
# Filing Receipt

**Filing Date - 2023-12-27 01:57:25 PM**

**Control Number - 54445**

**Item Number - 51**

**PROJECT NO. 54445**

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| **CY 2023 REVIEW OF RULES ADOPTED BY THE INDEPENDENT ORGANIZATION** | **§ § §** | **PUBLIC UTILITY COMMISSION OF TEXAS** |

**NOTICE OF RECOMMENDED APPROVAL OF REVISION REQUESTS BY ERCOT BOARD OF DIRECTORS**

Effective June 8, 2021, rules adopted by Electric Reliability Council of Texas, Inc. (ERCOT) under delegated authority from the Public Utility Commission of Texas (Commission) are subject to Commission oversight and review and may not take effect before receiving Commission approval.

At its meeting on December 19, 2023, the ERCOT Board of Directors (Board) recommended Commission approval of the following proposed revisions to the ERCOT rules (Revision Requests) (Nodal Protocol Revision Requests (NPRRs), Nodal Operating Guide Revision Request (NOGRR), Planning Guide Revision Request (PGRR), and Retail Market Guide Revision Request (RMGRR)):

- NPRR1172, Fuel Adder Definition, Mitigated Offer Caps, and RUC Clawback;
- NPRR1181, Submission of Seasonal Coal and Lignite Inventory Declaration;
- NPRR1192, Move OBD to Section 22 – Requirements for Aggregate Load Resource Participation in the ERCOT Markets;
- NPRR1196, Correction of NCLR Ancillary Service Failed Quantity Calculations under NPRR1149;
- NPRR1201, Limitations on Resettlement Timeline and Default Uplift Exposure Adjustments;
- NPRR1204, Considerations of State of Charge with Real-Time Co-Optimization Implementation;
- NOGRR257, Removal of Redundant ERS Reporting Requirement;
- PGRR110, Revision to Accommodate Steady-State Node-Breaker Modeling; and
- RMGRR176, Addition of Market Processes Specific to LP&L.

Included for Commission review are the Board Reports—each of which includes an ERCOT Market Impact Statement—and ERCOT Impact Analyses for these Revision Requests.

Dated: December 27, 2023

Respectfully submitted,

*/s/ Jonathan Levine*

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ATTORNEYS FOR ELECTRIC RELIABILITY COUNCIL OF TEXAS, INC.

# Board Report

| NPRR Number | 1172 | NPRR Title | Fuel Adder Definition, Mitigated Offer Caps, and RUC Clawback |
|---|---|---|---|
| **Date of Decision** | | December 19, 2023 | |
| **Action** | | Recommended Approval | |
| **Timeline** | | Normal | |
| **Proposed Effective Date** | | Phase 1: First of the month following Public Utility Commission of Texas (PUCT) approval<br>Phase 2: Upon system implementation | |
| **Priority and Rank Assigned** | | Phase 1: Not applicable<br>Phase 2: Priority – 2024; Rank – 4070 | |
| **Nodal Protocol Sections Requiring Revision** | | 2.1, Definitions<br>3.14.1.2, ERCOT Evaluation Process<br>3.14.1.20, Budgeting Fuel Costs<br>4.4.9.4.1, Mitigated Offer Cap<br>5.5.2, Reliability Unit Commitment (RUC) Process<br>5.6.1.1, Verifiable Startup Costs<br>5.6.1.2, Verifiable Minimum-Energy Costs<br>5.7.2, RUC Clawback Charge<br>6.6.6.2, RMR Payment for Energy<br>6.6.6.9, MRA Payment for Deployment Event<br>6.6.12.1, Switchable Generation Make-Whole Payment<br>9.14.7, Disputes for RUC Make-Whole Payment for Fuel Costs<br>9.14.9, Incremental Fuel Costs for Switchable Generation Make-Whole Payment Disputes<br>25.5.2, Market Suspension Make-Whole Payment | |
| **Related Documents Requiring Revision/Related Revision Requests** | | None | |
| **Revision Description** | | This Nodal Protocol Revision Request (NPRR) removes the Mitigated Offer Cap (MOC) multipliers, and creates a 100% clawback for Reliability Unit Commitment (RUC). This NPRR also sets the Three-Part Supply Offers that ERCOT creates at 100% of the approved verifiable costs or generic costs. | |
| **Reason for Revision** | | ☐ Addresses current operational issues.<br>☐ Meets Strategic goals (tied to the ERCOT Strategic Plan or | |

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| | directed by the ERCOT Board).<br>☒ Market efficiencies or enhancements<br>☐ Administrative<br>☐ Regulatory requirements<br>☐ Other: (explain)<br>*(please select all that apply)* |
| **Business Case** | The MOC multipliers are outdated and reflect a market design prior to the inclusion of the Operating Reserve Demand Curve (ORDC) Fuel Adder and the Exceptional Fuel Cost process.<br>A 100% clawback for RUC eliminates possible incentives for a Resource to be used for RUC and should encourage self-commitment and reduce the needs for RUCs will still allowing Resources to recover their fuel costs. |
| **PRS Decision** | On 5/10/23 PRS voted to table NPRR1172 and refer the issue to WMS. There were six abstentions from the Consumer (3) (Occidental, City of Eastland, Residential), Independent Generator (2) (Broad Reach Power, Enel Green Power), and Investor Owned Utility (IOU) (Lone Star Transmission) Market Segments. All Market Segments participated in the vote.<br>On 9/13/23, PRS voted to recommend approval of NPRR1172 as amended by the 9/11/23 CPS Energy comments. There were five opposing votes from the Cooperative (2) (GSEC, STEC), Independent Generator (2) (Calpine, Constellation), and Municipal (GEUS) Market Segments, and nine abstentions from the Cooperative (2) (Brazos, LCRA), Independent Generator (5) (EDP Renewables, Broad Reach Power, Key Capture Energy, ENGIE, Jupiter Power), and Independent Power Marketer (IPM) (2) (Tenaska, NG Renewables) Market Segments. All Market Segments participated in the vote.<br>On 10/12/23, PRS voted to endorse and forward to TAC the 9/13/23 PRS Report as amended by the 10/4/23 ERCOT comments as revised by PRS and the 10/11/23 Impact Analysis for NPRR1172 with a recommended priority of 2024 and rank of 4070 for Phase 2. There were three opposing votes from the Cooperative (2) (GSEC and STEC) and Independent Generator (Constellation) Market Segments, and two abstentions from the IPM (Tenaska) and Municipal (GEUS) Market Segments. All Market Segments participated in the vote. |
| **Summary of PRS** | On 5/10/23, participants requested that interested parties submit comments to NPRR1172, and requested additional review by the |

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| **Discussion** | Resource Cost Working Group (RCWG) and the Wholesale Market Working Group (WMWG).<br><br>On 9/13/23, participants reviewed the 9/11/23 CPS Energy comments.<br><br>On 10/12/23, participants reviewed the 10/11/23 Impact Analysis for NPRR1172 and the 10/4/23 ERCOT comments. Desktop edits were offered to restore revisions to Section 4.4.9.4.1. Some participants continued to disagree with the assertion that NPRR1172 will incentivize Resources to self-commit in Real-Time when not committed in the Day-Ahead Market (DAM). |
| **TAC Decision** | On 10/24/23, TAC voted to recommend approval of NPRR1172 as recommended by PRS in the 10/12/23 PRS Report; and the 10/17/23 Revised Impact Analysis. There were five opposing votes from the Cooperative (2) (GSEC, STEC) and Independent Generator (3) (Calpine, ENGIE, Luminant) Market Segments, and two abstentions from the Independent Generator (Jupiter Power) and IPM (Tenaska) Market Segments. All Market Segments participated in the vote. |
| **Summary of TAC Discussion** | On 10/24/23, TAC reviewed the ERCOT Opinion, ERCOT Market Impact Statement, and Independent Market Monitor (IMM) Opinion for NPRR1172, and the 10/17/23 Revised Impact Analysis. Participants also reviewed the 10/23/23 Joint Commenters comments; ERCOT Staff noted NPRR1172 does not impact Switchable Generation Resources (SWGRs). Some participants commented NPRR1172 represents poor policy coordination and expressed concern that thermal generation will be adversely affected. |
| **ERCOT Board Decision** | On 12/19/23, the ERCOT Board voted unanimously to recommend approval of NPRR1172 as recommended by TAC in the 10/24/23 TAC Report. |

| **Opinions** | |
|---|---|
| **Credit Review** | ERCOT Credit Staff and the Credit Finance Sub Group (CFSG) have reviewed NPRR1172 and do not believe that it requires changes to credit monitoring activity or the calculation of liability. |
| **Independent Market Monitor Opinion** | IMM supports NPRR1172. |
| **ERCOT Opinion** | ERCOT supports approval of NPRR1172. |

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| **ERCOT Market Impact Statement** | ERCOT Staff has reviewed NPRR1172 and believes it will have a positive market impact as the proposed changes will incentivize Resources to self-commit and reduce Reliability Unit Commitments (RUCs) by changing the clawback factors in RUC Clawback Charge Settlement to 100% and improves language to better align with the current market design and operation. |

| **Sponsor** | |
|---|---|
| **Name** | Eric Goff, Nabaraj Pokharel, Mark Dreyfus, John Hubbard, Mark Smith |
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| **Company** | Residential Consumer, Office of Public Utility Counsel (OPUC), City of Eastland, Texas Industrial Electric Consumers (TIEC), Texas Steel Mills |
| **Phone Number** | 512-632-7013, 512-825-7656, 512-632-5872, 512-964-0415, 512-635-7930 |
| **Cell Number** | |
| **Market Segment** | Consumer – Residential, Small Commercial, and Industrial |

| **Market Rules Staff Contact** | |
|---|---|
| **Name** | Brittney Albracht |
| **E-Mail Address** | Brittney.Albracht@ercot.com |
| **Phone Number** | 512-636-1852 |

| **Comments Received** | |
|---|---|
| **Comment Author** | **Comment Summary** |
| IMM 041223 | Supported the NPRR and urged stakeholders to approve all elements contained therein |
| WMS 060823 | Requested PRS continue to table NPRR1172 for further review by RCWG |
| Consumers 090523 | Proposed redlines to reduce the scope of NPRR1172 to only focus on MOC and RUC clawback |

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| WMS 090723 | Endorsed NPRR1172 as amended by the 9/5/23 Consumers comments |
| CPS Energy 091123 | Proposed additional edits to the 9/5/23 Consumers comments to set the RUC clawback percentage within Section 5.5.2 to 100% instead of 150% |
| ERCOT 100423 | Improved the Settlement equations and language in Section 5.7.2 such that the equations don't include an unnecessary clawback factor valued a 100% |
| Joint Commenters 102323 | Opined that NPRR1172 will not incentivize more units to self-commit in Real-Time; the current market design does not align with ERCOT's "conservative operations"; the 100% clawback will reduce the economic viability of units that are most frequently used for RUC; and potentially undermines DAM participation |

**Market Rules Notes**

Please note the current baseline for the RUCAC revenue calculation for a Combined Cycle Train has been restored to Section 5.7.2.

Please note the baseline Protocol language in the following section(s) has been updated to reflect the incorporation of the following NPRR(s) into the Protocols:

- NPRR1177, Enhance Exceptional Fuel Cost Process (incorporated 6/30/23)
  - Section 4.4.9.4.1
- NPRR1183, ECEII Definition Clarification and Updates to Posting Rules for Certain Documents without ECEII (incorporated 11/1/23)
  - Section 3.14.1.2

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

- NPRR1179, Fuel Purchase Requirements for Resources Submitting RUC Fuel Costs
  - Section 9.14.7
- NPRR1186, Improvements Prior to the RTC+B Project for Better ESR State of Charge Awareness, Accounting, and Monitoring
  - Section 5.5.2
- NPRR1203, Implementation of Dispatchable Reliability Reserve Service
  - Section 5.5.2
- NPRR1204, Considerations of State of Charge with Real-Time Co-Optimization Implementation
  - Section 5.5.2

**Proposed Protocol Language Revision**

## 2.1 DEFINITIONS

~~**Fuel Adder**~~

~~For natural gas Resources, the Resource-specific cost difference between the routine or reoccurring and predictable expenses for fuel and the Fuel Index Price (FIP). Costs include variable transport and storage costs or other costs that routinely occur multiple times in a month. For coal-fired Resources, Fuel Adders can be applied as described in the Verifiable Cost Manual.~~

**Exceptional Fuel Cost**

The hourly volume-weighted price of natural gas, purchased during an Operating Day or after the Day-Ahead nomination deadline of 1300 Central Prevailing Time (CPT) on the prior Operating Day, submitted in accordance with paragraph (1)(l) of Section 4.4.9.4.1, Mitigated Offer Cap. ~~Exceptional costs are not routine or reoccurring and predictable costs.~~

### 3.14.1.2 ERCOT Evaluation Process

(1) Except as provided in paragraph (3) of Section 3.14.1.1, Notification of Suspension of Operations, upon receipt of an NSO under Section 3.14.1.1 ERCOT shall post the NSO on the MIS Secure Area and shall post all existing relevant studies and data and provide a Market Notice of the NSO and posting of the studies and data.

*[NPRR1183: Replace paragraph (1) above with the following upon system implementation:]*

(1) Except as provided in paragraph (3) of Section 3.14.1.1, Notification of Suspension of Operations, upon receipt of an NSO under Section 3.14.1.1 ERCOT shall post the NSO on the ERCOT website and shall post on the MIS Secure Area all existing relevant studies and data and provide a Market Notice of the NSO and posting of the studies and data.

(2) Within 21 days after receiving the NSO described in paragraph (1) above, unless otherwise notified by ERCOT that a shorter comment period is required, Market Participants may submit comments to ERCOT on whether the Generation Resource(s) referenced in the NSO is necessary to support ERCOT System reliability or should qualify for a multi-year RMR Agreement. ERCOT shall consider and post all submitted comments on the MIS Secure Area.

(3) ERCOT shall conduct a reliability analysis of the need for any Generation Resource(s) with a summer Seasonal net max sustainable rating greater than or equal to 20 MW to support ERCOT System reliability. For Generation Resource(s) with a summer Seasonal net max sustainable rating less than 20 MW, ERCOT may conduct a reliability analysis if deemed appropriate by ERCOT following consultation with affected Transmission Service Provider(s) (TSP(s)).

(a) ERCOT shall use a Load forecast consistent with current Regional Transmission Plan assumptions and methodologies for the appropriate season(s). If additional new Generation Resources meet the criteria in Planning Guide Section 6.9, Addition of Proposed Generation to the Planning Models, ERCOT shall include those additional Generation Resources with the appropriate seasonal ratings.

(b) If the NSO indicates that the Generation Resource(s) will decommission or suspend operation, or in the case of a Forced Outage, has permanently ceased operation, ERCOT, in its sole discretion, may perform transmission reliability analysis over a planning horizon as defined by the available base cases but not to exceed two years.

(c) For purposes of the reliability analysis, ERCOT shall use the following criteria to identify a performance deficiency that is materially impacted by the Generation Resource:

(i) Without the Generation Resource, there are one or more Transmission Facilities loaded above their Normal Rating under pre-contingency conditions.

