the revenues received for the same RMR Units from RUC and Real-Time operations, for the hour.
$RMRNPAMTQSETOT_{q}$	$	*Reliability Must-Run Unexcused Misconduct Amount QSE Total per QSE*—The total of the charges to QSE *q* for unexcused Misconduct Events of the RMR Units represented by the same QSE for the Operating Day.
q	none	A QSE.
H	none	The number of hours of the Operating Day.

6.6.6.6 Method for Reconciling RMR Actual Eligible Costs, RMR and MRA Contributed Capital Expenditures, and Miscellaneous RMR Incurred

Expenses

(1) No later than 30 days after the RTM True-Up Statement is issued for the termination date of the RMR Agreement, ERCOT shall issue a miscellaneous Invoice to charge the QSE representing the RMR Unit for any overpayments to the QSE representing the RMR Unit as described in Section 3.14.1.16, Reconciliation of Actual Eligible Costs, and contributed capital expenditures described in Section 3.14.1.19, Charge for Contributed Capital Expenditures. Refunded contributed capital expenditures are prorated evenly and on a monthly basis over the RMR Agreement period before being allocated to Load on an hourly LRS basis. Refunded overpayments described in Section 3.14.1.16 are allocated directly to the month in which the overpayment occurred before being allocated to Load on an hourly LRS basis. A separate Invoice will be sent for each RMR Agreement.

(a) The one-time charge to the QSE to collect the lump sum of over-payments and contributed capital expenditures is calculated as follows:

$$RMRRAMT_{q,r,c} = RMRCE_{q,r,c} + \sum_{m} RMROP_{q,r,c,m}$$

(b) The one-time payment is calculated as follows:

$$LARMRRAMT_{q} = (-1) * \sum_{m} (MRMRCE_{m} + RMROP_{q,r,c,m}) / MH_{m} * HLRS_{q,m}$$

Where:

$$MRMRCE_{m} = \sum_{q} \sum_{r} RMRCE_{q,r,c} / CM_{q,r,c}$$

The HLRS used will be the HLRS for each day within the contracted month *m*. The most recent approved HLRS available at time the miscellaneous Invoice is posted will be used. The miscellaneous Invoice will not be re-calculated with subsequent Settlement runs unless required by a dispute or Alternative Dispute Resolution (ADR). If a dispute or ADR requires ERCOT to re-issue the miscellaneous Invoice, the most recent approved HLRS values will be used.

(c) Upon issuance of the miscellaneous Invoice, ERCOT shall issue a Market Notice containing the values of RMROP, RMRCE, and the Settlement run containing the HLRS that was used in the Settlement.

The above variables are defined as follows:

Variable	Unit	Description
$RMRRAMT_{q,r,c}$	$	*Reliability Must-Run Reconciled Amount* – The lump sum charge to the QSE *q* representing the RMR Unit *r* that reconciles any contributed

		capital expenditure amounts and any over-payments to the QSE during the period of the RMR Agreement *c*.
$RMRCE_{q, r, c}$	$	*Reliability Must-Run Capital Expenditure Refund*– The lump sum amount of contributed capital expenditures for the QSE *q* representing the RMR Unit *r* for the period of the RMR Agreement *c* to be refunded to ERCOT per Section 3.14.1.19.
$RMROP_{q, r, c, m}$	$	*Reliability Must-Run Over-Payment* – The amount of overpayments to the QSE *q* representing the RMR Unit *r* for the month *m* during the period of the RMR Agreement *c* to be refunded to ERCOT per Section 3.14.1.19. This amount cannot be negative.
$MRMRCE_{m}$	$	*Monthly Reliability Must-Run Capital Expenditure Refund* – The lump sum amount of contributed capital expenditures for the month *m* refunded to ERCOT per Section 3.14.1.19 pro-rated over the number of months of the RMR Agreement.
$LARMRRAMT_{q}$	$	*Load Allocated Reliability Must-Run Reconciled Amount* – The amount of refunded capital expenditures paid to QSE *q* based on its HLRS.
$HLRS_{q, m}$	none	*Hourly Load Ratio Share per QSE* – The hourly LRS calculated for QSE *q* for the hour for month *m*. See Section 6.6.2.4, QSE Load Ratio Share for an Operating Hour.
MH_{m}	hour	*Number of Hours in the Month* —The total number of hours in the month *m*, which overlaps a month in which an RMR Agreement was effective. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$CM_{q, r, c}$	none	The number of months of the RMR Agreement period.
m	none	A month in the RMR Agreement period.
q	none	A QSE.
c	none	An RMR Agreement.
r	none	An RMR Unit.

(2) ERCOT shall issue a miscellaneous Invoice allocating expenses incurred related to the processing of an RMR Agreement or validation and/or processing of RMR budgets on an LRS basis. ERCOT shall issue the miscellaneous Invoice no later than 30 days after the RTM True-Up Statement is issued for the last day of the calendar month in which ERCOT incurred the expense. A separate Invoice will be sent for each RMR Agreement.

(a) The one-time charge is calculated as follows:

$$LARMROEIAMT_{q} = (-1) * \sum_{m} RMROEIAMT_{m} / MH_{m} * HLRS_{q, m}$$

The HLRS used will be the HLRS for each day within the contracted month *m*. The most recent approved HLRS available at the time the miscellaneous Invoice is posted will be used. The miscellaneous Invoice will not be re-calculated with subsequent Settlement runs unless required by a dispute or ADR. If a dispute or ADR requires ERCOT to re-issue the miscellaneous Invoice, the most recent approved HLRS values will be used.

(b) Upon issuance of the miscellaneous Invoice, ERCOT shall issue a Market Notice containing the value of RMROEIAMT and the Settlement run containing the HLRS that was used in the Settlement.

The above variables are defined as follows:

Variable	Unit	Description
$RMROEIAMT_m$	$	*RMR Other Expense Incurred Amount* – The amount of expenses incurred in the validation and processing of an RMR Agreement, for the month *m*, that are not paid to the QSE representing the RMR Unit e.g. third-party expenses incurred in the evaluation and validation of submitted RMR budgets.
$LARMROEIAMT_q$	$	*Load Allocated RMR Other Expense Incurred Amount* – The amount of other expenses incurred charged to QSE *q* based on its HLRS.
$HLRS_{q,m}$	none	*Hourly Load Ratio Share per QSE* – The hourly LRS calculated for QSE *q* for the hour for month *m*. See Section 6.6.2.4, QSE Load Ratio Share for an Operating Hour.
MH_m	hour	*Number of Hours in the Month* —The total number of hours in the month *m*, which overlaps a month in which an RMR Agreement was effective.
m	none	A month in the RMR Agreement period.
q	none	A QSE.
r	none	An RMR Unit.

(3) ERCOT shall collect and distribute Must-Run Alternative (MRA) contributed capital expenditures described in Section 3.14.1.19 as follows:

(a) The one-time charge to the QSE to collect the lump sum of contributed capital expenditures will be reflected as:

$$MRACERAMT_{q,r,c}$$

(b) The one-time payment is calculated as follows:

$$LAMRACERAMT_q = (-1) * \sum_M \sum_D MMRACER / MH_{q,r} * HLRS_q$$

Where:

$$MMRACER = MRACERAMT_{q,r,c} / CM_{q,r,c}$$

The HLRS used will be the HLRS for each day within the contracted month M. The most recent approved HLRS available at time the miscellaneous Invoice is posted will be used. The miscellaneous Invoice will not be re-calculated with subsequent Settlement runs unless required by a dispute or ADR. If a dispute or ADR requires ERCOT to re-issue the miscellaneous Invoice, the most recent approved HLRS values will be used.

The above variables are defined as follows:

Variable	Unit	Description
$MRACERAMT_{q, r, c}$	$	*Must-Run Alternative Capital Expenditure Refund Amount* – The lump sum amount of contributed capital expenditures refunded to ERCOT per Section 3.14.1.19.
MMRACER	$	*Monthly Must-Run Alternative Capital Expenditure Refund* – The lump sum amount of contributed capital expenditures refunded to ERCOT per Section 3.14.1.19 pro-rated over the number of months of the MRA Agreement.
$LAMRACERAMT_{q}$	$	*Load Allocated Must-Run Alternative Capital Expenditure Refund Amount* – The amount of refunded capital expenditures paid to QSE *q* based on its HLRS.
$HLRS_{q}$	none	*Hourly Load Ratio Share per QSE* – The hourly LRS calculated for QSE *q* for the hour for month M. See Section 6.6.2.4, QSE Load Ratio Share for an Operating Hour.
$MH_{q, r}$	hour	*Number of Hours in the Month per QSE per Resource*—The total number of hours in the month, when MRA *r* represented by QSE *q* is under an MRA Agreement. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Train.
$CM_{q, r, c}$	none	The number of months of the MRA Agreement period.
M	none	A month in the MRA Agreement period.
D	none	The number of days in the month.
q	none	A QSE.
c	none	An MRA Agreement.
r	none	An MRA.

[NPRR885: Insert Section 6.6.6.7 below upon system implementation:]

6.6.6.7 MRA Standby Payment

(1) The Standby Payment for MRA Service is paid to each QSE representing an MRA for each MRA Contracted Hour under performance requirements set forth in Section 22, Attachment N, Standard Form Must-Run Alternative Agreement, the MRA Request for Proposal (RFP), and the Protocols.

(2) The standby payment to each QSE representing a Generation Resource MRA registered is calculated as follows for each hour:

$$MRASBAMT_{q, r, h} = (-1) * MRASBPR_{q, r, m} * MRACCAP_{q, r, m} * MRAGRCRF_{q, r, m} * MRAARF_{q, r, m}$$

Where:

$$MRAGRCRF_{q, r, m} = (MRATCAP_{q, r, m} + MRATCAPA_{q, r, m}) / MRACCAP_{q, r, m}$$

(3) The standby payment to each QSE representing an Other Generation MRA or Demand Response MRA is calculated as follows for each hour:

$$MRASBAMT_{q, r, h} = (-1) * MRASBPR_{q, r, m} * MRACCAP_{q, r, m} * MRAEPRF_{q, r, m} * MRAARF_{q, r, m}$$

(4) The MRA Capacity Availability Reduction Factor (MRAARF) is calculated as:

For initial Settlement

$$MRAARF_{q, r, m} = 1$$

For all other resettlements

If $MRACMAF_{q, r, m} \geq 95\% * MRATA_{q, r, m}$

$$MRAARF_{q, r, m} = 1$$

If $85\% * MRATA_{q, r, m} \leq MRACMAF_{q, r,m} < 95\% * MRATA_{q, r, m}$

$$MRAARF_{q, r, m} = MRACMAF_{q, r, m}$$

If $MRACMAF_{q, r, m} < 85\% * MRATA_{q, r, m}$

$$MRAARF_{q, r, m} = (MRACMAF_{q, r, m})^2$$

Where:

For an MRA registered as a Generation Resource,

$$MRACMAF_{q, r, m} = \sum_{h} (MRAMAH_{q, r, h}) / (MH_{q, r, m})$$

And,

For an MRA not registered as a Generation Resource, the availability factor is calculated pursuant to Section 3.14.4.6.4, MRA Availability Measurement and Verification.

The above variables are defined as follows:

Variable	Unit	Definition
$MRASBAMT_{q, r, h}$	$	*Must-Run Alternative Standby Amount per QSE per Resource by hour*—The hourly standby payment amount for MRA *r* represented by QSE *q*, for the hour *h*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Train.
$MRASBPR_{q, r, m}$	$/MW per hour	*Must-Run Alternative Standby Price per QSE per Resource per MW per hour*—The hourly standby price per MW for MRA *r* represented by QSE *q*, for the month *m*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Train.

$MRAEPRF_{q, r, m}$	None	*Must-Run Alternative Event Performance Reduction Factor per QSE per Resource*—The Event Performance Reduction Factor of the MRA *r* represented by QSE *q*, for each hour of the month m, as calculated per Section 3.14.4.6.5, MRA Event Performance Measurement and Verification. If the MRAEPRF for the month is not available then the most recent MRAEPRF prior to month of the Operating Day shall be used. If no previous MRAEPRF is available then MRAEPRF shall be set to 1. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$MRAGRCRF_{q, r, m}$	None	*Must-Run Alternative Generation Resource Capacity Reduction Factor per QSE per Resource per month* —The capacity reduction factor of the Generation Resource MRA *r* represented by QSE *q*, for each hour of the month *m*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$MRACCAP_{q, r, m}$	MW	*Must-Run Alternative Contract Capacity per QSE per Resource*—The capacity of MRA *r* represented by QSE *q* as specified in the MRA Agreement, for the MRA Contracted Month *m*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$MRAARF_{q, r, m}$	None	*Must-Run Alternative Availability Reduction Factor per QSE per Resource*—The availability reduction factor of MRA *r* represented by QSE *q*, for each hour of the MRA Contracted Month *m*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$MRATCAPA_{q, r, m}$	MW	*Must-Run Alternative Testing Capacity Adjustment per month*—The testing capacity adjustment factor of an MRA *r* represented by QSE *q*, for each hour of the MRA Contracted Month *m*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$MRATCAP_{q, r, m}$	MW	*Must-Run Alternative Testing Capacity per month*—The testing capacity value of MRA *r* represented by QSE *q*, for each hour of the MRA Contracted Month *m*. If the MRATCAP for the month is not available then the most recent MRATCAP prior to month of the Operating Day shall be used. If no previous MRATCAP is available, then MRATCAP shall be set to MRACCAP. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Train.
$MRATA_{q, r, m}$	None	*Must-Run Alternative Target Availability per QSE per Resource per Month*—The monthly Target Availability of MRA *r* represented by QSE *q*, as specified in the MRA Agreement and divided by 100 to convert a percentage to a fraction. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Train.
$MRACMAF_{q, r, m}$	None	*Must-Run Alternative Calculated Monthly Availability Factor per QSE per Resource*—The calculated monthly availability factor of MRA *r* represented by QSE *q*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$MRAMAH_{q, r, h}$	Hour	*Number of Available Hours in the Month per QSE per Resource*— For an MRA registered as a Generation Resource, the total number of hours in the month when the MRA *r* represented by QSE *q* was available for the MRA Contracted Hours if the MRA's Availability Plan and telemetry both indicate availability for that hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$MH_{q, r, m}$	Hour	*Number of Total MRA Contracted Hours in the Month per QSE per Resource*— The total number of MRA Contracted Hours in the month for the MRA *r* represented by QSE *q* as indicated in the MRA Agreement. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
h	None	A MRA Contracted Hour under the MRA Agreement for the MRA Contracted month.
q	None	A QSE.

r	None	An MRA.
m	None	An MRA Contracted Month under the MRA Agreement.

(5) The total of the Standby Payments for all MRAs represented by the QSE for a given hour is calculated as follows:

$$MRASBAMTQSETOT_{q} = \sum_{r} MRASBAMT_{q, r, h}$$

The above variables are defined as follows:

Variable	Unit	Definition
$MRASBAMTQSETOT_{q}$	$	*Must-Run Alternative Standby Amount Total per QSE per hour* — The total of the Standby Payments for all MRAs represented by the QSE *q* for the hour.
$MRASBAMT_{q, r, h}$	$	*Must-Run Alternative Standby Amount per QSE per Resource by hour* — The hourly standby payment amount for MRA *r* represented by QSE *q*, for the hour *h*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Train.
q	None	A QSE.
r	None	An MRA.
h	None	An MRA Contracted Hour under the MRA Agreement for the calendar month.

(6) The total of the Standby Payments for a given hour is calculated as follows:

$$MRASBAMTTOT = \sum_{q} MRASBAMTQSETOT_{q}$$

The above variables are defined as follows:

Variable	Unit	Definition
MRASBAMTTOT	$	*Must-Run Alternative Standby Amount Total* —The total of the Standby Payments to all QSEs *q* for all MRAs for the hour.
$MRASBAMTQSETOT_{q}$	$	*Must-Run Alternative Standby Amount Total per QSE per hour* —The total of the Standby Payments for all MRAs represented by the QSE *q* for the hour.
q	None	A QSE.

[NPRR885: Insert Section 6.6.6.8 below upon system implementation:]

6.6.6.8 MRA Contributed Capital Expenditures Payment

(1) The contributed capital expenditure payment to each QSE for each MRA for each MRA Contracted Hour of each month is calculated as follows:

$$\mathbf{MRACAPEXAMT_{q, r} = (-1) * MRAMCAPEX_{q, r, m} / MH_{q, r, m}}$$

The above variables are defined as follows:

Variable	Unit	Definition
MRACAPEXAMT $_{q, r}$	$	*Must-Run Alternative Contributed Capital Expenditures Amount per QSE per Resource per hour*— The total monthly contributed capital expenditure payment for MRA *r* represented by QSE *q*, allocated to each MRA Contracted Hour. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Train.
MRAMCAPEX $_{q, r, m}$	$	*Must-Run Alternative Monthly Contributed Capital Expenditures per QSE*— The total monthly contributed capital expenditures for MRA *r* represented by QSE *q*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Train.
MH $_{q, r, m}$	hour	*Number of Total Contracted Hours in the Month per QSE per Resource*—The total number of MRA Contracted Hours in the MRA Contracted Month *m* for the MRA *r* represented by QSE *q* as indicated in the MRA Agreement. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
q	none	A QSE.
r	none	An MRA.
m	none	An MRA Contracted Month under the MRA Agreement.

(2) The total of the contributed capital expenditure payments for all MRAs represented by the QSE for a given hour is calculated as follows:

$$\mathbf{MRACAPEXAMTQSETOT}_{q} = \sum_{r} \mathbf{MRACAPEXAMT}_{q, r}$$

The above variables are defined as follows:

Variable	Unit	Definition
MRACAPEXAMTQSETOT $_{q}$	$	*Must-Run Alternative Contributed Capital Expenditures per QSE per hour* – The total contributed capital expenditures for all MRAs *r* represented by QSE *q* for the MRA Contracted Hour.
MRACAPEXAMT $_{q, r}$	$	*Must-Run Alternative Contributed Capital Expenditures Amount per QSE per Resource* – The total monthly contributed capital expenditure payment for MRA *r* represented by QSE q, allocated to each MRA Contracted Hour. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Train.
q	none	A QSE.
r	none	An MRA.

(3) The total contributed capital expenditure payments for a given MRA Contracted Hour is calculated as follows:

$$\mathbf{MRACAPEXAMTTOT} = \sum_{q} \mathbf{MRACAPEXAMTQSETOT}_{q}$$

The above variables are defined as follows:

Variable	Unit	Definition
MRACAPEXAMTTOT	$	*Must-Run Alternative Contributed Capital Expenditures per hour* – The total contributed capital expenditures to all QSEs for all MRAs for the MRA Contracted Hour.

MRACAPEXAMTQSETOT $_q$	$	*Must-Run Alternative Contributed Capital Expenditures per QSE per hour* – The total contributed capital expenditures for all MRAs represented by QSE *q* for the MRA Contracted Hour.
q	none	A QSE.

[NPRR885: Insert Section 6.6.6.9 below upon system implementation:]

6.6.6.9 MRA Payment for Deployment Event

(1) The deployment event payment to each QSE representing a Generation Resource MRA:

$$MRADEAMT_{q,r,h} = (-1) * Max\{EDPRICE_{q,r,m}, (FIP + MRACEFA_{q,r}) * MRAPSUFQ_{q,r}\} * MRAFLAG_{q,r,h} / MRAH_{q,r}$$

(2) The deployment event payment to each QSE representing a Demand Response MRA or Other Generation MRA:

$$MRADEAMT_{q,r,h} = (-1) * Max\{EDPRICE_{q,r}, (FIP + MRACEFA_{q,r}) * MRAPSUFQ_{q,r}\} * MRAEPRF_{q,r,m} / MRAH_{q,r}$$

The above variables are defined as follows:

Variable	Unit	Definition
MRADEAMT $_{q,r,h}$	$	*Must-Run Alternative Deployment Event Amount per QSE per Resource by hour*—The deployment event payment to QSE *q* for MRA *r*, for the MRA Contracted Hour *h*. Where for a Combined Cycle Train, the Resource r is the Combined Cycle Train.
FIP	$/MMBtu	*Fuel Index Price*—The FIP for the Operating Day.
EDPRICE $_{q,r}$	$	*Event Deployment Price per QSE per Resource*—The event deployment price to QSE *q* for MRA *r*, as specified in the MRA Agreement. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
MRAEPRF $_{q,r,m}$	None	*Must-Run Alternative Event Performance Reduction Factor per QSE per Resource* —The event performance reduction factor of the MRA *r* represented by QSE *q*, for each hour of the month *m*, as calculated per Section 3.14.4.6.5, MRA Event Performance Measurement and Verification. If the MRAEPRF for the month is not available then the most recent MRAEPRF prior to the month of the Operating Day shall be used. If no previous MRAEPRF is available then MRAEPRF shall be set to 1. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
MRAPSUFQ $_{q,r}$	MMBtu	*Must-Run Alternative Proxy Startup Fuel Quantity per QSE per Resource*—The proxy start up fuel quantity specified in the MRA Agreement for MRA *r* represented by QSE *q*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
MRAH $_{q,r}$	Hour	*Must-Run Alternative Hours*—The number of hours during which MRA *r* represented by QSE *q* received a deployment instruction for each deployment event for the Operating Day. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.

MRAFLAG $_{q, r, h}$	none	*Must-Run Alternative Flag* – An indicator to signify that an MRA *r* represented by QSE *q* followed the deployment instruction for the event for the hour *h*. An MRAFLAG value of 1 represents followed and a 0 represents did not follow the deployment. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
MRACEFA $_{q, r}$	$/MMBtu	*Must-Run Alternative Contractual Estimated Fuel Adder*—The Estimated Fuel Adder for the MRA *r* represented by QSE *q* as specified in the MRA Agreement. Where for a Combined Cycle Train, the Generation Resource *r* is the Combined Cycle Train.
q	none	A QSE.
r	none	An MRA.
m	none	An MRA Contracted Month under the MRA Agreement.
h	none	An MRA Contracted Hour under the MRA Agreement for the MRA Contracted Month.

(3) The total of the deployment event payments for all MRAs represented by the QSE for a given MRA Contracted Hour is calculated as follows:

$$\text{MRADEAMTQSETOT}_{q} = \sum_{r} \text{MRADEAMT}_{q, r, h}$$

The above variables are defined as follows:

Variable	Unit	Definition
MRADEAMTQSETOT $_{q}$	$	*Must-Run Alternative Deployment Event Amount per QSE by hour*—The total of the deployment event payments for all MRAs *r*, represented by the QSE q for the hour.
MRADEAMT $_{q, r, h}$	$	*Must-Run Alternative Deployment Event Amount per QSE per Resource by hour*—The deployment event payment to QSE *q* for MRA *r*, for the hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
q	none	A QSE.
r	none	An MRA.
h	none	An MRA Contracted Hour under the MRA Agreement for the MRA Contracted Month.

(4) The total of the deployment event payments for a given MRA Contracted Hour is calculated as follows:

$$\text{MRADEAMTTOT} = \sum_{q} \text{MRADEAMTQSETOT}_{q}$$

The above variables are defined as follows:

Variable	Unit	Definition
MRADEAMTTOT	$	*Must-Run Alternative Deployment Event Amount Total by hour*—The total deployment event payment to all QSEs for all MRAs, for the hour.
MRADEAMTQSETOT $_{q}$	$	*Must-Run Alternative Deployment Event Amount per QSE by hour*—The total of the deployment event payments for all MRAs represented by the QSE *q* for the MRA Contracted Hour.

q	none	A QSE.

