|  |  |  |  |
| --- | --- | --- | --- |
| NPRR Number | [1216](https://www.ercot.com/mktrules/issues/NPRR1216) | NPRR Title | Implementation of Emergency Pricing Program |
| Date of Decision | | August 20, 2024 | |
| Action | | Recommended Approval | |
| Timeline | | Normal | |
| Estimated Impacts | | Phase 1  Cost/Budgetary: Between $150K and $200K  Project Duration: 6 to 8 months  Phase 2  Cost/Budgetary: Between $25K and $50K  Project Duration: 3 to 5 months | |
| Proposed Effective Date | | Upon system implementation | |
| Priority and Rank Assigned | | Priority – 2024; Rank – 380 | |
| Nodal Protocol Sections Requiring Revision | | 2.1, Definitions  2.2, Acronyms and Abbreviations  4.4.9.3.3, Energy Offer Curve Cost Caps  4.4.11, System-Wide Offer Caps  4.4.12, Determination of Ancillary Service Demand Curves for the Day-Ahead Market and Real-Time Market  4.6.2.3.1, Day-Ahead Make-Whole Payment  6.6.9.1, Payment for Emergency Power Increase Directed by ERCOT  6.8, Settlement for Operating Losses During an LCAP or ECAP Effective Period  6.8.1, Determination of Operating Losses During an LCAP or ECAP Effective Period  6.8.2, Recovery of Operating Losses During an LCAP or ECAP Effective Period  6.8.3, Charges for Operating Losses During an LCAP Effective Period (delete)  6.8.3.1, Charges for Capacity Shortfalls During an LCAP Effective Period (delete)  6.8.3.1.1, Capacity Shortfall Ratio Share for an LCAP Effective Period (delete)  6.8.3.2, Uplift Charges for an LCAP Effective Period  6.8.4, Miscellaneous Invoices of Payments and Charges for an LCAP or ECAP Effective Period  9.5.3, Real-Time Market Settlement Charge Types | |
| Related Documents Requiring Revision/Related Revision Requests | | Other Binding Document Revision Request (OBDRR) 051, Related to NPRR1216, Implementation of Emergency Pricing Program  Verifiable Cost Manual Revision Request (VCMRR) 039, Related to NPRR1216, Implementation of Emergency Pricing Program | |
| Revision Description | | This Nodal Protocol Revision Request (NPRR) aligns the Protocols with the Public Utility Commission of Texas (PUCT) Order amending 16 Texas Administrative Code (TAC) § 25.509 in Project No. 54585 (54585 Order), which establishes an Emergency Pricing Program (EPP) for the wholesale electric market as required by Public Utility Regulatory Act (PURA) § 39.160. Additionally, this NPRR, along with the estimated implementation costs identified in the Impact Analysis, provides a framework for automating components of the EPP, specifically the activation and deactivation of the Emergency Offer Cap (ECAP), reporting and external communications, and the Settlement for operating losses.  During an ECAP Effective Period, the System-Wide Offer Cap (SWCAP) shall be set to the ECAP, which will have a value equal to the Low System-Wide Offer Cap (LCAP).  An ECAP Effective Period initiates at the beginning of the next Operating Hour after the sum of the Real-Time Market (RTM) System Lambda, Real-Time On-Line Reserve Price Adder, and Real-Time On-Line Reliability Deployment Price Adder is greater than or equal to the High System-Wide Offer Cap (HCAP) for 12 hours (i.e., 48 15-minute Settlement Intervals) within a rolling 24-hour period. An ECAP Effective Period then remains in effect until the later of:   * 24 hours after the initial activation of the EPP; or * 24 hours after ERCOT exits emergency operations, if ERCOT entered into or remained in emergency operations while the EPP was activated. If multiple emergency operations periods occur during a 24-hour period, then the ECAP Effective Period will extend from the latest exit from emergency operations that occurred.   For purposes of the EPP, emergency operations is defined as declaration of an Energy Emergency Alert (EEA).  In order for a Resource (through its Qualified Scheduling Entity (QSE)) to recover actual marginal costs for an ECAP Effective Period, the QSE must submit a Settlement and billing dispute in accordance with the procedures in Sections 6.8.1 and 9.14.  An attestation must be provided affirming that the information submitted is accurate and that fixed costs were not included in any of the costs submitted. In addition, if the marginal costs exceed the HCAP due to fuel costs, the attestation must also indicate that marginal fuel costs included in the submission are solely related to the provision of fuel or services directly related to the provision of the purchased fuel, as required by 16 TAC § 25.509(c)(5)(B).  Recovery of actual marginal costs above the ECAP revenues are allocated to QSEs based on Load Ratio Share (LRS), as required by 16 TAC § 25.509(c)(5)(C).  Furthermore, this NPRR proposes using a single SWCAP for each Operating Day in the calculation of the Energy Offer Curve Cost Caps in Section 4.4.9.3.3 prior to the implementation of Real-Time Co-Optimization (RTC). After the implementation of RTC, the Day-Ahead System Wide Offer Cap (DASWCAP) will be the value that was used to clear the Day-Ahead Market. In addition, changes to Section 4.6.2.3.1, Day-Ahead Make-Whole Payment, and Section 6.6.9.1, Payment for Emergency Power Increase Directed by ERCOT, have been made to address the calculation of the Day-Ahead Average Incremental Energy Curve (DAAIEC) and Emergency Base Point Price (EBPPR) to ensure the Energy Offer Curves used in Settlements utilizes the curves capped by the applicable SWCAP. This NPRR also removes the allocation of operating losses payment during an LCAP Effective Period to QSEs that are capacity short and replaces it with the same LRS mechanism to allocate costs during ECAP Effective Period, per Section 6.8.3. This will align the ECAP and LCAP operating losses payment allocations methods, enable definitive settlements for the scenario in which an ECAP and LCAP Effective Period overlap, and reduce the overall impact to ERCOT’s Settlements processes.  Finally, this NPRR adds a provision to clarify that a QSE representing a Generation Resource or a Switchable Generation Resource cannot submit a dispute to recover the same costs under both Section 6.8, Settlement for Operating Losses During an LCAP or ECAP Effective Period, and 9.14.7, Disputes for RUC Make-Whole Payment for Fuel Costs or Section 6.6.12.1, Switchable Generation Make-Whole Payment. | |
| Reason for Revision | | [Strategic Plan](https://www.ercot.com/files/docs/2023/08/25/ERCOT-Strategic-Plan-2024-2028.pdf) Objective 1 – Be an industry leader for grid reliability and resilience  [Strategic Plan](https://www.ercot.com/files/docs/2023/08/25/ERCOT-Strategic-Plan-2024-2028.pdf) Objective 2 - Enhance the ERCOT region’s economic competitiveness with respect to trends in wholesale power rates and retail electricity prices to consumers  [Strategic Plan](https://www.ercot.com/files/docs/2023/08/25/ERCOT-Strategic-Plan-2024-2028.pdf) Objective 3 - Advance ERCOT, Inc. as an independent leading industry expert and an employer of choice by fostering innovation, investing in our people, and emphasizing the importance of our mission  General system and/or process improvement(s)  Regulatory requirements  ERCOT Board/PUCT Directive  *(please select ONLY ONE – if more than one apply, please select the ONE that is most relevant)* | |
| Justification of Reason for Revision and Market Impacts | | This NPRR incorporates the EPP into the Protocols and provides a framework for automating components of the EPP. | |
| PRS Decision | | On 2/8/24, PRS voted unanimously to table NPRR1216 and refer the issue to WMS. All Market Segments participated in the vote.  On 5/9/24, PRS voted unanimously to recommend approval of NPRR1216 as amended by the 4/17/24 ERCOT comments. All Market Segments participated in the vote.  On 6/13/24, PRS voted unanimously to endorse and forward to TAC the 5/9/24 PRS Report and 6/11/24 Revised Impact Analysis for NPRR1216 with a recommended priority of 2024 and rank of 380. All Market Segments participated in the vote. | |
| Summary of PRS Discussion | | On 2/8/24, the sponsor provided an overview of NPRR1216. Participants raised concerns with the timeline(s) for exiting an EPP period, potential impacts on submitted offers following an EPP, and requested additional discussion at WMS.  On 5/9/24, participants noted the WMS endorsement of NPRR1216 as amended by the 4/17/24 ERCOT comments.  On 6/13/24, participants reviewed the 6/11/24 Revised Impact Analysis for NPRR1216 and discussed the appropriate priority and rank. | |
| TAC Decision | | On 6/24/24, TAC voted unanimously to recommend approval of NPRR1216 as recommended by PRS in the 6/13/24 PRS Report as amended by the 6/18/24 ERCOT comments. All Market Segments participated in the vote. | |
| Summary of TAC Discussion | | On 6/24/24, there was no additional discussion beyond TAC review of the items below. | |
| TAC Review/Justification of Recommendation | | Revision Request ties to Reason for Revision as explained in Justification  Impact Analysis reviewed and impacts are justified as explained in Justification  Opinions were reviewed and discussed  Comments were reviewed and discussed (if applicable)  Other: (explain) | |
| ERCOT Board Decision | | On 8/20/24, the ERCOT Board voted unanimously to recommend approval of NPRR1216 as recommended by TAC in the 6/24/24 TAC Report. | |

|  |  |
| --- | --- |
| **Opinions** | |
| Credit Review | ERCOT Credit Staff and CFSG have reviewed NPRR1216 and do not believe that it requires changes to credit monitoring activity or the calculation of liability. |
| Independent Market Monitor Opinion | IMM has no opinion on NPRR1216. |
| ERCOT Opinion | ERCOT supports approval of NPRR1216. |
| ERCOT Market Impact Statement | ERCOT Staff has reviewed NPRR1216 and believes the market impact for NPRR1216, along with OBDRR051, implements the EPP as directed by the PUCT. |