(ii) Without the Generation Resource, there is any instability or cascading for any of the following conditions:

(A) Pre-contingency;

(B) Normal system conditions followed by the contingency loss of a generating unit, transmission circuit, common tower outage, transformer, shunt device, or flexible alternating current transmission system (FACTS) device;

(C) Unavailability of a generating unit, followed by Manual System Adjustments, followed by the contingency loss of a generating unit, transmission circuit, common tower outage, transformer, shunt device, or FACTS device; or

(D) Unavailability of a 345/138 kV transformer, followed by Manual System Adjustments, followed by the contingency loss of a generating unit, transmission circuit, common tower outage, transformer, shunt device, or FACTS device.

(iii) Without the Generation Resource, there are one or more Transmission Facilities loaded above 110% of the Emergency Rating under normal system conditions followed by the contingency loss of a generating unit, transmission circuit, common tower outage, transformer, shunt device, or FACTS device.

(iv) For paragraphs (i) through (iii) above, the Generation Resource will only be deemed to have a material impact on a performance deficiency that is

caused by a thermal overload(s) if the Generation Resource has a more than 2% unloading Shift Factor on the Transmission Facility(s) that is overloaded and more than 5% unloading impact on the Transmission Facility(s) that is overloaded. For purposes herein, an unloading impact is a measure of a reduction in flow on a Transmission Facility as a percent of its Rating due to a unit injection of power from the Generation Resource.

(v) ERCOT may, in its sole discretion, deviate from the above criteria in order to maintain ERCOT System reliability. However, ERCOT shall present its reasons for deviating from the above criteria to the Technical Advisory Committee (TAC) and ERCOT Board.

(d) ERCOT, in consultation with affected TSP(s), may rely upon the results of past planning studies to determine if the Generation Resource is necessary to support ERCOT System reliability. The past planning studies must have used the same or more restrictive reliability criteria than the criteria described in paragraph (c) above.

(e) Additionally, ERCOT shall conduct any other analysis (e.g., operations studies) as required and shall post all study data and results and all analyses and its determination on the MIS Secure Area and issue a Market Notice of its determination.

(4) Within 30 days after receiving the NSO, ERCOT shall issue a Market Notice indicating the status of the reliability analysis referenced in paragraph (3) above. The Market Notice will indicate one of the following:

(a) ERCOT has completed its reliability analysis and the Generation Resource is not required to support ERCOT System reliability;

(b) ERCOT has completed its reliability analysis and the analysis identifies a performance deficiency for which the Generation Resource has a material impact; or

(c) ERCOT has not completed its reliability analysis and will need additional time to complete the assessment.

(5) Within 60 days after receiving Part I and Part II of the NSO, ERCOT shall complete its reliability analysis described in paragraph (3) above and shall issue a Market Notice describing the results of its reliability analysis if the results were not provided in the Market Notice issued under paragraph (4) above. If ERCOT determines that the Generation Resource is not needed to support ERCOT System reliability, then the Generation Resource may cease or suspend operations according to the schedule in its NSO, unless ERCOT in its sole discretion permits the Generation Resource to suspend operations at an earlier date, and ERCOT shall note this in the Market Notice.

(6) Within ten days after a determination by ERCOT that the proposed suspension of the Generation Resource would result in a performance deficiency on which the Generation

Resource has a material impact, as described in this Section, ERCOT shall issue a Request for Proposal (RFP) for Must-Run Alternatives (MRAs). ERCOT shall include in the RFP reasonably available information that would enable potential MRAs to assess the feasibility of submitting a proposal to provide a more cost-effective alternative to the Generation Resource, including any known minimum technical requirements and/or operational characteristics required to eliminate the identified performance deficiency. The MRA RFP shall specify the expected number of hours that an MRA would be needed during the contract period, and the hours of the day, by season, that the MRA would be required to be available. ERCOT shall establish an RFP response schedule such that responses can be evaluated prior to 150 days after submittal of the NSO.

(7) Within ten days after a determination by ERCOT that the proposed suspension of the Generation Resource would result in a performance deficiency on which the Generation Resource has a material impact, as described in this Section, the Resource Entity shall, if it has not already done so, complete and submit to ERCOT Part III of the NSO (Section 22, Attachment E, Notification of Suspension of Operations). ERCOT shall post the Part III information on the MIS Secure Area. Concurrently, the Generation Resource shall submit an initial estimated budget used in the calculation of the proposed Standby Cost and RMR ~~estimated LF~~fuel Aadder, prepared in accordance with Section 3.14.1.11, Budgeting Eligible Costs, and Section 3.14.1.20, Budgeting Fuel Costs, to ERCOT. On or before the 11th day after the determination or the receipt of Part III of the NSO, whichever comes first, ERCOT and the Resource Entity shall begin good faith negotiations on an RMR Agreement. These negotiations shall include the budgeting process for Eligible Costs and for fuel costs as detailed in Section 3.14.1.11 and Section 3.14.1.20.

*[NPRR1183: Replace paragraph (7) above with the following upon system implementation:]*

(7) Within ten days after a determination by ERCOT that the proposed suspension of the Generation Resource would result in a performance deficiency on which the Generation Resource has a material impact, as described in this Section, the Resource Entity shall, if it has not already done so, complete and submit to ERCOT Part III of the NSO (Section 22, Attachment E, Notification of Suspension of Operations). ERCOT shall post the Part III information on the ERCOT website. Concurrently, the Generation Resource shall submit an initial estimated budget used in the calculation of the proposed Standby Cost and RMR fuel adder, prepared in accordance with Section 3.14.1.11, Budgeting Eligible Costs, and Section 3.14.1.20, Budgeting Fuel Costs, to ERCOT. On or before the 11th day after the determination or the receipt of Part III of the NSO, whichever comes first, ERCOT and the Resource Entity shall begin good faith negotiations on an RMR Agreement. These negotiations shall include the budgeting process for Eligible Costs and for fuel costs as detailed in Section 3.14.1.11 and Section 3.14.1.20.

(8) ERCOT shall issue a Market Notice on the status of the RMR Unit or MRA, including the start date, duration of the RMR or MRA Agreement, the Standby Cost ($/Hour) as

applicable, and the amount of MW under contract, within 24 hours of signing an RMR or MRA Agreement with a Resource Entity.

(9) Except in cases where the Generation Resource is to be mothballed on a seasonal basis, if, after 150 days following ERCOT's receipt of Part I and Part II of the NSO, ERCOT has neither notified the Resource Entity that the continued operation of the Generation Resource is not required nor obtained ERCOT Board approval to enter into an RMR or MRA Agreement, then the Resource Entity may file a complaint with the Public Utility Commission of Texas (PUCT) under subsection (e)(1) of P.U.C. SUBST. R. 25.502, Pricing Safeguards in Markets Operated by the Electric Reliability Council of Texas. If the Generation Resource is to be mothballed on a seasonal basis, then the Resource Entity may file such a complaint with the PUCT under subsection (e)(1) of P.U.C. SUBST. R. 25.502 if ERCOT has neither notified the Resource Entity that the continued operation of the Generation Resource is not required nor obtained ERCOT Board approval to enter into an RMR Agreement within 90 days following ERCOT's receipt of Part I and Part II of the NSO.

(10) If the ERCOT Board approves entering into an RMR Agreement but ERCOT and the Resource Entity have not both executed the RMR Agreement by the date on which the Resource Entity intends to cease or suspend operation of the Generation Resource, then the Resource Entity shall maintain that Generation Resource(s) so that it is available for Reliability Unit Commitment (RUC) commitment until no longer required to do so under subsection (e)(2) of P.U.C. SUBST. R. 25.502. This paragraph does not apply to a Generation Resource that suspended operations due to a Forced Outage.

**3.14.1.20 Budgeting Fuel Costs**

(1) The RMR Unit owner shall supply ERCOT a preliminary monthly fuel cost budget for the anticipated term and effective date of the RMR Agreement. The fuel cost budget must include information pertaining to the cost of the fuel feedstock, including where appropriate transportation costs and terms, as well as fuel storage costs and terms, and any other fuel contract provisions (e.g. "take or pay" provisions) that may impact the cost of all fuels anticipated to be used by the RMR Unit over the life of the RMR Agreement and must include fuel costs categorized in terms of:

(a) Primary fuel; and

(b) Secondary fuel.

(2) The estimated fuel payments may include a ~~n estimated F~~f~~f~~uel A~~a~~adder to better approximate expected fuel costs, which may be adjusted from time to time by mutual agreement of the RMR Unit owner and ERCOT. The F~~f~~fuel A~~a~~adder shall represent the difference between the forecasted average fuel price and the forecasted average of the relevant index price over the RMR contract period. The F~~f~~fuel A~~a~~adder must also include the forecasted ~~routine~~ cost of transporting and delivering fuel and fuel imbalance fees to the Resource. The RMR Unit owner must provide to ERCOT supporting documentation indicating how the ~~F~~f~~f~~uel A~~a~~adder was determined.

(3) The RMR Unit owner shall provide good faith estimates of the RMR Unit input/output curve coefficients to ERCOT with its Notification of Suspension of Operations.

(4) Based on production figures provided to the RMR Unit owner by ERCOT, the RMR Unit owner shall also provide ERCOT fuel supply options available for the RMR Unit. For each option, the RMR Unit owner shall detail the associated impacts on the fuel and non-fuel budgets and on the availability of the RMR Unit. If no reasonable alternatives are available then an affirmation by the RMR Unit owner to that effect must be included in the RMR Agreement. If there are available fuel options, then no less than 30 days after the receipt of the fuel supply options, ERCOT shall notify the RMR Unit owner of its fuel supply option selection.

#### *4.4.9.4.1 Mitigated Offer Cap*

(1) Energy Offer Curves may be subject to mitigation in Real-Time operations under Section 6.5.7.3, Security Constrained Economic Dispatch, using a Mitigated Offer Cap (MOC). ERCOT shall construct an incremental MOC curve in accordance with Section 6.5.7.3 such that each point on the MOC curve is calculated as follows:

***[NPRR1014: Replace paragraph (1) above with the following upon system implementation:]***

(1) Energy Offer Curves and Energy Bid/Offer Curves may be subject to mitigation in Real-Time operations under Section 6.5.7.3, Security Constrained Economic Dispatch, using a Mitigated Offer Cap (MOC). For Generation Resources, ERCOT shall construct an incremental MOC curve in accordance with Section 6.5.7.3 such that each point on the MOC curve is calculated as follows:

$$MOC_{q,r,h} = \text{Max}\,[GIHR_{q,r} * \text{Max}(FIP, WAFP_{q,r,h}), (IHR_{q,r} * FPRC_{q,r} - OM_{q,r}) ~~* CFMLT_{q,r}~~]$$

***[NPRR1058: Replace the formula "$MOC_{q,r,h}$" above with the following upon system implementation:]***

$$MOC_{q,r,h} = \text{Max}\,[GIHR_{q,r} * \text{Max}(FIP, WAFP_{q,r,h}), (IHR_{q,r} * FPRC_{q,r} + OM_{q,r})]$$

Where,

If a QSE has submitted an Energy Offer Curve on behalf of a Generation Resource and the Generation Resource has approved verifiable costs, then

$$FPRC_{q,r} = \text{Max}(WAFP_{q,r,h}, FIP + FA_{q,r}) * RTPERFIP_{q,r} / 100 \quad FOP * RTPERFOP_{q,r} / 100$$

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If a QSE has not submitted an Energy Offer Curve on behalf of a Generation Resource and the Generation Resource has approved verifiable costs, then

$$FPRC_{q,r} = \text{Max}(WAFP_{q,r,h}, FIP - FA_{q,r}) * GASPEROL_{q,r} / 100 - FOP * OILPEROL_{q,r} / 100 + (SFP - FA_{q,r}) * SFPEROL_{q,r} / 100$$

The above variables are defined as follows:

| Variable | Unit | Definition |
|---|---|---|
| $MOC_{q,r,h}$ | $/MWh | *Mitigated Offer Cap per Resource* The MOC for Resource *r*, for the hour. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| $GIHR_{q,r}$ | MMBtu/MWh | *Generic Incremental Heat Rate* The generic, single-value, incremental heat rate. For Generation Resources with a Commercial Operations Date on or before January 1, 2004, the generic incremental heat rate shall be set to 10.5. For Generation Resources that have a Commercial Operations Date after January 1, 2004, this value shall be set to 14.5. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| $IHR_{q,r}$ | MMBtu/MWh | *Verifiable Incremental Heat Rate per Resource* The verifiable incremental heat rate curve for Resource *r*, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| FIP | $/MMBtu | *Fuel Index Price* The natural gas index price as defined in Section 2.1, Definitions. |
| $RTPERFIP_{q,r}$ | none | *Fuel Index Price Percentage* The percentage of natural gas used by Resource *r* to operate above LSL, as submitted with the energy offer curve. |
| FOP | $/MMBtu | *Fuel Oil Price*—The fuel oil index price as defined in Section 2.1. |
| $RTPERFOP_{q,r}$ | none | *Fuel Oil Price Percentage* The percentage of fuel oil used by Resource *r* to operate above $LSL_r$ as submitted with the energy offer curve. |
| SFP | $/MMBtu | *Solid Fuel Price* The solid fuel index price is $1.50. |
| $FPRC_{q,r}$ | $/MMBtu | *Fuel Price Calculated per Resource*—The calculated index price for fuel for the Resource based on the Resources fuel mix. Where for a Combined Cycle Train, the Resource r is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| $GASPEROL_{q,r}$ | none | *Percent of Natural Gas to Operate Above LSL*—The percentage of natural gas used by Resource *r* to operate above LSL, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource r is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| $OILPEROL_{q,r}$ | none | *Percent of Oil to Operate Above LSL*—The percentage of fuel oil used by Resource *r* to operate above $LSL_r$ as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource r is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| $SFPEROL_{q,r}$ | none | *Percent of Solid Fuel to Operate Above LSL*—The percentage of solid fuel used by Resource *r* to operate above $LSL_r$ as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource r is a Combined Cycle Generation Resource within the Combined Cycle Train. |

| Variable | Unit | Definition |
|---|---|---|
| $FA_{q,r}$ | $/MMBtu | *Fuel Adder* ~~The Fuel Adder as defined in Section 2.1, Definitions, for the Resource r. The fuel adder is the average cost above the index price Resource r has paid to obtain fuel.~~ The fuel adder is the average cost above the index price Resource *r* has paid to obtain fuel. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. See the Verifiable Cost Manual for additional information. |
| $OM_{q,r}$ | $/MWh | *Variable Operations and Maintenance Cost above LSL* The O&M cost for Resource *r* to operate above $LSL_r$, including an adjustment for emissions costs, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource r is a Combined Cycle Generation Resource within the Combined Cycle Train. See the Verifiable Cost Manual for additional information. |
| ~~$CFMLT_{q,r}$~~ | ~~none~~ | ~~*Capacity Factor Multiplier* — A multiplier based on the corresponding monthly capacity factor as described in paragraph (1)(d) below.~~ |
| ***[NPRR1058: Delete the variable "$CFMLT_{q,r}$" above upon system implementation.]*** | | |
| $WAFP_{q,r,h}$ | $/MMBtu | *Weighted Average Fuel Price* The volume-weighted average intraday, same-day and spot fuel price, the projected incremental fuel consistent with a fuel supply contract(s), or a combination of these two prices, submitted to ERCOT during the Adjustment Period for a specific Resource and specific hour within the Operating Day, as described in paragraph (1)(f) below.<br>***[NPRR1177: Replace the definition above with the following on January 1, 2025:]***<br>*Weighted Average Fuel Price* The volume-weighted average intraday, same-day and spot price of fuel submitted to ERCOT during the Adjustment Period for a specific Resource and specific hour within the Operating Day, as described in paragraph (1)(f) below. |
| *q* | none | A QSE. |
| *r* | none | A Generation Resource. |
| *h* | none | The Operating Hour. |

(a) For a Resource contracted by ERCOT under paragraph (4) of Section 6.5.1.1, ERCOT Control Area Authority, ERCOT shall increase the O&M cost such that every point on the MOC curve is greater than the SWCAP in $/MWh.