[NPRR885, NPRR1010, and NPRR1014: Insert applicable portions of Section 6.6.6.10 below upon system implementation for NPRR885 or NPRR1014; or upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1010:]

6.6.6.10 MRA Variable Payment for Deployment

(1) The variable payment to each QSE representing a Generation Resource MRA:

Outside of the MRA Contracted Hours, a Generation Resource MRA shall be treated in Settlements in the same manner as any Generation Resource registered with ERCOT

For MRA Contracted Hours with a deployment instruction:

$$MRAVAMT_{q,r,h} = (-1) * (MRAGRCVP_{q,r,h} - MRARTREV_{q,r,h})$$

For MRA Contracted Hours without a deployment instruction:

$$MRAVAMT_{q,r,h} = (-1) * (\text{Min}(MRAGRCVP_{q,r,h}, MRARTREV_{q,r,h}) - MRARTREV_{q,r,h})$$

Where,

$$MRAGRCVP_{q,r,h} = \sum_{i=1}^{4} \text{Max}[VPRICE_{q,r}, (FIP + MRACEFA_{q,r}) * MRAPHR_{q,r}] * \text{Min}(RTMG_{q,r,p,i}, MRACCAP_{q,r,m}/4)$$

$$MRARTREV_{q,r,h} = \sum_{i=1}^{4} \text{Max}[0, (RESREV_{q,r,gsc,p,i} + (-1) * (EMREAMT_{q,r,p,i} + VSSVARAMT_{q,r,i} + VSSEAMT_{q,r,i}))]$$

(2) The variable payment to each QSE representing an Other Generation MRA:

For MRA Contracted Hours with a deployment instruction:

$$MRAVAMT_{q,r,h} = (-1) * (MRACVP_{q,r,h} - MRACRTREV_{q,r,h})$$

For MRA Contracted Hours without a deployment instruction:

$$MRAVAMT_{q,r,h} = (-1) * (\text{Min}(MRACVP_{q,r,h}, MRACRTREV_{q,r,h}) - MRACRTREV_{q,r,h})$$

Where,

$$MRACVP_{q,r,h} = \sum_{i=1}^{4} \text{Max}[VPRICE_{q,r}, (FIP + MRACEFA_{q,r}) * MRAPHR_{q,r}] *$$

$$RTVQ_{q, r, i}$$

$$MRACRTREV_{q, r, h} = \sum_{i=1}^{4} (Max(0, Min(RTVQ_{q, r, i}, MRACCAP_{q, r, m} / 4) * RTSPP_{p, i}))$$

Where,

$$RTVQ_{q, r, i} = MRAIPF_{q, r, i} * MRACCAP_{q, r, m} / 4$$

(3) The variable payment to each QSE representing a Demand Response MRA:

For MRA Contracted Hours with a deployment instruction:

$$MRAVAMT_{q, r, h} = (-1) * \sum_{i=1}^{4} Max[VPRICE_{q, r}, (FIP + MRACEFA_{q, r}) * MRAPHR_{q, r}] * RTVQ_{q, r, i}$$

Where,

$$RTVQ_{q, r, i} = MRAIPF_{q, r, i} * MRACCAP_{q, r, m} / 4$$

The above variables are defined as follows:

Variable	Unit	Definition
$MRAVAMT_{q, r, h}$	$	*Must-Run Alternative Variable Amount per QSE per Resource by hour*—The variable payment to QSE *q* for MRA *r*, for the hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$MRAGRCVP_{q, r, h}$	$	*Must-Run Alternative Generation Resource Calculated Variable Payment per QSE per Resource* - The variable payment to QSE *q* for Generation Resource MRA *r*, for the hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
FIP	$/MMBtu	*Fuel Index Price*—The FIP for the Operating Day.
$MRARTREV_{q, r, h}$	$	*Must-Run Alternative Real-Time Revenues per QSE per Resource by hour*—The revenues received in Real-Time for QSE *q* for MRA *r*, for the hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$MRACCAP_{q, r, m}$	MW	*Must-Run Alternative Contract Capacity per QSE per Resource*—The capacity of MRA *r* represented by QSE *q* as specified in the MRA Agreement, for the month. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$MRAIPF_{q, r, i}$	none	*Must-Run Alternative Interval Performance Factor per QSE per Resource for the interval*— The interval performance factor of the MRA *r* represented by QSE *q*, for the 15-minute Settlement Interval *i*.
$MRACVP_{q, r, h}$	$	*Must-Run Alternative Calculated Variable Payment per QSE per Resource* - The variable payment to QSE *q* for an Other Generation MRA or Demand Response MRA *r*, for the hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.

VSSVARAMT $_{q, r, i}$	$	*Voltage Support Service VAr Amount per QSE per Generation Resource* - The payment to QSE *q* for the VSS provided by Generation Resource MRA *r*, for the 15-minute Settlement Interval *i*. Where for a combined cycle resource, *r* is a Combined Cycle Train.
VSSEAMT $_{q, r, i}$	$	*Voltage Support Service Energy Amount per QSE per Generation Resource*—The lost opportunity payment to QSE *q* for ERCOT-directed VSS from Generation Resource MRA *r* for the 15-minute Settlement Interval. Where for a combined cycle resource, *r* is a Combined Cycle Train.
RESREV $_{q, r, gsc, p, i}$	$	*Resource Share Revenue Settlement Payment*—The Resource share of the total payment to the entire Facility with a net metering arrangement attributed to Generation Resource MRA *r* that is part of a generation site code *gsc* for the QSE *q* at Settlement Point *p*, for the 15-minute Settlement Interval *i*.
EMREAMT $_{q, r, p, i}$	$	*Emergency Energy Amount per QSE per Settlement Point per unit per interval*—The payment to QSE *q* as additional compensation for the additional energy or Ancillary Services produced or consumed by Resource MRA *r* at Resource Node *p* in Real-Time during the Emergency Condition, for the 15-minute Settlement Interval *i*. Payment for emergency energy is made to the Combined Cycle Train.
VPRICE $_{q, r}$	$/MWh	*Must-Run Alternative Variable Price per QSE per Resource*—The variable price for QSE *q* for MRA *r*, as specified in the MRA Agreement. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
MRAPHR $_{q, r}$	MMBtu /MWh	*Must-Run Alternative Proxy Heat Rate per QSE per Resource – A proxy heat rate value for* MRA *r* represented by QSE *q, as* specified in the MRA Agreement. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
MRACRTREV $_{q, r, h}$	$	*Must-Run Alternative Calculated Real-Time Revenues per QSE per Resource* —The calculated variable revenue to QSE *q* for MRA *r*, for the hour.
RTVQ $_{q, r, i,}$	MWh	*Real-Time Variable Quantity per QSE per Resource by Settlement Interval* — The Real-Time variable quantity for MRA *r* represented by QSE *q*, for the 15-minute Settlement Interval *i*.
RTMG $_{q, r, p, i}$	MWh	*Real-Time Metered Generation per QSE per Settlement Point per Generation Resource*—The metered generation of Resource *r* at Resource Node *p* represented by QSE *q* in Real-Time for the 15-minute Settlement Interval *i*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
MRACEFA $_{q, r}$	$/MMBtu	*Must-Run Alternative Contractual Estimated Fuel Adder*—The Estimated Fuel Adder that is contractually agreed upon in Section 22, Attachment N, Standard Form Must-Run Alternative Agreement. Where for a Combined Cycle Train, the Generation Resource *r* is the Combined Cycle Train.
RTSPP $_{p, i}$	$/MWh	*Real-Time Settlement Point Price*—The Real-Time Settlement Point Price at the Settlement Point *p* for the 15-minute Settlement Interval *i*.
q	none	A QSE.
r	none	An MRA.
m	none	An MRA Contracted Month.
h	none	An MRA Contracted Hour for the MRA Contracted Month.
i	none	A 15-minute Settlement Interval during the MRA Contracted Hours.
gsc	none	A generation site code.

p	none	A Resource Node Settlement Point.

(2) The total of the variable payments for all MRAs represented by the QSE for a given hour is calculated as follows:

$$MRAVAMTQSETOT_{q} = \sum_{r} MRAVAMT_{q, r, h}$$

The above variables are defined as follows:

Variable	Unit	Definition
$MRAVAMTQSETOT_{q}$	$	*Must-Run Alternative Variable Amount Total per QSE by hour*—The total variable payment for all MRAs *r*, represented by the QSE *q*, for the hour.
$MRAVAMT_{q, r, h}$	$	*Must-Run Alternative Variable Amount per QSE per Resource by hour*—The variable payment to QSE *q* representing MRA *r* for the hour *h*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
q	none	A QSE.
r	none	An MRA.
h	none	An MRA Contracted Hour for the MRA Contracted Month.

(3) The total of the variable payments for a given MRA Contracted Hour is calculated as follows:

$$MRAVAMTTOT = \sum_{q} MRAVAMTQSETOT_{q}$$

The above variables are defined as follows:

Variable	Unit	Definition
MRAVAMTTOT	$	*Must-Run Alternative Variable Amount Total by hour*—The total variable payments for the MRA Contracted Hour.
$MRAVAMTQSETOT_{q}$	$	*Must-Run Alternative Variable Amount Total per QSE by hour*—The total variable payment for all MRAs, represented by the QSE *q*, for the MRA Contracted Hour.
q	none	A QSE.

[NPRR885: Insert Section 6.6.6.11 below upon system implementation:]

6.6.6.11 MRA Charge for Unexcused Misconduct

(1) If one or more Misconduct Events are not excused, as provided for in Section 3.14.4.8, MRA Misconduct Events, then ERCOT shall charge the QSE that represents the MRA an unexcused misconduct amount for the Operating Day as follows:

$$MRAUMAMT_{q, r, h} = \$10{,}000 * MRAUMFLAG_{q, r, d} / MRACH_{q, r, d}$$

The above variable is defined as follows:

Variable	Unit	Definition
MRAUMAMT $_{q, r, h}$	$	*Must-Run Alternative Unexcused Misconduct Charge per QSE per Resource*—The charge to QSE *q* for the unexcused Misconduct Event of MRA *r* for the hour *h*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
MRAUMFLAG $_{q, r, d}$	none	*Must-Run Alternative Unexcused Misconduct Flag per QSE per Resource*—A flag for the QSE *q* for the unexcused Misconduct Event of MRA *r* for an Operating Day *d*. The MRAUMFLAG of MRA represented by QSE *q*, 1 for a unexcused misconduct and 0 for none, for the day. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
MRACH $_{q, r, d}$	hour	*Must-Run Alternative Contract Hours in the Operating Day* – The number of MRA Contracted Hours for QSE *q* for the MRA *r* for an Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
q	none	A QSE.
r	none	An MRA.
d	none	An Operating Day within a month under an MRA Agreement
h	none	An MRA Contracted Hour for the MRA Contracted Month.

(2) The total of the charges to each QSE for unexcused Misconduct Events of all MRAs represented by this QSE for a given hour is calculated as follows:

$$\text{MRAUMAMTQSETOT}_{q} = \sum_{r} \text{MRAUMAMT}_{q, r, h}$$

The above variables are defined as follows:

Variable	Unit	Definition
MRAUMAMTQSETOT $_{q}$	$	*Must-Run Alternative Unexcused Misconduct Amount per QSE*—The total of the charges to QSE *q* for unexcused Misconduct Events of the MRAs for an MRA Contracted Hour.
MRAUMAMT $_{q, r, h}$	$	*Must-Run Alternative Unexcused Misconduct Charge per QSE per Resource*—The charge to QSE *q* for the unexcused Misconduct Event of MRA *r* for the hour *h*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
q	none	A QSE.
r	none	An MRA.
h	none	An MRA Contracted Hour for the MRA Contracted Month.

(3) The total of the charges to all QSEs for unexcused Misconduct Events of all MRAs for an MRA Contracted Hour is calculated as follows:

$$\text{MRAUMAMTTOT} = \sum_{q} \text{MRAUMAMTQSETOT}_{q}$$

The above variables are defined as follows:

Variable	Unit	Definition
MRAUMAMTTOT	$	*Must-Run Alternative Unexcused Misconduct Amount Total per hour*—The total of the charges for unexcused Misconduct Events for the hour.
MRAUMAMTQSETOT $_q$	$	*Must-Run Alternative Unexcused Misconduct Amount per QSE*—The total of the charges to QSE *q* for unexcused Misconduct Events of the MRAs for an MRA Contracted Hour.
q	none	A QSE.

[NPRR885: Insert Section 6.6.6.12 below upon system implementation:]

6.6.6.12 MRA Service Charge

(1) The total MRA cost for all MRAs is allocated to the QSEs representing Loads based on HLRS. The MRA Service charge to each QSE for a given hour is calculated as follows:

$$LAMRAAMT_q = (-1) * (MRASBAMTTOT + MRACAPEXAMTTOT + MRADEAMTTOT + MRAVAMTTOT + MRAUMAMTTOT) * HLRS_q$$

The above variables are defined as follows:

Variable	Unit	Definition
LAMRAAMT $_q$	$	*Load-Allocated Must-Run Alternative Amount per QSE*—The MRA cost allocated to QSE *q* based on its HLRS.
MRASBAMTTOT	$	*Must-Run Alternative Standby Amount Total* —The total of the Standby Payments to all QSEs *q* for all MRAs for the hour.
MRACAPEXAMTTOT	$	*Must-Run Alternative Contributed Capital Expenditures per hour* - The total contributed capital expenditures to all QSEs *q* for all MRAs *r* for the hour.
MRADEAMTTOT	$	*Must-Run Alternative Deployment Event Amount Total by hour*—The total deployment event payment to all QSEs *q* for all MRAs *r*, for the hour.
MRAVAMTTOT	$	*Must-Run Alternative Variable Amount Total by hour*—The total variable payments for the hour.
MRAUMAMTTOT	$	*Must-Run Alternative Unexcused Misconduct Amount Total per hour*—The total of the charges for unexcused Misconduct Events for the hour.
HLRS $_q$	none	*The hourly LRS calculated for QSE q for the hour.* See Section 6.6.2.4, QSE Load Ratio Share for an Operating Hour.
q	none	A QSE.

6.6.7 Voltage Support Settlement

6.6.7.1 Voltage Support Service Payments

(1) All other Generation Resources shall be eligible for compensation for Reactive Power production in accordance with Section 6.5.7.7, Voltage Support Service, only if ERCOT issues a Dispatch Instruction that results in the following unit operation:

(a) When ERCOT instructs the Generation Resource to exceed its Unit Reactive Limit (URL) and the Generation Resource provides additional Reactive Power, then ERCOT shall pay for the additional Reactive Power provided at a price that recognizes the avoided cost of reactive support Resources on the transmission network.

(b) Any real power reduction directed by ERCOT through VDIs to provide for additional reactive capability for voltage support must be compensated as a lost opportunity payment

(2) The payment for a given 15-minute Settlement Interval to each QSE representing a Generation Resource that operates in accordance with an ERCOT Dispatch Instruction is calculated as follows:

Depending on the Dispatch Instruction, payment for Volt-Amperes reactive (VAr):

If $VSSVARLAG_{q,r} > 0$

$$\mathbf{VSSVARAMT_{q,r}} = \mathbf{(-1) * VSSVARPR * VSSVARLAG_{q,r}}$$

If $VSSVARLEAD_{q,r} > 0$

$$\mathbf{VSSVARAMT_{q,r}} = \mathbf{(-1) * VSSVARPR * VSSVARLEAD_{q,r}}$$

Where:

$VSSVARLAG_{q,r}$ = Max [0, Min (¼ * $VSSVARIOL_{q,r}$, $RTVAR_{q,r}$) – (¼ * $URLLAG_{q,r}$)]

$VSSVARLEAD_{q,r}$ = Max $\{0, [(¼ * URLLEAD_{q,r}) – Max ((¼ * VSSVARIOL_{q,r}), RTVAR_{q,r})]\}$

$URLLAG_{q,r}$ = 0.32868 * $HSL_{q,r}$

$URLLEAD_{q,r}$ = (-1) * 0.32868 * $HSL_{q,r}$

The above variables are defined as follows:

Variable	Unit	Definition
VSSVARAMT $_{q, r}$	$	*Voltage Support Service VAr Amount per QSE per Generation Resource* - The payment to QSE *q* for the VSS provided by Generation Resource *r*, for the 15-minute Settlement Interval. Where for a combined cycle resource, *r* is a Combined Cycle Train.
VSSVARPR	$/MVArh	*Voltage Support Service VAr Price* - The price for instructed MVAr beyond a Generation Resource's URL currently is $2.65/MVArh (based on $50.00/installed kVAr).
VSSVARLAG $_{q, r}$	MVArh	*Voltage Support Service VAr Lagging per QSE per Generation Resource* - The instructed portion of the Reactive Power above the Generation Resource's lagging URL for Generation Resource *r* represented by QSE *q*, for the 15-minute Settlement Interval. Where for a combined cycle resource, *r* is a Combined Cycle Train.
VSSVARLEAD $_{q, r}$	MVArh	*Voltage Support Service VAr Leading per QSE per Generation Resource* - The instructed portion of the Reactive Power below the Generation Resource's leading URL for Generation Resource *r* represented by QSE *q*, for the 15-minute Settlement Interval. Where for a combined cycle resource, *r* is a Combined Cycle Train.
VSSVARIOL $_{q, r}$	MVAr	*Voltage Support Service VAr Instructed Output Level per QSE per Generation Resource*—The instructed Reactive Power output level of Generation Resource *r* represented by QSE *q*, lagging Reactive Power if positive and leading Reactive Power if negative, for the 15-minute Settlement Interval. Where for a combined cycle resource, *r* is a Combined Cycle Train.
RTVAR $_{q, r}$	MVArh	*Real-Time VAr per QSE per Resource*—The netted Reactive Energy measured for Generation Resource *r* represented by QSE *q*, for the 15-minute Settlement Interval. Where for a combined cycle resource, *r* is a Combined Cycle Train.
URLLAG $_{q, r}$	MVAr	*Unit Reactive Limit Lagging per QSE per Resource*—The URL for lagging Reactive Power of the Generation Resource *r* represented by QSE *q* as determined in accordance with these Protocols. Its value is positive. Where for a combined cycle resource, *r* is a Combined Cycle Train.
URLLEAD $_{q, r}$	MVAr	*Unit Reactive Limit Leading per QSE per Resource*—The URL for leading Reactive Power of the Generation Resource *r* represented by QSE *q* as determined in accordance with these Protocols. Its value is negative. Where for a combined cycle resource, *r* is a Combined Cycle Train.
HSL $_{q, r}$	MW	*High Sustained Limit*—The HSL of a Generation Resource as defined in Section 2, Definitions and Acronyms, for the hour that includes the Settlement Interval *i*. Where for a combined cycle resource, *r* is a Combined Cycle Generation Resource.
q	none	A QSE.
r	none	A Generation Resource.

(3) The total additional compensation to each QSE for VSS for the 15-minute Settlement Interval is calculated as follows:

$$\mathbf{VSSVARAMTQSETOT_q} = \sum_{r} \mathbf{VSSVARAMT_{q,r}}$$

Variable	Unit	Definition
VSSVARAMT $_{q, r}$	$	*Voltage Support Service VAr Amount per QSE per Generation Resource*—The payment to QSE *q* for the VSS provided by Generation Resource *r*, for the 15-minute Settlement Interval. Where for a combined cycle resource, *r* is a Combined Cycle Train.
VSSVARAMTQSETOT $_{q}$	$	*Voltage Support VAr Amount QSE total per QSE*—The total of the payments to QSE *q* as compensation for VSS by this QSE for the 15-minute Settlement Interval.
q	none	A QSE.
r	none	A Generation Resource.

(4) The lost opportunity payment, if applicable:

$$\mathbf{VSSEAMT}_{q,r} = \mathbf{(-1) * Max\ (0, (RTSPP}_{p} \mathbf{- RTEOCOST}_{q,r,i}\mathbf{) * Max\ (0, (HSL}_{q,r} \mathbf{* \frac{1}{4} - RTMG}_{q,r}\mathbf{)))}$$

The above variables are defined as follows:

Variable	Unit	Definition
VSSEAMT $_{q, r}$	$	*Voltage Support Service Energy Amount per QSE per Generation Resource*—The lost opportunity payment to QSE *q* for ERCOT-directed VSS from Generation Resource *r* for the 15-minute Settlement Interval. Where for a combined cycle resource, *r* is a Combined Cycle Train.
RTMG $_{q, r}$	MWh	*Real-Time Metered Generation per QSE per Resource*—The Real-Time metered generation of Generation Resource *r* represented by QSE *q*, for the 15-minute Settlement Interval. Where for a combined cycle resource, *r* is a Combined Cycle Train.
RTSPP $_{p}$	$/MWh	*Real-Time Settlement Point Price*—The Real-Time Settlement Point Price at the Resource Node for the 15-minute Settlement Interval.
RTEOCOST $_{q, r, i}$	$/MWh	*Real-Time Energy Offer Curve Cost*—The Energy Offer Curve Cost for Resource *r* represented by QSE *q*, for the Resource's generation above the LSL for the Settlement Interval *i*. See Section 4.4.9.3.3, Energy Offer Curve Costs. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
HSL $_{q, r}$	MW	*High Sustained Limit Generation per QSE per Settlement Point per Resource*—The HSL of Generation Resource *r* represented by QSE *q* at Resource Node *p* for the hour that includes the 15-minute Settlement Interval. Where for a combined cycle resource, *r* is a Combined Cycle Generation Resource.
LSL $_{q, r}$	MW	*Low Sustained Limit Generation per QSE per Settlement Point per Resource*—The LSL of Generation Resource *r* represented by QSE *q* at Resource Node *p* for the hour that includes the 15-minute Settlement Interval. Where for a combined cycle resource, *r* is a Combined Cycle Generation Resource.
q	none	A QSE.
r	none	A Generation Resource.
p	none	A Resource Node Settlement Point.

(5) The total of the payments to each QSE for ERCOT-directed power reduction to provide VSS for a given 15-minute Settlement Interval is calculated as follows:

$$\mathbf{VSSEAMTQSETOT}_{q} = \sum_{r} \mathbf{VSSEAMT}_{q,r}$$

The above variables are defined as follows:

Variable	Unit	Definition
VSSEAMTQSETOT $_q$	$	*Voltage Support Service Lost Opportunity Amount QSE Total per QSE*—The total of the lost opportunity payments to QSE *q* for providing VSS for providing ERCOT-directed VSS for the 15-minute Settlement Interval.
VSSEAMT $_{q, r}$	$	*Voltage Support Service Energy Amount per QSE per Settlement Point per Generation Resource*—The lost opportunity payment to QSE *q* for ERCOT-directed VSS from Generation Resource *r* for the 15-minute Settlement Interval for the 15-minute Settlement Interval. Where for a combined cycle resource, *r* is a Combined Cycle Train.
q	none	A QSE.
r	none	A Generation Resource.

[NPRR1014: Replace Section 6.6.7.1 above with the following upon system implementation:]

6.6.7.1 Voltage Support Service Payments

(1) All other Generation Resources or ESRs shall be eligible for compensation for Reactive Power production in accordance with Section 6.5.7.7, Voltage Support Service, only if ERCOT issues a Dispatch Instruction that results in the following unit operation:

(a) When ERCOT instructs the Generation Resource or ESR to exceed its Unit Reactive Limit (URL) and the Generation Resource or ESR provides additional Reactive Power, then ERCOT shall pay for the additional Reactive Power provided at a price that recognizes the avoided cost of reactive support Resources on the transmission network.

(b) Any real power reduction directed by ERCOT through VDIs to provide for additional reactive capability for voltage support must be compensated as a lost opportunity payment

(2) The payment for a given 15-minute Settlement Interval to each QSE representing a Generation Resource or ESR that operates in accordance with an ERCOT Dispatch Instruction is calculated as follows:

Depending on the Dispatch Instruction, payment for Volt-Amperes reactive (VAr):

If VSSVARLAG $_{q, r} > 0$

$$\mathbf{VSSVARAMT}_{q,r} = \mathbf{(-1) * VSSVARPR * VSSVARLAG}_{q,r}$$

If $VSSVARLEAD_{q,r} > 0$

$$\mathbf{VSSVARAMT_{q,r} = (-1) * VSSVARPR * VSSVARLEAD_{q,r}}$$

Where:

$VSSVARLAG_{q,r}$ = Max [0, Min (¼ * $VSSVARIOL_{q,r}$, $RTVAR_{q,r}$) – (¼ * $URLLAG_{q,r}$)]

$VSSVARLEAD_{q,r}$ = Max {0, [(¼ * $URLLEAD_{q,r}$) – Max ((¼ * $VSSVARIOL_{q,r}$), $RTVAR_{q,r}$)]}

And:

If an ESR has a net withdrawal for the Settlement Interval, then:

$URLLAG_{q,r}$ = 0.32868 * ABS($LSL_{q,r}$)

$URLLEAD_{q,r}$ = (-1) * 0.32868 * ABS($LSL_{q,r}$)

Otherwise:

$URLLAG_{q,r}$ = 0.32868 * $HSL_{q,r}$

$URLLEAD_{q,r}$ = (-1) * 0.32868 * $HSL_{q,r}$

The above variables are defined as follows:

Variable	Unit	Definition
$VSSVARAMT_{q,r}$	$	*Voltage Support Service VAr Amount per QSE per Resource* - The payment to QSE *q* for the VSS provided by Resource *r*, for the 15-minute Settlement Interval. Where for a combined cycle resource, *r* is a Combined Cycle Train.
VSSVARPR	$/MVArh	*Voltage Support Service VAr Price* - The price for instructed MVAr beyond a Resource's URL currently is $2.65/MVArh (based on $50.00/installed kVAr).
$VSSVARLAG_{q,r}$	MVArh	*Voltage Support Service VAr Lagging per QSE per Resource* - The instructed portion of the Reactive Power above the Generation Resource's lagging URL for Resource *r* represented by QSE *q*, for the 15-minute Settlement Interval. Where for a combined cycle resource, *r* is a Combined Cycle Train.
$VSSVARLEAD_{q,r}$	MVArh	*Voltage Support Service VAr Leading per QSE per Resource* - The instructed portion of the Reactive Power below the Resource's leading URL for Resource *r* represented by QSE *q*, for the 15-minute Settlement Interval. Where for a combined cycle resource, *r* is a Combined Cycle Train.

VSSVARIOL $_{q, r}$	MVAr	*Voltage Support Service VAr Instructed Output Level per QSE per Resource*—The instructed Reactive Power output level of Resource *r* represented by QSE *q*, lagging Reactive Power if positive and leading Reactive Power if negative, for the 15-minute Settlement Interval. Where for a combined cycle resource, *r* is a Combined Cycle Train.
RTVAR $_{q, r}$	MVArh	*Real-Time VAr per QSE per Resource*—The netted Reactive Energy measured for Resource *r* represented by QSE *q*, for the 15-minute Settlement Interval. Where for a combined cycle resource, *r* is a Combined Cycle Train.
URLLAG $_{q, r}$	MVAr	*Unit Reactive Limit Lagging per QSE per Resource*—The URL for lagging Reactive Power of the Resource *r* represented by QSE *q* as determined in accordance with these Protocols. Its value is positive. Where for a combined cycle resource, *r* is a Combined Cycle Train.
URLLEAD $_{q, r}$	MVAr	*Unit Reactive Limit Leading per QSE per Resource*—The URL for leading Reactive Power of the Resource *r* represented by QSE *q* as determined in accordance with these Protocols. Its value is negative. Where for a combined cycle resource, *r* is a Combined Cycle Train.
HSL $_{q, r}$	MW	*High Sustained Limit*—The HSL of Resource *r* represented by QSE *q* as defined in Section 2, Definitions and Acronyms, for the hour that includes the Settlement Interval. Where for a combined cycle resource, *r* is a Combined Cycle Generation Resource.
LSL $_{q, r}$	MW	*Low Sustained Limit*—The LSL for Resource *r* represented by QSE *q*, as defined in Section 2, for the hour that includes the Settlement Interval.
q	none	A QSE.
r	none	A Generation Resource or ESR.