|  |  |
| --- | --- |
| Sponsor | |
| Name | Dave Maggio / Austin Rosel |
| E-mail Address | [david.maggio@ercot.com](mailto:david.maggio@ercot.com) / [austin.rosel@ercot.com](mailto:austin.rosel@ercot.com) |
| Company | ERCOT |
| Phone Number | 512-248-6998 / 512-248-6686 |
| Cell Number |  |
| Market Segment | Not applicable |

|  |  |
| --- | --- |
| **Market Rules Staff Contact** | |
| **Name** | Cory Phillips |
| **E-Mail Address** | [cory.phillips@ercot.com](mailto:cory.phillips@ercot.com) |
| **Phone Number** | 512-248-6464 |

|  |  |
| --- | --- |
| **Comments Received** | |
| Comment Author | **Comment Summary** |
| WMS 030624 | Requested PSR continue to table NPRR1216 for further review by the Wholesale Market Working Group (WMSG) |
| TCPA 032624 | Proposed edits to the ECAP timeline and fuel cost attestation |
| ERCOT 041724 | Responded to issues raised in the 3/26/24 TCPA comments and proposed additional clarifying edits |
| WMS 050224 | Endorsed NPRR1216 as amended by the 4/17/24 ERCOT comments |
| ERCOT 061824 | Proposed edits clarifying that an ECAP Effective Period will end at the top of the following Operating Hour |

|  |
| --- |
| Market Rules Notes |

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

* NPRR1235, Dispatchable Reliability Reserve Service as a Stand-Alone Ancillary Service
  + Section 4.4.12
  + Section 4.6.2.3.1
  + Section 9.5.3
* NPRR1245, Additional Clarifying Revisions to Real-Time Co-Optimization
  + Section 4.4.12
* NPRR1246, Energy Storage Resource Terminology Alignment for the Single-Model Era
  + Section 4.4.9.3.3

|  |
| --- |
| Proposed Protocol Language Revision |

**2.1 DEFINITIONS**

**High Ancillary Service Limit (HASL)**

A dynamically calculated MW upper limit on a Resource to reserve the part of the Resource’s capacity committed for Ancillary Service, calculated as described in Section 6.5.7.2, Resource Limit Calculator.HASL is also included in Section 5.7.4.1.1, Capacity Shortfall Ratio Share, and in the Reliability Unit Commitment (RUC) optimization but is not adjusted for Non-Frequency Responsive Capacity (NFRC) as in Section 6.5.7.2.

|  |
| --- |
| ***[NPRR1013: Delete the above definition “High Ancillary Service Limit (HASL)” upon system implementation of the Real-Time Co-Optimization (RTC) project.]*** |

**Emergency Offer Cap (ECAP) Effective Period**

The period during which the System-Wide Offer Cap (SWCAP) is set to the ECAP.

|  |
| --- |
| ***[NPRR1216: Replace the definition “Emergency Offer Cap (ECAP) Effective Period” above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project:]***  **Emergency Offer Cap (ECAP) Effective Period**  The period during which the Day-Ahead System-Wide Offer Cap (DASWCAP) is set to the ECAP. |

**2.2 ACRONYMS AND ABBREVIATIONS**

**ECAP** Emergency Offer Cap

**EPP** Emergency Pricing Program

***4.4.9.3.3 Energy Offer Curve Cost Caps***

(1) The following Energy Offer Curve Cost Caps must be used for the purpose of make-whole Settlements, Real-Time High Dispatch Limit Override Energy Payments, and Voltage Support Service Payments:

(a) Nuclear = $15.00/MWh;

(b) Coal and Lignite = $18.00/MWh;

(c) Combined Cycle greater than 90 MW = 9 MMBtu/MWh \* ((Percentage of FIP \* FIP) + (Percentage of FOP \* FOP))/100, as specified in the Energy Offer Curve;

(d) Combined Cycle less than or equal to 90 MW = 10 MMBtu/MWh \* ((Percentage of FIP \* FIP) + (Percentage of FOP \* FOP))/100, as specified in the Energy Offer Curve;

(e) Gas - Steam Supercritical Boiler = 10.5 MMBtu/MWh \* ((Percentage of FIP \* FIP) + (Percentage of FOP \* FOP))/100, as specified in the Energy Offer Curve;

(f) Gas Steam Reheat Boiler = 11.5 MMBtu/MWh \* ((Percentage of FIP \* FIP) + (Percentage of FOP \* FOP))/100, as specified in the Energy Offer Curve;

(g) Gas Steam Non-reheat or boiler without air-preheater = 14.5 MMBtu/MWh \* ((Percentage of FIP \* FIP) + (Percentage of FOP \* FOP))/100, as specified in the Energy Offer Curve;

(h) Simple Cycle greater than 90 MW = 14 MMBtu/MWh \* ((Percentage of FIP \* FIP) + (Percentage of FOP \* FOP))/100, as specified in the Energy Offer Curve;

(i) Simple Cycle less than or equal to 90 MW = 15 MMBtu/MWh \* ((Percentage of FIP \* FIP) + (Percentage of FOP \* FOP))/100, as specified in the Energy Offer Curve;

(j) Reciprocating Engines = 16 MMBtu/MWh \* ((Percentage of FIP \* FIP) + (Percentage of FOP \* FOP))/100, as specified in the Energy Offer Curve;

(k) Hydro = $10.00/MWh;

(l) Other = SWCAP;

|  |
| --- |
| ***[NPRR1008: Replace item (l) above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project:]***  (l) Other = DASWCAP or RTSWCAP; |

(m) RMR Resource = SWCAP;

|  |
| --- |
| ***[NPRR1008: Replace item (m) above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project:]***  (m) RMR Resource = effective Value of Lost Load (VOLL); |

(n) Wind Generation Resources = $0.00/MWh; and

(o) PhotoVoltaic Generation Resource (PVGR) = $0.00/MWh.

(2) ERCOT shall produce an annual report each April that provides the amount of DAM and RUC Make-Whole Payments during the previous calendar year for Resources categorized as Other, per item (1)(l) above, as a percentage of the total amount of DAM and RUC Make-Whole Payments made during the previous calendar year. The report shall be based on final Settlements and include the total number of Resources classified as Other. ERCOT shall present this report annually to the appropriate Technical Advisory Committee (TAC) subcommittee. If there are no Make-Whole Payments for Resources categorized as Other for a given calendar year, then ERCOT will not be required to produce the annual report.

(3) Items in paragraphs (1)(c) and (d) above are determined by capacity of largest simple-cycle combustion turbine in the train selected.

(4) The FIP and FOP used to calculate the Energy Offer Curve Cap for Make-Whole Payment calculation purposes shall be the FIP or FOP for the Operating Day. In the event the Energy Offer Curve Cap for Make-Whole Payment calculation purposes must be calculated before the FIP or FOP is available for the particular Operating Day, the FIP and FOP for the most recent preceding Operating Day shall be used. Once the FIP and FOP are available for a particular Operating Day, those values shall be used in the calculations. If the percentage fuel mix is not specified or if no Energy Offer Curve exists, then the minimum of FIP or FOP shall be used.

(5) During an ECAP Effective Period, the SWCAP used for purposes of calculating the Energy Offer Curve Cost Caps shall be set to the maximum value of SWCAP that was effective for the Operating Day.

|  |
| --- |
| ***[NPRR1216: Replace paragraph (5) above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project:]***  (5) During an ECAP Effective Period, for purposes of calculating the Energy Offer Curve Cost Caps, the DASWCAP shall be set to the DASWCAP that was used to clear the DAM, and the VOLL shall be set to the maximum value VOLL that was effective for the Operating Day. |

***4.4.11 System-Wide Offer Caps***

(1) The SWCAP shall be determined in accordance with the Public Utility Commission of Texas (PUCT) rules. The methodology for determining the SWCAP is as follows:

(a) The SWCAP shall be set equal to the High System-Wide Offer Cap (HCAP) and maintained at this level until either of the following criteria are met:

(i) If the sum of the Real-Time Market (RTM) System Lambda, Real-Time On-Line Reserve Price Adder, and Real-Time On-Line Reliability Deployment Price Adder is greater than or equal to the HCAP for a total of 12 hours within a rolling 24-hour period, ERCOT will activate the Emergency Pricing Program (EPP) and SWCAP will be set to Emergency Offer Cap (ECAP) starting at the beginning of the next Operating Hour that ERCOT can implement the change. Security-Constrained Economic Dispatch (SCED)-level data, time-weight averaged to a 15-minute Settlement Interval equivalent, will be used to make this determination. The SWCAP will remain at ECAP until the later of the following, at which point the ECAP Effective Period will end at the beginning of the next Operating Hour:

(A) 24 hours after the initial setting of SWCAP to ECAP; or

(B) 24 hours after ERCOT exits Energy Emergency Alert (EEA) conditions, if ERCOT entered into or remained in EEA while ECAP was in effect. If ERCOT reenters EEA conditions within 24 hours, then the ECAP Effective Period will continue for 24 hours after the latest exit from EEA conditions.

(ii) If the Peaker Net Margin (PNM) exceeds the PNM threshold per MW-year during a year, on the next Operating Day, the SWCAP shall be set to the Low System-Wide Offer Cap (LCAP) for the remainder of that year. At the beginning of the next calendar year, the SWCAP shall be reset to the HCAP. This transition process is further described in Section 4.4.11.1, Scarcity Pricing Mechanism.