***[NPRR1008 and NPRR1014: Replace applicable portions of paragraph (a) above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1008; or upon system implementation for NPRR1014:]***

(a) For a Resource contracted by ERCOT under paragraph (4) of Section 6.5.1.1, ERCOT Control Area Authority, ERCOT shall increase the O&M cost such that every point on the MOC curve is greater than the effective Value of Lost Load (VOLL) in $/MWh.

(b) Notwithstanding the MOC calculation described in paragraph (1) above, the MOC for ESRs shall be set at the SWCAP. No later than December 31, 2023, ERCOT and stakeholders shall submit a report to TAC that includes a recommendation to continue the existing approach or a proposal to implement an alternative approach to determine the MOC for ESRs.

***[NPRR1008 and NPRR1014: Replace applicable portions of paragraph (b) above with the following upon the system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1008; or upon system implementation for NPRR1014:]***

(b) Notwithstanding the MOC calculation described in paragraph (1) above, the MOC for ESRs shall be set at the RTSWCAP. No later than December 31, 2023, ERCOT and stakeholders shall submit a report to TAC that includes a recommendation to continue the existing approach or a proposal to implement an alternative approach to determine the MOC for ESRs.

(c) For Quick Start Generation Resources (QSGRs) the MOC shall be adjusted in accordance with Verifiable Cost Manual Appendix 7, Calculation of the Variable O&M Value and Incremental Heat Rate used in Real Time Mitigation for Quick Start Generation Resources (QSGRs).

***[NPRR1008 and NPRR1014: Insert applicable portions of paragraph (d) below upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1008; or upon system implementation for NPRR1014; and renumber accordingly:]***

(d) For On-line hydro Generation Resources not operating in Synchronous Condenser Fast-Response mode, the MOC shall be adjusted in accordance with Verifiable Cost Manual, Appendix 12, Calculation of the Variable O&M Value and Incremental Heat Rate used in Real Time Mitigation for On-Line Hydro Generation Resources not operating in Synchronous Condenser Fast-Response mode.

~~(d) The multipliers for the MOC calculation above are as follows:~~

~~(i) 1.10 for Resources running at a ≥ 50% capacity factor for the previous 12 months;~~

~~(ii) 1.15 for Resources running at a ≥ 30 and < 50% capacity factor for the previous 12 months;~~

~~(iii) 1.20 for Resources running at a ≥ 20 and < 30% capacity factor for the previous 12 months;~~

~~(iv) 1.25 for Resources running at a ≥ 10 and < 20% capacity factor for the previous 12 months;~~

~~(v) 1.30 for Resources running at a ≥ 5 and < 10% capacity factor for the previous 12 months;~~

~~(vi) 1.40 for Resources running at a ≥ 1 and < 5% capacity factor for the previous 12 months; and~~

~~(vii) 1.50 for Resources running at a less than 1% capacity factor for the previous 12 months.~~

*[NPRR1058: Delete paragraph (d) above upon system implementation and renumber accordingly.]*

(d~~e~~) ~~The previous 12 months' capacity factor must be updated by ERCOT by the 20th day of each month using the most recent data for use in the next month. ERCOT shall post to the MIS Secure Area the capacity factor for each Resource before the start of the effective month.~~

~~*[NPRR1058: Delete paragraph (de) above upon system implementation and renumber accordingly.]*~~

(d~~e~~f) During the Adjustment Period, a QSE representing a Resource may submit Exceptional Fuel Cost as a volume-weighted average fuel price for use in the MOC calculation for that Resource. To qualify as Exceptional Fuel Cost, the submission must meet the following conditions:

(i) For all Resources, the weighted average fuel price must exceed FIP for the applicable Operating Day, plus a threshold parameter value of $1/MMBtu, plus the applicable ~~F~~fuel ~~A~~adder. For Resources without approved verifiable costs, the ~~F~~ffuel ~~A~~adder will be set to the default value assigned to Resources with approved verifiable costs, as defined in the Verifiable Cost Manual. The threshold parameter value in this paragraph shall be recommended by the Wholesale Market Subcommittee (WMS) and approved by the Technical Advisory Committee (TAC). ERCOT shall update the threshold value on the first day of the month following TAC approval unless otherwise directed by the TAC. ERCOT shall provide a Market Notice prior to implementation of a revised parameter value.

(ii) Fixed cost (fees, penalties and similar non-gas costs) may not be included in the calculation of the weighted average fuel price.

(iii) The weighted average fuel price in paragraph (1) above must be a single value and based on the following fuel price options:

(A) A volume-weighted price considering all intra-day, same day, and spot fuel purchases for the Resource; or

(B) A projected fuel price for a Resource with a fuel supply contract(s) that also has submitted an Energy Offer Curve for the Operating Hour where the Energy Offer Curve is calculated as the incremental heat rate times the incremental fuel price plus Operations and Maintenance (O&M) cost; or

(C) A combination of the above two options.

A weighted average fuel price based on actual fuel purchases must be included in the calculation of the weighted average fuel price in paragraph (1) above. These must account for at least 10% of the total fuel volume burned by the applicable Resource for the hour for which the weighted average fuel price is computed. A projected incremental fuel price must be consistent with the terms of the fuel supply contract(s). A weighted average fuel price based on a combination of these options must meet the requirements described for each of the options. As noted in paragraph (l) below, the methodology used in the allocation of the cost and volume of fuel to the Resource for the hour is subject to validation by ERCOT.

*[NPRR1177: Replace paragraph (iii) above with the following on January 1, 2025:]*

(iii) All intra-day, same day, and spot fuel purchases must be included in the calculation of the weighted average fuel price in paragraph (1) above. These must account for at least 10% of the total fuel volume burned by the applicable Resource for the hour for which the weighted average fuel price is computed. As noted in paragraph (l) below, the methodology used in the allocation of the cost and volume of purchased fuel to the Resource for the hour is subject to validation by ERCOT.

(iv) Weighted average fuel prices must be submitted individually for each Operating Hour for which they are applicable. Values submitted outside of the Adjustment Period will be rejected and not used in the calculation of the MOC for the designated Operating Hour.

(v) A projected volume-weighted average fuel price must be consistent with the Energy Offer Curve for each Operating Hour for which they are applicable, and consistent with the signed and executed fuel supply contract(s) for each Resource.

(vi) An Exceptional Fuel Cost submitted based on projected fuel prices may not match with the actual volume-weighted average fuel price due to prospective costs and/or contractual costs.

*[NPRR1177: Delete paragraphs (v) and (vi) above on January 1, 2025.]*

~~(v) Any costs associated with an Exceptional Fuel Cost submission must not be reflected in routine Fuel Adder documentation. Exceptional Fuel Costs represent an unanticipated or unusual increased fuel costs above and beyond what is allowed by the Fuel Adder.~~

(cfg) ERCOT may notify the Independent Market Monitor (IMM) if a QSE submits an Exceptional Fuel Cost.

(fgh) No later than five Business Days after an Operating Day for which an Exceptional Fuel Cost is submitted, ERCOT shall issue a Market Notice indicating the affected Operating Hours and the number of Resources for which a QSE submitted Exceptional Fuel Cost for a particular Operating Day.

*[NPRR1121: Replace paragraph (fgh) above with the following upon system implementation:]*

(fgh) The day following an Operating Day for which an Exceptional Fuel Cost is submitted, ERCOT shall post a report on the ERCOT website indicating the affected Operating Hours and the number of Resources for which a QSE submitted Exceptional Fuel Cost for a particular Operating Day.

(ghi) No later than 1700 Central Prevailing Time (CPT) on the 15th day following an Exceptional Fuel Cost submission, the submitting QSE shall provide ERCOT with the calculation of the weighted average fuel price, intraday or same-day fuel purchases, if applicable, and any available supporting documentation. Such information may include, but is not limited to, documents of the following nature: relevant contracts between the QSE or Resource Entity and fuel supplier, trade logs, transportation, storage, balancing and distribution agreements, calculation of the weighted average fuel price, or any other documentation necessary to support the Exceptional Fuel Cost price and volume for the applicable period(s).

(hij) No later than 1700 Central Prevailing Time (CPT) on the 60th day following an Exceptional Fuel Cost submission, the submitting QSE shall provide ERCOT with all supporting documentation not previously provided to ERCOT. No supporting documentation will be accepted after the 60th day.

(ijk) The accuracy of submitted Exceptional Fuel Cost and the need for purchasing intraday or same-day gas must be attested to by a duly authorized officer or agent

of the QSE representing the Resource. The attestation must be provided in a standardized format acceptable to ERCOT and submitted with the other documentation described in paragraph~~s (h) and~~ (g~~i~~) above. An attestation for Exceptional Fuel Costs must state that the costs are accurate and variable, based on the dispatch of the Resource. ~~The attestation must state that the costs associated with the Exceptional Fuel Cost are not routine costs.~~

*[NPRR1177: Replace paragraph (i~~jk~~) above with the following on January 1, 2025:]*

(i~~jk~~) The accuracy of submitted Exceptional Fuel Cost and the need for purchasing intraday or same-day gas must be attested to by a duly authorized officer or agent of the QSE representing the Resource. The attestation must be provided in a standardized format acceptable to ERCOT and submitted with the other documentation described in paragraph~~s (h) and~~ (g~~i~~) above.

(j~~kl~~) ERCOT will use the supporting documentation to validate the Exceptional Fuel Cost for the applicable period. Validation will include, but not be limited to, the cost and the quantity of purchased fuel, Resource-specific heat rates, and the methodology used in the allocation of the cost and volume of purchased fuel, if applicable, to the Resource for the applicable hour used in the weighted average fuel price calculation. In connection with the validation process ERCOT may request additional documentation or clarification of previously submitted documentation. Such requests must be honored within ten Business Days.

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

(l~~mn~~) The documentation described in paragraphs (g~~i~~) through (j~~k~~) above is only required for the hours for which Exceptional Fuel Costs were submitted and the Resource was subject to mitigation.

(m~~no~~) For Resources submitting Exceptional Fuel Costs based on projected incremental fuel prices based on a contract(s) the QSE must submit to ERCOT all applicable fuel supply contracts at least ten Business Days in advance of submitting Exceptional Fuel Costs. ERCOT may, at any time, notify the QSE of any cost identified in the contract that is ineligible for inclusion in any Exceptional Fuel Cost submission. Upon receiving such notification, the QSE shall ensure that such cost is not included in any Exceptional Fuel Cost submission or in any Energy Offer Curve submission for any hours for which Exceptional Fuel Costs are submitted. The absence of any such notification shall not imply that such cost is eligible for inclusion in any Exceptional Fuel Cost submission or in any Energy Offer Curve submission.

*[NPRR1177: Delete paragraphs (l~~mn~~) and (m~~no~~) above on January 1, 2025.]*

### 5.5.2 *Reliability Unit Commitment (RUC) Process*

**Commented [BA1]:** Please note NPRR1186, NPRR1203, and NPRR1204 also propose revisions to this section.

(1) The RUC process recommends commitment of Generation Resources, to match ERCOT's forecasted Load including Direct Current Tie (DC Tie) Schedules, subject to all transmission constraints and Resource performance characteristics. The RUC process takes into account Resources already committed in the Current Operating Plans (COPs), Resources already committed in previous RUCs, Off-Line Available Resources having a start-up time of one hour or less, and Resource capacity already committed to provide Ancillary Service. The formulation of the RUC objective function must employ penalty factors on violations of security constraints. The objective of the RUC process is to minimize costs based on the Resource costs described in paragraphs (5) through (9) below. For all hours of the RUC Study Period within the RUC process, Quick Start Generation Resources (QSGRs) with a COP Resource Status of OFFQS shall be considered as On-Line with Low Sustained Limit (LSL) at zero MW. QSGRs with a Resource Status of OFFQS shall only be committed by ERCOT through a RUC instruction in instances when a reliability issue would not otherwise be managed through Dispatch Instructions from Security-Constrained Economic Dispatch (SCED).

(2) The RUC process can recommend Resource decommitment. ERCOT may only decommit a Resource to resolve transmission constraints that are otherwise unresolvable. Qualifying Facilities (QFs) may be decommitted only after all other types of Resources have been assessed for decommitment. In addition, the HRUC process provides decision support to ERCOT regarding a Resource decommitment requested by a Qualified Scheduling Entity (QSE).

(3) ERCOT shall review the RUC-recommended Resource commitments and the list of Off-Line Available Resources having a start-up time of one hour or less to assess feasibility and shall make any changes that it considers necessary, in its sole discretion. During the RUC process, ERCOT may also review and commit, through a RUC instruction, Combined Cycle Generation Resources that are currently planned to be On-Line but are capable of transitioning to a configuration with additional capacity. ERCOT may deselect Resources recommended in DRUC and in all HRUC processes if in ERCOT's sole discretion there is enough time to commit those Resources in the future HRUC processes, taking into account the Resources' start-up times, to meet ERCOT System reliability. After each RUC run, ERCOT shall post the amount of capacity deselected per hour in the RUC Study Period to the MIS Secure Area. A Generation Resource shown as On-Line and available for SCED dispatch for an hour in its COP prior to a DRUC or HRUC process execution, according to Section 5.3, ERCOT Security Sequence Responsibilities, will be considered self-committed for that hour. For purpose of Settlement, snapshot data will be used as specified in paragraph (2) of Section 5.3. ERCOT shall issue RUC instructions to each QSE specifying its Resources that have been committed as a result of the RUC process. ERCOT shall, within one day after making any changes to the RUC-recommended commitments, post to the MIS Secure Area any changes that ERCOT made to the RUC-recommended commitments with an explanation of the changes.

(4) A QSE shall notify the ERCOT Operator of any physical limitation that impacts its Resource's ability to start that is not reflected in the Resource's COP or the Resource's startup time, minimum On-Line time, or minimum Off-Line time. The following shall apply:

(a) If a Resource receives a RUC Dispatch Instruction that it cannot meet due to a physical limitation described in paragraph (4) above, the QSE representing the Resource shall notify the ERCOT Operator of the inability to fully comply with the instruction and shall comply with the instruction to the best of the Resource's ability. If the QSE has provided the ERCOT Operator notice of that limitation at least seven days prior to the Operating Day in which the instruction occurs, the QSE shall be excused from complying with the portion of the RUC Dispatch Instruction that it could not meet due to the identified limitation.

(b) If a QSE provides notice pursuant to paragraph (a) above of a physical limitation that will delay the RUC-committed Resource's ability to reach its LSL in accordance with a RUC Dispatch Instruction, ERCOT shall extend the RUC Dispatch Instruction so that the Resource's minimum run time is respected. However, if the Resource will not be available in time to address the issue for which it received the RUC instruction, ERCOT may instead cancel the RUC Dispatch Instruction.