(3) The total additional compensation to each QSE for voltage support service for the 15-minute Settlement Interval is calculated as follows:

$$\mathbf{VSSVARAMTQSETOT_q} = \sum_{r} \mathbf{VSSVARAMT_{q,r}}$$

Variable	Unit	Definition
VSSVARAMT $_{q, r}$	$	*Voltage Support Service VAr Amount per QSE per Resource*—The payment to QSE *q* for the VSS provided by Resource *r*, for the 15-minute Settlement Interval. Where for a combined cycle resource, *r* is a Combined Cycle Train.
VSSVARAMTQSETOT $_{q}$	$	*Voltage Support VAr Amount QSE total per QSE*—The total of the payments to QSE *q* as compensation for VSS by this QSE for the 15-minute settlement interval.
q	None	A QSE.
r	None	A Generation Resource or ESR.

(4) The lost opportunity payment, if applicable:

If an ESR has a net withdrawal for the Settlement Interval, then:

$VSSEAMT_{q,r}$ = (-1) * Max (0, $RTSPP_p$) * Max (0, (ABS($LSL_{q,r}$ * ¼ - $NETVSSA_{q,r}$)))

Otherwise:

$VSSEAMT_{q,r}$ = (-1) * Max (0, ($RTSPP_p$ – $RTEOCOST_{q,r,i}$) * Max (0, ($HSL_{q,r}$ * ¼ - $NETVSSA_{q,r}$)))

Where:

$NETVSSA_{q,r} = RTCL_{q,r} + RTMG_{q,r}$

For an ESR that is not a WSL:

$RTCL_{q,r} = \sum_{b} MEBR_{q,r,b}$

And for an ESR that is a WSL:

$RTCL_{q,r} = \sum_{b} MEBL_{q,r,b}$

The above variables are defined as follows:

Variable	Unit	Definition
$VSSEAMT_{q,r}$	$	*Voltage Support Service Energy Amount per QSE per Resource*—The lost opportunity payment to QSE *q* for ERCOT-directed VSS from Resource *r* for the 15-minute Settlement Interval. Where for a combined cycle resource, *r* is a Combined Cycle Train.
$RTMG_{q,r}$	MWh	*Real-Time Metered Generation per QSE per Resource*—The Real-Time metered generation of Resource *r* represented by QSE *q*, for the 15-minute Settlement Interval. Where for a combined cycle resource, *r* is a Combined Cycle Train.
$RTSPP_p$	$/MWh	*Real-Time Settlement Point Price*—The Real-Time Settlement Point Price at the Resource Node for the 15-minute Settlement Interval.
$RTEOCOST_{q,r,i}$	$/MWh	Real-Time Energy Offer Curve Cost - The Energy Offer Curve Cost for Resource *r* represented by QSE *q*, for the Resource's generation above the LSL for the Settlement Interval *i*. See Section 4.4.9.3.3, Energy Offer Curve Costs. Where for an ESR, RTEOCOST shall be set to zero. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$NETVSSA_{q,r}$	MWh	*Net VSS Activity*—The sum of the total energy metered by the Settlement Meter which measures ESR load and the RTMG, for Resource *r* represented by the QSE *q* for the 15-minute Settlement Interval.
$RTCL_{q,r}$	MWh	*Real-Time Charging Load per QSE per Resource* —The charging load for Resource *r* represented by the QSE *q*, represented as a negative value, for the 15-minute 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 ESR load that is not WSL for the 15-minute Settlement Interval represented as a negative value, for the QSE *q*, Resource *r*, at bus *b*.
HSL $_{q, r}$	MW	*High Sustained Limit per QSE per Settlement Point per Resource*—The HSL of Resource *r* represented by QSE *q* at Resource Node *p* for the hour that includes the 15-minute Settlement Interval. Where for a combined cycle resource, *r* is a Combined Cycle Generation Resource.
LSL $_{q, r}$	MW	*Low Sustained Limit per QSE per Settlement Point per Resource*—The LSL of Resource *r* represented by QSE *q* at Resource Node *p* for the hour that includes the 15-minute Settlement Interval. Where for a combined cycle resource, *r* is a Combined Cycle Generation Resource.
q	none	A QSE.
r	none	A Generation Resource or ESR.
p	none	A Resource Node Settlement Point.
b	none	An Electrical Bus.

(5) The total of the payments to each QSE for ERCOT-directed power reduction to provide VSS for a given 15-minute Settlement Interval is calculated as follows:

$$\mathbf{VSSEAMTQSETOT}_{q} = \sum_{r} \mathbf{VSSEAMT}_{q, r}$$

The above variables are defined as follows:

Variable	Unit	Definition
VSSEAMTQSETOT $_{q}$	$	*Voltage Support Service Lost Opportunity Amount QSE Total per QSE*—The total of the lost opportunity payments to QSE *q* for providing VSS for providing ERCOT-directed VSS for the 15-minute Settlement Interval.
VSSEAMT $_{q, r}$	$	*Voltage Support Service Energy Amount per QSE per Settlement Point per Resource*—The lost opportunity payment to QSE *q* for ERCOT-directed VSS from Resource *r* for the 15-minute Settlement Interval for the 15-minute Settlement Interval. Where for a combined cycle resource, *r* is a Combined Cycle Train.
q	none	A QSE.
r	none	A Generation Resource or ESR.

6.6.7.2 Voltage Support Charge

(1) ERCOT shall charge each QSE representing LSEs the total payment for VSS as specified in Section 6.6.7.1, Voltage Support Service Payments, based on a LRS. The charge to each QSE for a given 15-minute Settlement Interval is calculated as follows:

$$\mathbf{LAVSSAMT}_{q} = \mathbf{(-1) * (VSSVARAMTTOT + VSSEAMTTOT) * LRS}_{q}$$

Where:

$$VSSVARAMTTOT = \sum_{q} VSSVARAMTQSETOT_{q}$$

$$VSSEAMTTOT = \sum_{q} VSSEAMTQSETOT_{q}$$

The above variables are defined as follows:

Variable	Unit	Definition
$LAVSSAMT_{q}$	$	*Load-Allocated Voltage Support Service Amount per QSE*—The charge to QSE *q* for VSS, for the 15-minute Settlement Interval.
VSSVARAMTTOT	$	*Voltage Support Service var Amount Total*—The total of payments to all QSEs providing VSS, for the 15-minute Settlement Interval.
$VSSVARAMTQSETOT_{q}$	$	*Voltage Support Service var Amount QSE Total per QSE*—The total of the payments to QSE *q* for providing VSS for the 15-minute Settlement Interval.
LRS_{q}	none	*The Load Ratio Share* calculated for QSE *q* for the 15-minute Settlement Interval. See Section 6.6.2.2, QSE Load Ratio Share for a 15-Minute Settlement Interval.
VSSEAMTTOT	$	*Voltage Support Service Lost Opportunity Amount Total*—The total of payments to all QSEs providing VSS in lieu of energy, for the 15-minute Settlement Interval.
$VSSEAMTQSETOT_{q}$	$	*Voltage Support Service Lost Opportunity Amount QSE Total per QSE*—The total of the payments to QSE *q* for providing VSS in lieu of energy, for the 15-minute Settlement Interval.
q	none	A QSE.

6.6.8 Black Start Capacity

6.6.8.1 Black Start Hourly Standby Fee Payment

(1) ERCOT shall pay an Hourly Standby Fee to the QSEs representing a Black Start Resource. This standby fee is determined through a competitive bi-annual bidding process, with an adjustment for reliability based on a six-month rolling availability equal to 85% in accordance with Section 22, Attachment D, Standard Form Black Start Agreement.

(2) The Black Start Hourly Standby Fee is subject to reduction and claw-back provisions as described in Section 8.1.1.2.1.5, System Black Start Capability Qualification and Testing.

(3) ERCOT shall pay a Black Start Hourly Standby Fee payment to each QSE for each Black Start Resource. The payment for each hour is calculated as follows:

$$\mathbf{BSSAMT}_{q,r} = \mathbf{(-1) * BSSPR}_{q,r} \mathbf{* BSSARF}_{q,r}$$

Where:

Black Start Service Availability Reduction Factor

If ($BSSHREAF_{q,r} \geq 0.85$)

$$BSSARF_{q,r} = 1$$

Otherwise

$$BSSARF_{q,r} = Max(0, 1 - (0.85 - BSSHREAF_{q,r}) * 2)$$

Black Start Service Hourly Rolling Equivalent Availability Factor

If ($BSSEH_{q,r} < 4380$)

$$BSSHREAF_{q,r} = 1$$

Otherwise

$$BSSHREAF_{q,r} = \left(\sum_{hr=h-4379}^{h} BSSAFLAG_{q,r,hr}\right) / 4380$$

Availability for a Combined Cycle Train will be determined pursuant to contractual terms but no more than once per hour.

The above variables are defined as follows:

Variable	Unit	Definition
$BSSAMT_{q,r}$	$	*Black Start Service Amount per QSE per Resource by hour*—The standby payment to QSE *q* for the Black Start Service (BSS) provided by Resource *r*, for the hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$BSSPR_{q,r}$	$ per hour	*Black Start Service Price per QSE per Resource*—The standby price of BSS Resource *r* represented by QSE *q*, as specified in the Black Start Agreement. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$BSSARF_{q,r}$	none	*Black Start Service Availability Reduction Factor per QSE per Resource by hour*—The availability reduction factor of Resource *r* represented by QSE *q* under the Black Start Agreement, for the hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$BSSHREAF_{q,r}$	none	*Black Start Service Hourly Rolling Equivalent Availability Factor per QSE per Resource by hour*—The equivalent availability factor of the BSS Resource *r* represented by QSE *q* over 4,380 hours, for the hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$BSSEH_{q,r}$	none	*Black Start Service Elapsed number of Hours per QSE per Resource by hour*—The number of the elapsed hours of BSS Resource *r* represented by QSE *q* since the beginning of the BSS Agreement, for the hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$BSSAFLAG_{q,r,hr}$	none	*Black Start Service Availability Flag per QSE per Resource by hour*—The flag of the availability of BSS Resource *r* represented by QSE *q*, 1 for available and 0 for unavailable, for the hour. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
q	none	A QSE.
r	none	A BSS Resource.
hr	none	The index of a given hour and the previous 4379 hours.
4380	none	The number of hours in a six-month period.

(3) The total of the payments to each QSE for all BSS Resources represented by this QSE for a given hour is calculated as follows:

$$\mathbf{BSSAMTQSETOT}_{q} = \sum_{r} \mathbf{BSSAMT}_{q,r}$$

The above variables are defined as follows:

Variable	Unit	Definition
$BSSAMTQSETOT_q$	$	*Black Start Service Amount QSE Total per QSE*—The total of the payments to QSE *q* for BSS provided by all the BSS Resources represented by this QSE for the hour *h*.
$BSSAMT_{q,r}$	$	*Black Start Service Amount per QSE per Resource*—The standby payment to QSE *q* for BSS provided by Resource *r*, for the hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
q	none	A QSE.
r	none	A BSS Resource.

6.6.8.2 Black Start Capacity Charge

(1) ERCOT shall allocate the total Black Start Service Capacity payment to the QSEs representing Loads based on a LRS. The resulting charge to each QSE for a given hour is calculated as follows:

$$\mathbf{LABSSAMT_q = (-1) * BSSAMTTOT * HLRS_q}$$

Where:

$$BSSAMTTOT = \sum_q BSSAMTQSETOT_q$$

The above variables are defined as follows:

Variable	Unit	Definition
$LABSSAMT_q$	$	*Load-Allocated Black Start Service Amount per QSE*—The charge allocated to QSE *q* for the BSS, for the hour.
$BSSAMTQSETOT_q$	$	*Black Start Service Amount QSE Total per QSE*—The Black Start Service payment to QSE *q* for BSS Resource *r*, for the hour.
BSSAMTTOT	$	*Black Start Service Amount QSE Total ERCOT-Wide* — The total of the payments to QSE *q* for BSS provided by all the BSS Resource represented by this QSE for the hour h.
$HLRS_q$	none	The hourly LRS calculated for QSE *q* for the hour. See Section 6.6.2.4, QSE Load Ratio Share for an Operating Hour.
q	none	A QSE.

6.6.9 Emergency Operations Settlement

(1) Due to Emergency Conditions or Watches, additional compensation for each Generation Resource for which ERCOT provides an Emergency Base Point may be awarded to the QSE representing the Generation Resource. If the Emergency Base Point is higher than the SCED Base Point immediately before the Emergency Condition or Watch and the Settlement Point Price at the Resource Node is lower than the Generation Resource's Energy Offer Curve price at the Emergency Base Point, ERCOT shall pay the QSE additional compensation for the additional energy above the SCED Base Point.

(2) In accordance with paragraph (8) of Section 8.1.1.2, General Capacity Testing Requirements, QSEs that receive a VDI to operate the designated Generation Resource for an unannounced Generation Resource test may be considered for additional compensation utilizing the formula as stated in Section 6.6.9.1, Payment for Emergency Power Increase Directed by ERCOT. If the test period SCED Base Point is higher than the SCED Base Point immediately before the test period and the Settlement Point Price at the Resource Node is lower than the Generation Resource's Energy Offer Curve price, or MOC if no offer exists, at the test Base Point, and the test was not a retest requested by the QSE, ERCOT shall pay the QSE additional compensation for the additional energy above the pre-test SCED Base Point. For the purpose of this Settlement, and limited to Settlement Intervals inclusive of the unannounced Generation Resource test, SCED Base Points will be used in place of the Emergency Base Point.

(3) A QSE that represents a QSGR that comes On-Line as a result of a Base Point greater than zero shall be considered for additional compensation using the formula in Section 6.6.9.1 when the Base Point is less than or equal to its applicable Seasonal net minimum sustainable rating provided in the Resource Registration data. If the Resource Settlement Point Price at the QSGR's Resource Node is lower than the Energy Offer Curve price, capped per the MOC pursuant to Section 4.4.9.4.1, Mitigated Offer Cap, at the aggregated Base Point during the 15-minute Settlement Interval, ERCOT shall pay the QSE additional compensation for the amount of energy from the Off-Line zero Base Point to the aggregated output level. For the purpose of this Settlement, inclusive of the first Settlement Interval in which the QSGR is deployed by SCED from a current SCED Base Point equal to zero MW to a Base Point greater than zero, SCED Base Points will be used in place of the Emergency Base Point. The compensation specified in this paragraph continues over all applicable Intervals until SCED no longer needs the QSGR to generate energy pursuant to Section 3.8.3.1, Quick Start Generation Resource Decommitment Decision Process, and there is no manual Low Dispatch Limit (LDL) override in place on the QSGR.

(4) QSEs that received Base Points that are inconsistent with Real-Time Settlement Point Prices and QSEs that receive a manual override from the ERCOT Operator shall be considered for additional compensation using the formula in Section 6.6.9.1. If the Resource Settlement Point Price at the Resource Node is lower than the Energy Offer Curve price, capped per the MOC pursuant to Section 4.4.9.4.1, at the held Base Point during the 15-minute Settlement Interval, ERCOT shall pay the QSE additional compensation for the amount of energy from a zero Base Point to the held Base Point. The held Base Point is the Base Point that the QSE received due to a manual override by ERCOT Operator or the Base Point received by the QSE that ERCOT identified as inconsistent with Real-Time Settlement Point Prices. For the purpose of this Settlement, and limited to the held Settlement Intervals inclusive of the manual override or Base Points identified as inconsistent with prices, SCED Base Points will be used in place of the Emergency Base Point.

(5) In accordance with Section 6.3, Adjustment Period and Real-Time Operations Timeline, if ERCOT sets any SCED interval as failed, then QSEs shall be considered for additional compensation using the formula in Section 6.6.9.1. For the purpose of this Settlement,

and limited to the failed SCED interval, SCED Base Points will be used in place of the Emergency Base Point.

(6) For each 15-minute Settlement Interval, a QSGR that receives a manual override from the ERCOT Operator shall only be considered for compensation under paragraph (4) above.

(7) For a QSGR, the MOC curve used to cap the Energy Offer Curve shall not include the variable Operations and Maintenance (O&M) adjustment cost to start the Resource from first fire to LSL, including the startup fuel described in paragraph (1)(c) of Section 4.4.9.4.1 for all emergency operations Settlement calculations with the exception of paragraph (3) above.

(8) QSEs that receive a VDI to operate its Resources for an unannounced CFC test, as described in the ERCOT Operating Guides, or have been instructed to operate in CFC mode, may be considered for additional compensation utilizing the formula in Section 6.6.9.1. If the Resource Settlement Point Price at the Resource Node is lower than the Energy Offer Curve price, capped per the MOC pursuant to Section 4.4.9.4.1, at the Emergency Base Point during the CFC period, ERCOT shall pay the QSE additional compensation for the amount of energy from a zero Base Point to the Emergency Base Point for each Resource that provided CFC. Compensation for a CFC test will not be provided if the test was a retest requested by the QSE. For the purpose of this Settlement, and limited to Settlement Intervals inclusive of the CFC period, the Emergency Base Point shall be set to the Average Telemetered Generation for the 5 Minutes (AVGTG5M). Only Resources that moved in the direction to correct frequency are eligible to receive compensation for providing CFC.

(9) If Emergency Base Points or SCED Base Points are unavailable, corrupted or otherwise unusable for Settlement purposes due to system conditions, hardware failure, or software failure, the Real-Time Metered Generation (RTMG) will be used to create proxy Base Points pursuant to Section 6.6.9.1. If the RTMG is not available the most accurate available generation data as determined by ERCOT will be used to create proxy Base Points pursuant to Section 6.6.9.1. ERCOT shall issue a Market Notice stating the Operating Day and Settlement Intervals that were impacted and the generation data that was used to create proxy Base Points.

[NPRR1010, NPRR1014, and NPRR1058: Replace applicable portions of Section 6.6.9 above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1010; or upon system implementation for NPRR1014 or NPRR1058:]

6.6.9 Emergency Operations Settlement

(1) Due to Emergency Conditions or Watches, additional compensation for each Generation Resource or Energy Storage Resource (ESR) for which ERCOT provides an Emergency Base Point may be awarded to the QSE representing the Generation Resource or ESR. If the Resource was instructed to increase generation at a Settlement

Point price that is lower than the price based on their Energy Offer Curve or Energy Bid/Offer Curve, or if the Resource was instructed to increase withdrawal at a Settlement Point price that is higher than the price based on their Energy Bid/Offer Curve, ERCOT shall pay the QSE additional compensation for the change from the SCED Base Point immediately before the Emergency Condition or Watch, per paragraph (1) in Section 6.6.9.1, Payment for Emergency Operations Settlement. The Energy Offer Curve and Energy/Bid Offer Curve shall be capped by the Mitigated Offer Cap (MOC).

(2) In accordance with paragraph (8) of Section 8.1.1.2, General Capacity Testing Requirements, QSEs that receive a VDI to operate the designated Generation Resource for an unannounced Generation Resource test may be considered for additional compensation utilizing the formula as stated in paragraph (1) in Section 6.6.9.1. If the test period SCED Base Point is higher than the SCED Base Point immediately before the test period and the Settlement Point Price at the Resource Node is lower than the Generation Resource's Energy Offer Curve price, or MOC if no offer exists, at the test Base Point, and the test was not a retest requested by the QSE, ERCOT shall pay the QSE additional compensation for the additional energy above the pre-test SCED Base Point. For the purpose of this Settlement, and limited to Settlement Intervals inclusive of the unannounced Generation Resource test, SCED Base Points will be used in place of the Emergency Base Point.

(3) A QSE that represents a QSGR that comes On-Line as a result of a Base Point greater than zero shall be considered for additional compensation using the formula in paragraph (2) in Section 6.6.9.1 when the Base Point is less than or equal to its applicable Seasonal net minimum sustainable rating provided in the Resource Registration data. For the 15-minute Settlement Interval, the process for additional compensation compares the Resource's energy and Ancillary Services revenue with the Resource's revenue target, as defined in Section 6.6.9.1, considering both Ancillary Service awards and Base Points, where the Energy Offer Curve is capped per the MOC. For the purpose of this Settlement, inclusive of the first Settlement Interval in which the QSGR is deployed by SCED from a current SCED Base Point equal to zero MW to a Base Point greater than zero, SCED Base Points will be used in place of the Emergency Base Point. The compensation specified in this paragraph continues over all applicable Intervals until SCED no longer needs the QSGR to generate energy pursuant to Section 3.8.3.1, Quick Start Generation Resource Decommitment Decision Process, and there is no manual Low Dispatch Limit (LDL) override in place on the QSGR.

(4) QSEs that received Base Points that are inconsistent with Real-Time Settlement Point Prices and QSEs that receive a manual override from the ERCOT Operator shall be considered for additional compensation using the formula in paragraph (2) in Section 6.6.9.1. For the 15-minute Settlement Interval, the process for additional compensation compares the Resource's energy and Ancillary Services revenue with the Resource's revenue target, as defined in Section 6.6.9.1, considering both the Ancillary Service awards and held Base Points, where the Energy Offer Curve or the

Energy Bid/Offer Curve is capped per the MOC. The held Base Point is the Base Point that the QSE received due to a manual override by ERCOT Operator or the Base Point received by the QSE that ERCOT identified as inconsistent with Real-Time Settlement Point Prices. For the purpose of this Settlement, and limited to the held Settlement Intervals inclusive of the manual override or Base Points identified as inconsistent with prices, SCED Base Points will be used in place of the Emergency Base Point.

(5) In accordance with Section 6.3, Adjustment Period and Real-Time Operations Timeline, if ERCOT sets any SCED interval as failed, then QSEs shall be considered for additional compensation using the formula in paragraph (1) in Section 6.6.9.1. For the purpose of this Settlement, and limited to the failed SCED interval, SCED Base Points will be used in place of the Emergency Base Point.

(6) For each 15-minute Settlement Interval, a QSGR that receives a manual override from the ERCOT Operator shall only be considered for compensation under paragraph (4) above.

(7) For a QSGR, the MOC curve used to cap the Energy Offer Curve shall not include the variable Operations and Maintenance (O&M) adjustment cost to start the Resource from first fire to LSL, including the startup fuel described in paragraph (1)(d) of Section 4.4.9.4.1 for all emergency operations Settlement calculations with the exception of paragraph (3) above.

(8) Any QSE that receives a VDI to operate its Resource for an unannounced CFC test, as described in the ERCOT Operating Guides, or that has been instructed to operate in CFC mode, may be considered for additional compensation utilizing the formula in paragraph (1) in Section 6.6.9.1. If the Resource increased generation at a Settlement Point Price that is lower than the price based on the Energy Offer Curve or Energy Bid/Offer Curve, or if the Resource was instructed to increase withdrawal at a Settlement Point Price that is higher than the price based on its Energy Bid/Offer Curve, ERCOT shall pay the QSE additional compensation for the amount of energy from a zero Base Point to the Emergency Base Point for each Resource that provided CFC. Compensation for a CFC test will not be provided if the test was a retest requested by the QSE. For the purpose of this Settlement, and limited to Settlement Intervals inclusive of the CFC period, the Emergency Base Point shall be set to the Average Telemetered Generation for the 5 Minutes (AVGTG5M) and the Energy Offer Curve and Energy/Bid Offer Curve shall be capped by the MOC. Only Resources that moved in the direction to correct frequency are eligible to receive compensation for providing CFC.

(9) If Emergency Base Points or SCED Base Points are unavailable, corrupted or otherwise unusable for Settlement purposes due to system conditions, hardware failure, or software failure, the Real-Time Metered Generation (RTMG) and Real-Time Charging Load (RTCL) will be used to create proxy Base Points pursuant to Section 6.6.9.1. If the RTMG and RTCL are not available, the most accurate available generation and withdrawal data as determined by ERCOT will be used to create proxy

Base Points pursuant to Section 6.6.9.1. ERCOT shall issue a Market Notice stating the Operating Day and Settlement Intervals that were impacted and the generation data that was used to create proxy Base Points.

(10) The Energy Offer Curve or Energy Bid/Offer Curve used to calculate the Emergency Base Point Price (EBPPR) will be the Energy Offer Curve or Energy Bid/Offer Curve that was submitted by the QSE and effective for the applicable Operating Hour at the time of the triggering event that led to emergency Settlement consideration, except when the QSE has received Base Points that are inconsistent with Real-Time Settlement Point Prices, as described in paragraph (4) above. In the case of the condition described in paragraph (3) above, the triggering event would be the first interval in which the QSGR comes On-Line as a result of a Base Point greater than zero.

(11) For ESRs that qualify for emergency Settlement, for purposes of this section, the MOC curve used to cap the Energy Bid/Offer Curve shall be set to the highest Real-Time Settlement Point Price (RTSPP) at the Resource's Settlement Point for the Operating Day.