(b) ERCOT shall issue operations notices when the ECAP Effective Period begins and ends. Such notices shall respectively state the date and time of the initiation and cessation of the ECAP Effective Period.

|  |
| --- |
| ***[NPRR1216: Insert paragraph (c) below upon system implementation and renumber accordingly:]***  (c) ERCOT will post on the ERCOT website the cumulative number of hours in which the sum of the Real-Time Market (RTM) System Lambda, Real-Time On-Line Reserve Price Adder, and Real-Time On-Line Reliability Deployment Price Adder has been greater than or equal to the SWCAP over a rolling 24-hour period. This calculation of cumulative hours will use the 15-minute Settlement Interval equivalent price referenced in paragraph (1)(a)(i) above. |

(c) Within ten Business Days of the end of the ECAP Effective Period, ERCOT shall file an initial report with the PUCT providing a summary of the event that triggered the EPP and an analysis of the EPP’s performance.

(d) Within 90 days of the end of the ECAP Effective Period, ERCOT shall file a final report with the PUCT providing a summary of the event that triggered the EPP, an analysis of the EPP’s performance, and any recommendations to modify or improve the EPP. The report shall also include the number of Resources for which Qualified Scheduling Entities (QSEs) filed for cost recovery and the total dollar amount of costs submitted and costs recovered, including fuel type, MW per hour, and number of Resources associated with the recovered costs.

(e) For the PNM process described above, ERCOT shall set the PNM threshold at three times the cost of new entry of new generation plants.

The above parameters are defined as follows:

| **Parameter** | **Unit** | **Current Value\*** |
| --- | --- | --- |
| ECAP | $/MWh | 2,000 |
| HCAP | $/MWh | 5,000 |
| LCAP | $/MWh | 2,000 |
| PNM threshold | $/MW-year | 315,000 |
| \* The current value for the parameters referenced in this table above will be recommended by TAC and approved by the ERCOT Board. ERCOT shall update parameter values on the first day of the month following ERCOT Board approval unless otherwise directed by the ERCOT Board. ERCOT shall provide a Market Notice prior to implementation of a revised parameter value. | | |

(2) Any offers submitted that exceed the current SWCAP shall be rejected by ERCOT.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***[NPRR1008: Replace Section 4.4.11 above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project:]***  ***4.4.11 Day-Ahead and Real-Time System-Wide Offer Caps***  (1) The DASWCAP and RTSWCAP shall be determined in accordance with the Public Utility Commission of Texas (PUCT) rules. The methodology for determining the DASWCAP and RTSWCAP is as follows:  (a) The DASWCAP and RTSWCAP shall be set equal to the respective High System-Wide Offer Cap (HCAP) . Additionally, the Value of Lost Load (VOLL) used to determine the ASDCs for DAM and RTM shall be set to the HCAP for DAM. These caps shall be maintained at these levels until either of the following criteria are met:  (i) If the sum of the Real-Time Market (RTM) System Lambda and Real-Time Reliability Deployment Price Adder for Energy is greater than or equal to the HCAP for DAM for a total of 12 hours within a rolling 24-hour period, ERCOT will activate the Emergency Pricing Program (EPP) and the DASWCAP and VOLL used to determine the ASDCs for DAM and RTM will be set to ECAP starting at the beginning of the next Operating Hour that ERCOT can implement the change. Security-Constrained Economic Dispatch (SCED)-level data, time-weight averaged to a 15-minute Settlement Interval equivalent, will be used to make this determination. The EPP will remain active until the later of the following, at which point the ECAP Effective Period will end at the beginning of the next Operating Hour:  (A) 24 hours after the initial setting of these values to ECAP; or  (B) 24 hours after ERCOT exits Energy Emergency Alert (EEA) conditions, if ERCOT entered into or remained in EEA while the EPP was active. If ERCOT reenters EEA conditions within 24 hours, then the ECAP Effective Period will continue for 24 hours after the latest exit from EEA conditions.  (ii) If the Peaker Net Margin (PNM) exceeds the PNM threshold per MW-year during a year, the DASWCAP and the VOLL used to determine the ASDCs for DAM and RTM shall be set per the schedule in Section 4.4.11.1, Scarcity Pricing Mechanism.  (b) ERCOT shall issue operations notices when the ECAP Effective Period begins and ends. Such notices shall respectively state the date and time of the initiation and cessation of the ECAP Effective Period.  (c) ERCOT will post on the ERCOT website the cumulative number of hours in which the sum of the Real-Time Market (RTM) System Lambda and Real-Time Reliability Deployment Price Adder for Energy has been greater than or equal to the DASWCAP over a rolling 24-hour period. This calculation of cumulative hours will use the 15-minute Settlement Interval equivalent price referenced in paragraph (1)(a)(i) above.  (d) Within ten Business Days of the end of the ECAP Effective Period, ERCOT shall file an initial report with the PUCT providing a summary of the event that triggered the EPP and an analysis of the EPP’s performance.  (e) Within 90 days of the end of the ECAP Effective Period, ERCOT shall file a final report with the PUCT providing a summary of the event that triggered the EPP, an analysis of the EPP’s performance, and any recommendations to modify or improve the EPP. The report shall also include the number of Resources for which Qualified Scheduling Entities (QSEs) filed for cost recovery and the total dollar amount of costs submitted and costs recovered, including fuel type, MW per hour, and number of Resources associated with the recovered costs.  (f) For the PNM process described above, ERCOT shall set the PNM threshold at three times the cost of new entry of new generation plants.  The above parameters are defined as follows:   | **Parameter** | **Unit** | **Current Value\*** | | --- | --- | --- | | ECAP | $/MWh | 2,000 | | HCAP – DAM (DASWCAP) | $/MWh | 5,000 | | HCAP – RTM (RTSWCAP) | $/MWh | 2,000 | | LCAP | $/MWh | 2,000 | | PNM threshold | $/MW-year | 315,000 | | \* The current value for the parameters referenced in this table above will be recommended by TAC and approved by the ERCOT Board. ERCOT shall update parameter values on the first day of the month following ERCOT Board approval unless otherwise directed by the ERCOT Board. ERCOT shall provide a Market Notice prior to implementation of a revised parameter value. | | |   (2) Any offers submitted that exceed the current respective DASWCAP or RTSWCAP shall be rejected by ERCOT. The applicable cap will be dependent on the timing of the submission. |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***[NPRR1008: Insert Section 4.4.12 below upon system implementation of the Real-Time Co-Optimization (RTC) project:]***  ***4.4.12 Determination of Ancillary Service Demand Curves for the Day-Ahead Market and Real-Time Market***  (1) This Section describes the process for determining ASDCs for Regulation Up Service (Reg-Up), Regulation Down Service (Reg-Down), Responsive Reserve (RRS), ERCOT Contingency Reserve Service (ECRS), and Non-Spinning Reserve (Non-Spin) for the Day-Ahead Market (DAM) and Real-Time Market (RTM). This section does not apply to ASDCs used in the Reliability Unit Commitment (RUC) process.  (2) The DAM shall use the same ASDCs as the RTM, as an initial condition. Specific to the DAM, the ASDCs will be adjusted, as needed, to account for negative Self-Arranged Ancillary Service Quantities.  (3) For Reg-Down, the ASDC shall be a constant value equal to VOLL for the full range of the Ancillary Service Plan for Reg-Down.  (4) To determine the individual ASDCs for Reg-Up, RRS, ECRS, and Non-Spin, an Aggregate ORDC (AORDC) will be created and then disaggregated into individual curves for the different Ancillary Services.  (5) ERCOT shall develop the AORDC from historical data from the period of June 1, 2014 through December 31, 2023 as follows:  (a) For all SCED intervals where the sum of RTOLCAP and RTOFFCAP is less than 10,000 MW, use the RTOLCAP and RTOFFCAP values to calculate the AORDC as follows:  The above variables are defined as follows:   | **Variable** | **Unit** | **Definition** | | --- | --- | --- | | RTOLCAP | MWh | *Real-Time On-Line Reserve Capacity –* The Real-Time reserve capacity of On-Line Resources available for the SCED intervals beginning June 1, 2014 through December 31, 2023 | | RTOFFCAP | MWh | *Real-Time Off-Line Reserve Capacity –* The Real-Time reserve capacity of Off-Line Resources available for the SCED intervals beginning June 1, 2014 through December 31, 2023. | | *μ* | None | The mean value of the shifted LOLP distribution as published for Fall 2024 | | *σ* | None | The standard deviation of the shifted LOLP distribution as published for Fall 2024 |   (b) Using the results of step (a) above, use regression methods to fit a curve to the average reserve pricing outcomes for the various MW reserve levels.  (c) Calculate points on the regression curve in 1 MW increments for any observed reserve level >= 2,000 MW and price >$0.01/MWh. These points form the AORDC.  (6) ERCOT shall disaggregate the AORDC developed pursuant to paragraph (5) above into individual ASDCs for each Ancillary Service product as follows:  (a) The ASDC for all Reg-Up in the Ancillary Service Plan shall use the highest price portion of the AORDC;  (b) The ASDC for all RRS in the Ancillary Service Plan shall use the highest price portion of the remaining AORDC after removing the portion of the AORDC that was used for the Reg-Up ASDC;  (c) The ASDC for all ECRS in the Ancillary Service Plan shall use the highest price portion of the remaining AORDC after removing the portions of the AORDC that were used for the Reg-Up and RRS ASDCs;  (d) The ASDC for Non-Spin shall use the remaining portion of the remaining AORDC after removing the portions of the AORDC that were used for the Reg-Up, RRS, and ECRS ASDCs.  (7) Each ASDC will be represented by a 100-point linear approximation to the corresponding part of the AORDC. Fewer points may be used for cases where it would not result in decreased accuracy in representing the corresponding part of the AORDC.  (8) The AORDC used in determining the individual ASDCs will be adjusted to reflect any updates to the value of VOLL, as described in Protocol Sections 4.4.11, Day-Ahead and Real-Time System-Wide Offer Caps, and 4.4.11.1, Scarcity Pricing Mechanism. |

***4.6.2.3.1 Day-Ahead Make-Whole Payment***

(1) ERCOT shall pay the QSE a Day-Ahead Make-Whole Payment for an eligible Resource for each Operating Hour in a DAM-commitment period.