(5) A QSE shall be excused from complying with any portion of a RUC Dispatch Instruction that it could not meet due to a physical limitation that was reflected, at the time of the RUC Dispatch Instruction, in the Resource's COP, startup time, minimum On-Line time, or minimum Off-Line time.

(6) To determine the projected energy output level of each Resource and to project potential congestion patterns for each hour of the RUC, ERCOT shall calculate proxy Energy Offer Curves based on the Mitigated Offer Caps (MOCs) for the type of Resource as specified in Section 4.4.9.4, Mitigated Offer Cap and Mitigated Offer Floor, for use in the RUC. Proxy Energy Offer Curves are calculated by multiplying the MOC by a constant selected by ERCOT from time to time that is no more than 0.10% and applying the cost for all Generation Resource output between High Sustained Limit (HSL) and LSL. The intent of this process is to minimize the effect of the proxy Energy Offer Curves on optimization.

(7) ERCOT shall use the RUC process to evaluate the need to commit Resources for which a QSE has submitted Three-Part Supply Offers and other available Off-Line Resources in addition to Resources that are planned to be On-Line during the RUC Study Period. All of the above commitment information must be as specified in the QSE's COP. For available Off-Line Resources with a cold start time of one hour or less that have not been removed from special consideration under paragraph (9) below pursuant to paragraph (4) of Section 8.1.2, Current Operating Plan (COP) Performance Requirements, the Startup Offers and Minimum-Energy Offer from a Resource's Three-Part Supply Offer shall not be used in the RUC process.

(8) ERCOT shall create Three-Part Supply Offers for all Resources that did not submit a Three-Part Supply Offer, but are specified as available but Off-Line, excluding Resources with a Resource Status of EMR, in a QSE's COP. For such Resources, excluding available Off-Line Resources with a cold start time of one hour or less that have not been removed from special consideration under paragraph (9) below pursuant to paragraph (4) of Section 8.1.2, ERCOT shall use in the RUC process ~~150~~100% of any approved verifiable Startup Cost and verifiable minimum-energy cost or if verifiable costs have not been approved, the applicable Resource Category Generic Startup Offer Cost and the applicable Resource Category Generic Minimum-Energy Offer Cost as described specified in Section 4.4.9.2.3, Startup Offer and Minimum-Energy Offer Generic Caps, registered with ERCOT. ~~However~~ Also, for Settlement purposes, ERCOT shall use any approved verifiable Startup Costs and verifiable minimum-energy cost for such Resources, or if verifiable costs have not been approved, the applicable Resource Category Generic Startup Offer Cost and Generic Minimum-Energy Offer Cost.

(9) For all available Off-Line Resources having a cold start time of one hour or less and not removed from special consideration pursuant to paragraph (4) of Section 8.1.2, ERCOT shall scale any approved verifiable Startup Cost and verifiable minimum-energy cost or if verifiable costs have not been approved, the applicable Resource Category Generic Startup Offer Cost and the applicable Resource Category Generic Minimum-Energy Offer Cost as specified in Section 4.4.9.2.3 for use in the RUC process.

The above parameter is defined as follows:

| Parameter | Unit | Current Value* |
|---|---|---|
| 1HRLESSCOSTSCALING | Percentage | Maximum value of 100% |
| * The current value for the parameter(s) referenced in this table above will be recommended by the Technical Advisory Committee (TAC) and approved by the ERCOT Board. ERCOT shall update parameter value(s) 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. | | |

(10) The RUC process must treat all Resource capacity providing Ancillary Service as unavailable for the RUC Study Period, unless that treatment leads to infeasibility (i.e., that capacity is needed to resolve some local transmission problem that cannot be resolved by any other means). If an ERCOT Operator decides that the Ancillary Service capacity allocated to that Resource is infeasible based on ERCOT System conditions, then, ERCOT shall inform each affected QSE of the amount of its Resource capacity that does not qualify to provide Ancillary Service, and the projected hours for which this is the case. In that event, the affected QSE may, under Section 6.4.9.1.2, Replacement of Infeasible Ancillary Service Due to Transmission Constraints, either:

(a) Substitute capacity from Resources represented by that QSE;

(b) Substitute capacity from other QSEs using Ancillary Service Trades; or

(c) Ask ERCOT to replace the capacity.

(11) Factors included in the RUC process are:

(a) ERCOT System-wide hourly Load forecast allocated appropriately over Load buses;

(b) Transmission constraints – Transfer limits on energy flows through the electricity network;

(i) Thermal constraints – protect transmission facilities against thermal overload;

(ii) Generic constraints – protect the transmission system against transient instability, dynamic instability or voltage collapse;

(c) Planned transmission topology;

(d) Energy sufficiency constraints;

(e) Inputs from the COP, as appropriate;

(f) Inputs from Resource Parameters, including a list of Off-Line Available Resources having a start-up time of one hour or less, as appropriate;

(g) Each Generation Resource's Minimum-Energy Offer and Startup Offer, from its Three-Part Supply Offer;

(h) Any Generation Resource that is Off-Line and available but does not have a Three-Part Supply Offer;

(i) Forced Outage information; and

(j) Inputs from the eight-day look ahead planning tool, which may potentially keep a unit On-Line (or start a unit for the next day) so that a unit minimum duration between starts does not limit the availability of the unit (for security reasons).

(12) The HRUC process and the DRUC process are as follows:

(a) The HRUC process uses current Resource Status for the initial condition for the first hour of the RUC Study Period. All HRUC processes use the projected status of transmission breakers and switches starting with current status and updated for each remaining hour in the study as indicated in the COP for Resources and in the Outage Scheduler for transmission elements.

(b) The DRUC process uses the Day-Ahead forecast of total ERCOT Load including DC Tie Schedules for each hour of the Operating Day. The HRUC process uses the current hourly forecast of total ERCOT Load including DC Tie Schedules for each hour in the RUC Study Period.

(c) The DRUC process uses the Day-Ahead weather forecast for each hour of the Operating Day. The HRUC process uses the weather forecast information for each hour of the balance of the RUC Study Period.

(13) A QSE that has one or more of its Resources RUC-committed to provide Ancillary Services must increase its Ancillary Service Supply Responsibility by the total amount of RUC-committed Ancillary Service quantities. The QSE may only use a RUC-committed Resource to meet its Ancillary Service Supply Responsibility during that Resource's RUC-Committed Interval if the Resource has been committed by the RUC process to provide Ancillary Service, or the Resource is a Combined Cycle Generation Resource that was RUC-committed to transition from one On-Line configuration to a different configuration with additional capacity. For cases in which the commitment was to provide Ancillary Service, the QSE shall indicate the exact amount and type of Ancillary Service for which it was committed as the Resource's Ancillary Service Resource Responsibility and Ancillary Services Schedule for the RUC-Committed Intervals for both telemetry and COP information provided to ERCOT. Upon deployment of the Ancillary Services, the QSE shall adjust its Ancillary Services Schedule to reflect the amounts requested in the deployment.

(14) A QSE with a Resource that is not a Reliability Must-Run (RMR) Unit or has not received an Outage Schedule Adjustment (OSA) that has been committed in a RUC process or by a RUC Verbal Dispatch Instruction (VDI) may opt out of the RUC Settlement (or "buy back" the commitment) by setting the telemetered Resource Status of the RUC-committed Resource to ONOPTOUT for the first SCED run that the Resource is On-Line and available for SCED dispatch during the first hour of a contiguous block of RUC-Committed Hours. All the configurations of the same Combined Cycle Train shall be treated as the same Resource for the purpose of creating the block of RUC-Committed Hours. A RUC-committed Combined Cycle Generation Resource may opt out of the RUC Settlement by setting the telemetered Resource Status to ONOPTOUT for any On-Line configuration of the same Combined Cycle Train for the first SCED run that the Combined Cycle Train is On-Line and available for SCED Dispatch during the first hour of a contiguous block of RUC-Committed Hours. A Combined Cycle Generation Resource that is RUC-committed from one On-Line configuration in order to transition to a different configuration with additional capacity may opt out of the RUC Settlement following the same rule for RUC-committed Combined Cycle Generation Resources described above. A QSE that opts out of RUC Settlement forfeits RUC Settlement for the affected Resource for a given block of RUC Buy-Back Hours. A QSE that opts out of RUC Settlement treatment must make the Resource available to SCED for all RUC Buy-Back Hours. All hours in a contiguous block of RUC-Committed Hours that includes the RUC Buy-Back Hour shall be considered RUC Buy-Back Hours. However, if a contiguous block of RUC-Committed Hours spans more than one Operating Day, each contiguous block of RUC-Committed Hours within each Operating Day shall be treated as an independent block for purposes of opting out, and a QSE that wishes to opt out of RUC Settlement for the RUC-Committed Hours in the next Operating Day must set its telemetered Resource Status to ONOPTOUT for the first SCED run the next Operating Day.

(15) If a QSE-committed Resource experiences a Forced Outage or Startup Loading Failure in an hour for which another Resource under the control of the same QSE is committed by a RUC instruction, the QSE may opt out of RUC Settlement for the RUC-committed Resource in accordance with paragraph (14) above, or if the Forced Outage or Startup Loading Failure occurs after the beginning of the first RUC-Committed Interval, the QSE may opt out of RUC Settlement by submitting a dispute pursuant to Section 9.14, Settlement and Billing Dispute Process, requesting a correction of the RUC Settlement treatment for the RUC-committed Resource.

(16) ERCOT shall, as soon as practicable, post to the MIS Secure Area a report identifying those hours that were considered RUC Buy-Back Hours, along with the name of each RUC-committed Resource whose QSE opted out of RUC Settlement.

(17) A Resource that has a Three-Part Supply Offer cleared in the Day-Ahead Market (DAM) and subsequently receives a RUC commitment for the Operating Hour for which it was awarded will be treated as if the telemetered Resource Status was ONOPTOUT for purposes of Section 6.5.7.3, Security Constrained Economic Dispatch, and Section 6.5.7.3.1, Determination of Real-Time On-Line Reliability Deployment Price Adder.

***[NPRR1009, NPRR1032, and NPRR1092: Replace applicable portions of Section 5.5.2 above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1009; or upon system implementation for NPRR1032 or NPRR1092:]***

*5.5.2 Reliability Unit Commitment (RUC) Process*

(1) The RUC process recommends commitment of Generation Resources, to match ERCOT's forecasted Load including Direct Current Tie (DC Tie) Schedules and RUC Ancillary Service Demand Curves (ASDCs), subject to all transmission constraints and Resource performance characteristics. The RUC process takes into account Resources already committed in the Current Operating Plans (COPs), Resources already committed in previous RUCs, and Off-Line Available Resources having a start-up time of one hour or less. The formulation of the RUC objective function must employ penalty factors on violations of security constraints. The objective of the RUC process is to minimize costs based on the Resource costs described in paragraphs (9) through (13) below.

(2) ERCOT shall create an ASDC for each Ancillary Service for use in RUC. ERCOT shall post the ASDCs to the ERCOT website as soon as practicable after any change to the ASDCs.

(3) For all hours of the RUC Study Period within the RUC process, Quick Start Generation Resources (QSGRs) with a COP Resource Status of OFFQS shall be considered as On-Line with Low Sustained Limit (LSL) at zero MW. QSGRs with a Resource Status of OFFQS shall only be committed by ERCOT through a RUC instruction in instances when a reliability issue would not otherwise be managed through Dispatch Instructions from Security-Constrained Economic Dispatch (SCED).

(4) In addition to On-Line qualified Resources, the RUC engine shall consider a COP

Resource status of OFFQS for QSGRs that are qualified for ERCOT Contingency Reserve Service (ECRS), as being eligible to provide ECRS constrained by the Ancillary Service capability in the COP.

(5) In addition to On-Line qualified Resources, the RUC engine shall consider a COP Resource Status of OFFQS for QSGRs that are qualified for Non-Spinning Reserve (Non-Spin), as being eligible to provide Non-Spin constrained by the Ancillary Service Capability in the COP. The RUC engine shall also consider a COP Resource Status of OFF (Off-Line but available for commitment in the DAM and RUC) for a Resource that is qualified for Non-Spin, as being eligible to provide Non-Spin constrained by the Ancillary Service capability in the COP.

(6) The RUC process can recommend Resource decommitment. ERCOT may only decommit a Resource to resolve transmission constraints that are otherwise unresolvable. Qualifying Facilities (QFs) may be decommitted only after all other types of Resources have been assessed for decommitment. In addition, the HRUC process provides decision support to ERCOT regarding a Resource decommitment requested by a Qualified Scheduling Entity (QSE).

(7) ERCOT shall review the RUC-recommended Resource commitments and the list of Off-Line Available Resources having a start-up time of one hour or less to assess feasibility and shall make any changes that it considers necessary, in its sole discretion. During the RUC process, ERCOT may also review and commit, through a RUC instruction, Combined Cycle Generation Resources that are currently planned to be On-Line but are capable of transitioning to a configuration with additional capacity. ERCOT may deselect Resources recommended in DRUC and in all HRUC processes if in ERCOT's sole discretion there is enough time to commit those Resources in the future HRUC processes, taking into account the Resources' start-up times, to meet ERCOT System reliability. After each RUC run, ERCOT shall post the amount of capacity deselected per hour in the RUC Study Period to the MIS Secure Area. A Generation Resource shown as On-Line and available for SCED dispatch for an hour in its COP prior to a DRUC or HRUC process execution, according to Section 5.3, ERCOT Security Sequence Responsibilities, will be considered self-committed for that hour. For purpose of Settlement, snapshot data will be used as specified in paragraph (2) of Section 5.3.

(8) ERCOT shall issue RUC instructions to each QSE specifying its Resources that have been committed as a result of the RUC process. ERCOT shall, within one day after making any changes to the RUC-recommended commitments, post to the MIS Secure Area any changes that ERCOT made to the RUC-recommended commitments with an explanation of the changes.

(9) ERCOT shall use the RUC process to evaluate the need to commit Resources for which a QSE has submitted Three-Part Supply Offers and other available Off-Line Resources in addition to Resources that are planned to be On-Line during the RUC Study Period. All of the above commitment information must be as specified in the QSE's COP. For available Off-Line Resources with a cold start time of one hour or less that have not been removed from special consideration under paragraph (15) below pursuant to paragraph (4) of

Section 8.1.2, Current Operating Plan (COP) Performance Requirements, the Startup Offers and Minimum-Energy Offer from a Resource's Three-Part Supply Offer shall not be used in the RUC process.

(10) ERCOT shall create Three-Part Supply Offers for all Resources that did not submit a Three-Part Supply Offer, but are specified as available but Off-Line, excluding Resources with a Resource Status of EMR, in a QSE's COP. For such Resources, excluding available Off-Line Resources with a cold start time of one hour or less that have not been removed from special consideration under paragraph (13) below pursuant to paragraph (4) of Section 8.1.2, ERCOT shall use in the RUC process ~~150~~100% of any approved verifiable Startup Cost and verifiable minimum-energy cost or if verifiable costs have not been approved, the applicable Resource Category Generic Startup Offer Cost and the applicable Resource Category Generic Minimum-Energy Offer Cost as described specified in Section 4.4.9.2.3, Startup Offer and Minimum-Energy Offer Generic Caps, registered with ERCOT. ~~However~~ Also, for Settlement purposes, ERCOT shall use any approved verifiable Startup Costs and verifiable minimum-energy cost for such Resources, or if verifiable costs have not been approved, the applicable Resource Category Generic Startup Offer Cost and Generic Minimum-Energy Offer Cost.