6.6.9.1 Payment for Emergency Power Increase Directed by ERCOT

(1) If the Emergency Base Point issued to a Generation Resource is higher than the SCED Base Point immediately before the Emergency Condition or Watch, then ERCOT shall pay the QSE an additional compensation for the Resource at its Resource Node Settlement Point. The payment for a given 15-minute Settlement Interval is calculated as follows:

$$\mathbf{EMREAMT}_{q,r,p} = \mathbf{(-1)} * \mathbf{EMREPR}_{q,r,p} * \mathbf{EMRE}_{q,r,p}$$

Where:

$$\mathrm{EMREPR}_{q,r,p} = \mathrm{Max}(0, \mathrm{EBPWAPR}_{q,r,p} - \mathrm{RTSPP}_{p})$$

$$\mathrm{EBPWAPR}_{q,r,p} = \sum_{y} (\mathrm{EBPPR}_{q,r,p,y} * \mathrm{EBP}_{q,r,p,y} * \mathrm{TLMP}_{y}) \Big/ \sum_{y} (\mathrm{EBP}_{q,r,p,y} * \mathrm{TLMP}_{y})$$

$$\mathrm{EMRE}_{q,r,p} = \mathrm{Max}(0, \mathrm{Min}(\mathrm{AEBP}_{q,r,p}, \mathrm{RTMG}_{q,r,p}) - \tfrac{1}{4} * \mathrm{BP}_{q,r,p})$$

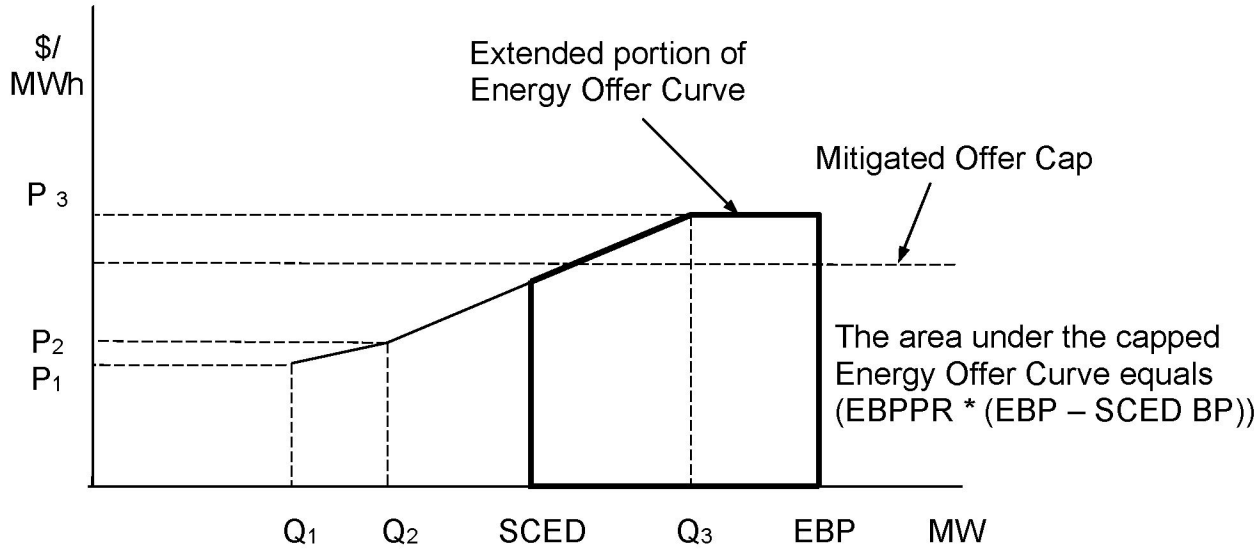
$$\mathrm{AEBP}_{q,r,p} = \sum_{y} (\mathrm{EBP}_{q,r,p,y} * \mathrm{TLMP}_{y} / 3600)$$

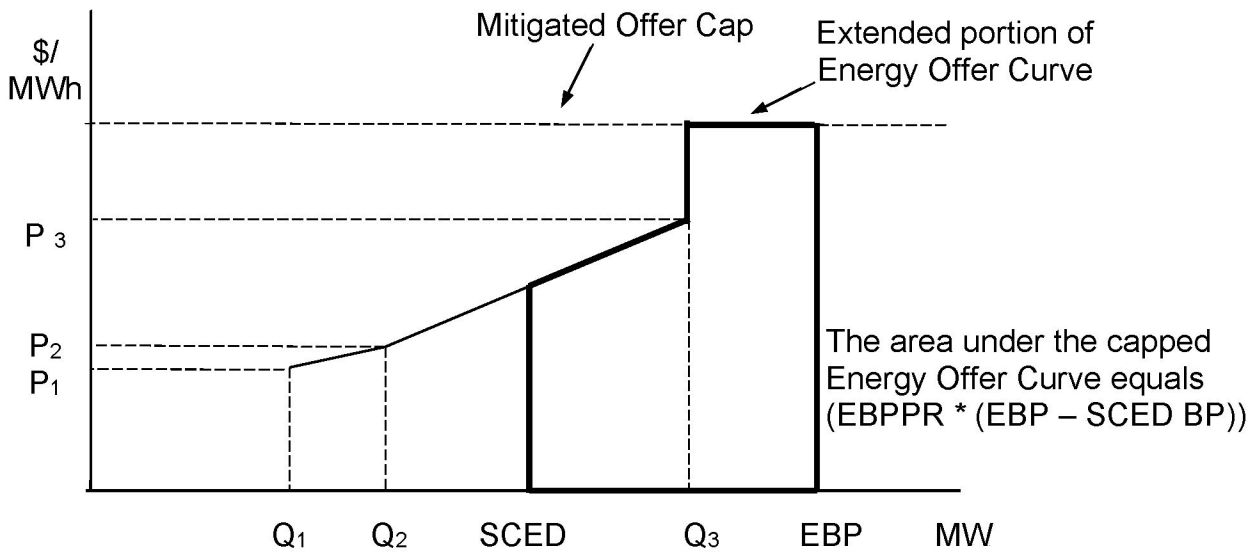
The above variables are defined as follows:

Variable	Unit	Definition
EMREAMT $_{q, r, p}$	$	*Emergency Energy Amount per QSE per Settlement Point per Resource*—The payment to QSE *q* as additional compensation for the additional energy produced by Generation Resource *r* at Resource Node *p* in Real-Time during the Emergency Condition or Watch, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
EMREPR $_{q, r, p}$	$/MWh	*Emergency Energy Price per QSE per Settlement Point per Resource*—The compensation rate for the additional energy produced by Generation Resource *r* at Resource Node *p* represented by QSE *q* in Real-Time during the Emergency Condition or Watch, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
EMRE $_{q, r, p}$	MWh	*Emergency Energy per QSE per Settlement Point per Resource*—The additional energy produced by Generation Resource *r* at Resource Node *p* represented by QSE *q* in Real-Time during the Emergency Condition or Watch, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
EBPWAPR $_{q, r, p}$	$/MWh	*Emergency Base Point Weighted Average Price per QSE per Settlement Point per Resource*—The weighted average of the energy prices corresponding with the Emergency Base Points on the Energy Offer Curve for Resource *r* at Resource Node *p* represented by QSE *q*, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
BP $_{q, r, p}$	MW	*Base Point per QSE per Settlement Point per Resource*—The Base Point of Resource *r* at Resource Node *p* represented by QSE *q* from the SCED prior to the Emergency Condition or Watch. For a Combined Cycle Train, the Resource *r* must be one of the registered Combined Cycle Generation Resources within the Combined Cycle Train.
AEBP $_{q, r, p}$	MWh	*Aggregated Emergency Base Point*—The Generation Resource's aggregated Emergency Base Point, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, AEBP is calculated for the Combined Cycle Train considering all emergency Dispatch Instructions to any Combined Cycle Generation Resources within the Combined Cycle Train.
EBP $_{q, r, p, y}$	MW	*Emergency Base Point per QSE per Settlement Point per Resource by interval*—The Emergency Base Point of Resource *r* at Resource Node *p* represented by QSE *q* for the Emergency Base Point interval or SCED interval *y*. If a Base Point instead of an Emergency Base Point is effective during the interval *y*, its value equals the Base Point. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
EBPPR $_{q, r, p, y}$	$/MWh	*Emergency Base Point Price per QSE per Settlement Point per Resource by interval*—The average incremental energy cost calculated per the Energy Offer Curve, capped by the MOC pursuant to Section 4.4.9.4.1, Mitigated Offer Cap, for the output levels between the SCED Base Point immediately before the Emergency Condition or Watch and the Emergency Base Point of Resource *r* at Resource Node *p* represented by QSE *q* for the Emergency Base Point interval or SCED interval *y*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
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.

Variable	Unit	Definition
$RTMG_{q, r, p}$	MWh	*Real-Time Metered Generation per QSE per Settlement Point per Resource*—The metered generation of Resource *r* at Resource Node *p* represented by QSE *q* in Real-Time for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$TLMP_{y}$	second	*Duration of Emergency Base Point interval or SCED interval per interval*—The duration of the portion of the Emergency Base Point interval or SCED interval *y* within the 15-minute Settlement Interval.
q	none	A QSE.
p	none	A Resource Node Settlement Point.
r	none	A Generation Resource.
y	none	An Emergency Base Point interval or SCED interval that overlaps the 15-minute Settlement Interval.
3600	none	The number of seconds in one hour.

(2) The extension of the Energy Offer Curve is used to calculate the Emergency Base Point Price. If the Emergency Base Point MW value is greater than the largest MW value on the Energy Offer Curve submitted by the QSE for the Resource, then the Energy Offer Curve is extended to the Emergency Base Point MW value with a $/MWh value that is the MOC (pursuant to Section 4.4.9.4.1) for the highest MW output on the Energy Offer Curve submitted by the QSE for the Resource.





(3) The total additional compensation to each QSE for emergency power increases of Generation Resources for the 15-minute Settlement Interval is calculated as follows:

$$\mathbf{EMREAMTQSETOT}_{q} = \sum_{r}\sum_{p}\mathbf{EMREAMT}_{q,r,p}$$

The above variables are defined as follows:

Variable	Unit	Definition
EMREAMTQSETOT $_q$	$	*Emergency Energy Amount QSE Total per QSE*—The total of the payments to QSE *q* as additional compensation for emergency power increases of the Generation Resources represented by this QSE for the 15-minute Settlement Interval.
EMREAMT $_{q, r, p}$	$	*Emergency Energy Amount per QSE per Settlement Point per Resource*—The payment to QSE *q* as additional compensation for the additional energy produced by Generation Resource *r* at Resource Node *p* in Real-Time during the Emergency Condition or Watch, for the 15-minute Settlement 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.

[NPRR1010 and NPRR1014: Replace applicable portions of Section 6.6.9.1 above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1010; or upon system implementation for NPRR1014:]

6.6.9.1 Payment for Emergency Operations Settlement

(1) ERCOT shall pay the QSE additional compensation for the Resource at its Resource Node Settlement Point during the Settlement Intervals that qualify for emergency Settlement as described in Section 6.6.9, Emergency Operations Settlement. The payment for a given 15-minute Settlement Interval is calculated as follows:

$$\mathbf{EMREAMT}_{q,r,p} = \mathbf{(-1)} * (\mathbf{EMREPRGEN}_{q,r,p} * \mathbf{EMREGEN}_{q,r,p}) + \mathbf{EMREPRLOAD}_{q,r,p} * \mathbf{EMRELOAD}_{q,r,p}$$

Where:

If any EBP > 0 then:

$$EMREPRGEN_{q,r,p} = \text{Max}(0, EBPWAPRGEN_{q,r,p} - RTSPP_{p})$$

$$EBPWAPRGEN_{q,r,p} = \sum_{y} (EBPPR_{q,r,p,y} * \text{Max}(0.001, EBP_{q,r,p,y}) * TLMP_{y}) \Big/ \sum_{y} (\text{Max}(0.001, EBP_{q,r,p,y}) * TLMP_{y})$$

$$EMREGEN_{q,r,p} = \text{Max}(0, \text{Min}(AEBPGEN_{q,r,p}, RTMG_{q,r,p}) - \tfrac{1}{4} * \text{Max}(0, BP_{q,r,p}))$$

$$AEBPGEN_{q,r,p} = \sum_{y} (\text{Max}(0, EBP_{q,r,p,y}) * TLMP_{y} / 3600)$$

If any EBP < 0 then:

$$EMREPRLOAD_{q,r,p} = \text{Max}(0, RTSPP_{p} - EBPWAPRLOAD_{q,r,p})$$

$$EBPWAPRLOAD_{q,r,p} = \sum_{y} (EBPPR_{q,r,p,y} * \text{Min}(-0.001, EBP_{q,r,p,y}) * TLMP_{y}) \Big/ \sum_{y} (\text{Min}(-0.001, EBP_{q,r,p,y}) * TLMP_{y})$$

$$EMRELOAD_{q,r,p} = \text{Min}(0, \text{Max}(AEBPLOAD_{q,r,p}, RTCL_{q,r,p}) - \tfrac{1}{4} * \text{Min}(0, BP_{q,r,p}))$$

$$AEBPLOAD_{q,r,p} = \sum_{y} (\text{Min}(0, EBP_{q,r,p,y}) * TLMP_{y} / 3600)$$

The above variables are defined as follows:

Variable	Unit	Definition
EMREAMT $_{q, r, p}$	$	*Emergency Energy Amount per QSE per Settlement Point per Resource*—The payment to QSE *q* as additional compensation for the additional energy or Ancillary Services produced or consumed by Resource *r* at Resource Node *p* in Real-Time during the Emergency Condition or Watch, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
EMREPRGEN $_{q, r, p}$	$/MWh	*Emergency Energy Price for Generation per QSE per Settlement Point per Resource*—The compensation rate for the generation produced by Resource *r* at Resource Node *p* represented by QSE *q* in Real-Time during the Emergency Condition or Watch, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
EMREPRLOAD $_{q, r, p}$	$/MWh	*Emergency Energy Price for Charging Load per QSE per Settlement Point per Resource*—The compensation rate for the charging load for Resource *r* at Resource Node *p* represented by QSE *q* in Real-Time during the Emergency Condition or Watch, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
EMREGEN $_{q, r, p}$	MWh	*Emergency Energy for Generation per QSE per Settlement Point per Resource*—The generation produced by Resource *r* at Resource Node *p* represented by QSE *q* in Real-Time during the Emergency Condition or Watch, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
EMRELOAD $_{q, r, p}$	MWh	*Emergency Energy for Charging Load per QSE per Settlement Point per Resource*—The charging load for Resource *r* at Resource Node *p* represented by QSE *q* in Real-Time during the Emergency Condition or Watch, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
EBPWAPRGEN $_{q, r, p}$	$/MWh	*Emergency Base Point Weighted Average Price for Generation per QSE per Settlement Point per Resource*—The weighted average of the Emergency Base Point Prices corresponding with the positive Emergency Base Points, for Resource *r* at Resource Node *p* represented by QSE *q*, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
EBPWAPRLOAD $_{q, r, p}$	$/MWh	*Emergency Base Point Weighted Average Price for Charging Load per QSE per Settlement Point per Resource*—The weighted average of the Emergency Base Point Prices corresponding with the negative Emergency Base Points, for Resource *r* at Resource Node *p* represented by QSE *q*, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
BP $_{q, r, p}$	MW	*Base Point per QSE per Settlement Point per Resource*—The Base Point of Resource *r* at Resource Node *p* represented by QSE *q* from the SCED prior to the Emergency Condition or Watch. For a Combined Cycle Train, the Resource *r* must be one of the registered Combined Cycle Generation Resources within the Combined Cycle Train.
AEBPGEN $_{q, r, p}$	MWh	*Aggregated Emergency Base Point for Generation*—The aggregation of the positive Emergency Base Points for the Resource *r* represented by QSE *q*, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, AEBP is calculated for the Combined Cycle Train considering all emergency Dispatch Instructions to any Combined Cycle Generation Resources within the Combined Cycle Train.

AEBPLOAD $_{q, r, p}$	MWh	*Aggregated Emergency Base Point for Charging Load*—The aggregation of the negative Emergency Base Points for the Resource *r* represented by QSE *q*, for the 15-minute Settlement Interval.
EBP $_{q, r, p, y}$	MW	*Emergency Base Point per QSE per Settlement Point per Resource by interval*—The Emergency Base Point of Resource *r* at Resource Node *p* represented by QSE *q* for the Emergency Base Point interval or SCED interval *y*. If a Base Point instead of an Emergency Base Point is effective during the interval *y*, its value equals the Base Point. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
EBPPR $_{q, r, p, y}$	$/MWh	*Emergency Base Point Price per QSE per Settlement Point per Resource by interval*—The average incremental energy cost calculated per the Energy Offer Curve or Energy Bid/Offer Curve corresponding to the Emergency Base Point for Resource *r* at Resource Node *p* represented by QSE *q* for the Emergency Base Point interval or SCED interval *y*. The Energy Offer Curve shall be capped by the MOC pursuant to Section 4.4.9.4.1, Mitigated Offer Cap and the Energy Bid/Offer Curve shall be capped by the maximum RTSPP at the Settlement Point for the Operating Day, per paragraph (10)(b) of Section 6.6.9. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
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 $_{q, r, p}$	MWh	*Real-Time Metered Generation per QSE per Settlement Point per Resource*—The metered generation of Resource *r* at Resource Node *p* represented by QSE *q* in Real-Time for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTCL $_{q, r, p}$	MWh	*Real-Time Charging Load per QSE per Resource per Settlement Point* —The charging load for Resource *r* at Resource Node *p* represented by the QSE *q*, represented as a negative value, for the 15-minute Settlement Interval.
TLMP $_{y}$	second	*Duration of Emergency Base Point interval or SCED interval per interval*—The duration of the portion of the Emergency Base Point interval or SCED interval *y* within the 15-minute Settlement Interval.
q	none	A QSE.
p	none	A Resource Node Settlement Point.
r	none	A Generation Resource or ESR.
y	none	An Emergency Base Point interval or SCED interval that overlaps the 15-minute Settlement Interval.
3600	none	The number of seconds in one hour.

(2) ERCOT shall pay the QSE additional compensation for the Resource at its Resource Node Settlement Point during the Settlement Intervals that qualify for emergency Settlement as described in Section 6.6.9, Emergency Operations Settlement. The payment for a given 15-minute Settlement Interval is calculated as follows:

EMREAMT $_{q, r, p}$ = **Min (0, RTENET** $_{q, r, p}$ + **RTASNET** $_{q, r, p}$**)**

(a) Where the Real-Time Energy Net Revenue is calculated as follows:

$$RTENET_{q,r,p} = RTEREV_{q,r,p} - RTEREVT_{q,r,p}$$

Where:

$$RTEREV_{q,r,p} = RTSPP_{q,r,p} * (EMREGEN_{q,r,p} + EMRELOAD_{q,r,p})$$

$$RTEREVT_{q,r,p} = EBPWAPRGEN_{q,r,p} * EMREGEN_{q,r,p} + EBPWAPRLOAD_{q,r,p} * EMRELOAD_{q,r,p}$$

If any EBP > 0 then:

$$EBPWAPRGEN_{q,r,p} = \sum_{y} (EBPPR_{q,r,p,y} * Max (0.001, EBP_{q,r,p,y}) * TLMP_{y}) / \sum_{y} (Max (0.001, EBP_{q,r,p,y}) * TLMP_{y})$$

$$EMREGEN_{q,r,p} = Max (0, Min (AEBPGEN_{q,r,p}, RTMG_{q,r,p}))$$

$$AEBPGEN_{q,r,p} = \sum_{y} (Max (0, EBP_{q,r,p,y}) * TLMP_{y} / 3600)$$

If any EBP < 0 then:

$$EBPWAPRLOAD_{q,r,p} = \sum_{y} (EBPPR_{q,r,p,y} * Min (-0.001, EBP_{q,r,p,y}) * TLMP_{y}) / \sum_{y} (Min (-0.001, EBP_{q,r,p,y}) * TLMP_{y})$$

$$EMRELOAD_{q,r,p} = Min (0, Max (AEBPLOAD_{q,r,p}, RTCL_{q,r,p}))$$

$$AEBPLOAD_{q,r,p} = \sum_{y} (Min (0, EBP_{q,r,p,y}) * TLMP_{y} / 3600)$$

(b) Where the Real-Time Ancillary Services Net Revenue is calculated as follows:

$$RTASNET_{q,r} = RTRUNET_{q,r} + RTRDNET_{q,r} + RTNSNET_{q,r} + RTRRNET_{q,r} + RTECRNET_{q,r}$$

Where for Reg-Up:

$$RTRUNET_{q,r} = RTRUREV_{q,r} - (¼) * RTRUREVT_{q,r,p}$$

$$RTRUREVT_{q,r,p} = RTRUWAPR_{q,r,p} * RTRUAWD_{q,r}$$

$$RTRUWAPR_{q,r,p} = \sum_{y} (RTRUOPR_{q,r,p,y} * Max(0.001, RTRUAWDS_{q,r,p,y}) * TLMP_{y}) / \sum_{y} (Max(0.001, RTRUAWDS_{q,r,p,y}) * TLMP_{y})$$

Where for Reg-Down:

$$RTRDNET_{q,r} = RTRDREV_{q,r} - (¼) * RTRDREVT_{q,r,p}$$

$$RTRDREVT_{q,r,p} = RTRDWAPR_{q,r,p} * RTRDAWD_{q,r}$$

$$RTRDWAPR_{q,r,p} = \sum_{y} (RTRDOPR_{q,r,p,y} * Max(0.001, RTRDAWDS_{q,r,p,y}) * TLMP_{y}) / \sum_{y} (Max(0.001, RTRDAWDS_{q,r,p,y}) * TLMP_{y})$$

Where for RRS:

$$RTRRNET_{q,r} = RTRREV_{q,r} - (¼) * RTRREVT_{q,r,p}$$

$$RTRREVT_{q,r,p} = RTRRWAPR_{q,r,p} * RTRRAWD_{q,r}$$

$$RTRRWAPR_{q,r,p} = \sum_{y} (RTRROPR_{q,r,p,y} * Max(0.001, RTRRAWDS_{q,r,p,y}) * TLMP_{y}) / \sum_{y} (Max(0.001, RTRRAWDS_{q,r,p,y}) * TLMP_{y})$$

Where for Non-Spin:

$$RTNSNET_{q,r} = RTNSREV_{q,r} - (¼) * RTNSREVT_{q,r,p}$$

$$RTNSREVT_{q,r,p} = RTNSWAPR_{q,r,p} * RTNSAWD_{q,r}$$

$$RTNSWAPR_{q,r,p} = \sum_{y} (RTNSOPR_{q,r,p,y} * Max(0.001, RTNSAWDS_{q,r,p,y}) * TLMP_{y}) / \sum_{y} (Max(0.001, RTNSAWDS_{q,r,p,y}) * TLMP_{y})$$

Where for ERCOT Contingency Reserve (ECRS):

$$RTECRNET_{q,r} = RTECRREV_{q,r} - (¼) * RTECRREVT_{q,r}$$

$$RTECRREVT_{q,r,p} = RTECRWAPR_{q,r,p} * RTECRAWD_{q,r}$$

$$RTECRWAPR_{q,r,p} = \sum_{y} (RTECROPR_{q,r,p,y} * Max(0.001, RTECRAWDS_{q,r,p,y}) * TLMP_{y}) / \sum_{y} (Max(0.001, RTECRAWDS_{q,r,p,y}) * TLMP_{y})$$

The above variables are defined as follows:

Variable	Unit	Definition
$EMREAMT_{q,r,p}$	$	*Emergency Energy Amount per QSE per Settlement Point per Resource*—The payment to QSE *q* as additional compensation for the additional energy or Ancillary Services produced or consumed by Resource *r* at Resource Node *p* in Real-Time during the Emergency Condition or Watch, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$RTENET_{q,r,p}$	$	*Real-Time Energy Net Revenue*– The net difference between the Real-Time Energy Revenue and the Real-Time Energy Revenue Target for QSE *q* for Resource *r* at Resource node *p* for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$RTASNET_{q,r,}$	$	*Real-Time Ancillary Service Net Revenue* – The sum of the Ancillary Service net revenues for QSE *q* for Resource *r* for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$RTEREV_{q,r,p}$	$	*Real-Time Energy Revenue*— The calculated Real-Time energy revenue at the RTSPP for QSE *q* calculated for Resource *r* at Resource node *p* for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$EMREGEN_{q,r,p}$	MWh	*Emergency Energy for Generation per QSE per Settlement Point per Resource*—The generation produced by Resource *r* at Resource Node *p* represented by QSE *q* in Real-Time during the Emergency Condition or Watch, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$EMRELOAD_{q,r,p}$	MWh	*Emergency Energy for Charging Load per QSE per Settlement Point per Resource*—The charging load for Resource *r* at Resource Node *p* represented by QSE *q* in Real-Time during the Emergency Condition or Watch, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$RTEREVT_{q,r,p}$	$	*Real-Time Energy Revenue Target* – The energy revenue target at the EBPWAPRGEN and EBPWAPRLOAD of the Resource *r* represented by QSE *q*, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$EBPWAPRGEN_{q,r,p}$	$/MWh	*Emergency Base Point Weighted Average Price for Generation per QSE per Settlement Point per Resource*—The weighted average of the Emergency Base Point Prices corresponding with the positive Emergency Base Points for Resource *r* at Resource Node *p* represented by QSE *q*, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$EBPWAPRLOAD_{q,r,p}$	$/MWh	*Emergency Base Point Weighted Average Price for Charging Load per QSE per Settlement Point per Resource*—The weighted average of the Emergency Base Point Prices corresponding with the negative Emergency Base Points, for Resource *r* at Resource Node *p* represented by QSE *q*, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.