(2) Any Ancillary Service Offer cleared for the same Operating Hour, QSE, and Generation Resource as a Three-Part Supply Offer cleared in the DAM shall be included in the calculation of the Day-Ahead Make-Whole Payment.

|  |
| --- |
| ***[NPRR1008: Replace paragraph (2) above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project:]***  (2) Any Resource-Specific Ancillary Service Offer cleared for the same Operating Hour, QSE, and Generation Resource as a Three-Part Supply Offer cleared in the DAM shall be included in the calculation of the Day-Ahead Make-Whole Payment. |

(3) The guaranteed cost, energy revenue, and Ancillary Service revenue calculated for each Combined Cycle Generation Resource are each summed for the Combined Cycle Train, and the the Day-Ahead Make-Whole Amount is calculated for the Combined Cycle Train.

(4) For an Aggregate Generation Resource (AGR), Startup Cost shall be scaled according to the ratio of the maximum number of its generators online during a contiguous block of DAM-committed Intervals, as indicated by telemetry, compared to the total number of generators registered to the AGR and used in the approved verifiable cost for the AGR.

(5) The Day-Ahead Make-Whole Payment to each QSE for each DAM-committed Generation Resource is calculated as follows:

**DAMWAMT *q, p, r, h* = (-1) \* Max (0, DAMGCOST *q, p, r* + DAEREV *q, p, r, h* + DAASREV *q, r, h*) \* DAESR *q, p, r, h* / (DAESR *q, p, r, h*)**

(6) The Day-Ahead Make-Whole Guaranteed Costs are calculated for each eligible DAM-Committed Generation Resource as follows:

**For non-Combined Cycle Trains,**

DAMGCOST *q, p, r* = Min(DASUO *q, p, r* , DASUCAP *q, p, r*) + (Min(DAMEO *q, p, r, h* , DAMECAP *p ,q, r ,h* )\* DALSL *q, p, r, h*) + (DAAIEC *q, p, r, h* \* (DAESR *q, p, r, h* – DALSL *q, p, r, h*))

**For a Resource which is not an AGR,**

If ERCOT has approved verifiable Startup Costs and minimum-energy costs for the Resource,

Then: DASUCAP *p,q, r* = verifiable Startup Costs *q, r, s*

DAMECAP *p,q,r,h* = verifiable minimum-energy costs *q, r, i*

Otherwise: DASUCAP *p,q, r* = Resource Category Startup Offer Generic Cap (RCGSC)

DAMECAP *p,q, r, h* = Resource Category Minimum-Energy Generic Cap (RCGMEC)

**For an AGR,**

DAMGCOST *q, p, r* = DASUPR *q, p, r* + (Min(DAMEO*q, p, r, h,* DAMECAP *p,q,r,h*) \* DALSL *q, p, r, h*) + (DAAIEC *q, p, r, h* \* (DAESR *q, p, r, h* – DALSL *q, p, r, h*))

Where:

DASUPR *q, p, r* = Min(DASUO *q, p, r*, DASUCAP *q, p, r*)

If ERCOT has approved verifiable Startup Costs

Then: DASUCAP *q, p, r* = Maxc(AGRRATIO *q, p, r* ) \* verifiable Startup Costs *q, r*

Where: AGRRATIO *q, p, r* = AGRMAXON *q, p, r* / AGRTOT *q, p, r*

Otherwise: DASUCAP *q, p, r* = Max*c*(AGGRATIO *q,p,r*) \* RCGSC

**For Combined Cycle Trains,**

**DAMGCOST *q, p, r* = Min(DASUO *q, p, r* , DASUCAP*q, p, r*) +  (Min(DAMEO *q, p, r, h* , DAMECAP *q, p, r,h*) \* DALSL*q, p, r, h*) + (Max(0, Min(DASUO *afterCCGR* , DASUCAP*afterCCGR*) – Min(DASUO *beforeCCGR* , DASUCAP*beforeCCGR*)) +  (DAAIEC *q, p, r, h* \* (DAESR *q, p, r, h* – DALSL *q, p, r, h*))**

(7) The Day-Ahead Make-Whole Revenue is calculated for each DAM-Committed Generation Resource as follows:

DAEREV *q, p, r, h*  = (-1) \* DASPP *p, h* \* DAESR *q, p, r, h*

DAASREV *q, r, h* = ((-1) \* MCPCRU *DAM, h* \* PCRUR *r, q, DAM, h*)

+ ((-1) \* MCPCRD *DAM, h*  \* PCRDR *r, q, DAM, h*)

+ ((-1) \* MCPCECR *DAM, h*  \* PCECRR *r, q, DAM, h*)

+ ((-1) \* MCPCNS *DAM, h*  \* PCNSR *r, q, DAM, h*)

+ ((-1) \* MCPCRR *DAM, h*  \* PCRRR *r, q, DAM, h*)

The above variables are defined as follows:

| **Variable** | **Unit** | **Definition** |
| --- | --- | --- |
| DAMWAMT *q, p, r, h* | $ | *Day-Ahead Make-Whole Payment per QSE per Settlement Point per Resource per hour*⎯The payment to QSE *q* to make-whole the Startup Cost and energy cost of Resource *r* committed in the DAM at Resource Node *p* for the hour *h*. When a Combined Cycle Generation Resource is committed in the DAM, payment is made to the Combined Cycle Train for the DAM-committed Combined Cycle Generation Resource. |
| DAMGCOST *q, p, r* | $ | *Day-Ahead Market Guaranteed Amount per QSE per Settlement Point per Resource*⎯The sum of the Startup Cost and the operating energy costs of the DAM-committed Resource *r* at Resource Node *p* represented by QSE *q*, for the DAM-commitment period. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| DAEREV *q, p, r, h* | $ | *Day-Ahead Energy Revenue per QSE per Settlement Point per Resource by hour*⎯The revenue received in the DAM for Resource *r* at Resource Node *p* represented by QSE *q*, based on the DAM Settlement Point Price, for the hour *h*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| DAASREV *q, r, h* | $ | *Day-Ahead Ancillary Service Revenue per QSE per Resource by hour*⎯The revenue received in the DAM for Resource *r* represented by QSE *q*, based on the Market Clearing Price for Capacity (MCPC) for each Ancillary Service in the DAM, for the hour *h*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| DASPP *p, h* | $/MWh | *Day-Ahead Settlement Point Price by Settlement Point by hour*⎯The DAM Settlement Point Price at Resource Node *p* for the hour *h*. |
| DAESR *q, p, r, h* | MW | *Day-Ahead Energy Sale from Resource per QSE by Settlement Point per Resource by hour*⎯The amount of energy cleared through Three-Part Supply Offers in the DAM for Resource *r* at Resource Node *p* represented by QSE *q* for the hour *h*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| DASUPR*q, p, r* | $/MWh | *Day-Ahead Startup Price per QSE per Settlement Point per Resource*—The derived Startup Price for an AGR *r* at Resource Node *p* represented by QSE *q*, for the first hour of the DAM-commitment period. |
| DASUCAP *q, p, r,* | $/start | *Day-Ahead Startup Cap per QSE per Settlement Point per Resource*—The amount used for AGR *r* or Resource *r* as Startup Costs. The cap is the Resource Category Startup Offer Generic Cap (RCGSC) unless ERCOT has approved verifiable unit-specific Startup Costs for that Resource, in which case the startup cap is the scaled verifiable unit-specific Startup Cost for the AGR or the verifiable unit-specific Startup Cost for non-AGR Resources. See Section 5.6.1, Verifiable Costs, for more information on verifiable costs. |
| DAMECAP *p,q,r,h* | $/MWh | *Day-Ahead Minimum-Energy Cap* —The amount used for Resource *r* for minimum-energy costs. The minimum cost is the Resource Category Minimum-Energy Generic Cap (RCGMEC) unless ERCOT has approved verifiable unit-specific minimum energy costs for that Resource, in which case the minimum energy cap is the verifiable unit-specific minimum energy cost. See Section 5.6.1 for more information on verifiable costs. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| RCGSC | $/Start | *Resource Category Generic Startup Cost*—The Resource Category Generic Startup Cost cap for the category of the Resource, according to Section 4.4.9.2.3, Startup Offer and Minimum-Energy Offer Generic Caps, for the Operating Day. |
| PCRUR *r, q, DAM, h* | MW | *Procured Capacity for Reg-Up from Resource per Resource per QSE per hour in DAM*—The Regulation Up (Reg-Up) capacity quantity awarded to QSE *q* in the DAM for Resource *r* for the hour *h*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| MCPCRU *DAM, h* | $/MW per hour | *Market Clearing Price for Capacity for Reg-Up per hour in DAM*—The DAM MCPC for Reg-Up for the hour *h*. |
| PCRDR *r, q, DAM, h* | MW | *Procured Capacity for Reg-Down from Resource per Resource per QSE per hour in DAM*—The Regulation Down (Reg-Down) capacity quantity awarded to QSE *q* in the DAM for Resource *r* for the hour *h*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| MCPCRD *DAM, h* | $/MW per hour | *Market Clearing Price for Capacity for Reg-Down per hour in DAM*—The DAM MCPC for Reg-Down for the hour *h*. |
| PCRRR *r, q, DAM, h* | MW | *Procured Capacity for Responsive Reserve from Resource per Resource per QSE per hour in DAM*—The Responsive Reserve (RRS) capacity quantity awarded to QSE *q* in the DAM for Resource *r* for the hour *h*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| MCPCRR *DAM, h* | $/MW per hour | *Market Clearing Price for Capacity for Responsive Reserve per hour in DAM*—The DAM MCPC for RRS for the hour *h*. |
| PCECRR *r, q, DAM, h* | MW | *Procured Capacity for ERCOT Contingency Reserve Service from Resource per Resource per QSE per hour in DAM*—The ERCOT Contingency Reserve Service (ECRS) capacity quantity awarded to QSE *q* in the DAM for Resource *r* for the hour *h*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| MCPCECR *DAM, h* | $/MW per hour | *Market Clearing Price for Capacity for ERCOT Contingency Reserve Service per hour in DAM*—The DAM MCPC for ECRS for the hour *h*. |
|  | | |
| PCNSR *r, q, DAM, h* | MW | *Procured Capacity for Non-Spin from Resource per Resource per QSE per hour in DAM*—The Non-Spinning Reserve (Non-Spin) capacity quantity awarded to QSE *q* in the DAM for Resource *r* for the hour *h*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| MCPCNS *DAM, h* | $/MW per hour | *Market Clearing Price for Capacity for Non-Spin per hour in DAM*—The DAM MCPC for Non-Spin for the hour *h*.   |  | | --- | | ***[NPRR1008: Replace the description above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project:]***  *Market Clearing Price for Capacity for Non-Spin per hour*—The DAM MCPC for Non-Spin for the hour *h*. | |
| DASUO *q, p, r* | $/start | *Day-Ahead Startup Offer per QSE per Settlement Point per Resource*—The Startup Offer included in the Three-Part Supply Offer submitted in the DAM associated with Resource *r* at Resource Node *p* represented by QSE *q*, for the first hour of the DAM-commitment period. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| AGRRATIO *q, p, r* | none | *Aggregate Generation Resource Ratio per QSE per Settlement Point per Aggregate Generation Resource*—A value which represents the ratio of the maximum number of generators online in an hour, as indicated by telemetry, compared to the total number of generators registered to the AGR and used in the approved verifiable cost for the AGR. The value is only applicable if the Resource is an AGR. |
| AGRMAXON *q, p, r* | none | *Aggregate Generation Resource Maximum Online per QSE per Settlement Point per Aggregate Generation Resource*—The maximum number of generators online during an hour, as indicated by telemetry. The value is only applicable if the Resource is an AGR. |
| AGRTOT *q, p, r* | none | *Aggregate Generation Resource Total per QSE per Settlement Point per Aggregate Generation Resource*—The total number of generators registered to the AGR and used in the approved verifiable cost for the AGR. The value is only applicable if the Resource is an AGR. |
| DAMEO *q, p, r, h* | $/MWh | *Day-Ahead Minimum-Energy Offer per QSE per Settlement Point per Resource per hour*—The Minimum-Energy Offer included in the Three-Part Supply Offer submitted in the DAM associated with Resource *r* at Resource Node *p* represented by QSE *q*, for the hour *h*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| DALSL *q, p, r, h* | MW | *Day-Ahead Low Sustained Limit per QSE per Settlement Point per Resource per hour*⎯The Low Sustained Limit (LSL) of Resource *r* at Resource Node *p* represented by QSE *q*, for the hour *h* as seen in the 1000 Day-Ahead snapshot. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| DAAIEC *q, p, r h* | $/MWh | *Day-Ahead Average Incremental Energy Cost per QSE per Settlement Point per Resource per hour*⎯The average incremental energy cost, calculated according to the Energy Offer Curve capped by the generic energy price and the SWCAP used in the DAM Clearing, for the output levels between the DAESR and the LSL of Resource *r* at Resource Node *p* represented by QSE *q*, for the hour *h*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.   |  | | --- | | ***[NPRR1216: Replace the description above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project:]***  *Day-Ahead Average Incremental Energy Cost per QSE per Settlement Point per Resource per hour*⎯The average incremental energy cost, calculated according to the Energy Offer Curve capped by the generic energy price and the DASWCAP, for the output levels between the DAESR and the LSL of Resource *r* at Resource Node *p* represented by QSE *q*, for the hour *h*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. | |
| *q* | none | A QSE. |
| *p* | none | A Resource Node Settlement Point. |
| *r* | none | A DAM-committed Generation Resource. |
| *h* | none | An hour in the DAM-commitment period. |
| *c* | none | A contiguous block of DAM-committed hours. |
| *afterCCGR* | none | The Combined Cycle Generation Resource to which a Combined Cycle Train transitions. |
| *beforeCCGR* | none | The Combined Cycle Generation Resource from which a Combined Cycle Train transitions. |

(8) The calculation of the Day-Ahead Average Incremental Energy Cost for each Resource for each hour is illustrated with the picture below, where Pcap is the Energy Offer Curve Cap. The method to calculate such cost is described in Section 4.6.5, Calculation of “Average Incremental Energy Cost” (AIEC).

$/

MWh

DASPP

P cap

P3

P2

P1

Q (P1) Q (P2) Q (P3) Q (P cap) Q cleared MW

[LSL] [DAESR]

Energy Offer Curve

The area under the capped Energy Offer Curve equals (DAAIEC \* (DAESR – LSL))

(9) The total of the Day-Ahead Make-Whole Payments to each QSE for Generation Resources for a given hour is calculated as follows:

**DAMWAMTQSETOT *q* = DAMWAMT *q, p, r***

The above variables are defined as follows:

| **Variable** | **Unit** | **Definition** |
| --- | --- | --- |
| DAMWAMTQSETOT *q* | $ | *Day-Ahead Make-Whole Payment QSE Total per QSE*⎯The total of the Day-Ahead Make-Whole Payments to QSE *q* for the DAM-committed Generation Resources represented by this QSE for the hour. |
| DAMWAMT *q, p, r* | $ | *Day-Ahead Make-Whole Payment per QSE per Settlement Point per Resource*⎯The payment to QSE *q* to make-whole the Startup Cost and energy cost of Resource *r* committed in the DAM at Resource Node *p* for the hour. When a Combined Cycle Generation Resource is committed in the DAM, payment is made to the Combined Cycle Train for the DAM-committed Combined Cycle Generation Resource. |
| *q* | none | A QSE. |
| *p* | none | A Settlement Point. |
| *r* | none | A DAM-committed Generation Resource. |

**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:

**EMREAMT *q, r, p* = (-1) \* EMREPR *q, r, p* \* EMRE *q, r, p***

Where:

EMREPR *q, r, p* = Max (0, EBPWAPR *q, r, p* – RTSPP *p*)

EBPWAPR *q, r, p* = (EBPPR *q, r, p, y* \* EBP *q, r, p, y* \* TLMP *y*) **/**

(EBP*q, r, p, y* \* TLMP *y*)

EMRE *q, r, p* = Max (0, Min (AEBP*q, r, p*, RTMG *q, r, p*) – ¼ \* BP *q, r, p*)

AEBP*q, r, p* =  (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 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, and by the SWCAP, 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. |
| 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.

Q1 Q2 SCED Q3 EBP MW

$/

MWh

P 3

P2

P1

The area under the capped Energy Offer Curve equals

(EBPPR \* (EBP – SCED BP))

Mitigated Offer Cap

Extended portion of Energy Offer Curve

Q1 Q2 SCED Q3 EBP MW

$/

MWh

P 3

P2

P1

The area under the capped Energy Offer Curve equals

(EBPPR \* (EBP – SCED BP))

Mitigated Offer Cap

Extended portion of Energy Offer Curve

(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:

**EMREAMTQSETOT *q* = 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:  **EMREAMT *q, r, p* = (-1) \* (EMREPRGEN *q, r, p* \* EMREGEN *q, r, p*)**  **+ EMREPRLOAD *q, r, p* \* EMRELOAD *q, r, p***  Where:  If any EBP > 0 then:  EMREPRGEN *q, r, p* = Max (0, EBPWAPRGEN *q, r, p* – RTSPP *p*)  EBPWAPRGEN *q, r, p* = (EBPPR *q, r, p, y* \* Max (0.001, EBP *q, r, p, y*) \* TLMP *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*) – ¼ \* Max (0, BP *q, r, p*))  AEBPGEN*q, r, p* =  (Max (0, EBP *q, r, p, y*) \* TLMP*y* / 3600)  If any EBP < 0 then:  EMREPRLOAD *q, r, p* = Max (0, RTSPP *p* – EBPWAPRLOAD *q, r, p* )  EBPWAPRLOAD *q, r, p* = (EBPPR *q, r, p, y* \* Min (-0.001, EBP *q, r, p, y*) \* TLMP *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*) – ¼ \* Min (0, BP *q, r, p*))  AEBPLOAD *q, r, p* =  (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* = (EBPPR *q, r, p, y* \* Max (0.001, EBP *q, r, p, y* )\* TLMP *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* =  (Max (0, EBP *q, r, p, y*) \* TLMP*y* / 3600)  If any EBP < 0 then:  EBPWAPRLOAD *q, r, p* = (EBPPR *q, r, p, y* \* Min (-0.001, EBP *q, r, p, y*) \* TLMP *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* =  (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* = (RTRUOPR *q, r, p, y* \* Max (0.001, RTRUAWDS *q, r, p, y*) \* TLMP *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* = (RTRDOPR *q, r, p, y* \* Max (0.001, RTRDAWDS *q, r, p, y* ) \* TLMP *y*) **/**  (Max (0.001, RTRDAWDS *q, r, p, y*)\* TLMP *y*)  Where for RRS:  RTRRNET *q, r*  = RTRRREV *q, r*  - (¼)\* RTRRREVT *q, r, p*  RTRRREVT*q, r, p* = RTRRWAPR *q, r, p* \* RTRRAWD *q, r*  RTRRWAPR *q, r, p* = (RTRROPR *q, r, p, y* \* Max (0.001, RTRRAWDS *q, r, p, y*) \* TLMP *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* = (RTNSOPR *q, r, p, y* \* Max (0.001, RTNSAWDS *q, r, p, y* ) \* TLMP *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* = (RTECROPR *q, r, p, y* \* Max (0.001, RTECRAWDS *q, r, p, y*) \* TLMP *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 forResource *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 forResource *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 forResource *r* for the 15-minute Settlement interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. | | RTRRREV *q, r* | $ | *Real-Time Responsive Reserve Revenue*— The calculated Real-Time RRS revenue for QSE *q* calculated forResource *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 forResource *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 forResource *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. | | RTRRREVT *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-Timefor 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-Timefor 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-Timefor 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-Timefor 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-Timefor 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.  Q1 Q2 SCED Q3 EBP MW  $/  MWh  P 3  P2  P1  The area under the capped Energy Offer Curve equals  (EBPPR \* (EBP – SCED BP))  Mitigated Offer Cap  Extended portion of Energy Offer Curve  Q1 Q2 SCED Q3 EBP MW  $/  MWh  P 3  P2  P1  The area under the capped Energy Offer Curve equals  (EBPPR \* (EBP – SCED BP))  Mitigated Offer Cap  Extended portion of Energy Offer Curve  (4) The total additional compensation to each QSE for emergency Settlement of Resources for the 15-minute Settlement Interval is calculated as follows:  **EMREAMTQSETOT *q* = 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. | |

**6.8 Settlement for Operating Losses During an LCAP or ECAP Effective Period**

**6.8.1 Determination of Operating Losses During an LCAP or ECAP Effective Period**

(1) In order for a Qualified Scheduling Entity (QSE) that represents a Generation Resource or Energy Storage Resource (ESR) to recover actual marginal costs for operating losses during a Low System-Wide Offer Cap (LCAP) or an Emergency Offer Cap (ECAP) Effective Period, and incurred as calculated in Section 6.8.2, Recovery of Operating Losses During an LCAP or ECAP Effective Period, the QSE shall timely submit a Settlement and billing dispute for each affected Operating Day, consistent with the dispute process described in Section 9.14, Settlement and Billing Dispute Process. The QSE shall also submit, through the Settlement and billing dispute process, and within 60 days of the issuance of a Real-Time Market (RTM) Initial Statement for an Operating Day, the following information:

(a) For a Generation Resource:

(i) All fuel purchases used to determine the weighted average fuel price included in the calculation of the actual marginal operating fuel cost component, for the Generation Resource, for the 15-minute Settlement Interval within the Operating Day.

(b) For an ESR the average electricity cost incurred to charge the ESR for the amount of discharge during the LCAP or ECAP Effective Period.

(c) For Resources with approved Raw Verifiable Operations and Maintenance Cost Above LSL(ROM), the QSE may submit an Incremental Variable Operations and Maintenance Costs (IVC) rate for costs incurred during the LCAP or ECAP Effective Period that were not included in the currently approved ROM value, subject to verification and approval by ERCOT.

(d) For Resources that do not have approved ROM, the QSE may submit an IVC rate for costs incurred during the LCAP or ECAP Effective Period in lieu of the Standard Operations and Maintenance Cost (STOM), defined in Section 6.8.2, Recovery of Operating Losses During an LCAP or ECAP Effective Period, subject to verification and approval by ERCOT.

(e) An attestation signed by an officer or executive with authority to bind the QSE stating that the information contained in the Settlement and billing dispute is accurate and that fixed costs (e.g., fees, penalties, and similar non-gas costs) were not included in the calculation of the weighted average fuel price. If the marginal fuel cost (MFC) exceeds the HCAP, the attestation must also include the following provision : “All marginal fuel costs included in this submission are solely related to the provision of fuel or services directly related to the provision of the purchased fuel.”

(2) The calculation of operating losses under Section 6.8.2 applies:

(a) When the Real-Time Settlement Point Price for the Resource is equal to or exceeds the LCAP or ECAP; and

(b) When the Resource’s Energy Offer Curve is at the LCAP or ECAP and the Resource receives a Dispatch Instruction or a Base Point above its Low Sustained Limit (LSL).

|  |
| --- |
| ***[NPRR1216: Replace paragraph (2) above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project:]***  (2) The calculation of operating losses under Section 6.8.2 applies:  (a) When the Real-Time Settlement Point Price for the Resource is equal to or exceeds the LCAP or ECAP; and  (b) When the Resource’s Energy Offer Curve or Energy Bid/Offer Curve is at the LCAP or ECAP and the Resource receives a Dispatch Instruction or a Base Point above its Low Sustained Limit (LSL). |

(3) Fuel prices may include all variable costs associated with the purchase, transportation, and storage of fuel.

(4) ERCOT will consider the documentation provided by the QSE in order to determine the weighted average fuel price for a Generation Resource or the average electricity cost to charge for an ESR during an LCAP or ECAP Effective Period.

(5) For purposes of determining operating losses during an LCAP or ECAP Effective Period, ERCOT may request additional information, documentation, or clarification from the QSE. In addition, if the marginal fuel cost (MFC) exceeds the HCAP , ERCOT may require copies of relevant fuel purchase contracts. A QSE shall respond to any such request within ten Business Days. Failure to provide such information to ERCOT shall result in denial of the fuel reimbursement request.

(6) At ERCOT’s sole discretion, submission and follow-up information deadlines may be extended on a case-by-case basis.

(7) Notwithstanding paragraphs (1) through (5) above:

(a) A QSE representing a Generation Resource cannot submit a dispute to recover the incremental fuel costs incurred under both Section 9.14.7, Disputes for RUC Make-Whole Payment for Fuel Costs, and Section 6.8.1, Determination of Operating Losses During an LCAP or ECAP Effective Period; and

(b) A QSE representing a Switchable Generation Resource that ERCOT directs to switch to the ERCOT Control Area cannot submit a dispute to recover the same incremental fuel and operations costs under both Section 6.6.12.1, Switchable Generation Make-Whole Payment, and Section 6.8.1, Determination of Operating Losses During an LCAP or ECAP Effective Period.

**6.8.2 Recovery of Operating Losses During an LCAP or ECAP Effective Period**

(1) ERCOT shall calculate the recovery of operating losses during an LCAP or ECAP Effective Period with the actual marginal costs that exceed LCAP or ECAP revenues in accordance with this Section.

(2) The actual marginal cost (AMC) and marginal energy production (MEP) used to calculate operating losses (OPL) for a Combined Cycle Train are the AMC and MEP that correspond to the Combined Cycle Generation Resource, within a Combined Cycle Train, that operates in Real-Time for the 15-minute Settlement Interval.

(3) Payment for operating losses during an LCAP or ECAP Effective Period is calculated as follows:

OPLPAMT *q, r, i* = (-1) \* (OPL *q, r, i* + ADJOPL *q, r, i*)

Where,

For the Generation Resource:

OPL *q, r,i*  = Max(0, (AMC *q, r, i* - Max(LCAP, RTSPP *p, i*)) \* Min(RTMG *q, r, i*, MEP *q, r, i*))

AMC *q, r, i* = MFC *q, r, i*  + VOM *q, r*

If ERCOT approved ROM for the Generation Resource:

MEP *q, r, i* = AMF *q, r, i* / AHR *q, r, i*

MFC *q, r, i*  = AHR *q, r, i* \* WAFP *q, r, i*

VOM *q, r* = ROM *q, r* + IVC *q, r*

Otherwise,

MFC *q, r, i*  = PAHR *q, r, i* \* WAFP *q, r, i*

VOM *q, r* = Max (IVC *q, r*, STOM *rc*)

MEP *q, r, i* = AMF *q, r, i* / PAHR *q, r, i*

For ESRs:

OPL *q, r, i*  = Max(0, (AMC *q, r, i* - Max(LCAP, RTSPP *p, i*)) \* RTMG *q, r, i*)