(11) A QSE shall notify the ERCOT Operator of any physical limitation that impacts its Resource's ability to start that is not reflected in the Resource's COP or the Resource's startup time, minimum On-Line time, or minimum Off-Line time. The following shall apply:

(a) If a Resource receives a RUC Dispatch Instruction that it cannot meet due to a physical limitation described in paragraph (4) above, the QSE representing the Resource shall notify the ERCOT Operator of the inability to fully comply with the instruction and shall comply with the instruction to the best of the Resource's ability. If the QSE has provided the ERCOT Operator notice of that limitation at least seven days prior to the Operating Day in which the instruction occurs, the QSE shall be excused from complying with the portion of the RUC Dispatch Instruction that it could not meet due to the identified limitation.

(b) If a QSE provides notice pursuant to paragraph (a) above of a physical limitation that will delay the RUC-committed Resource's ability to reach its LSL in accordance with a RUC Dispatch Instruction, ERCOT shall extend the RUC Dispatch Instruction so that the Resource's minimum run time is respected. However, if the Resource will not be available in time to address the issue for which it received the RUC instruction, ERCOT may instead cancel the RUC Dispatch Instruction.

(12) A QSE shall be excused from complying with any portion of a RUC Dispatch Instruction that it could not meet due to a physical limitation that was reflected, at the time of the RUC Dispatch Instruction, in the Resource's COP, startup time, minimum On-Line time, or minimum Off-Line time.

(13) To determine the projected energy output level of each Resource and to project potential

congestion patterns for each hour of the RUC, ERCOT shall calculate proxy Energy Offer Curves based on the Mitigated Offer Caps (MOCs) for the type of Resource as specified in Section 4.4.9.4, Mitigated Offer Cap and Mitigated Offer Floor, for use in the RUC. Proxy Energy Offer Curves are calculated by multiplying the MOC by a constant selected by ERCOT from time to time that is no more than 0.10% and applying the cost for all Generation Resource output between High Sustained Limit (HSL) and LSL. The intent of this process is to minimize the effect of the proxy Energy Offer Curves on optimization.

(14) ERCOT shall calculate proxy Ancillary Service Offer Curves for use in RUC based on validated Ancillary Service Offers as specified in Section 4.4.7.2, Ancillary Service Offers. For all Resources that do not have a valid Ancillary Service Offer but are qualified to provide an Ancillary Service, ERCOT shall create an Ancillary Service Offer Curve for use in RUC as described in Section 6.5.7.3, Security Constrained Economic Dispatch. Proxy Ancillary Service Offer Curves for use in RUC are calculated by multiplying the Ancillary Service Offer by a constant selected by ERCOT from time to time that is no more than 0.1%, and are extended between the HSL and LSL. Notwithstanding the presence or absence of a proxy Ancillary Service Offer, Ancillary Service provision in RUC shall be limited by the Resource's Ancillary Service capabilities as reflected in the COP.

(15) For all available Off-Line Resources having a cold start time of one hour or less and not removed from special consideration pursuant to paragraph (4) of Section 8.1.2, ERCOT shall scale any approved verifiable Startup Cost and verifiable minimum-energy cost or if verifiable costs have not been approved, the applicable Resource Category Generic Startup Offer Cost and the applicable Resource Category Generic Minimum-Energy Offer Cost as specified in Section 4.4.9.2.3 for use in the RUC process.

The above parameter is defined as follows:

| Parameter | Unit | Current Value* |
|---|---|---|
| 1HRLESSCOSTSCALING | Percentage | Maximum value of 100% |

* The current value for the parameter(s) referenced in this table above will be recommended by the Technical Advisory Committee (TAC) and approved by the ERCOT Board. ERCOT shall update parameter value(s) 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.

(16) Factors included in the RUC process are:

(a) ERCOT System-wide hourly Load forecast allocated appropriately over Load buses;

(b) ERCOT's Ancillary Service Plans in the form of ASDCs;

(c) Transmission constraints – Transfer limits on energy flows through the electricity network;

(i) Thermal constraints – protect transmission facilities against thermal overload;

(ii) Generic constraints – protect the transmission system against transient instability, dynamic instability or voltage collapse;

(d) Planned transmission topology;

(e) Energy sufficiency constraints;

(f) Inputs from the COP, as appropriate;

(g) Inputs from Resource Parameters, including a list of Off-Line Available Resources having a start-up time of one hour or less, as appropriate;

(h) Each Generation Resource's Minimum-Energy Offer and Startup Offer, from its Three-Part Supply Offer;

(i) Any Generation Resource that is Off-Line and available but does not have a Three-Part Supply Offer;

(j) Forced Outage information; and

(k) Inputs from the eight-day look ahead planning tool, which may potentially keep a unit On-Line (or start a unit for the next day) so that a unit minimum duration between starts does not limit the availability of the unit (for security reasons).

(17) The HRUC process and the DRUC process are as follows:

(a) The HRUC process uses current Resource Status for the initial condition for the first hour of the RUC Study Period. All HRUC processes use the projected status of transmission breakers and switches starting with current status and updated for each remaining hour in the study as indicated in the COP for Resources and in the Outage Scheduler for transmission elements.

(b) The DRUC process uses the current hourly forecast of total ERCOT Load including DC Tie Schedules up to the physical rating of the DC Tie for each hour of the Operating Day. The HRUC process uses the current hourly forecast of total ERCOT Load including DC Tie Schedules up to the physical rating of the DC Tie for each hour in the RUC Study Period.

(c) The DRUC process uses the Day-Ahead weather forecast for each hour of the Operating Day. The HRUC process uses the weather forecast information for each hour of the balance of the RUC Study Period.

(18) A QSE with a Resource that is not a Reliability Must-Run (RMR) Unit or has not received an Outage Schedule Adjustment (OSA) that has been committed in a DRUC or HRUC process may opt out of the RUC Settlement (or "buy back" the commitment) by setting the

COP status of the RUC-committed Resource to ONOPTOUT for the first hour of a contiguous block of RUC-Committed Hours in the Opt Out Snapshot. All the configurations of the same Combined Cycle Train shall be treated as the same Resource for the purpose of creating the block of RUC-Committed Hours. A RUC-committed Combined Cycle Generation Resource may opt out of the RUC Settlement by setting the COP status of any Combined Cycle Generation Resource within the same Combined Cycle Train as the RUC-committed Resource to ONOPTOUT for the first hour of a contiguous block of RUC-Committed Hours in the Opt Out Snapshot. A Combined Cycle Generation Resource that is RUC-committed from one On-Line configuration in order to transition to a different configuration with additional capacity may opt out of the RUC Settlement following the same rule for RUC-committed Combined Cycle Generation Resources described above. A QSE that opts out of RUC Settlement forfeits RUC Settlement for the affected Resource for a given block of RUC Buy-Back Hours. A QSE that opts out of RUC Settlement treatment must make the Resource available to SCED for all RUC Buy-Back Hours. All hours in a contiguous block of RUC-Committed Hours that includes the RUC Buy-Back Hour shall be considered RUC Buy-Back Hours. If a contiguous block of RUC-Committed Hours spans more than one Operating Day and a QSE wishes to opt out of RUC Settlement for the RUC-Committed Hours in the second or subsequent Operating Day, the QSE must set its COP status to ONOPTOUT for the first hour of that the first Operating Day in the Opt Out Snapshot of the first Operating Day.

(19) ERCOT shall, as soon as practicable, post to the MIS Secure Area a report identifying those hours that were considered RUC Buy-Back Hours, along with the name of each RUC-committed Resource whose QSE opted out of RUC Settlement.

(20) A Resource that has a Three-Part Supply Offer cleared in the Day-Ahead Market (DAM) and subsequently receives a RUC commitment for the Operating Hour for which it was awarded will be treated as if the Resource Status was ONOPTOUT for purposes of Section 6.5.7.3 and Section 6.5.7.3.1, Determination of Real-Time Reliability Deployment Price Adders.

(21) A Resource that has self-committed for an Operating Hour after the RUC Snapshot was taken but before the RUC commitment has been communicated through an XML message for that RUC process and that Operating Hour is included in a block of RUC-committed hours for that RUC process will be treated as if the Resource Status was ONOPTOUT for purposes of Section 6.5.7.3, Section 6.5.7.3.1, Operating Reserve Demand Curve (ORDC) calculations, and RUC Settlement for the entire block of RUC-committed hours. A QSE that has a Resource that meets these conditions must make the Resource available to SCED for the entire block of RUC-committed hours. ERCOT will send the QSE a notification stating the Operating Day and block of hours for which this occurred.

### 5.6.1.1 Verifiable Startup Costs

(1) The unit-specific verifiable costs for starting a Resource for each cold, intermediate, and hot start condition, as determined using the data submitted under Section 5.6.1, Verifiable Costs, and the Resource Parameters for the Resource are:

(a) Actual fuel consumption rate per start (MMBtu/start) multiplied by a resource fuel price plus consideration of a ~~F~~fuel ~~a~~Aadder that compensates for the transportation and purchasing of spot fuel as described in the Verifiable Cost Manual; and

(b) Unit-specific verifiable or standard O&M expenses.

**5.6.1.2 Verifiable Minimum-Energy Costs**

(1) The unit-specific verifiable minimum-energy costs for a Resource are:

(a) Actual fuel cost to operate the unit at its LSL including a ~~F~~fuel ~~A~~aadder that compensates for the transportation and purchasing of spot fuel as described in the Verifiable Cost Manual; plus

(b) Verifiable or standard variable O&M expenses.

(2) The QSE must submit the Resource's cost information by Season if the Resource's costs vary by Season. For gas-fired units, the actual fuel costs must be calculated using the actual Seasonal heat rate (which must be supplied to ERCOT with Seasonal heat-rate test data) multiplied by the fuel price plus consideration of a ~~F~~fuel ~~A~~aadder that compensates for the transportation and purchasing of spot fuel as described in the Verifiable Cost Manual. For coal- and lignite-fired units, the actual fuel costs must be calculated using the actual Seasonal heat rate multiplied by a deemed fuel price of $1.50 per MMBtu. For fuel oil-fired operations, the number of gallons burned must be multiplied by the FOP.

*5.7.2 RUC Clawback Charge*

(1) A QSE for a Resource shall pay a RUC Clawback Charge for the Operating Day if the RUC Guarantee is less than the sum of:

(a) RUC Minimum-Energy Revenue calculated in Section 5.7.1.2, RUC Minimum-Energy Revenue;

(b) Revenue Less Cost Above LSL During RUC-Committed Hours calculated in Section 5.7.1.3, Revenue Less Cost Above LSL During RUC-Committed Hours; and

(c) Revenue Less Cost During QSE-Clawback Intervals calculated in Section 5.7.1.4, Revenue Less Cost During QSE Clawback Intervals.

(2) The amount of the RUC Clawback Charge is 100% of ~~a percentage of~~ the difference calculated in paragraph (1) above. ~~Whether or not the QSE submits a Three-Part Supply Offer for a Resource in the Day-Ahead Market (DAM) determines if that Resource will have a clawback applied in its Settlement. If the QSE submitted a validated Three-Part Supply Offer for the Resource into the DAM, then the clawback percentage in RUC Committed Hours is 50% and the clawback percentage in QSE Clawback Intervals is 0%.~~

~~If not, then the clawback percentage in RUC Committed Hours is 100% and the clawback percentage in QSE Clawback Intervals is 50%.~~

*[NPRR1172: Remove paragraph (2) above upon system implementation and renumber accordingly:]*

~~(3) If an Energy Emergency Alert (EEA) is in effect for any period of the Operating Day, then in all RUC-Committed Hours and all QSE Clawback Intervals of the Operating Day the clawback percentage is 0% if the QSE submitted a validated Three-Part Supply Offer for the Resource into the DAM and 50% otherwise.~~

~~(3)~~4) ~~For Combined Cycle Trains, if~~ at least one Combined Cycle Generation Resource is ~~offered into the DAM, then the Combined Cycle Train is considered to be offered into the DAM.~~

(3~~4~~5) The RUC Clawback Charge for a Resource, including RMR Units, for each Operating Day is allocated evenly over the RUC-Committed Hours for that Resource.

*[NPRR1014: Insert paragraph (~~4~~56) below upon system implementation and renumber accordingly:]*

(4~~5~~6) Energy Storage Resources (ESRs) are not subject to RUC Clawback Charges.

(4~~5~~6) For each RUC-committed Resource, the RUC Clawback Charge for each RUC-Committed Hour of the Operating Day is calculated as follows:

If (RUCMEREV $_{q,r,d}$ – RUCEXRR $_{q,r,d}$ – RUCACREV $_{q,r,d}$ – RUCG $_{q,r,d}$) > 0,

**Then,**

**RUCCBAMT** $_{q,r,h}$ = **[(RUCMEREV** $_{q,r,d}$ **+ RUCEXRR** $_{q,r,d}$ **– RUCACREV** $_{q,r,d}$ **– RUCG** $_{q,r,d}$**) * RUCCBFR** $_{q,r,d}$ **+ RUCEXRQC** $_{q,r,d}$ *** RUCCBFC** $_{q,r,d}$**] / RUCHR** $_{q,r,d}$

**Otherwise,**

**RUCCBAMT** $_{q,r,h}$ = **[Max (0, RUCMEREV** $_{q,r,d}$ **+ RUCEXRR** $_{q,r,d}$ **+ RUCEXRQC** $_{q,r,d}$ **– RUCACREV** $_{q,r,d}$ **– RUCG** $_{q,r,d}$**) * RUCCBFC** $_{q,r,d}$**] / RUCHR** $_{q,r,d}$

Where,

The RUCAC revenue is calculated for a Combined Cycle Train as follows:

**RUCACREV** $_{q,r,d}$ = **Max{0,** $\sum_i$ **RUCMEREV96** $_{q,r,i}$ **+ Max(0,** $\sum_i$ **RUCEXRR96** $_{q,r,i}$**)}**