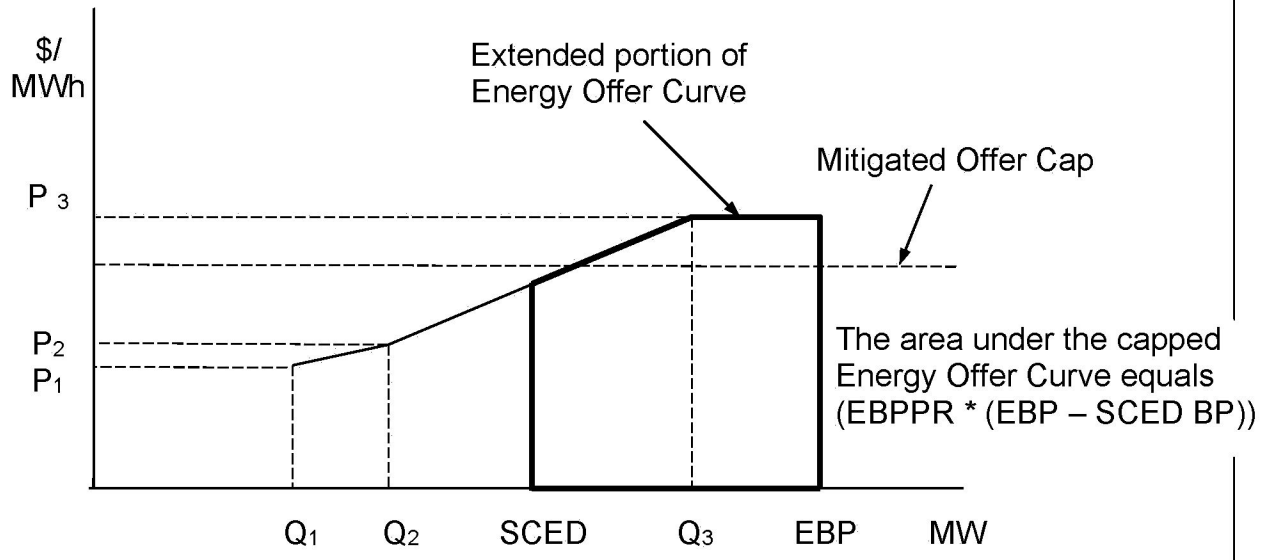
AEBPGEN $_{q, r, p}$	MWh	*Aggregated Emergency Base Point for Generation*—The aggregation of the positive Emergency Base Points for the Resource *r* represented by QSE *q*, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, AEBP is calculated for the Combined Cycle Train considering all emergency Dispatch Instructions to any Combined Cycle Generation Resources within the Combined Cycle Train.
AEBPLOAD $_{q, r, p}$	MWh	*Aggregated Emergency Base Point for Charging Load*—The aggregation of the negative Emergency Base Points for the Resource *r* represented by QSE *q*, for the 15-minute Settlement Interval.
EBP $_{q, r, p, y}$	MW	*Emergency Base Point per QSE per Settlement Point per Resource by interval*—The Emergency Base Point of Resource *r* at Resource Node *p* represented by QSE *q* for the Emergency Base Point interval or SCED interval *y*. If a Base Point instead of an Emergency Base Point is effective during the interval *y*, its value equals the Base Point. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
EBPPR $_{q, r, p, y}$	$/MWh	*Emergency Base Point Price per QSE per Settlement Point per Resource by interval*—The average incremental energy cost calculated per the Energy Offer Curve or Energy Bid/Offer Curve corresponding to the Emergency Base Point for Resource *r* at Resource Node *p* represented by QSE *q* for the Emergency Base Point interval or SCED interval *y*. The Energy Offer Curve shall be capped by the MOC pursuant to Section 4.4.9.4.1, Mitigated Offer Cap, and the Energy Bid/Offer Curve shall be capped by the maximum RTSPP at the Settlement Point for the Operating Day, per paragraph (10)(b) of Section 6.6.9. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
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 $_{q, r, p}$	MWh	*Real-Time Metered Generation per QSE per Settlement Point per Resource*—The metered generation of Resource *r* at Resource Node *p* represented by QSE *q* in Real-Time for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTCL $_{q, r, p}$	MWh	*Real-Time Charging Load per QSE per Resource per Settlement Point* —The charging load for Resource *r* at Resource Node *p* represented by the QSE *q*, represented as a negative value, for the 15-minute Settlement Interval.
RTRUNET $_{q, r}$	$	*Real-Time Reg-Up Net Revenue*– The difference between the Real-Time Reg-Up Revenue and the Real-Time Reg-Up Revenue Target for QSE *q* for Resource *r* for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTRDNET $_{q, r}$	$	*Real-Time Reg-Down Net Revenue* – The difference between calculated revenue for the Real-Time Reg-Down Revenue and the Real-Time Reg-Down Revenue Target for QSE *q* for Resource *r* for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTRRNET $_{q, r}$	$	*Real-Time Responsive Reserve Net Revenue* – The difference between Real-Time RRS Revenue and the Real-Time RRS Revenue Target for QSE *q* for Resource *r* for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.

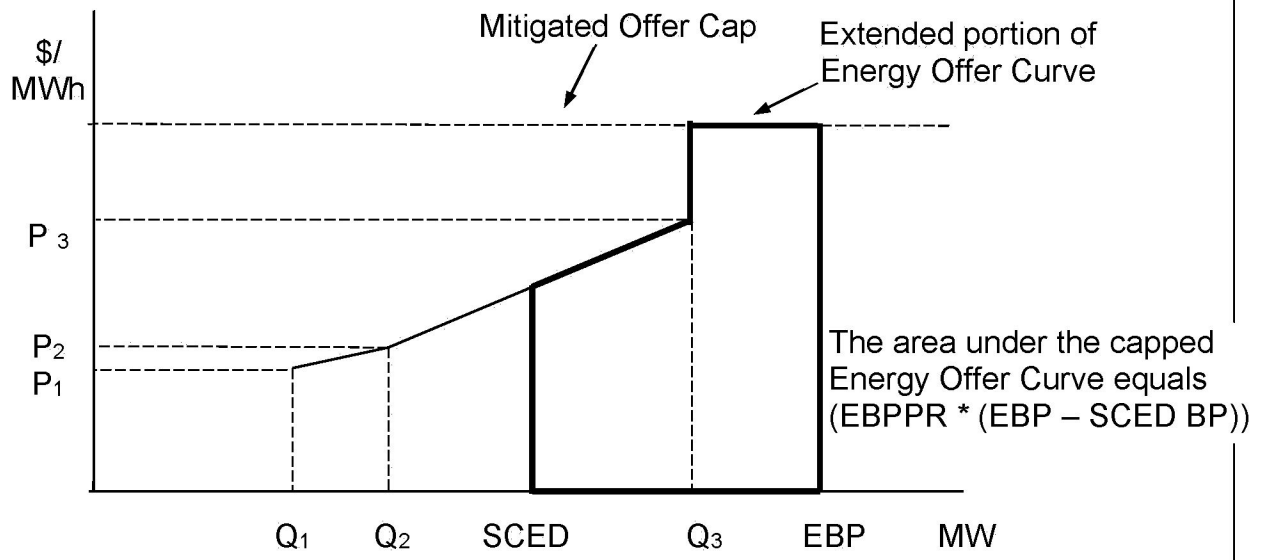
RTNSNET $_{q, r}$	$	*Real-Time Non-Spin Net Revenue* – The difference between Real-Time Non-Spin Revenue and the Real-Time Non-Spin Revenue Target for Resource *r* for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTECRNET $_{q, r}$	$	*Real-Time ERCOT Contingency Reserve Service Net Revenue* – The difference between Real-Time ECRS Revenue and the Real-Time ECRS Revenue Target for Resource *r* for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTRUREV $_{q, r}$	$	*Real-Time Reg-Up Revenue*— The calculated Real-Time Reg-Up revenue for QSE *q* calculated for Resource *r* for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTRDREV $_{q, r}$	$	*Real-Time Reg-Down Revenue*— The calculated Real-Time Reg-Down revenue for QSE *q* calculated for Resource *r* for the 15-minute Settlement interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTRREV $_{q, r}$	$	*Real-Time Responsive Reserve Revenue*— The calculated Real-Time RRS revenue for QSE *q* calculated for Resource *r* for the 15-minute Settlement interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTNSREV $_{q, r}$	$	*Real-Time Non-Spin Revenue*— The calculated Real-Time Non-Spin revenue for QSE *q* calculated for Resource *r* for the 15-minute Settlement interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTECRREV $_{q, r}$	$	*Real-Time ERCOT Contingency Reserve Service Revenue*— The calculated Real-Time ECRS revenue for QSE *q* calculated for Resource *r* for the 15-minute Settlement interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTRUREVT $_{q, r}$	$	*Real-Time Reg-Up Revenue Target* – The revenue target of the Reg-Up award to Resource *r* represented by QSE *q* based on the Ancillary Service Offer for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTRDREVT $_{q, r}$	$	*Real-Time Reg-Down Revenue Target* – The revenue target of the Reg-Down award to Resource *r* represented by QSE *q* based on the Ancillary Service Offer for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTRREVT $_{q, r}$	$	*Real-Time Responsive Reserve Revenue Target* – The revenue target of the RRS award to Resource *r* represented by QSE *q* based on the Ancillary Service Offer for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTNSREVT $_{q, r}$	$	*Real-Time Non-Spin Revenue Target* – The revenue target of the Non-Spin award to Resource *r* represented by QSE *q* based on the Ancillary Service Offer for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTECRREVT $_{q, r}$	$	*Real-Time ERCOT Contingency Reserve Service Revenue Target* – The revenue target of the ECRS award to Resource *r* represented by QSE *q* based on the Ancillary Service Offer for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.

RTRUWAPR $_{q, r, p}$	$/MW	*Real-Time Reg-Up Weighted-Average Price* – The weighted average of the Ancillary Service Offer prices corresponding with the Reg-Up awards on the Ancillary Service Offer curves for Resource *r* at Resource Node *p* represented by QSE *q*, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTRDWAPR $_{q, r, p}$	$/MW	*Real-Time Reg-Down Weighted-Average Price* – The weighted average of the Ancillary Service Offer prices corresponding with the Reg-Down awards on the Ancillary Service Offer curves for Resource *r* at Resource Node *p* represented by QSE *q*, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTRRWAPR $_{q, r, p}$	$/MW	*Real-Time Responsive Reserve Weighted-Average Price* – The weighted average of the Ancillary Service Offer prices corresponding with the RRS awards on the Ancillary Service Offer curves for Resource *r* at Resource Node *p* represented by QSE *q*, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTNSWAPR $_{q, r, p}$	$/MW	*Real-Time Non-Spin Weighted-Average Price* – The weighted average of the Ancillary Service Offer prices corresponding with the Non-Spin awards on the Ancillary Service Offer curves for Resource *r* at Resource Node *p* represented by QSE *q*, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTECRWAPR $_{q, r, p}$	$/MW	*Real-Time ERCOT Contingency Reserve Service Weighted-Average Price* – The weighted average of the Ancillary Service Offer prices corresponding with the ECRS awards on the Ancillary Service Offer curves for Resource *r* at Resource Node *p* represented by QSE *q*, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTRUAWD $_{q, r}$	MW	*Real-Time Reg-Up Award per Resource per QSE*— The Reg-Up amount awarded to QSE *q* for Resource *r* in Real-Time for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTRDAWD $_{q, r}$	MW	*Real-Time Reg-Down Award per Resource per QSE*— The Reg-Down amount awarded to QSE *q* for Resource *r* in Real-Time for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTRRAWD $_{q, r}$	MW	*Real-Time Responsive Reserve Award per Resource per QSE*— The RRS amount awarded to QSE *q* for Resource *r* in Real-Time for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTNSAWD $_{q, r}$	MW	*Real-Time Non-Spin Award per Resource per QSE*— The Non-Spin amount awarded to QSE *q* for Resource *r* in Real-Time for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTECRAWD $_{q, r}$	MW	*Real-Time ERCOT Contingency Reserve Service Award per Resource per QSE*— The ECRS amount awarded to QSE *q* for Resource *r* in Real-Time for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTRUOPR $_{q, r, p, y}$	$/MW	*Real-Time Reg-Up Offer Price* – The price on the Ancillary Service Offer curve at the Reg-Up award of Resource *r* at Resource Node *p* represented by QSE *q* 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.

RTRDOPR $_{q, r, p, y}$	$/MW	*Real-Time Reg-Down Offer Price* – The price on the Ancillary Service Offer curve at the Reg-Down award of Resource *r* at Resource Node *p* represented by QSE *q* 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.
RTRROPR $_{q, r, p, y}$	$/MW	*Real-Time Responsive Reserve Offer Price* – The price on the Ancillary Service Offer curve at the RRS award of Resource *r* at Resource Node *p* represented by QSE *q* 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.
RTNSOPR $_{q, r, p, y}$	$/MW	*Real-Time Non-Spin Offer Price* – The price on the Ancillary Service Offer curve at the Non-Spin award of Resource *r* at Resource Node *p* represented by QSE *q* 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.
RTECROPR $_{q, r, p, y}$	$/MW	*Real-Time ERCOT Contingency Reserve Service Offer Price* – The price on the Ancillary Service Offer curve at the ECRS award of Resource *r* at Resource Node *p* represented by QSE *q* 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.
RTRUAWDS $_{q, r, p, y}$	MW	*Real-Time Reg-Up Award per Resource per QSE per SCED interval* - The Reg-Up amount awarded to QSE *q* for Resource *r* in Real-Time 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.
RTRDAWDS $_{q, r, p, y}$	MW	*Real-Time Reg-Down Award per Resource per QSE per SCED interval* - The Reg-Down amount awarded to QSE *q* for Resource *r* in Real-Time 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.
RTRRAWDS $_{q, r, p, y}$	MW	*Real-Time Responsive Reserve Award per Resource per QSE per SCED interval* - The RRS amount awarded to QSE *q* for Resource *r* in Real-Time 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.
RTNSAWDS $_{q, r, p, y}$	MW	*Real-Time Non-Spin Award per Resource per QSE per SCED interval* - The Non-Spin amount awarded to QSE *q* for Resource *r* in Real-Time 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.
RTECRAWDS $_{q, r, p, y}$	MW	*Real-Time ERCOT Contingency Reserve Service Award per Resource per QSE per SCED interval* - The ECRS amount awarded to QSE *q* for Resource *r* in Real-Time 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.
TLMP $_{y}$	second	*Duration of Emergency Base Point interval or SCED interval per interval*— The duration of the portion of the Emergency Base Point interval or SCED interval *y* within the 15-minute Settlement Interval.
q	none	A QSE.
p	none	A Resource Node Settlement Point.
r	none	A Generation Resource or ESR.
y	none	An Emergency Base Point interval or SCED interval that overlaps the 15-minute Settlement Interval.
3600	none	The number of seconds in one hour.

(3) The extension of the Energy Offer Curve or Energy Bid/Offer Curve is used to calculate the Emergency Base Point Price. If the Emergency Base Point MW value is greater than the largest MW value on the Energy Offer Curve or Energy Bid/Offer Curve submitted by the QSE for the Resource, then the Energy Offer Curve or Energy Bid/Offer Curve is extended to the Emergency Base Point MW value with a $/MWh value that is the MOC (pursuant to Section 4.4.9.4.1) for the highest MW output on the Energy Offer Curve or Energy Bid/Offer Curve submitted by the QSE for the Resource.





(4) The total additional compensation to each QSE for emergency Settlement of Resources for the 15-minute Settlement Interval is calculated as follows:

$$\mathbf{EMREAMTQSETOT}_{q} = \sum_{r}\sum_{p} \mathbf{EMREAMT}_{q,r,p}$$

The above variables are defined as follows:

Variable	Unit	Definition
$EMREAMTQSETOT_q$	$	*Emergency Energy Amount QSE Total per QSE*—The total of the payments to QSE *q* as additional compensation for additional energy or Ancillary Services of the Resources represented by this QSE for the 15-minute Settlement Interval.
$EMREAMT_{q,r,p}$	$	*Emergency Energy Amount per QSE per Settlement Point per Resource*—The payment to QSE *q* as additional compensation for the additional energy or Ancillary Services produced or consumed by Resource *r* at Resource Node *p* in Real-Time during the Emergency Condition or Watch, for the 15-minute Settlement 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.

6.6.9.2 Charge for Emergency Power Increases

(1) The total cost for additional compensation for emergency power increases and unannounced Generation Resource tests is allocated to the QSEs representing Loads based on LRS. The charge to each QSE for a given 15-minute Settlement Interval is calculated as follows:

$$\mathbf{LAEMREAMT}_{q} = \mathbf{(-1) * EMREAMTTOT * LRS}_{q}$$

Where:

$$EMREAMTTOT = \sum_{q} EMREAMTQSETOT_{q}$$

The above variables are defined as follows:

Variable	Unit	Definition
$LAEMREAMT_q$	$	*Load-Allocated Emergency Energy Amount per QSE*—The QSE *q*'s Load-allocated amount of the total payments for all the Generation Resources with Real-Time Emergency Base Points, for the 15-minute Settlement Interval.

Variable	Unit	Definition
EMREAMTTOT	$	*Emergency Energy Amount Total*—The total of the payments to all QSEs as additional compensation for emergency power increases of the Generation Resources for the 15-minute Settlement Interval.
EMREAMTQSETOT $_q$	$	*Emergency Energy Amount QSE Total per QSE*—The total of the payments to QSE *q* as additional compensation for emergency power increases of the Generation Resources represented by this QSE for the 15-minute Settlement Interval.
LRS $_q$	none	The LRS calculated for QSE *q* for the 15-minute Settlement Interval. See Section 6.6.2.2, QSE Load Ratio Share for a 15-Minute Settlement Interval.
q	none	A QSE.

[NPRR1010 and NPRR1014: Replace applicable portions of Section 6.6.9.2 above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1010; or upon system implementation for NPRR1014:]

6.6.9.2 Charge for Emergency Operations Settlement

(1) The total cost for additional compensation for emergency Settlement as calculated in Section 6.6.9.1, Payment for Emergency Operations Settlement, is allocated to the QSEs representing Loads based on LRS. The charge to each QSE for a given 15-minute Settlement Interval is calculated as follows:

$$\mathbf{LAEMREAMT}_q = \mathbf{(-1) * EMREAMTTOT * LRS}_q$$

Where:

$$\text{EMREAMTTOT} = \sum_q \text{EMREAMTQSETOT}_q$$

The above variables are defined as follows:

Variable	Unit	Definition
LAEMREAMT $_q$	$	*Load-Allocated Emergency Energy Amount per QSE*—The QSE *q*'s Load-allocated amount of the total payments for all the Resources with Real-Time Emergency Base Points, for the 15-minute Settlement Interval.
EMREAMTTOT	$	*Emergency Energy Amount Total*—The total of the payments to all QSEs as additional compensation for additional energy or Ancillary Services of the Resources for the 15-minute Settlement Interval.
EMREAMTQSETOT $_q$	$	*Emergency Energy Amount QSE Total per QSE*—The total of the payments to QSE *q* as additional compensation for additional energy or Ancillary Services of the Resources represented by this QSE for the 15-minute Settlement Interval.
LRS $_q$	none	The LRS calculated for QSE *q* for the 15-minute Settlement Interval. See Section 6.6.2.2, QSE Load Ratio Share for a 15-Minute Settlement Interval.
q	none	A QSE.

6.6.10 Real-Time Revenue Neutrality Allocation

(1) ERCOT must be revenue-neutral in each Settlement Interval. Each QSE receives an allocated share, on a LRS basis, of the net amount of:

(a) Real-Time Energy Imbalance payments or charges under Section 6.6.3.1, Real-Time Energy Imbalance Payment or Charge at a Resource Node;

(b) Real-Time Energy Imbalance payments or charges under Section 6.6.3.2, Real-Time Energy Imbalance Payment or Charge at a Load Zone;

(c) Real-Time Energy Imbalance payments or charges under Section 6.6.3.3, Real-Time Energy Imbalance Payment or Charge at a Hub;

(d) Real-Time energy payments under Section 6.6.3.4, Real-Time Energy Payment for DC Tie Import;

(e) Real-Time energy payments under Section 6.6.3.5, Real-Time Payment for a Block Load Transfer Point;

(f) Real-Time Energy payments or charges under Section 6.6.3.8, Real-Time Payment or Charge for Energy from a Settlement Only Distribution Generator (SODG) or a Settlement Only Transmission Generator (SOTG);

[NPRR995: Replace item (f) above with the following upon system implementation:]

(f) Real-Time Energy payments or charges under Section 6.6.3.8, Real-Time Payment or Charge for Energy from a Settlement Only Distribution Generator (SODG), Settlement Only Transmission Generator (SOTG), Settlement Only Distribution Energy Storage System (SODESS), or Settlement Only Transmission Energy Storage System (SOTESS);

(g) Real-Time congestion payments or charges under Section 6.6.4, Real-Time Congestion Payment or Charge for Self-Schedules; and

(h) Real-Time payments or charges to the Congestion Revenue Right (CRR) Owners under Section 7.9.2, Real-Time CRR Payments and Charges.

(2) The Real-Time Revenue Neutrality Allocation for each QSE for a given 15-minute Settlement Interval is calculated as follows:

$$\mathbf{LARTRNAMT}_{q} = \mathbf{(-1) * (RTEIAMTTOT + BLTRAMTTOT + RTDCIMPAMTTOT + RTESOGAMTTOT + RTCCAMTTOT + RTOBLAMTTOT / 4 + RTOBLLOAMTTOT / 4) * LRS}_{q}$$

[NPRR995: Replace the formula "LARTRNAMT $_q$" above with the following upon system implementation:]

$$\mathbf{LARTRNAMT}_q = \mathbf{(-1) * (RTEIAMTTOT + BLTRAMTTOT + RTDCIMPAMTTOT + RTESOAMTTOT + RTCCAMTTOT + RTOBLAMTTOT / 4 + RTOBLLOAMTTOT / 4) * LRS}_q$$

Where:

Total Real-Time Energy Imbalance Payment (or Charge) at Settlement Point (or Hub)

$$\text{RTEIAMTTOT} = \sum_q \text{RTEIAMTQSETOT}_q$$

Total Real-Time Payment for BLT Resources

$$\text{BLTRAMTTOT} = \sum_q \text{BLTRAMTQSETOT}_q$$

Total Real-Time Payment for DC Tie Imports

$$\text{RTDCIMPAMTTOT} = \sum_q \text{RTDCIMPAMTQSETOT}_q$$

Total Real-Time Congestion Payment or Charge for Self-Schedules

$$\text{RTCCAMTTOT} = \sum_q \text{RTCCAMTQSETOT}_q$$

Total Real-Time Payment or Charge for Point-to-Point (PTP) Obligations

$$\text{RTOBLAMTTOT} = \sum_q \text{RTOBLAMTQSETOT}_q$$

Total Real-Time Payment for PTP Obligations with Links to Options

$$\text{RTOBLLOAMTTOT} = \sum_q \text{RTOBLLOAMTQSETOT}_q$$

Total Real-Time Payment or Charge for energy from SODGs and SOTGs

$$\text{RTESOGAMTTOT} = \sum_q \text{RTESOGAMTQSETOT}_q$$

[NPRR995: Replace the language above with the following upon system implementation:]

Total Real-Time Payment or Charge for energy from SODGs, SOTGs, SODESSs, or SOTESSs

$$\text{RTESOAMTTOT} = \sum_q \text{RTESOAMTQSETOT}_q$$

The above variables are defined as follows:

Variable	Unit	Description
LARTRNAMT $_q$	$	*Load-Allocated Real-Time Revenue Neutrality Amount per QSE*—The QSE *q*'s share of the total Real-Time revenue neutrality amount, for the 15-minute Settlement Interval.
RTEIAMTTOT $_q$	$	*Real-Time Energy Imbalance Amount Total*—The total net payments and charges for Real-Time Energy Imbalance Service at all Settlement Points (Resource, Load Zone or Hub) for the 15-minute Interval.
BLTRAMTTOT	$	*Block Load Transfer Resource Amount Total*—The total of payments for energy delivered into the ERCOT Region through BLT points for the 15-minute Settlement Interval.
RTDCIMPAMTTOT	$	*Real-Time DC Import Amount Total*—The summation of payments for DC Tie imports for the 15-minute Settlement Interval.
RTCCAMTTOT	$	*Real-Time Energy Congestion Cost Amount Total*—The total net congestion payments and charges for all Self-Schedules for the 15-minute Settlement Interval.
RTOBLAMTTOT	$	*Real-Time Obligation Amount Total*—The sum of all payments and charges for PTP Obligations settled in Real-Time for the hour that includes the 15-minute Settlement Interval.
RTOBLLOAMTTOT	$	*Real-Time Obligation with Links to an Option Amount Total*—The sum of all payments for PTP Obligations with Links to an Option settled in Real-Time for the hour that includes the 15-minute Settlement Interval.
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 at all Resource Node Settlement Points for the 15-minute Settlement Interval.
RTCCAMTQSETOT $_q$	$	*Real-Time Congestion Cost Amount QSE Total per QSE*—The total net congestion payments and charges to QSE *q* for its Self-Schedules for the 15-minute Settlement Interval.
BLTRAMTQSETOT $_q$	$	*Block Load Transfer Resource Amount QSE Total per QSE*—The total of the payments to QSE *q* for energy delivered into the ERCOT Region through BLT points for the 15-minute Settlement Interval.
RTDCIMPAMTQSETOT $_q$	$	*Real-Time DC Import Amount QSE Total per QSE*—The total of the payments to QSE *q* for energy imported into the ERCOT Region through DC Ties for the 15-minute Settlement Interval.
RTOBLAMTQSETOT $_q$	$	*Real-Time Obligation Amount QSE Total per QSE*—The net total payment or charge to QSE *q* of all its PTP Obligations settled in Real-Time for the hour that includes the 15-minute Settlement Interval. See paragraph (2) of Section 7.9.2.1, Payments and Charges for PTP Obligations Settled in Real-Time.
RTOBLLOAMTQSETOT $_q$	$	*Real-Time Obligation with Links to an Option Amount QSE Total per QSE*—The total payment to QSE *q* for all of its PTP Obligations with Links to an Option settled in Real-Time for the hour that includes the 15-minute Settlement Interval. See paragraph (2) of Section 7.9.2.1.
RTESOGAMTQSETOT $_q$	$	*Real-Time Energy Payment or Charge per QSE for Energy from SODGs and SOTGs* —The payment or charge to QSE *q* for Real-Time energy from SODGs and SOTGs, for the 15-minute Settlement Interval.
RTESOGAMTTOT	$	*Real-Time Energy Amount Total for Energy from all SODGs and SOTGs* — The total net payments and charges to all QSEs for Real-Time energy from SODGs and SOTGs, for the 15-minute Settlement Interval.