Where,

AMC *q, r, i*  = AFC *q, r, i* + STOM *rc*

The above variables are defined as follows:

| **Variable** | **Unit** | **Definition** |
| --- | --- | --- |
| OPLPAMT *q, r, i* | $ | *Operating Losses Payment Amount –* The operating losses payment to the QSE *q,* for Resource *r*, for the 15-minute Settlement Interval *i* within the Operating Day. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| OPL *q, r, i* | $ | *Operating Losses* – The operating losses for Resource *r*, represented by QSE *q,* for the 15-minute Settlement Interval *i* within the Operating Day. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| ADJOPL *q, r, i* | $ | *Operating Losses* *Adjustment* – The adjustment to the operating losses for Resource *r*, represented by QSE *q,* for the 15-minute Settlement Interval *i* within the Operating Day. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| WAFP *q, r, i* | $/MMBtu | *Weighted Average Fuel Price*—The volume-weighted average price of fuel submitted to ERCOT for the LCAP or ECAP Effective Period for a specific Resource *r,* represented by QSE *q,* and specific 15-minute Settlement Interval *i* within the Operating Day. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| AMC *q, r, i* | $/MWh | *Actual Marginal Cost –* The actual marginal costs for Resource *r* represented by QSE *q* for the 15-minute Settlement Interval *i* within the Operating Day. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| MFC *q, r, i* | $/MWh | Marginal Fuel Cost – The marginal fuel cost for Resource *r* represented by QSE *q* for the 15-minute Settlement Interval *i* within the Operating Day. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| LCAP | $/MWh | *Low System Wide Offer Cap –* The value set per paragraph (1) of Section 4.4.11, System-Wide Offer Caps. |
| ROM *q, r* | $/MWh | *Raw Verifiable Operations and Maintenance Cost Above LSL –* The raw verifiable O&M cost for the Resource *r* represented by QSE *q* for operations above Low Sustained Limit (LSL). Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| VOM *q, r* | $/MWh | Variable Operations and Maintenance Cost – The variable operations and maintenance cost incurred by the Resource *r* represented by QSE *q* for operations after breaker close. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| IVC *q, r* | $/MWh | Incremental Variable Operations and Maintenance Cost – The incremental variable operations and maintenance cost incurred by the Resource *r* represented by QSE *q* for operations after breaker close. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| AMF *q, r, i* | MMBtu | *Actual Marginal Fuel per QSE per Resource -* The actual marginal purchased and delivered fuel for the Resource *r* represented by QSE *q* for the 15-minute Settlement Interval *i* within the Operating Day. The AMF represents only the fuel used to calculate the weighted average fuel price, WAFP. 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* shall be set to the minimum energy variable O&M costs, as described in paragraph (6)(c) of Section 5.6.1, Verifiable Costs. For an ESR, STOM shall be set at $0.3/MWh.   |  | | --- | | ***[NPRR1086: Replace the definition above with the following upon system implementation of NPRR1029:]***  *Standard Operations and Maintenance Cost –* The standard O&M cost for the Resource category *rc*, shall be set to the minimum energy variable O&M costs, as described in paragraph (6)(c) of Section 5.6.1, Verifiable Costs. For an ESR, STOM shall be set at $0.3/MWh and for a DC-Coupled Resource, the value shall be set at $4.40/MWh. | |
| 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*. |
| AFC *q, r, i* | $/MWh | *Average Fuel Cost per Resource —*The average electricity cost used to charge the ESR *r* represented by QSE *q* applicable to the energy discharge for the 15-minute Settlement Interval *i* within the Operating Day. |
| AHR *q, r, i* | MMBtu / MWh | *Average Heat Rate per Resource –* The verifiable or actual submitted average heat rate for the Resource *r* represented by QSE *q*, for operating levels between LSL and High Sustained Limit (HSL), 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. |
| PAHR *q, r, i* | MMBtu / MWh | *Proxy Average Heat Rate –* The proxy or actual submitted average heat rate for the Resource *r,* represented by QSE *q*, 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. |
| 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. |
| MEP *q, r, i* | MWh | *Marginal Energy Production per QSE per Resource by Settlement Interval* — The calculated marginal generation of Resource *r* represented by QSE *q* in Real-Time 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. |
| *q* | None | A QSE. |
| *r* | None | A Generation Resource or ESR. |
| *i* | None | A 15-minute Settlement Interval within the Operating Day during an LCAP or ECAP Effective Period. |
| *rc* | None | A Resource category |

(2) The total compensation to each QSE for operating losses during an LCAP or ECAP Effective Period for the 15-minute Settlement Interval is calculated as follows:

OPLPAMTQSETOT *q*  =  OPLPAMT *q, r, i*

The above variables are defined as follows:

| **Variable** | **Unit** | **Definition** |
| --- | --- | --- |
| OPLPAMTQSETOT*q* | $ | *Total Operating Losses Payment Amount per QSE –* The total operating losses payment to the QSE *q*, for all Resources, for the 15-minute Settlement Interval within the Operating Day. |
| OPLPAMT *q, r, i* | $ | *Operating Losses Payment Amount* – The operating losses payment to the QSE *q*, for Resource *r*, for the 15-minute Settlement Interval *i* within the Operating Day. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| *q* | none | A QSE. |
| *r* | none | A Generation Resource or ESR. |
| *i* | none | A 15-minute Settlement Interval within the Operating Day during an LCAP or ECAP Effective Period. |







**6.8.3 Charges for Operating Losses During an LCAP or ECAP Effective Period**

(1) ERCOT shall allocate the total operating losses payment amount to the QSEs representing Loads. The resulting charge to each QSE’s Load Ratio Share (LRS) for a 15-minute Settlement Interval is calculated as follows:

**LALCAPAMT *q, i* = (-1) \* OPLPAMTTOT *i* \* LRS *q, i***

**Where:**

OPLPAMTTOT *i*  = OPLPAMTQSETOT *i, q*

The above variables are defined as follows:

|  |  |  |
| --- | --- | --- |
| **Variable** | **Unit** | **Definition** |
| LALCAPAMT *q, i* | $ | *Load Allocated LCAP or ECAP Effective Period Charge*—The amount owed from the QSE *q,* based on Load Ratio Share, for the 15-minute Settlement Interval *i*. |
| OPLPAMTQSETOT*i, q* | $ | *Total Operating Losses Payment Amount per QSE –* The total operating losses payment to the QSE *q*, for all Resources, for the 15-minute Settlement Interval *i* within the Operating Day. |
| OPLPAMTTOT *i* | $ | *Total Operating Losses Payment Amount –* The sum of Operating Losses Payments to all QSEs, for the 15-minute Settlement Interval *i*. |
|  |  |  |
|  |  |  |
| LRS *q, i* | none | *Load Ratio Share* *–* The ratio of Adjusted Metered Load to the total ERCOT Adjusted Metered Load for the 15-minute Settlement Interval. See Section 6.6.2, Load Ratio Share, item (2). |
| *i* | none | A 15-minute Settlement Interval. |
| *q* | none | A QSE. |

***6.8.4 Miscellaneous Invoice for Payments and Charges for an LCAP or ECAP Effective Period***

(1) ERCOT shall issue one-time miscellaneous Invoices using the most recent available Settlement data at the time the Invoices were issued.

(2) ERCOT shall issue miscellaneous Invoices to QSEs for payment of operating losses during an LCAP or ECAP Effective Period, as described in Section 6.8.2, Recovery of Operating Losses During an LCAP or ECAP Effective Period.

(3) ERCOT shall issue miscellaneous Invoices and allocate costs to the impacted QSEs as described in Section 6.8.3, Charges for Operating Losses During an LCAP or ECAP Effective Period.

(4) ERCOT shall issue a Market Notice in conjunction with the issuance of miscellaneous Invoices for payments or charges for an LCAP or ECAP Effective Period.

|  |
| --- |
| ***[NPRR1216: Delete Section 6.8.4 above upon system implementation.]*** |

***9.5.3 Real-Time Market Settlement Charge Types***

(1) ERCOT shall provide, on each RTM Settlement Statement, the dollar amount for each RTM Settlement charge and payment. The RTM Settlement “Charge Types” are:

(a) Section 5.7.1, RUC Make-Whole Payment;

(b) Section 5.7.2, RUC Clawback Charge;

(c) Section 5.7.3, Payment When ERCOT Decommits a QSE-Committed Resource;

(d) Section 5.7.4.1, RUC Capacity-Short Charge;

(e) Section 5.7.4.2, RUC Make-Whole Uplift Charge;

(f) Section [5.7.5, RUC Clawback Payment](#_Toc109528011);

(g) Section [5.7.6, RUC Decommitment Charge](#_Toc109528014);

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

(i) Section 6.6.3.2, Real-Time Energy Imbalance Payment or Charge at a Load Zone;

(j) Section 6.6.3.3, Real-Time Energy Imbalance Payment or Charge at a Hub;

(k) Section 6.6.3.4, Real-Time Energy Payment for DC Tie Import;

(l) Section 6.6.3.5, Real-Time Payment for a Block Load Transfer Point;

(m) Section 6.6.3.6, Real-Time High Dispatch Limit Override Energy Payment;

(n) Section 6.6.3.7, Real-Time High Dispatch Limit Override Energy Charge;

(o) 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);

(p) Section 6.6.4, Real-Time Congestion Payment or Charge for Self-Schedules;

(q) Section 6.6.5.1.1.1, Base Point Deviation Charge for Over Generation;

(r) Section 6.6.5.1.1.2, Base Point Deviation Charge for Under Generation;

(s) Section 6.6.5.2, IRR Generation Resource Base Point Deviation Charge;

(t) Section 6.6.5.4, Base Point Deviation Payment;

(u) Section 6.6.6.1, RMR Standby Payment;

(v) Section 6.6.6.2, RMR Payment for Energy;

(w) Section 6.6.6.3, RMR Adjustment Charge;

(x) Section 6.6.6.4, RMR Charge for Unexcused Misconduct;

(y) Section 6.6.6.5, RMR Service Charge;

(z) Section 6.6.6.6, Method for Reconciling RMR Actual Eligible Costs, RMR and MRA Contributed Capital Expenditures, and Miscellaneous RMR Incurred Expenses;

(aa) Paragraph (2) of Section 6.6.7.1, Voltage Support Service Payments;

(bb) Paragraph (4) of Section 6.6.7.1;

(cc) Section 6.6.7.2, Voltage Support Charge;

(dd) Section 6.6.8.1, Black Start Hourly Standby Fee Payment;

(ee) Section 6.6.8.2, Black Start Capacity Charge;

(ff) Section 6.6.9.1, Payment for Emergency Power Increase Directed by ERCOT;

(gg) Section 6.6.9.2, Charge for Emergency Power Increases;

(hh) Section 6.6.10, Real-Time Revenue Neutrality Allocation;

(ii) Section 6.6.14.2, Firm Fuel Supply Service Hourly Standby Fee Payment and Fuel Replacement Cost Recovery;