The above variables are defined as follows:

| Variable | Unit | Definition |
|---|---|---|
| RUCCBAMT $_{q,r,h}$ | $ | *RUC Clawback Charge* The RUC Clawback Charge to a QSE for Resource *r* represented by QSE *q* as described in this Section, for each RUC-Committed Hour *h* of the Operating Day for that Resource. When one or more Combined Cycle Generation Resources are committed by RUC, a charge is made to the Combined Cycle Train for all RUC-committed Combined Cycle Generation Resources. |
| RUCG $_{q,r,d}$ | $ | *RUC Guarantee* The sum of eligible Startup Costs and Minimum-Energy Costs for Resource *r* represented by QSE *q* during all RUC-Committed Hours, for the Operating Day *d*. See Section 5.7.1.1, RUC Guarantee. When one or more Combined Cycle Generation Resources are committed by RUC, guaranteed costs are calculated for the Combined Cycle Train for all RUC-committed Combined Cycle Generation Resources. |
| RUCMEREV $_{q,r,d}$ | $ | *RUC Minimum-Energy Revenue*—The sum of the energy revenues for generation of Resource *r* represented by QSE *q* up to LSL during all RUC-Committed Hours, for the Operating Day *d*. See Section 5.7.1.2. When one or more Combined Cycle Generation Resources are committed by RUC, RUC Minimum-Energy Revenue is calculated for the Combined Cycle Train for all RUC-committed Combined Cycle Generation Resources. |
| RUCEXRR $_{q,r,d}$ | $ | *Revenue Less Cost Above LSL During RUC-Committed Hours*—The sum of the total revenue for Resource *r* represented by QSE *q* above the LSL less the cost during all RUC-Committed Hours, for the Operating Day *d*. See Section 5.7.1.3. When one or more Combined Cycle Generation Resources are committed by RUC, Revenue Less Cost Above LSL During RUC-Committed Hours is calculated for the Combined Cycle Train for all RUC-committed Combined Cycle Generation Resources. |
| RUCEXRQC $_{q,r,d}$ | $ | *Revenue Less Cost from QSE-Clawback Intervals* The sum of the total revenue for Resource *r* represented by QSE *q* less the cost during all QSE-Clawback Intervals for the Operating Day *d*. See Section 5.7.1.4. When one or more Combined Cycle Generation Resources are committed by RUC, Revenue Less Cost from QSE-Clawback Intervals is calculated for the Combined Cycle Train for all Combined Cycle Generation Resources earning revenue in QSE Clawback Intervals. |
| RUCACREV $_{q,r,d}$ | $ | *Revenue from RUCAC Hours* The net positive sum for the energy revenues for generation of Resource *r* represented by QSE *q* up to LSL and the total revenue for Resource *r* operating above its LSL less the cost during all RUCAC-Hours, for the Operating Day *d*. When one or more Combined Cycle Generation Resources are RUCAC, revenue from RUCAC Hours is calculated for the Combined Cycle Train for all Combined Cycle Generation Resources that were RUC-committed during the RUCAC-Hours. |
| RUCMEREV96 $_{q,r,i}$ | $ | *RUC Minimum-Energy Revenue by Interval*—The energy revenues for generation of Resource *r* represented by QSE *q* up to LSL during all RUC-Committed Hours, for the Settlement Interval *i*. When one or more Combined Cycle Generation Resources are committed by RUC, RUC Minimum-Energy Revenue is calculated for the Combined Cycle Train for all RUC-committed Combined Cycle Generation Resources. During RUCAC-Intervals for a Combined Cycle Train, the minimum energy revenue is calculated as the difference between the minimum energy revenue of the RUC-committed configuration and the QSE-committed configuration. |

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| Variable | Unit | Definition |
|---|---|---|
| $RUCEXRR96_{q,r,i}$ | $ | *Revenue Less Cost Above LSL During RUC-Committed Hours by Interval*—The total revenue for Resource *r* represented by QSE *q* operating above its LSL less the cost during all RUC-Committed hours, for the Settlement Interval *i*. When one or more Combined Cycle Generation Resources are committed by RUC, revenue less cost above LSL is calculated for the Combined Cycle Train for all RUC-committed Combined Cycle Generation Resources. |
| $RUCCBFR_{q,r,d}$ | none | *RUC Clawback Factor for RUC-Committed Hours*—The Clawback Factor for Resource *r* represented by QSE *q* for RUC-Committed Hours, as specified in paragraphs (2) ~~and (3)~~ above, for the Operating Day *d*. When one or more Combined Cycle Generation Resources are committed by RUC, the RUC Clawback Factor for RUC-Committed Hours is determined for the Combined Cycle Train for all RUC-committed Combined Cycle Generation Resources. |
| $RUCCBFC_{q,r,d}$ | none | *RUC Clawback Factor for QSE Clawback Intervals* The Clawback Factor for Resource *r* represented by QSE *q* for QSE Clawback Intervals, as specified in paragraphs (2) ~~and (3)~~ above, for the Operating Day *d*. When one or more Combined Cycle Generation Resources are committed by RUC, the RUC Clawback Factor for QSE Clawback Intervals is determined for the Combined Cycle Train for all RUC-committed Combined Cycle Generation Resources. |
| $RUCHR_{q,r,d}$ | none | *RUC Hour* The total number of RUC-Committed Hours, for Resource *r* represented by QSE *q* for the Operating Day *d*. When one or more Combined Cycle Generation Resources are committed by RUC, the total number of RUC-Committed Hours is calculated for the Combined Cycle Train for all RUC-committed Combined Cycle Generation Resources. |
| *q* | none | A QSE. |
| *r* | none | A RUC-committed Generation Resource. |
| *d* | none | An Operating Day containing the RUC-commitment. |
| *h* | none | An hour in the RUC-commitment period. |
| *i* | none | A 15-minute Settlement Interval within the hour that includes a RUCAC instruction. |

***[NPRR1172: Replace paragraph (4) above with the following upon system implementation:]***

(4) For each RUC-committed Resource, the RUC Clawback Charge for each RUC-Committed Hour of the Operating Day is calculated as follows:

$$\mathbf{RUCCBAMT}_{q,r,h} = \mathbf{Max}\,(0, \mathbf{RUCMEREV}_{q,r,d} + \mathbf{RUCEXRR}_{q,r,d} + \mathbf{RUCEXRQC}_{q,r,d} - \mathbf{RUCACREV}_{q,r,d} - \mathbf{RUCG}_{q,r,d}) / \mathbf{RUCHR}_{q,r,d}$$

Where,

The RUCAC revenue is calculated for a Combined Cycle Train as follows:

$$\mathbf{RUCACREV}_{q,r,d} = \mathbf{Max}\{0, \sum_{i} \mathbf{RUCMEREV96}_{q,r,i} + \mathbf{Max}(0, \sum_{i} \mathbf{RUCEXRR96}_{q,r,i})\}$$

The above variables are defined as follows:

| Variable | Unit | Definition |
|---|---|---|
| $RUCCHAMT_{r,z}$ | $ | *RUC Clawback Charge*—The RUC Clawback Charge to a QSE for Resource *r* represented by QSE *q* as described in this Section, for each RUC-Committed Hour *h* of the Operating Day for that Resource. When one or more Combined Cycle Generation Resources are committed by RUC, a charge is made to the Combined Cycle Train for all RUC-committed Combined Cycle Generation Resources. |
| $RUCG_{r,q,d}$ | $ | *RUC Guarantee*—The sum of eligible Startup Costs and Minimum-Energy Costs for Resource *r* represented by QSE *q* during all RUC-Committed Hours, for the Operating Day *d*. See Section 5.7.1.1, RUC Guarantee. When one or more Combined Cycle Generation Resources are committed by RUC, guaranteed costs are calculated for the Combined Cycle Train for all RUC-committed Combined Cycle Generation Resources. |
| $RUCMEREV_{r,q,d}$ | $ | *RUC Minimum-Energy Revenue*—The sum of the energy revenues for generation of Resource *r* represented by QSE *q* up to LSL during all RUC-Committed Hours, for the Operating Day *d*. See Section 5.7.1.2. When one or more Combined Cycle Generation Resources are committed by RUC, RUC Minimum-Energy Revenue is calculated for the Combined Cycle Train for all RUC-committed Combined Cycle Generation Resources. |
| $RUCEXRR_{r,q,d}$ | $ | *Revenue Less Cost Above LSL During RUC-Committed Hours*—The sum of the total revenue for Resource *r* represented by QSE *q* above the LSL less the cost during all RUC-Committed Hours, for the Operating Day *d*. See Section 5.7.1.3, When one or more Combined Cycle Generation Resources are committed by RUC, Revenue Less Cost Above LSL During RUC-Committed Hours is calculated for the Combined Cycle Train for all RUC-committed Combined Cycle Generation Resources. |
| $RUCEXRQC_{r,q,i}$ | $ | *Revenue Less Cost from QSE-Clawback Intervals*—The sum of the total revenue for Resource *r* represented by QSE *q* less the cost during all QSE-Clawback Intervals for the Operating Day *d*. See Section 5.7.1.4. When one or more Combined Cycle Generation Resources are committed by RUC, Revenue Less Cost from QSE-Clawback Intervals is calculated for the Combined Cycle Train for all Combined Cycle Generation Resources earning revenue in QSE Clawback Intervals. |
| $RUCACREV_{r,q,d}$ | $ | *Revenue from RUCAC Hours*—The net positive sum for the energy revenues for generation of Resource *r* represented by QSE *q* up to LSL and the total revenue for Resource *r* operating above its LSL less the cost during all RUCAC-Hours, for the Operating Day *d*. When one or more Combined Cycle Generation Resources are RUCAC, revenue from RUCAC Hours is calculated for the Combined Cycle Train for all Combined Cycle Generation Resources that were RUC-committed during the RUCAC-Hours. |
| $RUCMEREV96_{r,q,i}$ | $ | *RUC Minimum-Energy Revenue by Interval*—The energy revenues for generation of Resource *r* represented by QSE *q* up to LSL during all RUC-Committed Hours, for the Settlement Interval *i*. When one or more Combined Cycle Generation Resources are committed by RUC, RUC Minimum-Energy Revenue is calculated for the Combined Cycle Train for all RUC-committed Combined Cycle Generation Resources. During RUCAC-Intervals for a Combined Cycle Train, the minimum energy revenue is calculated as the difference between the minimum energy revenue of the RUC-committed configuration and the QSE-committed configuration. |

| | | |
|---|---|---|
| RUCEXRR96 $_{q,r,i}$ | $ | *Revenue Less Cost Above LSL During RUC-Committed Hours by Interval*—The total revenue for Resource *r* represented by QSE *q* operating above its LSL less the cost during all RUC-Committed hours, for the Settlement Interval *i*. When one or more Combined Cycle Generation Resources are committed by RUC, revenue less cost above LSL is calculated for the Combined Cycle Train for all RUC-committed Combined Cycle Generation Resources. |
| RUCHR $_{q,r,d}$ | none | *RUC Hour*—The total number of RUC-Committed Hours, for Resource *r* represented by QSE *q* for the Operating Day *d*. When one or more Combined Cycle Generation Resources are committed by RUC, the total number of RUC-Committed Hours is calculated for the Combined Cycle Train for all RUC-committed Combined Cycle Generation Resources. |
| *q* | none | A QSE. |
| *r* | none | A RUC-committed Generation Resource. |
| *d* | none | An Operating Day containing the RUC-commitment. |
| *h* | none | An hour in the RUC-commitment period. |
| *i* | none | A 15-minute Settlement Interval within the hour that includes a RUCAC instruction. |

### 6.6.6.2 RMR Payment for Energy

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

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

The above variables are defined as follows:

| Variable | Unit | Definition |
|---|---|---|
| RMREAMT $_{q,r}$ | $ | *Reliability Must-Run Energy Amount per QSE per Resource by hour*—The energy payment to QSE *q* for RMR Unit *r*, for the hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| FIP | $/MMBtu | *Fuel Index Price*—The FIP for the Operating Day. |
| RMRSUFQ $_{q,r}$ | MMBtu | *Reliability Must-Run Startup Fuel Quantity per QSE per Resource*—The Estimated Start Up Fuel specified in the RMR Agreement for RMR Unit *r* represented by QSE *q*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| RMRH $_{q,r,h}$ | hour | *Reliability Must-Run Hours*—The number of hours during which RMR Unit *r* represented by QSE *q* is instructed On-Line for the Operating Day. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |

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| Variable | Unit | Definition |
|---|---|---|
| $RMRALLOCFLAG_{q, r}$ | none | *Reliability Must-Run Startup Flag per QSE per Resource by hour* The number that indicates whether or not the startup fuel cost of RMR Unit *r* represented by QSE *q* is allocated to the hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. The startup fuel cost will be allocated equally to all contiguous intervals for which there is an eligible start. The $RMRALLOCFLAG_{q, r}$ value is 1 if the startup fuel cost is allocated; otherwise, its value is 0.<br>The $RMRALLOCFLAG_{q, r}$ for eligibility is determined in Sections 5.6.2, RUC Startup Cost Eligibility, and 5.6.3, Forced Outage of a RUC-Committed Resource, for start-up payments and commitments in either the Reliability Unit Commitment (RUC) or DAM. |
| $RMRHR_{q, r, i}$ | MMBtu /MWh | *Reliability Must-Run Heat Rate per QSE per Resource by Settlement Interval by hour* The multiplier determined based on the input/output curve and the Real-Time generation of RMR Unit *r* represented by QSE *q*, for the 15-minute Settlement Interval *i* in the hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| $RMRVCC_{q, r}$ | $/MWh | *Reliability Must-Run Variable Cost Component per QSE per Resource* The monthly cost component that is used to adjust the energy cost calculation to reflect the actual fuel costs of RMR Unit *r* represented by QSE *q*. The value is initially set to zero. For resettlements, see item (2) below. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| $RTMG_{q, r, h}$ | MWh | *Real-Time Metered Generation per QSE per Resource by Settlement Interval by hour* The Real-Time energy from RMR Unit *r* represented by QSE *q*, for the 15-minute Settlement Interval *i* in the hour *h*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| $RMRCEFA_{q, r}$ | $/MMBtu | *Reliability Must-Run Contractual Estimated Fuel Adder* The ~~RMR~~ Estimated Fuel Adder that is contractually agreed upon in Section 22, Attachment B, Standard Form Reliability Must-Run Agreement. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. The ~~RMR Estimated Fu~~fuel ~~A~~adder will be subsequently trued up to reflect actual fuel costs as set forth in item (1) above. |
| *q* | none | A QSE. |
| *r* | none | An RMR Unit. |
| *i* | none | A 15-minute Settlement Interval. |

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

**6.6.6.9 MRA Payment for Deployment Event**

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

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

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

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

The above variables are defined as follows:

| Variable | Unit | Definition |
|---|---|---|
| $MRADEAMT_{q,r,h}$ | $ | *Must-Run Alternative Deployment Event Amount per QSE per Resource by hour*—The deployment event payment to QSE $q$ for MRA $r$, for the MRA Contracted Hour $h$. Where for a Combined Cycle Train, the Resource $r$ is the Combined Cycle Train. |
| FIP | $/MMBtu | *Fuel Index Price* The FIP for the Operating Day. |
| $EDPRICE_{q,r}$ | $ | *Event Deployment Price per QSE per Resource* The event deployment price to QSE $q$ for MRA $r$, as specified in the MRA Agreement. Where for a Combined Cycle Train, the Resource $r$ is the Combined Cycle Train. |
| $MRAEPRF_{q,r,m}$ | None | *Must-Run Alternative Event Performance Reduction Factor per QSE per Resource* —The event performance reduction factor of the MRA $r$ represented by QSE $q$, for each hour of the month $m$, as calculated per Section 3.14.4.6.5, MRA Event Performance Measurement and Verification. If the MRAEPRF for the month is not available then the most recent MRAEPRF prior to the month of the Operating Day shall be used. If no previous MRAEPRF is available then MRAEPRF shall be set to 1. Where for a Combined Cycle Train, the Resource $r$ is the Combined Cycle Train. |
| $MRAPSUFQ_{q,r}$ | MMBtu | *Must-Run Alternative Proxy Startup Fuel Quantity per QSE per Resource* The proxy start up fuel quantity specified in the MRA Agreement for MRA $r$ represented by QSE $q$. Where for a Combined Cycle Train, the Resource $r$ is the Combined Cycle Train. |
| $MRAH_{q,r}$ | Hour | *Must-Run Alternative Hours*—The number of hours during which MRA $r$ represented by QSE $q$ received a deployment instruction for each deployment event for the Operating Day. Where for a Combined Cycle Train, the Resource $r$ is the Combined Cycle Train. |
| $MRAFLAG_{q,r,h}$ | none | *Must-Run Alternative Flag* – An indicator to signify that an MRA $r$ represented by QSE $q$ followed the deployment instruction for the event for the hour $h$. An MRAFLAG value of 1 represents followed and a 0 represents did not follow the deployment. Where for a Combined Cycle Train, the Resource $r$ is the Combined Cycle Train. |
| $MRACEFA_{q,r}$ | $/MMBtu | *Must-Run Alternative Contractual Estimated Fuel Adder*—The MRA Estimated Fuel Adder for the MRA $r$ represented by QSE $q$ as specified in the MRA Agreement. Where for a Combined Cycle Train, the Generation Resource $r$ is the Combined Cycle Train. |
| $q$ | none | A QSE. |
| $r$ | none | An MRA. |
| $m$ | none | An MRA Contracted Month under the MRA Agreement. |
| $h$ | none | An MRA Contracted Hour under the MRA Agreement for the MRA Contracted Month. |