Variable	Unit	Description
[NPRR995: Replace the variables "RTESOGAMTQSETOT $_q$" and "RTESOGAMTTOT" above with the following upon system implementation:]		
RTESOAMTQSETOT $_q$	$	*Real-Time Energy Payment or Charge per QSE for SODGs, SOTGs, SODESSs, or SOTESSs* —The payment or charge to QSE *q* for Real-Time energy from SODGs, SOTGs, SODESSs, or SOTESSs, for the 15-minute Settlement Interval.
RTESOAMTTOT	$	*Real-Time Energy Amount Total from all SODGs, SOTGs, SODESSs, or SOTESSs* —The total net payments and charges to all QSEs for Real-Time energy from SODGs, SOTGs, SODESSs, or SOTESSs, for the 15-minute Settlement Interval.
LRS $_q$	none	The LRS calculated for QSE *q* for the 15-minute Settlement Interval. See Section 6.6.2.2, QSE Load Ratio Share for a 15-Minute Settlement Interval.
q	none	A QSE.
o	none	A CRR owner.

(3) In the event that ERCOT is unable to execute the DAM, the Real-Time Revenue Neutrality Allocation for each QSE for a given 15-minute Settlement Interval is calculated as follows:

LARTRNAMT $_q$ = (-1) * (RTEIAMTTOT + BLTRAMTTOT + RTDCIMPAMTTOT + RTESOGAMTTOT + RTCCAMTTOT + NDRTOBLAMTTOT / 4 + NDRTOPTAMTTOT / 4 + NDRTOPTRAMTTOT / 4 + NDRTOBLRAMTTOT / 4) * LRS $_q$

[NPRR995: Replace the formula "LARTRNAMT $_q$" above with the following upon system implementation:]

LARTRNAMT $_q$ = (-1) * (RTEIAMTTOT + BLTRAMTTOT + RTDCIMPAMTTOT + RTESOAMTTOT + RTCCAMTTOT + NDRTOBLAMTTOT / 4 + NDRTOPTAMTTOT / 4 + NDRTOPTRAMTTOT / 4 + NDRTOBLRAMTTOT / 4) * LRS $_q$

Where:

Total Real-Time Energy Imbalance Payment (or Charge) at Settlement Point (or Hub)

$$RTEIAMTTOT = \sum_q RTEIAMTQSETOT_q$$

Total Real-Time Payment for BLT Resources

$$BLTRAMTTOT = \sum_q BLTRAMTQSETOT_q$$

Total Real-Time Payment for DC Tie Imports

$$RTDCIMPAMTTOT = \sum_{q} RTDCIMPAMTQSETOT_{q}$$

Total Real-Time Congestion Payment or Charge for Self Schedules

$$RTCCAMTTOT = \sum_{q} RTCCAMTQSETOT_{q}$$

Total Real-Time Payment or Charge for PTP Obligations when ERCOT is unable to execute the DAM

$$NDRTOBLAMTTOT = \sum_{o} NDRTOBLAMTOTOT_{o}$$

Total Real-Time Payment for PTP Options when ERCOT is unable to execute the DAM

$$NDRTOPTAMTTOT = \sum_{o} NDRTOPTAMTOTOT_{o}$$

Total Real-Time Payment for PTP Options with Refund when ERCOT is unable to execute the DAM

$$NDRTOPTRAMTTOT = \sum_{o} NDRTOPTRAMTOTOT_{o}$$

Total Real-Time Payment or Charge for PTP Obligations with Refund when ERCOT is unable to execute the DAM

$$NDRTOBLRAMTTOT = \sum_{o} NDRTOBLRAMTOTOT_{o}$$

Total Real-Time Payment or Charge for energy from SODGs and SOTGs

$$RTESOGAMTTOT = \sum_{q} RTESOGAMTQSETOT_{q}$$

[NPRR995: Replace the language above with the following upon system implementation:]

Total Real-Time Payment or Charge for energy from SODGs, SOTGs, SODESSs, or SOTESSs

$$RTESOAMTTOT = \sum_{q} RTESOAMTQSETOT_{q}$$

The above variables are defined as follows:

Variable	Unit	Description
$LARTRNAMT_{q}$	$	*Load-Allocated Real-Time Revenue Neutrality Amount per QSE*—The QSE *q*'s share of the total Real-Time revenue neutrality amount for the 15-minute Settlement Interval.
RTEIAMTTOT	$	*Real-Time Energy Imbalance Amount Total*—The total net payments and charges for Real-Time Energy Imbalance at all Settlement Points (Resource, Load Zone, or Hub) for the 15-minute Interval.
BLTRAMTTOT	$	*Block Load Transfer Resource Amount Total*—The total of the payments for energy delivered into the ERCOT Region through BLT points for the 15-minute Settlement Interval.

Variable	Unit	Description
RTDCIMPAMTTOT	$	*Real-Time DC Import Amount Total*—The summation of payments for DC Tie imports for the 15-minute Settlement Interval.
RTCCAMTTOT	$	*Real-Time Energy Congestion Cost Amount Total*—The total net congestion payments and charges for all Self-Schedules for the 15-minute Settlement Interval.
NDRTOBLAMTTOT	$	*No DAM Real-Time Obligation Amount Total*—The sum of all payments and charges for PTP Obligations settled in Real-Time, when ERCOT is unable to execute the DAM, for the hour that includes the 15-minute Settlement Interval.
NDRTOPTAMTTOT	$	*No DAM Real-Time Option Amount Total*—The sum of all payments for PTP Options settled in Real-Time, when ERCOT is unable to execute the DAM, for the hour that includes the 15-minute Settlement Interval.
NDRTOPTRAMTTOT	$	*No DAM Real-Time Option with Refund Amount Total*—The sum of all payments for PTP Options with Refund settled in Real-Time, when ERCOT is unable to execute the DAM, for the hour that includes the 15-minute Settlement Interval.
NDRTOBLRAMTTOT	$	*No DAM Real-Time Obligation with Refund Amount Total*—The sum of all payments for PTP Obligations with Refund settled in Real-Time, when ERCOT is unable to execute the DAM, for the hour that includes the 15-minute Settlement Interval.
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.
RTCCAMTQSETOT $_q$	$	*Real-Time Congestion Cost Amount QSE Total per QSE*—The total net congestion payments and charges to QSE *q* for its Self-Schedules for the 15-minute Settlement Interval.
BLTRAMTQSETOT $_q$	$	*Block Load Transfer Resource Amount QSE Total per QSE*—The total of the payments to QSE *q* for energy delivered into the ERCOT Region through BLT points for the 15-minute Settlement Interval.
RTDCIMPAMTQSETOT $_q$	$	*Real-Time DC Import Amount QSE Total per QSE*—The total of the payments to QSE *q* for energy imported into the ERCOT Region through DC Ties for the 15-minute Settlement Interval.
NDRTOBLAMTOTOT $_o$	$	*No DAM Real-Time Obligation Amount Owner Total per CRR Owner*—The net total payment or charge to CRR owner *o* of all its PTP Obligations settled in Real-Time when ERCOT is unable to execute the DAM, for the hour.
NDRTOPTAMTOTOT $_o$	$	*No DAM Real-Time Option Amount Owner Total per CRR Owner*—The total payment to CRR owner *o* for all its PTP Options settled in Real-Time when ERCOT is unable to execute the DAM, for the hour.
NDRTOPTRAMTOTOT $_o$	$	*No DAM Real-Time Option with Refund Amount Owner Total per CRR Owner*—The total payment to Non-Opt-In Entity (NOIE) CRR owner *o* for all its PTP Options with Refund settled in Real-Time when ERCOT is unable to execute the DAM, for the hour.
NDRTOBLRAMTOTOT $_o$	$	*No DAM Real-Time Obligation with Refund Amount Owner Total per CRR Owner*—The net total payment or charge to CRR owner *o* for all its PTP Obligations with Refund settled in Real-Time, when ERCOT is unable to execute the DAM, for the hour.

Variable	Unit	Description
RTESOGAMTQSETOT $_q$	$	*Real-Time Energy Payment or Charge per QSE for Energy from SODGs and SOTGs* —The payment or charge to QSE *q* for Real-Time energy from SODGs and SOTGs, for the 15-minute Settlement Interval.
RTESOGAMTTOT	$	*Real-Time Energy Amount Total for Energy from all SODGs and SOTGs* —The total net payments and charges to all QSEs for Real-Time energy from SODGs and SOTGs, for the 15-minute Settlement Interval.

[NPRR995: Replace the variables "RTESOGAMTQSETOT $_q$" and "RTESOGAMTTOT" above with the following upon system implementation:]

RTESOAMTQSETOT $_q$	$	*Real-Time Energy Payment or Charge per QSE for SODGs, SOTGs, SODESSs, or SOTESSs* —The payment or charge to QSE *q* for Real-Time energy from SODGs, SOTGs, SODESSs, or SOTESSs, for the 15-minute Settlement Interval.
RTESOAMTTOT	$	*Real-Time Energy Amount Total from all SODGs, SOTGs, SODESSs, or SOTESSs* —The total net payments and charges to all QSEs for Real-Time energy from SODGs, SOTGs, SODESSs, or SOTESSs, for the 15-minute Settlement Interval.

LRS $_q$	none	The LRS calculated for QSE *q* for the 15-minute Settlement Interval. See Section 6.6.2.2.
q	none	A QSE.
o	none	A CRR Owner.

6.6.11 Emergency Response Service Capacity

6.6.11.1 Emergency Response Service Capacity Payments

(1) ERCOT shall pay, for each Emergency Response Service (ERS) Contract Period, the QSEs representing ERS Resources as follows:

$$\mathbf{ERSPAMT}_{qc(tp)d} = \mathbf{COMPAMT}_{qc(tp)d} + \mathbf{SPAMT}_{qc(tp)d}$$

$$\mathbf{ERSPAMTQSETOT}_{qcd} = \sum_{tp} \mathbf{ERSPAMT}_{qc(tp)d}$$

$$\mathbf{ERSPAMTTOT}_{c(tp)d} = \sum_{q} \mathbf{ERSPAMT}_{qc(tp)d}$$

Where:

$$\text{COMPAMT}_{qc(tp)d} = -1 * \text{ERSPRICE}_{qc(tp)d} * \text{COMPDELQSEMW}_{qcd(tp)d} * \text{TPH}_{c(tp)d}$$

$$\text{SPAMT}_{qc(tp)d} = -1 * (\text{ERSPRICE}_{qc(tp)d} * (\text{Min}(\text{SPCUL}_{qc(tp)d}, \text{SPDELQSEMW}_{qc(tp)d}) * \text{TPH}_{c(tp)d})$$

$$\text{COMPDELQSEMW}_{qc(tp)d} = \sum_{e=1}^{co} \text{COMPDELMW}_{qce(tp)d}$$

$$\text{COMPDELMWTOT}_{c(tp)d} = \sum_{q=1}^{n} \text{COMPDELQSEMW}_{qc(tp)d}$$

$$\text{SPDELQSEMW}_{qc(tp)d} = \sum_{e=1}^{s} \text{SPDELMW}_{qce(tp)d}$$

$$\text{SPDELMWTOT}_{c(tp)d} = \sum_{q} \text{SPDELQSEMW}_{qc(tp)d}$$

$$\text{COMPDELMW}_{qce(tp)d} = \text{ERSTESTPF}_{qred} * \text{COMPOFFERMW}_{qce(tp)d} * (\text{ERSAFWT}_{qcd} * \text{Min}(\text{ERSAFCOMB}_{qrd},1) + (1 - \text{ERSAFWT}_{qcd}) * \text{Min}(\text{ERSEPF}_{qrd},1))$$

$$\text{SPDELMW}_{qc(tp)d} = \text{ERSTESTPF}_{qred} * \text{SPOFFERMW}_{qce(tp)d} * (\text{ERSAFWT}_{qcd} * \text{Min}(\text{ERSAFCOMB}_{qrd},1) + (1 - \text{ERSAFWT}_{qcd}) * \text{Min}(\text{ERSEPF}_{qrd},1))$$

The ERS Self-Provision Capacity Upper Limit for each self-providing QSE shall be calculated by ERCOT using a two-pass process for each of the four ERS service types. The first pass will consist of simultaneously solving for all QSEs' ERS Self-Provision Capacity Upper Limits with the constraint that each QSE's ERS Self-Provision Capacity Upper Limit will equal its LRS multiplied by the total capacity awarded for competitive offers, plus the sum of all QSEs' ERS Self-Provision Capacity Upper Limits. The second pass will repeat the solution of the equations with a QSE's delivered self-provided MW capacity (adjusted for availability and/or event performance) substituted for the ERS Self-Provision Capacity Upper Limit if the delivered MW capacity is less than the first pass calculation of the ERS Self-Provision Capacity Upper Limit.

Pass 1:

For QSE 1:

$$\mathbf{SPCUL}_{1c(tp)d} = \mathbf{ERSLRS}_{1c(tp)d} * (\mathbf{COMPDELMWTOT}_{c(tp)d} + \mathbf{SPCUL}_{1c(tp)d} + \mathbf{SPCUL}_{2c(tp)d} + \ldots + \mathbf{SPCUL}_{nc(tp)d})$$

For QSE 2:

$$\mathbf{SPCUL}_{2c(tp)d} = \mathbf{ERSLRS}_{2c(tp)d} * (\mathbf{COMPDELMWTOT}_{c(tp)d} + \mathbf{SPCUL}_{1c(tp)d} + \mathbf{SPCUL}_{2c(tp)d} + \ldots + \mathbf{SPCUL}_{nc(tp)d})$$

…

For QSE n:

$$\mathbf{SPCUL}_{nc(tp)d} = \mathbf{ERSLRS}_{nc(tp)d} * (\mathbf{COMPDELMWTOT}_{c(tp)d} + \mathbf{SPCUL}_{1c(tp)d} + \mathbf{SPCUL}_{2c(tp)d} + \ldots + \mathbf{SPCUL}_{nc(tp)d})$$

Pass 2:

For QSE 1:

$$\mathbf{SPCUL}_{1c(tp)d} = \mathbf{ERSLRS}_{1c(tp)d} * (\mathbf{COMPDELMWTOT}_{c(tp)d} + \mathbf{Min}(\mathbf{SPDELMW}_{1c(tp)d}, \mathbf{SPCUL}_{1c(tp)d}) + \mathbf{Min}(\mathbf{SPDELMW}_{2c(tp)d}, \mathbf{SPCUL}_{2c(tp)d}) + \ldots + \mathbf{Min}(\mathbf{SPDELMW}_{nc(tp)d}, \mathbf{SPCUL}_{nc(tp)d}))$$

For QSE 2:

$$\mathbf{SPCUL}_{2c(tp)d} = \mathbf{ERSLRS}_{2c(tp)d} * (\mathbf{COMPDELMWTOT}_{c(tp)d} + \mathbf{Min}(\mathbf{SPDELMW}_{1c(tp)d}, \mathbf{SPCUL}_{1c(tp)d}) + \mathbf{Min}(\mathbf{SPDELMW}_{2c(tp)d}, \mathbf{SPCUL}_{2c(tp)d}) + \ldots + \mathbf{Min}(\mathbf{SPDELMW}_{nc(tp)d}, \mathbf{SPCUL}_{nc(tp)d}))$$

…

For QSE n:

$$\mathbf{SPCUL}_{nc(tp)d} = \mathbf{ERSLRS}_{nc(tp)d} * (\mathbf{COMPDELMWTOT}_{c(tp)d} + \mathbf{Min}(\mathbf{SPDELMW}_{1c(tp)d}, \mathbf{SPCUL}_{1c(tp)d}) + \mathbf{Min}(\mathbf{SPDELMW}_{2c(tp)d}, \mathbf{SPCUL}_{2c(tp)d}) + \ldots + \mathbf{Min}(\mathbf{SPDELMW}_{nc(tp)d}, \mathbf{SPCUL}_{nc(tp)d}))$$

The above variables are defined as follows:

Variable	Unit	Description
$\text{ERSPAMT}_{qc(tp)d}$	$	*ERS Payment Amount per QSE per ERS Contract Period per ERS Time Period per ERS Service Type*—ERS total payment to QSE *q* for ERS Contract Period *c,* and ERS Time Period *tp* and ERS service type *d*.
$\text{COMPAMT}_{qc(tp)d}$	$	*Competitive Amount per QSE per ERS Contract Period per ERS Time Period per ERS Service Type*—ERS total payment to QSE *q* for all competitively procured ERS Resources delivered for ERS Contract Period *c*, and ERS Time Period *tp* and ERS service type *d*.

SPAMT $_{qc(tp)d}$	$	*Self-Procured Amount per QSE per ERS Contract Period per ERS Time Period per ERS Service Type*—ERS total payment to QSE *q* for its self-provided ERS Resources for ERS Contract Period *c*, ERS Time Period *tp* and ERS service type *d*.
ERSPAMTQSETOT $_{q}$	$	*ERS Payment QSE Total per QSE*—The total ERS total payments to QSE *q*.
ERSPAMTTOT $_{c(tp)d}$	$	*ERS Payment Amount Total per ERS Contract Period per ERS Time Period per ERS Service Type*—Total of all ERS payments for ERS Contract Period *c*, ERS Time Period *tp* and ERS service type *d*.
ERSPRICE $_{qc(tp)d}$	$/MW per hour	*Price of the Highest Offer Cleared per QSE per ERS Contract Period per ERS Time Period per ERS Service Type*—Contracted clearing price for QSE *q* for ERS Contract Period *c*, ERS Time Period *tp* and ERS service type *d*.
COMPDELMW $_{qce(tp)d}$	MW	*Competitive Delivered MW per QSE per ERS Contract Period per ERS Resource per ERS Time Period per ERS Service Type*—ERS capacity delivered by the QSE *q* for ERS Contract Period *c,* competitive ERS Resource *e*, ERS Time Period *tp* and ERS service type *d*.
TPH $_{c(tp)d}$	Hours	Hours in ERS Time Period *tp* for ERS Contract Period *c*, and ERS service type *d*. For ERS Resources *e* whose obligation is not exhausted in an ERS Contract Period *c,* the number of hours in that ERS Time Period *tp* in that ERS Contract Period *c*. For ERS Resources *e* whose obligation is exhausted in an ERS Contract Period *c*, the number of hours in that ERS Time Period *tp* from the beginning of the ERS Contract Period *c* to the end of the ERS Standard Contract Term.
ERSTESTPF $_{qred}$	None	*ERS Test Performance Factor per QSE per ERS Standard Contract Term per ERS Resource per ERS Service Type*—Test performance factor for QSE *q* in ERS Standard Contract Term *r* for ERS Resource *e* and ERS service type *d* as calculated pursuant to Section 8.1.3.3.1, Suspension of Qualification of Non-Weather-Sensitive Emergency Response Service Resources and/or their Qualified Scheduling Entities.
SPDELMW $_{qc(tp)d}$	MW	*Self-Provided Delivered MW per QSE per ERS Contract Period per ERS Resource per ERS Time Period per ERS Service Type*—Total ERS capacity self-provided and delivered by QSE *q* for ERS Contract Period *c,* ERS Resource *e*, ERS Time Period *tp* and ERS service type *d*.
COMPDELQSEMW $_{qc(tp)d}$	MW	*Competitive Delivered MW Total per QSE per ERS Contract Period per ERS Time Period per ERS service type*—Total ERS competitive capacity delivered by QSE *q* for ERS Contract Period *c* and ERS Time Period *tp* and ERS service type *d*.
COMPDELMWTOT $_{c(tp)d}$	MW	*Competitive Delivered MW Total per ERS Contract Period per ERS Time Period per ERS Service Type*—Total ERS competitive capacity delivered by all QSEs for ERS Contract Period *c*, ERS Time Period *tp* and ERS service type *d*.
SPDELQSEMW $_{qc(tp)d}$	MW	*Self-Provision Delivered Total MW per QSE per ERS Contract Period per ERS Time Period per ERS Service Type*—Total ERS self-provision capacity delivered by QSE *q* for ERS Contract Period *c* and ERS Time Period *tp* and ERS service type *d*.

SPDELMWTOT $_{c(tp)d}$	MW	*Self-Provision Delivered Total MW per ERS Contract Period per ERS Time Period per ERS Service Type*—Total ERS self-provision capacity delivered by all QSE *q* for ERS Contract Period *c* and ERS Time Period *tp* and ERS service type *d*.
COMPOFFERMW $_{qce(tp)d}$	MW	*Competitive Offered MW Total per QSE per ERS Contract Period per ERS Resource per ERS Time Period per ERS Service Type*—ERS capacity offered by QSE *q* for ERS Contract Period *c*, competitive ERS Resource *e* and ERS Time Period *tp* and ERS service type *d*.
ERSAFWT $_{qcd}$	None	*Availability Settlement weighting factor per QSE per ERS Contract Period per ERS Service Type*—The weighting factor for QSE *q* for ERS Contract Period *c*, and ERS service type *d* to apply for Settlement as calculated pursuant to Section 8.1.3.1.3.3, Contract Period Availability Calculations for Emergency Response Service Resources.
ERSAFCOMB $_{qrd}$	None	*Time- and Capacity-Weighted ERS Availability Factor per QSE per ERS Standard Contract Term per ERS Service Type*—The availability factor for QSE *q* for ERS Standard Contract Term *r* and ERS service type *d,* as calculated pursuant to Section 8.1.3.3, Payment Reductions and Suspension of Qualification of Emergency Response Service Resources and/or their Qualified Scheduling Entities.
ERSEPF $_{qrd}$	None	*ERS Event Performance Factor per QSE per ERS Standard Contract Term per ERS Service Type*—Event performance factor for QSE *q* in ERS Standard Contract Term *r* and ERS service type *d* as calculated pursuant to Section 8.1.3.3.1.
SPCUL $_{qc(tp)d}$	MW	*Self-Provision Capacity Upper Limit per QSE per ERS Contract Period per ERS Time Period per ERS Service Type*—The ERS Self-Provision Capacity Upper Limit calculated by ERCOT for a self-providing QSE for ERS Contract Period *c* and ERS Time Period *tp* by simultaneously solving for all QSEs' obligations with the constraint that each QSE's ERS Self-Provision Capacity Upper Limit does not exceed its obligation.
SPOFFERMW $_{qce(tp)d}$	MW	*Self-Provision Offer MW per QSE per ERS Contract Period per ERS Resource per ERS Time Period per ERS Service Type*—ERS capacity offered as self-provision by QSE *q* for ERS Contract Period *c*, ERS Resource *e*, ERS Time Period *tp* and ERS service type *d*.
ERSLRS $_{qc(tp)}$	None	*ERS Load Ratio Share per QSE per ERS Contract Period per ERS Time Period per ERS Service Type*—ERS LRS for QSE *q* for ERS Contract Period *c*, ERS Time Period *tp* and ERS service type *d,* calculated starting with the first hour of the ERS Contract Period and ending with the earlier of the last hour of the ERS Contract Period or the hour containing the recall instruction in an ERS deployment event that results in the exhaustion of a QSE portfolio's ERS obligation. If the resultant QSE-level share is negative, the QSE's share will be set to zero and all other QSE shares will be adjusted on a pro rata basis such that the sum of all shares is equal to one.
q	None	A QSE.
c	None	ERS Contract Period.
r	None	ERS Standard Contract Term.
tp	None	Hours in an ERS Time Period.

e	None	An ERS Resource procured from a QSE for an ERS Contract Period.
co	None	The number of competitive ERS Resources procured from a QSE for an ERS Contract Period.
s	None	The number of self-provided ERS Resources procured from a QSE for an ERS Contract Period.
n	None	The number of QSEs for an ERS Contract Period.
d	None	ERS service type (Weather-Sensitive ERS-10, Non-Weather-Sensitive ERS-10, Weather-Sensitive ERS-30, or Non-Weather-Sensitive ERS-30).

6.6.11.2 Emergency Response Service Capacity Charge

(1) ERCOT shall allocate costs for an ERS service type and ERS Contract Period based on the LRS of each QSE during each ERS Time Period in an ERS Contract Period. A QSE's LRS for an ERS Time Period shall be the QSE's total Load for the ERS Time Period divided by the total ERCOT Load in the ERS Time Period. For the first Settlement of the ERS Contract Period as described in paragraph (1) of Section 9.14.5, Settlement of Emergency Response Service, LRS will be calculated using the latest Settlement Load for each Operating Day in the ERS Contract Period. For the resettlement of the ERS Contract Period as described in paragraph (2) of Section 9.14.5, the LRS will be calculated using the true-up Load for each Operating Day in the ERS Contract Period.

(2) ERCOT shall calculate each QSE's ERS capacity charge as follows:

$$\mathbf{LAERSAMT}_{qc(tp)d} = \mathbf{ERSLRS}_{qc(tp)d} * \mathbf{ERSPAMTTOT}_{c(tp)d}$$

$$\mathbf{LAERSAMTQSETOT}_{q} = \sum_{tp} \mathbf{LAERSAMT}_{q(tp)d}$$

The above variables are defined as follows:

Variable	Unit	Description
$ERSPAMTTOT_{c(tp)d}$	$	*ERS Payment Amount Total per ERS Contract Period per ERS Time Period per ERS Service Type*—Total of all ERS payments for ERS Contract Period *c,* ERS Time Period *tp* and ERS service type *d.*
$ERSLRS_{qc(tp)d}$	None	*ERS Load Ratio Share per QSE per ERS Contract Period per ERS Time Period per ERS Service Type*—ERS LRS for QSE *q* for ERS Contract Period *c,* ERS Time Period *tp* and ERS service type *d,* calculated starting with the first hour of the ERS Contract Period and ending with the earlier of the last hour of the ERS Contract Period or the hour containing the recall instruction in an ERS deployment event that results in the exhaustion of a QSE portfolio's ERS obligation. If the resultant QSE-level share is negative, the QSE's share will be set to zero and all other QSE shares will be adjusted on a pro rata basis such that the sum of all shares is equal to one.