(jj) Section 6.6.14.3, Firm Fuel Supply Service Capacity Charge;

(kk) Paragraph (1)(a) of Section 6.7.1, Payments for Ancillary Service Capacity Sold in a Supplemental Ancillary Services Market (SASM) or Reconfiguration Supplemental Ancillary Services Market (RSASM);

(ll) Paragraph (1)(b) of Section 6.7.1;

(mm) Paragraph (1)(c) of Section 6.7.1;

(nn) Paragraph (1)(d) of Section 6.7.1;

(oo) Paragraph (1)(e) of Section 6.7.1;

(pp) Paragraph (1)(a) of Section 6.7.2, Payments for Ancillary Service Capacity Assigned in Real-Time Operations;

(qq) Paragraph (1)(b) of Section 6.7.2;

(rr) Paragraph (1)(c) of Section 6.7.2;

(ss) Paragraph (1)(a) of Section 6.7.2.1, Charges for Infeasible Ancillary Service Capacity Due to Transmission Constraints;

(tt) Paragraph (1)(b) of Section 6.7.2.1;

(uu) Paragraph (1)(c) of Section 6.7.2.1;

(vv) Paragraph (1)(d) of Section 6.7.2.1;

(ww) Paragraph (1)(e) of Section 6.7.2.1;

(xx) Paragraph (1)(a) of Section 6.7.3, Charges for Ancillary Service Capacity Replaced Due to Failure to Provide;

(yy) Paragraph (1)(b) of Section 6.7.3;

(zz) Paragraph (1)(c) of Section 6.7.3;

(aaa) Paragraph (1)(d) of Section 6.7.3;

(bbb) Paragraph (1)(e) of Section 6.7.3;

(ccc) Paragraph (2) of Section 6.7.4, Adjustments to Cost Allocations for Ancillary Services Procurement;

(ddd) Paragraph (3) of Section 6.7.4;

(eee) Paragraph (4) of Section 6.7.4;

(fff) Paragraph (5) of Section 6.7.4;

(ggg) Paragraph (6) of Section 6.7.4;

(hhh) Paragraph (7) of Section 6.7.5, Real-Time Ancillary Service Imbalance Payment or Charge (Real-Time Ancillary Service Imbalance Amount);

(iii) Paragraph (7) of Section 6.7.5, (Real-Time Reliability Deployment Ancillary Service Imbalance Amount);

(jjj) Paragraph (8) of Section 6.7.5, (Real-Time RUC Ancillary Service Reserve Amount);

(kkk) Paragraph (8) of Section 6.7.5, (Real-Time Reliability Deployment RUC Ancillary Service Reserve Amount);

(lll) Section 6.7.6, Real-Time Ancillary Service Imbalance Revenue Neutrality Allocation (Load-Allocated Ancillary Service Imbalance Revenue Neutrality Amount);

(mmm) Section 6.7.6, (Load-Allocated Reliability Deployment Ancillary Service Imbalance Revenue Neutrality Amount);

|  |
| --- |
| ***[NPRR1216: Insert paragraphs (nnn) and (ooo) below upon system implementation and renumber accordingly:]***  (nnn) Section 6.8.2, Recovery of Operating Losses During an LCAP or ECAP Effective Period;  (ooo) Section 6.8.3, Charges for Operating Losses During an LCAP or ECAP Effective Period; |

(nnn) Section 7.9.2.1, Payments and Charges for PTP Obligations Settled in Real-Time; and

(ooo) Section 9.16.1, ERCOT System Administration Fee.

|  |
| --- |
| ***[NPRR841, NPRR885, NPRR963, NPRR995, NPRR1012, and NPRR1014: Replace applicable portions of paragraph (1) above with the following upon system implementation for NPRR841, NPRR885, NPRR963, NPRR995, or NPRR1014; or upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1012:]***  (1) ERCOT shall provide, on each RTM Settlement Statement, the dollar amount for each RTM Settlement charge and payment. The RTM Settlement “Charge Types” are:  (a) Section 5.7.1, RUC Make-Whole Payment;  (b) Section 5.7.2, RUC Clawback Charge;  (c) Section 5.7.3, Payment When ERCOT Decommits a QSE-Committed Resource;  (d) Section 5.7.4.1, RUC Capacity-Short Charge;  (e) Section 5.7.4.2, RUC Make-Whole Uplift Charge;  (f) Section [5.7.5, RUC Clawback Payment](#_Toc109528011);  (g) Section [5.7.6, RUC Decommitment Charge](#_Toc109528014);  (h) Section 6.6.3.1, Real-Time Energy Imbalance Payment or Charge at a Resource Node;  (i) Section 6.6.3.2, Real-Time Energy Imbalance Payment or Charge at a Load Zone;  (j) Section 6.6.3.3, Real-Time Energy Imbalance Payment or Charge at a Hub;  (k) Section 6.6.3.4, Real-Time Energy Payment for DC Tie Import;  (l) Section 6.6.3.5, Real-Time Payment for a Block Load Transfer Point;  (m) Section 6.6.3.6, Real-Time High Dispatch Limit Override Energy Payment;  (n) Section 6.6.3.7, Real-Time High Dispatch Limit Override Energy Charge;  (o) 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);  (p) Section 6.6.4, Real-Time Congestion Payment or Charge for Self-Schedules;  (q) Section 6.6.5.2, Set Point Deviation Charge for Over Generation;  (r) Section 6.6.5.2.1, Set Point Deviation Charge for Under Generation;  (s) Section 6.6.5.3, Controllable Load Resource Set Point Deviation Charge for Over Consumption;  (t) Section 6.6.5.3.1, Controllable Load Resource Set Point Deviation Charge for Under Consumption;  (u) Section 6.6.5.4, IRR Generation Resource Set Point Deviation Charge;  (v) Section 6.6.5.4, Set Point Deviation Payment;  (w) Section 6.6.5.5, Energy Storage Resource Set Point Deviation Charge for Over Performance;  (x) Section 6.6.5.5.1, Energy Storage Resource Set Point Deviation Charge for Under Performance;  (y) Section 6.6.6.1, RMR Standby Payment;  (z) Section 6.6.6.2, RMR Payment for Energy;  (aa) Section 6.6.6.3, RMR Adjustment Charge;  (bb) Section 6.6.6.4, RMR Charge for Unexcused Misconduct;  (cc) Section 6.6.6.5, RMR Service Charge;  (dd) Section 6.6.6.6, Method for Reconciling RMR Actual Eligible Costs, RMR and MRA Contributed Capital Expenditures, and Miscellaneous RMR Incurred Expenses;  (ee) Section 6.6.6.7, MRA Standby Payment;  (ff) Section 6.6.6.8, MRA Contributed Capital Expenditures Payment;  (gg) Section 6.6.6.9, MRA Payment for Deployment Event;  (hh) Section 6.6.6.10, MRA Variable Payment for Deployment;  (ii) Section 6.6.6.11, MRA Charge for Unexcused Misconduct;  (jj) Section 6.6.6.12, MRA Service Charge;  (kk) Paragraph (3) of Section 6.6.7.1, Voltage Support Service Payments;  (ll) Paragraph (5) of Section 6.6.7.1;  (mm) Section 6.6.7.2, Voltage Support Charge;  (nn) Section 6.6.8.1, Black Start Hourly Standby Fee Payment;  (oo) Section 6.6.8.2, Black Start Capacity Charge;  (pp) Section 6.6.9.1, Payment for Emergency Operations Settlement;  (qq) Section 6.6.9.2, Charge for Emergency Operations Settlement;  (rr) Section 6.6.10, Real-Time Revenue Neutrality Allocation;  (ss) Section 6.6.11.1, Emergency Response Service Capacity Payments;  (tt) Section 6.6.11.2, Emergency Response Service Capacity Charge;  (uu) Section 6.6.14.2, Firm Fuel Supply Service Hourly Standby Fee Payment and Fuel Replacement Cost Recovery;  (vv) Section 6.6.14.3, Firm Fuel Supply Service Capacity Charge;  (ww) Section 6.7.4, Real-Time Settlement for Updated Day-Ahead Market Ancillary Service Obligations;  (xx) Section 6.7.5.2, Regulation Up Service Payments and Charges;  (yy) Section 6.7.5.3, Regulation Down Service Payments and Charges;  (zz) Section 6.7.5.4, Responsive Reserve Payments and Charges;  (aaa) Section 6.7.5.5 , Non-Spinning Reserve Service Payments and Charges;  (bbb) Section 6.7.5.6 , ERCOT Contingency Reserve Service Payments and Charges;  (ccc) Section 6.7.5.7 , Real-Time Derated Ancillary Service Capability Payment;  (ddd) Section 6.7.5.8 , Real-Time Derated Ancillary Service Capability Charge;  (eee) Section 6.7.6, Real-Time Ancillary Service Revenue Neutrality Allocation;  (fff) Section 6.8.2, Recovery of Operating Losses During an LCAP or ECAP Effective Period;  (ggg) Section 6.8.3, Charges for Operating Losses During an LCAP or ECAP Effective Period;  (hhh) Section 7.9.2.1, Payments and Charges for PTP Obligations Settled in Real-Time; and  (iii) Section 9.16.1, ERCOT System Administration Fee. |

(2) In the event that ERCOT is unable to execute the Day-Ahead Market (DAM), ERCOT shall provide, on each RTM Settlement Statement, the dollar amount for the following RTM Congestion Revenue Right (CRR) Settlement charges and payments:

(a) Section 7.9.2.4, Payments for FGRs in Real-Time; and

(b) Section 7.9.2.5, Payments and Charges for PTP Obligations with Refund in Real-Time.