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

$$MRADEAMTQSETOT_{q} = MRADEAMT_{q,r,h}$$

The above variables are defined as follows:

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

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

MRADEAMTTOT = MRADEAMTQSETOT $_{q}$

The above variables are defined as follows:

| Variable | Unit | Definition |
|---|---|---|
| MRADEAMTTOT | $ | *Must-Run Alternative Deployment Event Amount Total by hour* The total deployment event payment to all QSEs for all MRAs, for the hour. |
| MRADEAMTQSETOT $_{q}$ | $ | *Must-Run Alternative Deployment Event Amount per QSE by hour* The total of the deployment event payments for all MRAs represented by the QSE *q* for the MRA Contracted Hour. |
| *q* | none | A QSE. |

### 6.6.12.1 Switchable Generation Make-Whole Payment

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

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

Where:

SWCG $_{q, r, d}$ = SWSUC $_{q, r, d}$ + SWMEC $_{q, r, d}$ + SWOC $_{q, r, d}$ + SWAC $_{q, r, d}$ +

SWPSLR $_{q, r, d}$

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

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

$$SWPSLR_{q,r,d} = (RTSPP_{p,i} * RTLPX_{q,r,i}) - (FIP-FA) * SFC_d$$

If ERCOT has approved verifiable costs for the SWGR:

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

$$SWMEC_{q,r,d} = ((AHR_{r,i} * (GASPERME_r * FIP + OILPERME_r * FOP + SFPERME_r * SFP + FA_r) + VOMLSL_r) * \text{Min}(LSL_{q,r,i} * (¼), RTMG_{q,r,i}))$$

$$SWOC_{q,r,d} = [(AHR_{r,i} * ((GASPEROL_r * FIP + OILPEROL_r * FOP + SFPEROL_r * SFP) + FA_r) + OM_r) * \text{Max}(0, (RTMG_{q,r,i} - LSL_{q,r,i} * (¼)))] - OPC_{r,d}$$

Where,

$$OPC_{r,d} = ((PAHR_{r,i} * (FIP + FA_r) + OM_r) * AENG_{r,i})$$

If ERCOT has not approved verifiable costs for the SWGR:

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

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

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

Where,

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

The above variables are defined as follows:

| Variable | Unit | Definition |
|---|---|---|

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

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

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| Variable | Unit | Definition |
|---|---|---|
| $SWAC_{q,r,d}$ | $ | *Switchable Generation Approved Costs* – The total amount of the calculation of financial loss, as submitted by the QSE *q* for the Resource *r*, as approved by ERCOT for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| $SWFC_{q,r,d}$ | $ | *Switchable Generator Fuel Cost* The incremental fuel costs and fees for Resource *r* represented by QSE *q* for all instructed hours, for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. Incremental fuel costs must be based on those costs incurred as described in Section 9.14.9, Incremental Fuel Costs for Switchable Generation Make-Whole Payment. |
| $SWFIPC_{q,r,d}$ | $ | *Switchable Generator Fuel Imbalance Penalty Cost* The fuel imbalance penalty cost for Resource *r* represented by QSE *q*, for the Operating Day, arising from the SWGR not consuming its contracted fuel quantities as a result of a switch from a non-ERCOT Control Area as requested by ERCOT. Fuel imbalance penalty costs are limited to those costs assessed for the period starting at the initiation of the ramp-down in the non-ERCOT Control Area to two hours following the time ERCOT released the SWGR. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| $SWEIC_{q,r,d}$ | $ | *Switchable Generator Energy Imbalance Cost* The energy imbalance costs for Resource *r* represented by QSE *q* for instructed hours, for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. Energy imbalance costs represent Real-Time imbalance charges for the amount of energy the SWGR was not able to provide as required by its DAM commitment from the non-ERCOT Control Area, starting from the beginning of the ramp-down period in the other grid to two hours following the time ERCOT released the Resource. |
| $SWASIC_{q,r,d}$ | $ | *Switchable Generator Ancillary Services Imbalance Cost* —The Ancillary Service imbalance costs for Resource *r* represented by QSE *q* for instructed hours, for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. Ancillary Service imbalance costs represent Real-Time imbalance charges for the amount of Ancillary Services the SWGR was not able to provide as required by its Day-Ahead commitment from the non-ERCOT Control Area, starting from the time of shutdown in the other grid to two hours following the time ERCOT released the Resource. |
| $SWMWDC_{q,r,d}$ | $ | *Switchable Generator Make-Whole Payment Distribution Cost* —The Make-Whole Payment distribution costs for Resource *r* represented by QSE *q* for instructed hours, for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. Make-Whole Payment distribution costs represent charges from non-ERCOT Control Area from the time of shutdown in the other grid to two hours following the time ERCOT released the Resource. |
| $SWRTREV_{q,r,d}$ | $ | *Switchable Generation Real-Time Revenues* – The sum of energy revenues for the Resource *r*, represented by QSE *q*, during all instructed hours for the Operating Day *d*. Where for a Combined Cycle Train, Resource *r* is the Combined Cycle Train. |
| $GASPERSU_{r,s}$ | none | *Percent of Natural Gas to Operate per Start* The percentage of natural gas used by Resource *r* to operate per start *s*, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |

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| Variable | Unit | Definition |
|---|---|---|
| OILPERSU $_{r,s}$ | none | *Percent of Oil to Operate per Start*—The percentage of fuel oil used by Resource *r* to operate per start *s*, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| SFPERSU $_{r,s}$ | none | *Percent of Solid Fuel to Operate per Start* The percentage of solid fuel used by Resource *r* to operate per start *s*, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| GASPERMIN $_r$ | None | *Percent of Natural Gas to Operate at LSL*—The percentage of natural gas used by Resource *r* to operate at LSL, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| OILPERMIN $_r$ | None | *Percent of Oil to Operate at LSL* The percentage of fuel oil used by Resource *r* to operate at LSL, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| SFPERMIN $_r$ | None | *Percent of Solid Fuel to Operate at LSL*—The percentage of solid fuel used by Resource *r* to operate at LSL, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| DAFCRS $_{r,s}$ | MMBtu/Start | *Day-Ahead Actual Fuel Consumption Rate per Start* The actual fuel consumption rate for Resource *r* to startup per start type *s*, adjusted by VOXR as defined in the Verifiable Cost Manual. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. For additional information, see Verifiable Cost Manual Section 3.3, Startup Fuel Consumption. |
| VOMS $_{r,s}$ | $/Start | *Variable Operations and Maintenance Cost per Start* The operations and maintenance cost for Resource *r* to startup, per start *s*, including an adjustment for emissions costs. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. For additional information, see Verifiable Cost Manual Section 3.2, Submitting Startup Costs. |
| VOMLSL $_r$ | $/MWh | *Variable Operations and Maintenance Cost at LSL*—The operations and maintenance cost for Resource *r* to operate at LSL, including an adjustment for emissions costs. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. For additional information, see Verifiable Cost Manual Section 4.2, Submitting Minimum Energy Costs. |
| LSL $_{q,r,i}$ | MW | *Low Sustained Limit*—The LSL of Generation Resource *r* represented by QSE *q* for the hour that includes the Settlement Interval *i*, as submitted in the COP. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| RTMG $_{q,r,i}$ | MWh | *Real-Time Metered Generation per QSE per Resource by Settlement Interval by hour* The Real-Time energy from Resource *r* represented by QSE *q*, for the 15-minute Settlement Interval *i*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| AHR $_{r,i}$ | MMBtu / MWh | *Average Heat Rate per Resource*– The verifiable average heat rate for the Resource *r*, for the operating level, for the 15-minute Settlement Interval *i*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |

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| Variable | Unit | Definition |
|---|---|---|
| $OM_r$ | $/MWh | *Verifiable Operations and Maintenance Cost Above LSL*– The O&M cost for Resource *r* to operate above LSL. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. See the Verifiable Cost Manual for additional information. |
| $SWIHR_{q,r,d}$ | none | *Switchable Generation Instructed Hours* The total number of Switchable Generation instructed hours, for Resource *r* represented by QSE *q*, for the Operating Day *d*. When one or more Combined Cycle Generation Resources are committed by ERCOT, the total number of instructed hours is calculated for the Combined Cycle Train for all switchable instructed Combined Cycle Generation Resources. |
| SFP | $/MMBtu | *Solid Fuel Price* The solid fuel index price is $1.50. |
| $GASPEROL_r$ | none | *Percent of Natural Gas to Operate Above LSL* The percentage of natural gas used by Resource *r* to operate above $LSL_r$ as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| $OILPEROL_r$ | none | *Percent of Oil to Operate Above LSL*—The percentage of fuel oil used by Resource *r* to operate above LSL, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| $SFPEROL_r$ | none | *Percent of Solid Fuel to Operate Above LSL* The percentage of solid fuel used by Resource *r* to operate above LSL, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| $ADJSWSUC_{q,r,d}$ | $ | *Adjustment to Switchable Generation Start-Up Cost* — Adjustment to Switchable Generation Start-up Cost for Resource *r* represented by QSE *q*, for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. This adjustment may include eligible startup transition costs for a Combined Cycle Train or costs for any SWGR not captured in other billing determinants. |
| $RCGSC_{s,rc}$ | $/Start | *Resource Category Generic Startup Cost*—The Resource Category Generic Startup Cost cap for the category of the Resource *rc*, according to Section 4.4.9.2.3, Startup Offer and Minimum-Energy Offer Generic Caps, for the Operating Day. |
| $RCGMEC_{s,rc}$ | $/MWh | *Resource Category Generic Minimum-Energy Cost* The Resource Category Generic Minimum Energy Cost cap for the category of the Resource *rc*, according to Section 4.4.9.2.3, for the Operating Day. |
| $PAHR_{r,i}$ | MMBtu / MWh | *Proxy Average Heat Rate*- The proxy average heat rate for the Resource *r* for the 15-minute Settlement Interval *i*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| $STOM_{rc}$ | $/MWh | *Standard Operations and Maintenance Cost* - The standard O&M cost for the Resource Category *rc* for operations above LSL, shall be set to the minimum energy variable O&M costs, as described in paragraph (6)(c) of Section 5.6.1, Verifiable Costs. |
| $RTSPP_{p,i}$ | $/MWh | *Real-Time Settlement Point Price*—The Real-Time Settlement Point Price at Settlement Point *p*, for the 15-minute Settlement Interval *i*. |
| FIP | $/MMBtu | *Fuel Index Price* As defined in Section 2.1, Definitions. |
| FOP | $/MMBtu | *Fuel Oil Price* As defined in Section 2.1. |

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| Variable | Unit | Definition |
|---|---|---|
| $FA_r$ | $/MMBtu | *Fuel Adder* — ~~The Fuel Adder as defined in Section 2.1, Definitions, for the Resource r.~~ The fuel adder is the average cost above the index price Resource *r* has paid to obtain fuel. ~~The fuel adder is the average cost above the index price Resource r has paid to obtain fuel.~~ ~~The fuel adder is the average cost above the index price Resource r has paid to obtain fuel.~~ Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. See the Verifiable Cost Manual for additional information. |
| $EMREAMT_{q,r,p,i}$ | $ | *Emergency Energy Amount per QSE per Settlement Point per unit per interval* The payment to QSE *q* for the additional energy produced by Generation Resource *r* at Resource Node *p* in Real-Time during the Emergency Condition, for the 15-minute Settlement Interval *i*. Payment for emergency energy is made to the Combined Cycle Train. |
| $VSSVARAMT_{q,r,i}$ | $ | *Voltage Support Service VAr Amount per QSE per Generation Resource* - The payment to QSE *q* for the VSS provided by Generation Resource *r*, for the 15-minute Settlement Interval *i*. Where for a Combined Cycle Resource *r* is a Combined Cycle Train. |
| $VSSEAMT_{q,r,i}$ | $ | *Voltage Support Service Energy Amount per QSE per Generation Resource* The lost opportunity payment to QSE *q* for ERCOT-directed VSS from Generation Resource *r* for the 15-minute Settlement Interval *i*. Where for a Combined Cycle Resource *r* is a Combined Cycle Train. |
| $RTOLHSLRA_{q,r,p,i}$ | MWh | *Real-Time Adjusted On-Line High Sustained Limit for the Resource* The Real-Time telemetered HSL for the Resource *r* represented by QSE *q* at Resource Node *p* that is available to SCED, integrated over the 15-minute Settlement Interval *i*, as described in Section 6.7.5, Real-Time Ancillary Service Imbalance Payment or Charge. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| $RTMGA_{q,r,p,i}$ | MWh | *Real-Time Adjusted Metered Generation per QSE per Settlement Point per Resource* The adjusted metered generation of Generation Resource *r* represented by QSE *q* at Resource Node *p* in Real-Time for the 15-minute Settlement Interval *i*, as described in Section 6.7.5. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| $RTRSVPOR_i$ | $/MWh | *Real-Time Reserve Price for On-Line Reserves*—The Real-Time Reserve Price for On-Line Reserves for the 15-minute Settlement Interval *i*, as described in Section 6.7.5. |
| $RTRDP_i$ | $/MWh | *Real-Time On-Line Reliability Deployment Price*—The Real-Time price for the 15-minute Settlement Interval *i*, reflecting the impact of reliability deployments on energy prices that is calculated from the Real-Time On-Line Reliability Deployment Price Adder, as described in Section 6.7.5. |
| *q* | none | A QSE. |
| *r* | none | A Switchable Generation Resource. |
| *d* | none | An Operating Day containing the RUC instruction to the SWGR. |
| *i* | none | A 15-minute Settlement Interval within the hour of an Operating Day during which the SWGR is instructed by ERCOT. |
| *s* | none | An ERCOT area start that is eligible to have its costs included in the Switchable Generation Cost Guarantee. |
| *rc* | none | A Resource Category. |
| *p* | none | A Resource Node Settlement Point. |

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

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

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

Where:

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

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

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

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

If ERCOT has approved verifiable costs for the SWGR:

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

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

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

Where,

$OPC_{r,d}$ = ((PAIR $_{r,i}$ * (FIP + FA$_{\Sigma}$) + OM$_r$) * AENG$_{r,i}$)