LAERSAMT $_{qc(tp)d}$	$	*Load-Allocated ERS Amount per QSE per ERS Contract Period per ERS Time Period per ERS Service Type*—ERS charge for QSE *q* for ERS Contract Period *c,* ERS Time Period *tp* and ERS service type *d.*
LAERSAMTQSETOT $_{q}$	$	*Load-Allocated ERS Amount QSE Total per QSE*—The total ERS charge for QSE *q*.
q	None	A QSE.
c	None	ERS Contract Period.
tp	None	An ERS Time Period.
d	None	ERS service type (Weather-Sensitive ERS-10, Non-Weather-Sensitive ERS-10, Weather-Sensitive ERS-30, or Non-Weather-Sensitive ERS-30).

6.6.12 Make-Whole Payment for Switchable Generation Resources Committed for Energy Emergency Alert (EEA)

(1) If ERCOT directs a Switchable Generation Resource (SWGR) to switch to the ERCOT Control Area for an actual or anticipated Energy Emergency Alert (EEA) condition, ERCOT shall pay the QSE representing the SWGR a Switchable Generation Make-Whole Payment (SWMWAMT) as calculated in Section 6.6.12.1, Switchable Generation Make-Whole Payment, if the QSE has:

(a) Not opted out of the RUC instruction, which may be a verbal RUC, per the process described in paragraph (14) of Section 5.5.2, Reliability Unit Commitment (RUC) Process;

(b) Complied with the RUC instruction, which may be a verbal RUC, to switch to the ERCOT Control Area and start the Resource;

(c) Submitted a timely Settlement and billing dispute, including the following items:

(i) An attestation signed by an officer or executive with authority to bind the QSE stating that the information contained in the submission is accurate;

(ii) The dollar amount and calculation of the financial loss, if applicable, by Settlement Interval for:

(A) Energy and ancillary service imbalance costs assessed under the non-ERCOT Control Area Operator's (CAO's) settlement process arising from DAM energy and ancillary service obligations of the SWGR in the non-ERCOT Control Area for the time period starting at the initiation of the ramp-down in the non-ERCOT Control Area to two hours following the time ERCOT released the SWGR;

(B) Incremental fuel costs incurred to comply with the instruction. Incremental fuel costs may include only those fuel costs described

in Section 9.14.9, Incremental Fuel Costs for Switchable Generation Make-Whole Payment Disputes;

(C) Make-Whole Payment distribution costs for the commitment of generation resources in the non-ERCOT Control Area arising from the need to replace the energy and ancillary service obligations of the generation instructed via a RUC instruction to switch into the ERCOT Control Area;

(D) Pipeline imbalance penalty costs arising from the SWGR not consuming or consuming over its contracted fuel quantities as a result of a switch from a non-ERCOT Control Area as requested by ERCOT. Fuel imbalance penalty costs are limited to those costs assessed for the period starting at the initiation of the ramp-down in the non-ERCOT Control Area to two hours following the time ERCOT released the SWGR;

(iii) Sufficient documentation to support the QSE's calculation of the amount of the financial loss and all submitted costs.

(2) For a SWGR without approved verifiable costs, the startup and minimum-energy costs will be determined based on generic costs as described in Section 4.4.9.2.3, Startup Offer and Minimum-Energy Offer Generic Caps. If generic costs are insufficient to cover startup and minimum-energy costs of the SWGR, the QSE may provide documentation and request that generic costs be replaced by proxy costs, if available, as determined by ERCOT.

(3) For a SWGR that is a Combined Cycle Generation Resource, all operating costs are those costs for the Combined Cycle Generation Resource within the Combined Cycle Train that is instructed for the hour. If the QSE representing a Combined Cycle Generation Resource complies with a RUC instruction by ERCOT to transition from one Combined Cycle Generation Resource to a different Combined Cycle Generation Resource within the Combined Cycle Train, the incremental cost to transition shall be included in the Switchable Generation Start-Up Cost (SWSUC), as calculated in Section 6.6.12.1, for the Combined Cycle Resource.

(4) A QSE representing a SWGR that is committed through an ERCOT instruction to switch to the ERCOT Control Area may recover lost revenue, net of saved fuel costs, attributable to a reduction in the output of other ERCOT-connected generators that are part of a Combined Cycle Train that includes the RUC-committed SWGR if the following conditions have been met:

(a) The QSE had to turn off one or more generators that were physically connected to the non-ERCOT Control Area in order to achieve the instructed switch, or had to turn off one or more generators that were physically connected to the ERCOT System in order to switch back to the non-ERCOT Control Area, in which case it

must have completed the shutdown sequence within 60 minutes of the end of the RUC instruction; and

(b) As a consequence of turning off one or more generators to facilitate a switch described in paragraph (a) above, the output of one or more generators in the configuration operating in ERCOT at the time of the instruction had to be reduced.

(5) The lost revenue, net of saved fuel costs, described in paragraph (4) above shall be included in the Switchable Generation Cost Guarantee (SWCG), as calculated in Section 6.6.12.1, for the Combined Cycle Generation Resource.

(6) For a SWGR switching from a non-ERCOT Control Area, the compensation described in paragraph (4) above shall be determined for the period from the commencement of the shutdown sequence of the switched unit in the non-ERCOT Control Area until breaker close in the ERCOT Control Area. For a SWGR switching to a non-ERCOT Control Area within 60 minutes of the end of the RUC instruction, the compensation described in paragraph (4) above shall be determined for the period from the commencement of the shutdown sequence of the unit in the ERCOT System until breaker close in the non-ERCOT Control Area, with a maximum duration equal to the duration of the switch from the non-ERCOT Control Area to ERCOT pursuant to the RUC instruction.

(7) A QSE that is entitled to compensation under paragraph (4) above, or the Resource Entity for the affected SWGR, must provide the following documentation for the Combined Cycle Train to verify the lost revenue:

(a) Documentation of the Real-Time output of each unit in the Combined Cycle Train, whether operating in ERCOT or in the non-ERCOT Control Area;

(b) For thermal units, the Input-Output Equation or other documentation that allows for calculating the reduction in fuel consumption if the unit had to reduce generation;

(c) Documentation of the time the shutdown sequence started while switching to ERCOT, and if the QSE seeks recovery of lost revenues for a switch to the non-ERCOT Control Area, documentation of the time the breaker closed in the non-ERCOT Control Area, which is subject to verification with the non-ERCOT Control Area operator;

(d) Documentation showing which combustion turbine of the Combined Cycle Generation Resource is providing the auxiliary service; and

(e) Any other technical documentation ERCOT finds necessary to verify the performance and physical characteristics of the Combined Cycle Train or any component thereof, such as thermal balance diagrams.

(8) The Startup Cost for the SWGR shall include the cost for starting in the ERCOT Control Area and, if the SWGR starts up in the non-ERCOT Control Area within 24 hours of

being released from ERCOT, the cost of starting in the non-ERCOT Control Area, which will be based on the same warmth state.

(9) ERCOT may request additional supporting documentation or explanation with respect to the submitted materials within 15 Business Days of receipt. Additional information requested by ERCOT must be provided by the QSE within 15 Business Days of ERCOT's request. ERCOT will provide Notice of its acceptance or rejection of the claim for the SWMWAMT within 15 Business Days of the updated submission.

(10) If ERCOT denies all or a portion of a QSE's non-ERCOT Control Area costs, pursuant to paragraph (1)(c)(ii) above, the QSE may submit a request for ADR as described in Section 20, Alternative Dispute Resolution Procedure.

6.6.12.1 Switchable Generation Make-Whole Payment

(1) To compensate QSEs representing SWGRs that switch to the ERCOT Control Area from a non-ERCOT Control Area pursuant to an ERCOT RUC instruction for an actual or anticipated EEA condition, ERCOT shall calculate a Switchable Generation Make-Whole Payment (SWMWAMT) for an Operating Day, allocated to each instructed Operating Hour as follows:

$$\mathbf{SWMWAMT}_{q,r} = \mathbf{(-1) * Max\ (0, (SWCG}_{q,r,d} - \mathbf{SWRTREV}_{q,r,d}\mathbf{)) / SWIHR}_{q,r,d}$$

Where:

$$SWCG_{q,r,d} = SWSUC_{q,r,d} + SWMEC_{q,r,d} + SWOC_{q,r,d} + SWAC_{q,r,d} + SWPSLR_{q,r,d}$$

$$SWRTREV_{q,r,d} = Max\ [0, \sum_{i}(RTSPP_{p,i} * RTMG_{q,r,i} + (-1) * (EMREAMT_{q,r,p,i} + VSSVARAMT_{q,r,i} + VSSEAMT_{q,r,i}) + Max(0, (RTOLHSLRA_{q,r,p,i} - RTMGA_{q,r,p,i}) * (RTRSVPOR_{i} + RTRDP_{i})))]$$

$$SWAC_{q,r,d} = SWFC_{q,r,d} + SWEIC_{q,r,d} + SWASIC_{q,r,d} + SWMWDC_{q,r,d} + SWFIPC_{q,r,d}$$

$$SWPSLR_{q,r,d} = \sum_{i}(RTSPP_{p,i} * RTLPX_{q,r,i}) - (FIP+FA) * SFC_{d}$$

If ERCOT has approved verifiable costs for the SWGR:

$$SWSUC_{q,r,d} = \sum_{s} [SWSF * (DAFCRS_{r,s} * (GASPERSU_{r,s} * FIP + OILPERSU_{r,s} * FOP + SFPERSU_{r,s} * SFP) + VOMS_{r,s})] + ADJSWSUC_{q,r,d}$$

$$SWMEC_{q,r,d} = \sum_{i} ((AHR_{r,i} * (GASPERME_{r} * FIP + OILPERME_{r} * FOP + SFPERME_{r} * SFP + FA_{r}) + VOMLSL_{r}) * Min (LSL_{q,r,i} * (¼), RTMG_{q,r,i}))$$

$$SWOC_{q,r,d} = \sum_{i} [(AHR_{r,i} * ((GASPEROL_{r} * FIP + OILPEROL_{r} * FOP + SFPEROL_{r} * SFP) + FA_{r}) + OM_{r}) * Max(0, (RTMG_{q,r,i} – LSL_{q,r,i} * (¼)))] - OPC_{r,d}$$

Where,

$$OPC_{r,d} = \sum_{i} ((PAHR_{r,i} * (FIP + FA) + OM_{r}) * AENG_{r,i})$$

If ERCOT has not approved verifiable costs for the SWGR:

$$SWSUC_{q,r,d} = \sum_{s} (SWSF * RCGSC_{s,rc}) + ADJSWSUC_{q,r,d}$$

$$SWMEC_{q,r,d} = \sum_{i} (RCGMEC_{i,rc} * Min (LSL_{q,r,i} * (¼), RTMG_{q,r,i}))$$

$$SWOC_{q,r,d} = \sum_{i} ((PAHR_{r,i} * FIP + STOM_{rc}) * Max(0, (RTMG_{q,r,i} – LSL_{q,r,i} * (¼)))) - OPC_{r,d}$$

Where,

$$OPC_{r,d} = \sum_{i} ((PAHR_{r,i} * FIP + STOM_{rc}) * AENG_{r,i})$$

The above variables are defined as follows:

Variable	Unit	Definition
$SWMWAMT_{q,r}$	$	*Switchable Generation Make-Whole Payment*—The Switchable Generation Make-Whole Payment to the QSE *q*, for Resource *r*, for the hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$SWCG_{q,r,d}$	$	*Switchable Generation Cost Guarantee*—The sum of eligible Startup Costs, minimum-energy costs, operating costs, and other Switchable Generation approved costs for Resource *r* represented by QSE *q* for all instructed hours, for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$OPC_{r,d}$	$	*Operational Cost* – The operational cost for the Resource *r* for the Operating Day *d* in the non-ERCOT Control Area. The operating costs represent the costs the Resource would have incurred to generate the awarded energy in the non-ERCOT Control Area Day-Ahead market absent a request to switch to ERCOT. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.

Variable	Unit	Definition
$AENG_{r, i}$	MWh	*Awarded Energy Non-ERCOT Day-Ahead Market* – The awarded energy in the non-ERCOT Day-Ahead Market for the Resource *r* during the Interval *i*. The awarded energy in the non-ERCOT Control Area Day-Ahead market represents the energy award for the interval that was not generated by the Resource due to the switch to ERCOT. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$SWSUC_{q,r,d}$	$	*Switchable Generation Start-Up Cost* —The Startup Costs for Resource *r* represented by QSE *q* for startup hours, for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$SWPSLR_{q,r,d}$	$	*Switchable Generation Physical Switch Lost Revenue* – The loss of revenue, net of any saved costs including avoided fuel consumption, experienced by the QSE when the Combined Cycle Generation Resource operating in ERCOT must reduce its output to accommodate a switch from a non-ERCOT Control Area of one or more turbines needed to achieve a Combined Cycle Generation Resource configuration instructed by ERCOT. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$RTLPX_{q, r, i}$	MWh	*Real-Time Proxy Generation per QSE per Resource by Settlement Interval*—The Real-Time energy that was not generated in ERCOT by Combined Cycle Train, *r*, represented by QSE *q*, for the 15-minute Settlement Interval *i*, due to a reduction in output that was necessary to facilitate a switch of another unit in the same Combined Cycle Train to the ERCOT System from a non-ERCOT Control Area, or to a non-ERCOT Control Area from the ERCOT System, when the switch is instructed by ERCOT. During a shutdown to switch to ERCOT, the value of RTLPX will be determined based on the reduced generation, by interval, for the period starting from the commencement of the shutdown sequence in the non-ERCOT Control Area until breaker close in ERCOT. The reduction in generation shall be determined based on the last metered output value for the Combined Cycle Generation Resource operating in ERCOT immediately prior to the commencement of the shutdown sequence in the non-ERCOT Control Area as compared with the actual metered output during the relevant period, but only to the extent ERCOT determines the reduction in output was necessary to facilitate the switch. During a shutdown after an ERCOT release of the SWGR, the value of RTLPX will be determined based on the reduced generation, by interval, for the period starting from the commencement of the shutdown sequence in the ERCOT Control Area until breaker close in the non-ERCOT Control Area, with a maximum duration equal to the duration of the switch from the non-ERCOT Control Area to ERCOT pursuant to the RUC instruction. This proxy value will apply only if the QSE shuts down the unit within 60 minutes after the ERCOT release. The reduction in generation shall be determined based on the last metered output value for the Combined Cycle Generation Resource operating in ERCOT immediately prior to the commencement of the shutdown sequence in ERCOT, as compared with the actual metered output during the relevant period, but only to the extent ERCOT determines the reduction in output was necessary to facilitate the switch.

Variable	Unit	Definition
SFC_{d}	MMBtu	*Saved Fuel Consumption* — Fuel quantity saved due to an output reduction of the combustion turbine(s) operating in ERCOT during the relevant period if necessary to accommodate the switch to and from the ERCOT area.
SWSF	none	*Switchable Generation Startup Factor* —The Switchable Generation Startup Factor for an SWGR. The SWSF shall be set to a value of 2 if the SWGR has a COP Resource Status of EMRSWGR within 24 hours of being released by the ERCOT Operator. Otherwise, the SWSF shall be set to a value of 1.
$SWMEC_{q, r, d}$	$	*Switchable Generation Minimum Energy Cost* —The minimum energy costs for Resource *r* represented by QSE *q* during instructed hours, for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$SWOC_{q, r, d}$	$	*Switchable Generation Operating Cost* —The operating costs for Resource *r* represented by QSE *q* during instructed hours, for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. Switchable generation operating cost represents the Real-Time operating costs in ERCOT reduced by the savings in operating costs not incurred due to the switch from the non-ERCOT Control Area.
$SWAC_{q, r, d}$	$	*Switchable Generation Approved Costs* – The total amount of the calculation of financial loss, as submitted by the QSE *q* for the Resource *r*, as approved by ERCOT for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$SWFC_{q, r, d}$	$	*Switchable Generator Fuel Cost* —The incremental fuel costs and fees for Resource *r* represented by QSE *q* for all instructed hours, for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. Incremental fuel costs must be based on those costs incurred as described in Section 9.14.9, Incremental Fuel Costs for Switchable Generation Make-Whole Payment.
$SWFIPC_{q, r, d}$	$	*Switchable Generator Fuel Imbalance Penalty Cost* —The fuel imbalance penalty cost for Resource *r* represented by QSE *q*, for the Operating Day, arising from the SWGR not consuming its contracted fuel quantities as a result of a switch from a non-ERCOT Control Area as requested by ERCOT. Fuel imbalance penalty costs are limited to those costs assessed for the period starting at the initiation of the ramp-down in the non-ERCOT Control Area to two hours following the time ERCOT released the SWGR. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$SWEIC_{q, r, d}$	$	*Switchable Generator Energy Imbalance Cost* —The energy imbalance costs for Resource *r* represented by QSE *q* for instructed hours, for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. Energy imbalance costs represent Real-Time imbalance charges for the amount of energy the SWGR was not able to provide as required by its DAM commitment from the non-ERCOT Control Area, starting from the beginning of the ramp-down period in the other grid to two hours following the time ERCOT released the Resource.

Variable	Unit	Definition
SWASIC $_{q, r, d}$	$	*Switchable Generator Ancillary Services Imbalance Cost* —The Ancillary Service imbalance costs for Resource *r* represented by QSE *q* for instructed hours, for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. Ancillary Service imbalance costs represent Real-Time imbalance charges for the amount of Ancillary Services the SWGR was not able to provide as required by its Day-Ahead commitment from the non-ERCOT Control Area, starting from the time of shutdown in the other grid to two hours following the time ERCOT released the Resource.
SWMWDC $_{q, r, d}$	$	*Switchable Generator Make-Whole Payment Distribution Cost* —The Make-Whole Payment distribution costs for Resource *r* represented by QSE *q* for instructed hours, for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. Make-Whole Payment distribution costs represent charges from non-ERCOT Control Area from the time of shutdown in the other grid to two hours following the time ERCOT released the Resource.
SWRTREV $_{q, r, d}$	$	*Switchable Generation Real-Time Revenues* – The sum of energy revenues for the Resource *r,* represented by QSE *q,* during all instructed hours for the Operating Day *d*. Where for a Combined Cycle Train, Resource *r* is the Combined Cycle Train.
GASPERSU $_{r, s}$	none	*Percent of Natural Gas to Operate per Start*—The percentage of natural gas used by Resource *r* to operate per start *s*, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
OILPERSU $_{r, s}$	none	*Percent of Oil to Operate per Start*—The percentage of fuel oil used by Resource *r* to operate per start *s*, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
SFPERSU $_{r, s}$	none	*Percent of Solid Fuel to Operate per Start*—The percentage of solid fuel used by Resource *r* to operate per start *s*, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
GASPERME $_{r}$	None	*Percent of Natural Gas to Operate at LSL*—The percentage of natural gas used by Resource *r* to operate at LSL, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
OILPERME $_{r}$	None	*Percent of Oil to Operate at LSL*—The percentage of fuel oil used by Resource *r* to operate at LSL, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
SFPERME $_{r}$	None	*Percent of Solid Fuel to Operate at LSL*—The percentage of solid fuel used by Resource *r* to operate at LSL, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
DAFCRS $_{r, s}$	MMBtu/Start	*Day-Ahead Actual Fuel Consumption Rate per Start*—The actual fuel consumption rate for Resource *r* to startup per start type *s*, adjusted by VOXR as defined in the Verifiable Cost Manual. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. For additional information, see Verifiable Cost Manual Section 3.3, Startup Fuel Consumption.

Variable	Unit	Definition
VOMS $_{r, s}$	$/Start	*Variable Operations and Maintenance Cost per Start*—The operations and maintenance cost for Resource *r* to startup, per start *s*, including an adjustment for emissions costs. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. For additional information, see Verifiable Cost Manual Section 3.2, Submitting Startup Costs.
VOMLSL $_{r}$	$/MWh	*Variable Operations and Maintenance Cost at LSL*—The operations and maintenance cost for Resource *r* to operate at LSL, including an adjustment for emissions costs. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. For additional information, see Verifiable Cost Manual Section 4.2, Submitting Minimum Energy Costs.
LSL $_{q, r, i}$	MW	*Low Sustained Limit*—The LSL of Generation Resource *r* represented by QSE *q* for the hour that includes the Settlement Interval *i*, as submitted in the COP. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
RTMG $_{q, r, i}$	MWh	*Real-Time Metered Generation per QSE per Resource by Settlement Interval by hour*—The Real-Time energy from Resource *r* represented by QSE *q*, for the 15-minute Settlement Interval *i*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
AHR $_{r, i}$	MMBtu / MWh	*Average Heat Rate per Resource*– The verifiable average heat rate for the Resource *r*, for the operating level, for the 15-minute Settlement Interval *i*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
OM $_{r}$	$/MWh	*Verifiable Operations and Maintenance Cost Above LSL*– The O&M cost for Resource *r* to operate above LSL. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. See the Verifiable Cost Manual for additional information.
SWIHR $_{q, r, d}$	none	*Switchable Generation Instructed Hours*—The total number of Switchable Generation instructed hours, for Resource *r* represented by QSE *q*, for the Operating Day *d*. When one or more Combined Cycle Generation Resources are committed by ERCOT, the total number of instructed hours is calculated for the Combined Cycle Train for all switchable instructed Combined Cycle Generation Resources.
SFP	$/MMBtu	*Solid Fuel Price*—The solid fuel index price is $1.50.
GASPEROL $_{r}$	none	*Percent of Natural Gas to Operate Above LSL*—The percentage of natural gas used by Resource *r* to operate above LSL, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
OILPEROL $_{r}$	none	*Percent of Oil to Operate Above LSL*—The percentage of fuel oil used by Resource *r* to operate above LSL, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
SFPEROL $_{r}$	none	*Percent of Solid Fuel to Operate Above LSL*—The percentage of solid fuel used by Resource *r* to operate above LSL, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.

Variable	Unit	Definition
ADJSWSUC $_{q, r, d}$	$	*Adjustment to Switchable Generation Start-Up Cost* — Adjustment to Switchable Generation Start-up Cost for Resource *r* represented by QSE *q*, for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. This adjustment may include eligible startup transition costs for a Combined Cycle Train or costs for any SWGR not captured in other billing determinants.
RCGSC $_{s, rc}$	$/Start	*Resource Category Generic Startup Cost*—The Resource Category Generic Startup Cost cap for the category of the Resource *rc*, according to Section 4.4.9.2.3, Startup Offer and Minimum-Energy Offer Generic Caps, for the Operating Day.
RCGMEC $_{i, rc}$	$/MWh	*Resource Category Generic Minimum-Energy Cost*—The Resource Category Generic Minimum Energy Cost cap for the category of the Resource *rc*, according to Section 4.4.9.2.3, for the Operating Day.
PAHR $_{r, i}$	MMBtu / MWh	*Proxy Average Heat Rate*- The proxy average heat rate for the Resource *r* for the 15-minute Settlement Interval *i*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
STOM $_{rc}$	$/MWh	*Standard Operations and Maintenance Cost* - The standard O&M cost for the Resource Category *rc* for operations above LSL, shall be set to the minimum energy variable O&M costs, as described in paragraph (6)(c) of Section 5.6.1, Verifiable Costs.
RTSPP $_{p, i}$	$/MWh	*Real-Time Settlement Point Price*—The Real-Time Settlement Point Price at Settlement Point *p*, for the 15-minute Settlement Interval *i*.
FIP	$/MMBtu	*Fuel Index Price*—As defined in Section 2.1, Definitions.
FOP	$/MMBtu	*Fuel Oil Price*—As defined in Section 2.1.
FA $_{r}$	$/MMBtu	*Fuel Adder* — The fuel adder is the average cost above the index price Resource *r* has paid to obtain fuel. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. See the Verifiable Cost Manual for additional information.
EMREAMT $_{q, r, p, i}$	$	*Emergency Energy Amount per QSE per Settlement Point per unit per interval*—The payment to QSE *q* for the additional energy produced by Generation Resource *r* at Resource Node *p* in Real-Time during the Emergency Condition, for the 15-minute Settlement Interval *i*. Payment for emergency energy is made to the Combined Cycle Train.
VSSVARAMT $_{q, r, i}$	$	*Voltage Support Service VAr Amount per QSE per Generation Resource* - The payment to QSE *q* for the VSS provided by Generation Resource *r,* for the 15-minute Settlement Interval *i*. Where for a Combined Cycle Resource *r* is a Combined Cycle Train.
VSSEAMT $_{q, r, i}$	$	*Voltage Support Service Energy Amount per QSE per Generation Resource*—The lost opportunity payment to QSE *q* for ERCOT-directed VSS from Generation Resource *r* for the 15-minute Settlement Interval *i*. Where for a Combined Cycle Resource *r* is a Combined Cycle Train.
RTOLHSLRA $_{q, r, p, i}$	MWh	*Real-Time Adjusted On-Line High Sustained Limit for the Resource*—The Real-Time telemetered HSL for the Resource *r* represented by QSE *q* at Resource Node *p* that is available to SCED, integrated over the 15-minute Settlement Interval *i*, as described in Section 6.7.5, Real-Time Ancillary Service Imbalance Payment or Charge. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.

Variable	Unit	Definition
$RTMGA_{q, r, p, i}$	MWh	*Real-Time Adjusted Metered Generation per QSE per Settlement Point per Resource*—The adjusted metered generation of Generation Resource *r* represented by QSE *q* at Resource Node *p* in Real-Time for the 15-minute Settlement Interval *i*, as described in Section 6.7.5. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$RTRSVPOR_{i}$	$/MWh	*Real-Time Reserve Price for On-Line Reserves*—The Real-Time Reserve Price for On-Line Reserves for the 15-minute Settlement Interval *i*, as described in Section 6.7.5.
$RTRDP_{i}$	$/MWh	*Real-Time On-Line Reliability Deployment Price*—The Real-Time price for the 15-minute Settlement Interval *i*, reflecting the impact of reliability deployments on energy prices that is calculated from the Real-Time On-Line Reliability Deployment Price Adder, as described in Section 6.7.5.
q	none	A QSE.
r	none	A Switchable Generation Resource.
d	none	An Operating Day containing the RUC instruction to the SWGR.
i	none	A 15-minute Settlement Interval within the hour of an Operating Day during which the SWGR is instructed by ERCOT.
s	none	An ERCOT area start that is eligible to have its costs included in the Switchable Generation Cost Guarantee.
rc	none	A Resource Category.
p	none	A Resource Node Settlement Point.

[NPRR1010 and NPRR1014: Replace applicable portions of paragraph (1) above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1010; or upon system implementation for NPRR1014:]

(1) To compensate QSEs representing SWGRs that switch to the ERCOT Control Area from a non-ERCOT Control Area pursuant to an ERCOT RUC instruction for an actual or anticipated EEA condition, ERCOT shall calculate a Switchable Generation Make-Whole Payment (SWMWAMT) for an Operating Day, allocated to each instructed Operating Hour as follows:

$$\mathbf{SWMWAMT}_{q, r} = (-1) * \mathbf{Max}\ (0, (\mathbf{SWCG}_{q, r, d} - \mathbf{SWRTREV}_{q, r, d})) / \mathbf{SWIHR}_{q, r, d}$$

Where:

$$SWCG_{q, r, d} = SWSUC_{q, r, d} + SWMEC_{q, r, d} + SWOC_{q, r, d} + SWAC_{q, r, d} + SWPSLR_{q, r, d}$$

$$SWRTREV_{q, r, d} = Max\ [0, \sum_{i}(RTSPP_{p, i} * RTMG_{q, r, i} + (-1) * (EMREAMT_{q, r, p, i} + VSSVARAMT_{q, r, i} + VSSEAMT_{q, r, i}) + RTUREV_{q, r, i} + RTRDREV_{q, r, i} + RTRREV_{q, r, i} + RTNSREV_{q, r, i} + RTECRREV_{q, r, i})]$$

$$SWAC_{q,r,d} = SWFC_{q,r,d} + SWEIC_{q,r,d} + SWASIC_{q,r,d} + SWMWDC_{q,r,d} + SWFIPC_{q,r,d}$$

$$SWPSLR_{q,r,d} = \sum_{i} (RTSPP_{p,i} * RTLPX_{q,r,i}) - (FIP+FA) * SFC_{d}$$

If ERCOT has approved verifiable costs for the SWGR:

$$SWSUC_{q,r,d} = \sum_{s} [SWSF * (DAFCRS_{r,s} * (GASPERSU_{r,s} * FIP + OILPERSU_{r,s} * FOP + SFPERSU_{r,s} * SFP) + VOMS_{r,s})] + ADJSWSUC_{q,r,d}$$

$$SWMEC_{q,r,d} = \sum_{i} ((AHR_{r,i} * (GASPERME_{r} * FIP + OILPERME_{r} * FOP + SFPERME_{r} * SFP + FA_{r}) + VOMLSL_{r}) * Min (LSL_{q,r,i} * (¼), RTMG_{q,r,i}))$$

$$SWOC_{q,r,d} = \sum_{i} [(AHR_{r,i} * ((GASPEROL_{r} * FIP + OILPEROL_{r} * FOP + SFPEROL_{r} * SFP) + FA_{r}) + OM_{r}) * Max(0, (RTMG_{q,r,i} - LSL_{q,r,i} * (¼)))] - OPC_{r,d}$$

Where,

$$OPC_{r,d} = \sum_{i} ((PAHR_{r,i} * (FIP + FA) + OM_{r}) * AENG_{r,i})$$

If ERCOT has not approved verifiable costs for the SWGR:

$$SWSUC_{q,r,d} = \sum_{s} (SWSF * RCGSC_{s,rc}) + ADJSWSUC_{q,r,d}$$

$$SWMEC_{q,r,d} = \sum_{i} (RCGMEC_{i,rc} * Min (LSL_{q,r,i} * (¼), RTMG_{q,r,i}))$$

$$SWOC_{q,r,d} = \sum_{i} ((PAHR_{r,i} * FIP + STOM_{rc}) * Max(0, (RTMG_{q,r,i} - LSL_{q,r,i} * (¼)))) - OPC_{r,d}$$

Where,

$$OPC_{r,d} = \sum_{i} ((PAHR_{r,i} * FIP + STOM_{rc}) * AENG_{r,i})$$

The above variables are defined as follows:

Variable	Unit	Definition
$SWMWAMT_{q,r}$	$	*Switchable Generation Make-Whole Payment*—The Switchable Generation Make-Whole Payment to the QSE *q*, for Resource *r*, for the hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.

$SWCG_{q, r, d}$	$	*Switchable Generation Cost Guarantee*—The sum of eligible Startup Costs, minimum-energy costs, operating costs, and other Switchable Generation approved costs for Resource *r* represented by QSE *q* for all instructed hours, for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$OPC_{r, d}$	$	*Operational Cost* – The operational cost for the Resource *r* for the Operating Day *d* in the non-ERCOT Control Area. The operating costs represent the costs the Resource would have incurred to generate the awarded energy in the non-ERCOT Control Area Day-Ahead market absent a request to switch to ERCOT. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$AENG_{r, i}$	MWh	*Awarded Energy Non-ERCOT Day-Ahead Market* – The awarded energy in the non-ERCOT Day-Ahead Market for the Resource *r* during the Interval *i*. The awarded energy in the non-ERCOT Control Area Day-Ahead market represents the energy award for the interval that was not generated by the Resource due to the switch to ERCOT. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$SWSUC_{q, r, d}$	$	*Switchable Generation Start-Up Cost* —The Startup Costs for Resource *r* represented by QSE *q* for startup hours, for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$SWPSLR_{q, r, d}$	$	*Switchable Generation Physical Switch Lost Revenue* – The loss of revenue, net of any saved costs including avoided fuel consumption, experienced by the QSE when the Combined Cycle Generation Resource operating in ERCOT must reduce its output to accommodate a switch from a non-ERCOT Control Area of one or more turbines needed to achieve a Combined Cycle Generation Resource configuration instructed by ERCOT. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.

RTLPX $_{q, r, i}$	MWh	*Real-Time Proxy Generation per QSE per Resource by Settlement Interval*—The Real-Time energy that was not generated in ERCOT by Combined Cycle Train, *r*, represented by QSE *q*, for the 15-minute Settlement Interval *i*, due to a reduction in output that was necessary to facilitate a switch of another unit in the same Combined Cycle Train to the ERCOT System from a non-ERCOT Control Area, or to a non-ERCOT Control Area from the ERCOT System, when the switch is instructed by ERCOT. During a shutdown to switch to ERCOT, the value of RTLPX will be determined based on the reduced generation, by interval, for the period starting from the commencement of the shutdown sequence in the non-ERCOT Control Area until breaker close in ERCOT. The reduction in generation shall be determined based on the last metered output value for the Combined Cycle Generation Resource operating in ERCOT immediately prior to the commencement of the shutdown sequence in the non-ERCOT Control Area as compared with the actual metered output during the relevant period, but only to the extent ERCOT determines the reduction in output was necessary to facilitate the switch. During a shutdown after an ERCOT release of the SWGR, the value of RTLPX will be determined based on the reduced generation, by interval, for the period starting from the commencement of the shutdown sequence in the ERCOT Control Area until breaker close in the non-ERCOT Control Area, with a maximum duration equal to the duration of the switch from the non-ERCOT Control Area to ERCOT pursuant to the RUC instruction. This proxy value will apply only if the QSE shuts down the unit within 60 minutes after the ERCOT release. The reduction in generation shall be determined based on the last metered output value for the Combined Cycle Generation Resource operating in ERCOT immediately prior to the commencement of the shutdown sequence in ERCOT, as compared with the actual metered output during the relevant period, but only to the extent ERCOT determines the reduction in output was necessary to facilitate the switch.
SFC $_{d}$	MMBtu	*Saved Fuel Consumption* — Fuel quantity saved due to an output reduction of the combustion turbine(s) operating in ERCOT during the relevant period if necessary to accommodate the switch to and from the ERCOT area.
SWSF	None	*Switchable Generation Startup Factor* —The Switchable Generation Startup Factor for an SWGR. The SWSF shall be set to a value of 2 if the SWGR has a COP Resource Status of EMRSWGR within 24 hours of being released by the ERCOT Operator. Otherwise, the SWSF shall be set to a value of 1.
SWMEC $_{q, r, d}$	$	*Switchable Generation Minimum Energy Cost* —The minimum energy costs for Resource *r* represented by QSE *q* during instructed hours, for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
SWOC $_{q, r, d}$	$	*Switchable Generation Operating Cost* —The operating costs for Resource *r* represented by QSE *q* during instructed hours, for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. Switchable generation operating cost represents the Real-Time operating costs in ERCOT reduced by the savings in operating costs not incurred due to the switch from the non-ERCOT Control Area.

$SWAC_{q, r, d}$	$	*Switchable Generation Approved Costs* – The total amount of the calculation of financial loss, as submitted by the QSE *q* for the Resource *r,* as approved by ERCOT for the Operating Day *d.* Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$SWFC_{q, r, d}$	$	*Switchable Generator Fuel Cost* —The incremental fuel costs and fees for Resource *r* represented by QSE *q* for all instructed hours, for the Operating Day *d.* Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. Incremental fuel costs must be based on those costs incurred as described in Section 9.14.9, Incremental Fuel Costs for Switchable Generation Make-Whole Payment.
$SWFIPC_{q, r, d}$	$	*Switchable Generator Fuel Imbalance Penalty Cost* —The fuel imbalance penalty cost for Resource *r* represented by QSE *q*, for the Operating Day, arising from the SWGR not consuming its contracted fuel quantities as a result of a switch from a non-ERCOT Control Area as requested by ERCOT. Fuel imbalance penalty costs are limited to those costs assessed for the period starting at the initiation of the ramp-down in the non-ERCOT Control Area to two hours following the time ERCOT released the SWGR. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$SWEIC_{q, r, d}$	$	*Switchable Generator Energy Imbalance Cost* —The energy imbalance costs for Resource *r* represented by QSE *q* for instructed hours, for the Operating Day *d.* Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. Energy imbalance costs represent Real-Time imbalance charges for the amount of energy the SWGR was not able to provide as required by its DAM commitment from the non-ERCOT Control Area, starting from the beginning of the ramp-down period in the other grid to two hours following the time ERCOT released the Resource.
$SWASIC_{q, r, d}$	$	*Switchable Generator Ancillary Services Imbalance Cost* —The Ancillary Service imbalance costs for Resource *r* represented by QSE *q* for instructed hours, for the Operating Day *d.* Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. Ancillary Service imbalance costs represent Real-Time imbalance charges for the amount of Ancillary Services the SWGR was not able to provide as required by its Day-Ahead commitment from the non-ERCOT Control Area, starting from the time of shutdown in the other grid to two hours following the time ERCOT released the Resource.
$SWMWDC_{q, r, d}$	$	*Switchable Generator Make-Whole Payment Distribution Cost* —The Make-Whole Payment distribution costs for Resource *r* represented by QSE *q* for instructed hours, for the Operating Day *d.* Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. Make-Whole Payment distribution costs represent charges from non-ERCOT Control Area from the time of shutdown in the other grid to two hours following the time ERCOT released the Resource.
$SWRTREV_{q, r, d}$	$	*Switchable Generation Real-Time Revenues* – The sum of energy revenues for the Resource *r,* represented by QSE *q,* during all instructed hours for the Operating Day *d.* Where for a Combined Cycle Train, Resource *r* is the Combined Cycle Train.

GASPERSU $_{r, s}$	none	*Percent of Natural Gas to Operate per Start*—The percentage of natural gas used by Resource *r* to operate per start *s*, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
OILPERSU $_{r, s}$	none	*Percent of Oil to Operate per Start*—The percentage of fuel oil used by Resource *r* to operate per start *s*, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
SFPERSU $_{r, s}$	none	*Percent of Solid Fuel to Operate per Start*—The percentage of solid fuel used by Resource *r* to operate per start *s*, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
GASPERME $_{r}$	None	*Percent of Natural Gas to Operate at LSL*—The percentage of natural gas used by Resource *r* to operate at LSL, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
OILPERME $_{r}$	None	*Percent of Oil to Operate at LSL*—The percentage of fuel oil used by Resource *r* to operate at LSL, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
SFPERME $_{r}$	None	*Percent of Solid Fuel to Operate at LSL*—The percentage of solid fuel used by Resource *r* to operate at LSL, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
DAFCRS $_{r, s}$	MMBtu/Start	*Day-Ahead Actual Fuel Consumption Rate per Start*—The actual fuel consumption rate for Resource *r* to startup per start type *s*, adjusted by VOXR as defined in the Verifiable Cost Manual. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. For additional information, see Verifiable Cost Manual Section 3.3, Startup Fuel Consumption.
VOMS $_{r, s}$	$/Start	*Variable Operations and Maintenance Cost per Start*—The operations and maintenance cost for Resource *r* to startup, per start *s*, including an adjustment for emissions costs. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. For additional information, see Verifiable Cost Manual Section 3.2, Submitting Startup Costs.
VOMLSL $_{r}$	$/MWh	*Variable Operations and Maintenance Cost at LSL*—The operations and maintenance cost for Resource *r* to operate at LSL, including an adjustment for emissions costs. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. For additional information, see Verifiable Cost Manual Section 4.2, Submitting Minimum Energy Costs.
LSL $_{q, r, i}$	MW	*Low Sustained Limit*—The LSL of Generation Resource *r* represented by QSE *q* for the hour that includes the Settlement Interval *i*, as submitted in the COP. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.

RTMG $_{q, r, i}$	MWh	*Real-Time Metered Generation per QSE per Resource by Settlement Interval by hour*—The Real-Time energy from Resource *r* represented by QSE *q*, for the 15-minute Settlement Interval *i*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
AHR $_{r, i}$	MMBtu / MWh	*Average Heat Rate per Resource*– The verifiable average heat rate for the Resource *r*, for the operating level, for the 15-minute Settlement Interval *i*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
OM $_{r}$	$/MWh	*Verifiable Operations and Maintenance Cost Above LSL*– The O&M cost for Resource *r* to operate above LSL. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. See the Verifiable Cost Manual for additional information.
SWIHR $_{q, r, d}$	none	*Switchable Generation Instructed Hours*—The total number of Switchable Generation instructed hours, for Resource *r* represented by QSE *q*, for the Operating Day *d*. When one or more Combined Cycle Generation Resources are committed by ERCOT, the total number of instructed hours is calculated for the Combined Cycle Train for all switchable instructed Combined Cycle Generation Resources.
SFP	$/MMBtu	Solid Fuel Price—The solid fuel index price is $1.50.
GASPEROL $_{r}$	none	*Percent of Natural Gas to Operate Above LSL*—The percentage of natural gas used by Resource *r* to operate above LSL, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
OILPEROL $_{r}$	none	*Percent of Oil to Operate Above LSL*—The percentage of fuel oil used by Resource *r* to operate above LSL, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
SFPEROL $_{r}$	none	*Percent of Solid Fuel to Operate Above LSL*—The percentage of solid fuel used by Resource *r* to operate above LSL, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
ADJSWSUC $_{q, r, d}$	$	*Adjustment to Switchable Generation Start-Up Cost* — Adjustment to Switchable Generation Start-up Cost for Resource *r* represented by QSE *q*, for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. This adjustment may include eligible startup transition costs for a Combined Cycle Train or costs for any SWGR not captured in other billing determinants.
RCGSC $_{s, rc}$	$/Start	*Resource Category Generic Startup Cost*—The Resource Category Generic Startup Cost cap for the category of the Resource *rc*, according to Section 4.4.9.2.3, Startup Offer and Minimum-Energy Offer Generic Caps, for the Operating Day.
RCGMEC $_{i, rc}$	$/MWh	*Resource Category Generic Minimum-Energy Cost*—The Resource Category Generic Minimum Energy Cost cap for the category of the Resource *rc*, according to Section 4.4.9.2.3, for the Operating Day.

PAHR $_{r, i}$	MMBtu / MWh	*Proxy Average Heat Rate*- The proxy average heat rate for the Resource *r* for the 15-minute Settlement Interval *i*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
STOM $_{rc}$	$/MWh	*Standard Operations and Maintenance Cost* - The standard O&M cost for the Resource Category *rc* for operations above LSL, shall be set to the minimum energy variable O&M costs, as described in paragraph (6)(c) of Section 5.6.1, Verifiable Costs.
RTSPP $_{p, i}$	$/MWh	*Real-Time Settlement Point Price*—The Real-Time Settlement Point Price at Settlement Point *p*, for the 15-minute Settlement Interval *i*.
FIP	$/MMBtu	*Fuel Index Price*—As defined in Section 2.1, Definitions.
FOP	$/MMBtu	*Fuel Oil Price*—As defined in Section 2.1.
FA $_{r}$	$/MMBtu	*Fuel Adder* — The fuel adder is the average cost above the index price Resource *r* has paid to obtain fuel. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. See the Verifiable Cost Manual for additional information.
EMREAMT $_{q, r, p, i}$	$	*Emergency Energy Amount per QSE per Settlement Point per unit per interval*—The payment to QSE *q* for the additional energy or Ancillary Services produced or consumed by Resource *r* at Resource Node *p* in Real-Time during the Emergency Condition, for the 15-minute Settlement Interval *i*. Payment for emergency energy is made to the Combined Cycle Train.
VSSVARAMT $_{q, r, i}$	$	*Voltage Support Service VAr Amount per QSE per Generation Resource* - The payment to QSE *q* for the VSS provided by Generation Resource *r*, for the 15-minute Settlement Interval *i*. Where for a Combined Cycle Resource *r* is a Combined Cycle Train.
VSSEAMT $_{q, r, i}$	$	*Voltage Support Service Energy Amount per QSE per Generation Resource*—The lost opportunity payment to QSE *q* for ERCOT-directed VSS from Generation Resource *r* for the 15-minute Settlement Interval *i*. Where for a Combined Cycle Resource *r* is a Combined Cycle Train.
RTRUREV $_{q, r}$	$	*Real-Time Reg-Up Revenue*— The Real-Time Reg-Up revenue for QSE *q* calculated for Resource *r* for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTRDREV $_{q, r}$	$	*Real-Time Reg-Down Revenue*— The Real-Time Reg-Down revenue for QSE *q* calculated for Resource *r* for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTRREV $_{q, r}$	$	*Real-Time Responsive Reserve Revenue*— The Real-Time RRS revenue for QSE *q* calculated for Resource *r* for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTNSREV $_{q, r}$	$	*Real-Time Non-Spin Revenue*— The Real-Time Non-Spin revenue for QSE *q* calculated for Resource *r* for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTECRREV $_{q, r}$	$	*Real-Time ERCOT Contingency Reserve Service Revenue*— The Real-Time ECRS revenue for QSE *q* calculated for Resource *r* for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.

q	none	A QSE.
r	none	A Switchable Generation Resource.
d	none	An Operating Day containing the RUC instruction to the SWGR.
i	none	A 15-minute Settlement Interval within the hour of an Operating Day during which the SWGR is instructed by ERCOT.
s	none	An ERCOT area start that is eligible to have its costs included in the Switchable Generation Cost Guarantee.
rc	none	A Resource Category.
p	none	A Resource Node Settlement Point.

(2) The total compensation to each QSE for the Switchable Generation Make-Whole Payment for a given hour in the Operating Day is calculated as follows:

$$\mathbf{SWMWAMTQSETOT}_{q} = \sum_{r} \mathbf{SWMWAMT}_{q,r}$$

The above variables are defined as follows:

Variable	Unit	Definition
$SWMWAMTQSETOT_{q}$	$	*Switchable Generation Make-Whole Payment per QSE*—The total Switchable Generation Make-Whole Payment to the QSE *q*, for the hour.
$SWMWAMT_{q,r}$	$	*Switchable Generation Make-Whole Payment*—The Switchable Generation Make-Whole Payment to the QSE *q*, for Resource *r*, for the hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
q	none	A QSE.
r	none	A Switchable Generation Resource.

6.6.12.2 Switchable Generation Make-Whole Charge

(1) The total cost for Switchable Generation Make-Whole Payments associated with SWGRs that switch to the ERCOT Control Area from a non-ERCOT Control Area pursuant to an ERCOT RUC instruction for an actual or anticipated EEA condition is allocated to QSEs representing Load based on HLRS. The Switchable Generation Make-Whole Charge for a given hour is calculated as follows:

$$\mathbf{LASWMWAMT}_{q} = \mathbf{(-1) * SWMWAMTTOT * HLRS}_{q}$$

Where:

$$SWMWAMTTOT = \sum_{q} SWMWAMTQSETOT_{q}$$

The above variables are defined as follows:

Variable	Unit	Definition
$LASWMWAMT_q$	$	*Load Allocated Switchable Generation Make-Whole Charge Amount*– The allocated charge to QSE *q* for Switchable Generation Make-Whole Payments.
SWMWAMTTOT	$	*Switchable Generation Make-Whole Payment Total*—The total Switchable Generation Make-Whole Payments to all QSEs for the hour.
$SWMWAMTQSETOT_q$	$	*Switchable Generation Make-Whole Payment per QSE* —The total Switchable Generation Make-Whole Payment to the QSE *q* for the hour.
$HLRS_q$	none	*The Hourly Load Ratio Share calculated for QSE q for the hour*. See Section 6.6.2.4, QSE Load Ratio Share for an Operating Hour.
q	none	A QSE.

6.6.12.3 Miscellaneous Invoice for Switchable Generation Make-Whole Payments and Charges

(1) All approved disputes shall be settled as described in Section 9.14.2, Notice of Dispute.

(2) ERCOT shall issue a miscellaneous Invoice to a QSE for Switchable Generation Make-Whole Payments as described in Section 6.6.12.1, Switchable Generation Make-Whole Payment.

(3) ERCOT shall issue a miscellaneous Invoice to the QSE representing Load based on the HLRS as described in Section 6.6.12.2, Switchable Generation Make-Whole Charge.

(4) ERCOT shall issue a Market Notice in conjunction with the issuance of the miscellaneous Invoice.

6.6.13 Wholesale Storage Load Reconciliation for ESRs Operating in a Private Microgrid Island

(1) A QSE representing an ESR operating in a Private Microgrid Island (PMI) configuration shall, within 96 hours of the end of such operations, submit a Settlement and billing dispute notifying ERCOT of the date and time that PMI operation began and ended. The QSE shall also notify the interconnecting Transmission and/or Distribution Service Provider(s) (TDSP(s)) of the time and date the PMI configuration began and ended within 96 hours of the end of such operations. Following the submission of such a dispute, ERCOT shall use the outflow quantities recorded by the ERCOT-Polled Settlement (EPS) Meter measuring the ESR's gross output net of any internal telemetered auxiliary Load, combined with any telemetered integrated auxiliary Load to determine the amount of Load served by the Resource during the period of PMI operation. ERCOT shall then determine the minimum whole number of Operating Days including and successively preceding the beginning of PMI operation for which the cumulative amount of WSL consumed on those Operating Days would equal or exceed the amount of Load served by the Resource during the period of PMI operation. ERCOT shall grant the

dispute and recharacterize all WSL previously settled on each such Operating Day as non-WSL. The adjustment to Settlements based on the recharacterization of WSL will be included in the RTM Final Settlement and/or RTM True-Up Settlement for each Operating Day.

6.6.14 Firm Fuel Supply Service Capability

6.6.14.1 Firm Fuel Supply Service Fuel Replacement Costs Recovery

(1) If ERCOT approves a Firm Fuel Supply Service Resource (FFSSR) to switch to consume the reserved fuel, ERCOT shall pay the QSE representing the FFSSR for the replacement of burned fuel, if the QSE has:

(a) Complied with the Firm Fuel Supply Service (FFSS) instruction to switch to the reserved fuel;

(b) Submitted a Settlement and billing dispute consistent with the dispute process described in Section 9.14, Settlement and Billing Dispute Process;

(c) Submitted the following within 90 days of the issuance of a Real-Time Market (RTM) Initial Statement for the Operating Day on which the FFSS instruction was issued:

(i) An attestation signed by an officer or executive with authority to bind the QSE stating that the information contained in the dispute is accurate;

(ii) For each deployment of FFSS, the quantity of total fuel consumed for the hours in each instance when FFSS was deployed;

(iii) For thermal units, the input-output equation or other documentation that allows for verification of fuel consumption for the hours when FFSS was deployed;

(iv) The dollar amount and quantity of fuel purchased to replace the consumed fuel;

(v) Sufficient documentation to support the QSE's determination of the amount and cost of replaced fuel; and

(vi) Any other technical documentation within the possession of the QSE or Resource Entity which ERCOT finds reasonably necessary to verify paragraphs (i) through (v) above. Any additional request from ERCOT for documentation or clarification of previously submitted documentation must be honored within 15 Business Days.

(2) The Firm Fuel Supply Service Fuel Replacement Cost shall only represent the replacement fuel costs not recovered during the FFSS deployment period through Day-