If ERCOT has not approved verifiable costs for the SWGR:

SWSUC $_{q,r,d}$ = (SWSF * RCGSC $_{s,rc}$) + ADJSWSUC $_{q,r,d}$

SWMEC $_{q,r,d}$ = (RCGMEC $_{i,rc}$ * Min (LSL $_{q,r,i}$ * (¼), RTMG $_{q,r,i}$))

SWOC $_{q,r,d}$ = ((PAHR $_{r,i}$ * FIP − STOM $_{rc}$) * Max(0, (RTMG $_{q,r,i}$ − LSL $_{q,r,i}$ * (¼)))) - OPC $_{r,d}$

Where,

$OPC_{r,d}$ = ((PAIR $_{r,i}$ * FIP + STOM $_{rc}$) * AENG$_{r,i}$)

The above variables are defined as follows:

| Variable | Unit | Definition |
|---|---|---|
| SWMWAMT $_{q,r}$ | $ | *Switchable Generation Make-Whole Payment*—The Switchable Generation Make-Whole Payment to the QSE *q*, for Resource *r*, for the hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| SWCG $_{q,r,s}$ | $ | *Switchable Generation Cost Guarantee* The sum of eligible Startup Costs, minimum-energy costs, operating costs, and other Switchable Generation approved costs for Resource *r* represented by QSE *q* for all instructed hours, for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| OPC $_{r,d}$ | $ | *Operational Cost* – The operational cost for the Resource *r* for the Operating Day *d* in the non-ERCOT Control Area. The operating costs represent the costs the Resource would have incurred to generate the awarded energy in the non-ERCOT Control Area Day-Ahead market absent a request to switch to ERCOT. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| AENG $_{r,i}$ | MWh | *Awarded Energy Non-ERCOT Day-Ahead Market* The awarded energy in the non-ERCOT Day-Ahead Market for the Resource *r* during the Interval *i*. The awarded energy in the non-ERCOT Control Area Day-Ahead market represents the energy award for the interval that was not generated by the Resource due to the switch to ERCOT. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| SWSUC $_{q,r,d}$ | $ | *Switchable Generation Start-Up Cost* The Startup Costs for Resource *r* represented by QSE *q* for startup hours, for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |

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

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

| | | |
|---|---|---|
| $SWRTREV_{q,r,d}$ | $ | *Switchable Generation Real-Time Revenues* The sum of energy revenues for the Resource *r*, represented by QSE *q*, during all instructed hours for the Operating Day *d*. Where for a Combined Cycle Train, Resource *r* is the Combined Cycle Train. |
| $GASPERSU_{r,s}$ | none | *Percent of Natural Gas to Operate per Start*—The percentage of natural gas used by Resource *r* to operate per start *s*, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| $OILPERSU_{r,s}$ | none | *Percent of Oil to Operate per Start* The percentage of fuel oil used by Resource *r* to operate per start *s*, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| $SFPERSU_{r,s}$ | none | *Percent of Solid Fuel to Operate per Start* The percentage of solid fuel used by Resource *r* to operate per start *s*, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| $GASPERME_{r}$ | None | *Percent of Natural Gas to Operate at LSL*—The percentage of natural gas used by Resource *r* to operate at LSL, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| $OILPERME_{r}$ | None | *Percent of Oil to Operate at LSL* The percentage of fuel oil used by Resource *r* to operate at LSL, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| $SFPERME_{r}$ | None | *Percent of Solid Fuel to Operate at LSL*—The percentage of solid fuel used by Resource *r* to operate at LSL, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| $DAFCRS_{r,s}$ | MMBtu/Start | *Day-Ahead Actual Fuel Consumption Rate per Start* The actual fuel consumption rate for Resource *r* to startup per start type *s*, adjusted by VOXR as defined in the Verifiable Cost Manual. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. For additional information, see Verifiable Cost Manual Section 3.3, Startup Fuel Consumption. |
| $VOMS_{r,s}$ | $/Start | *Variable Operations and Maintenance Cost per Start* The operations and maintenance cost for Resource *r* to startup, per start *s*, including an adjustment for emissions costs. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. For additional information, see Verifiable Cost Manual Section 3.2, Submitting Startup Costs. |
| $VOMLSL_{r}$ | $/MWh | *Variable Operations and Maintenance Cost at LSL*—The operations and maintenance cost for Resource *r* to operate at LSL, including an adjustment for emissions costs. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. For additional information, see Verifiable Cost Manual Section 4.2, Submitting Minimum Energy Costs. |

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

| | | |
|---|---|---|
| RCGMEC $_{rc}$ | $/MWh | *Resource Category Generic Minimum-Energy Cost* The Resource Category Generic Minimum Energy Cost cap for the category of the Resource *rc*, according to Section 4.4.9.2.3, for the Operating Day. |
| PAHR $_{r,i}$ | MMBtu / MWh | *Proxy Average Heat Rate* - The proxy average heat rate for the Resource *r* for the 15-minute Settlement Interval *i*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| STOM $_{rc}$ | $/MWh | *Standard Operations and Maintenance Cost* - The standard O&M cost for the Resource Category *rc* for operations above LSL, shall be set to the minimum energy variable O&M costs, as described in paragraph (6)(c) of Section 5.6.1, Verifiable Costs. |
| RTSPP $_{p,i}$ | $/MWh | *Real-Time Settlement Point Price*—The Real-Time Settlement Point Price at Settlement Point *p*, for the 15-minute Settlement Interval *i*. |
| FIP | $/MMBtu | *Fuel Index Price* As defined in Section 2.1, Definitions. |
| FOP | $/MMBtu | *Fuel Oil Price* As defined in Section 2.1. |
| FA $_{r}$ | $/MMBtu | *Fuel Adder* — ~~The Fuel Adder as defined in Section 2.1, Definitions, for the Resource r. The fuel adder is the average cost above the index price Resource r has paid to obtain fuel.~~ The fuel adder is the average cost above the index price Resource *r* has paid to obtain fuel. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. See the Verifiable Cost Manual for additional information. |
| EMREAMT $_{q,r,p,i}$ | $ | *Emergency Energy Amount per QSE per Settlement Point per unit per interval* The payment to QSE *q* for the additional energy or Ancillary Services produced or consumed by Resource *r* at Resource Node *p* in Real-Time during the Emergency Condition, for the 15-minute Settlement Interval *i*. Payment for emergency energy is made to the Combined Cycle Train. |
| VSSVARAMT $_{q,r,i}$ | $ | *Voltage Support Service VAr Amount per QSE per Generation Resource* - The payment to QSE *q* for the VSS provided by Generation Resource *r*, for the 15-minute Settlement Interval *i*. Where for a Combined Cycle Resource *r* is a Combined Cycle Train. |
| VSSEAMT $_{q,r,i}$ | $ | *Voltage Support Service Energy Amount per QSE per Generation Resource*—The lost opportunity payment to QSE *q* for ERCOT-directed VSS from Generation Resource *r* for the 15-minute Settlement Interval *i*. Where for a Combined Cycle Resource *r* is a Combined Cycle Train. |
| RTRUREV $_{q,r}$ | $ | *Real-Time Reg-Up Revenue* The Real-Time Reg-Up revenue for QSE *q* calculated for Resource *r* for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| RTRDREV $_{q,r}$ | $ | *Real-Time Reg-Down Revenue*— The Real-Time Reg-Down revenue for QSE *q* calculated for Resource *r* for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| RTRRREV $_{q,r}$ | $ | *Real-Time Responsive Reserve Revenue* The Real-Time RRS revenue for QSE *q* calculated for Resource *r* for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |

| | | |
|---|---|---|
| $RTNSREV_{q,r}$ | $ | *Real-Time Non-Spin Revenue* The Real-Time Non-Spin revenue for QSE *q* calculated for Resource *r* for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| $RTECRREV_{q,r}$ | $ | *Real-Time ERCOT Contingency Reserve Service Revenue*— The Real-Time ECRS revenue for QSE *q* calculated for Resource *r* for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| *q* | none | A QSE. |
| *r* | none | A Switchable Generation Resource. |
| *d* | none | An Operating Day containing the RUC instruction to the SWGR. |
| *i* | none | A 15-minute Settlement Interval within the hour of an Operating Day during which the SWGR is instructed by ERCOT. |
| *s* | none | An ERCOT area start that is eligible to have its costs included in the Switchable Generation Cost Guarantee. |
| *rc* | none | A Resource Category. |
| *p* | none | A Resource Node Settlement Point. |

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

**$SWMWAMTQSETOT_{q}$ = $SWMWAMT_{q,r}$**

The above variables are defined as follows:

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

### *9.14.7 Disputes for RUC Make-Whole Payment for Fuel Costs*

Commented [BA2]: Please note NPRR1179 also proposes revisions to this section.

(1) If the actual price paid for delivered natural gas for a specific Resource during a Reliability Unit Commitment (RUC)-Committed Interval is greater than Fuel Index Price (FIP) adjusted by the proxy ~~li~~fuel ~~A~~adder, X, ~~defined described~~ defined in the Verifiable Cost Manual (i.e., FIP * (1+X)), then the QSE may file a Settlement dispute for that Resource's RUC Make-Whole Payment. ~~Typically, these fuel costs are the result of costs that are not routinely incurred, and therefore are not included in the Fuel Adder.~~ The maximum amount that may be recovered through this dispute process is the difference between the RUC Guarantee based on the actual price paid and the fuel price of FIP * (1 + X). The QSE must provide documentation (invoices) that identifies intra-

day, same-day, or spot market costs of natural gas consumed during the RUC-Committed Interval. Such documentation is necessary to justify recovery of natural gas costs, which is limited to the actual fuel amount (MMBtus) consumed during RUC-Committed Intervals. All documentation submitted by the QSE for natural gas costs incurred intra-day, same-day, or via spot market must show a nexus from the seller or distributor of natural gas products to the QSE, Resource Entity or Generation Entity as the ultimate buyer. The QSE must demonstrate that the seller or distributor has procured natural gas fuel intra-day, same-day, or via spot market. A Power Purchase or Tolling Agreement (PPA) filed as documentation of proof of fuel costs will not be accepted unless the PPA was signed prior to July 16, 2008, and is not between Affiliates, subsidiaries, or partners.

(2) If the actual price paid for the delivered fuel oil used to replace oil consumed during a RUC-Committed Interval is greater than Fuel Oil Price (FOP) adjusted by the proxy ~~fuel oil~~ fuel adder, X, ~~defined described~~ defined in the Verifiable Cost Manual (i.e., FOP * (1−X)), then the QSE may file a Settlement dispute for the Resource's RUC Make-Whole Payment. The maximum amount that may be recovered through this dispute process is the difference between the RUC Guarantee based on the actual price paid and the adjusted price, FOP * (1+X).

(3) If the QSE representing the Generation Resource made a Three-Part Supply Offer into the DAM based on FIP and had to run on fuel oil in a RUC-Committed Hour with an active Three-Part Supply Offer based on the adjusted FIP, the QSE may file a Settlement dispute to recover the difference between the RUC Guarantee based actual price paid for delivered fuel oil and the fuel price of FIP * (1+X).

(4) When filing a Settlement dispute under paragraph (2) or (3) above, the QSE must provide documentation (invoices) that identifies purchases of fuel oil by the QSE, Resource Entity, or Generation Entity to replace oil consumed for a RUC-Committed Interval. In addition, the QSE must provide proof that the Resource actually consumed fuel oil during the RUC-Committed Interval. Proof of actual consumption may be based on the Resource's technical specifications or flow meters as appropriate. Documentation of fuel oil purchases must show that these were made no later than seven Business Days after the end of the last consecutive RUC-Committed Interval. Replacement fuel oil costs are limited to the actual gallons/barrels of fuel oil consumed during RUC-Committed Intervals.

(5) ERCOT may, in its sole discretion, consider documentation types other than those specifically listed in paragraphs (1) and (4) above when offered by a QSE in support of its recovery of fuel costs for RUC deployments. For example, ERCOT may require the Resource input-output equation or average heat rate curve that allows for verification of fuel consumption for operation at and above Low Sustained Limit (LSL).

(6) When calculating the RUC Guarantee as described in paragraph (1), (2) or (3) above, the Startup Price per start (SUPR) and the Minimum-Energy Price (MEPR), as defined in paragraph (6) of Section 5.7.1.1, RUC Guarantee, will be set to the Startup Cap (SUCAP) and Minimum-Energy Cap (MECAP), respectively, utilizing the actual fuel price paid.

(7) In order to recover fuel costs above LSL for a RUC-Committed Interval, the QSE must also submit proof of the volume-weighted average actual price paid for fuel consumed by the Resource during a RUC-Committed Interval for generation above LSL. ERCOT will adjust the RUC Guarantee (RUCG) to include the additional fuel costs above LSL filed by the QSE.

*[NPRR1140: Replace paragraph (7) above with the following upon system implementation:]*

(7) In order to recover fuel costs above LSL for a RUC-Committed Interval, the QSE must also submit proof of the volume-weighted average actual price paid for fuel consumed by the Resource during a RUC-Committed Interval for generation above LSL.

### *9.14.9 Incremental Fuel Costs for Switchable Generation Make-Whole Payment Disputes*

(1) For the purposes of any Settlement and billing dispute submitted pursuant to paragraph (1)(c) of Section 6.6.12, Make-Whole Payment for Switchable Generation Resources Committed for Energy Emergency Alert (EEA), if the actual price paid for delivered natural gas for a specific Switchable Generation Resource (SWGR) for an instructed hour is greater than FIP plus the ~~SWGR fuel natural gas fuel~~ adder, then the QSE may recover the fuel costs incurred for that SWGR in the Settlement and billing dispute. The QSE must provide documentation (invoices) that identifies intra-day costs of natural gas consumed. All documentation submitted by the QSE for natural gas costs incurred intra-day must show a nexus from the seller or distributor of natural gas products to the QSE, Resource Entity or Generation Entity as the ultimate buyer. The QSE must demonstrate that the seller or distributor has procured natural gas fuel intra-day.

(2) For the purposes of any Settlement and billing dispute submitted pursuant to paragraph (1)(c) of Section 6.6.12, if the actual price paid for the delivered fuel oil used to replace oil consumed for an instructed hour is greater than FOP plus the ~~SWGR~~ fuel ~~oil~~ adder, then the QSE may recover the fuel costs incurred for that SWGR in the dispute. The QSE must provide documentation that identifies purchases of fuel oil by the QSE, Resource Entity, or Generation Entity to replace oil consumed. In addition, the QSE must provide proof that the SWGR actually consumed fuel oil for the instructed hour. Proof of actual consumption may be based on the Resource's technical specifications or flow meters as appropriate. Documentation of fuel oil purchases must show that these were made no later than seven Business Days after the end of the last consecutive instructed hour.

(3) A QSE submitting documents for the recovery of RUC-related fuel costs other than those specifically discussed in paragraph (1) or (2) above must request to have such documents approved by the ERCOT Board during an Executive Session at the next regularly scheduled meeting of the ERCOT Board. If the ERCOT Board approves the inclusion of such documentation as proof of fuel purchases, the QSE must file an NPRR in accordance with Section 21, Revision Request Process, to add this category of

documentation to the process for approval of Switchable Generation Make-Whole Payments.

***25.5.2 Market Suspension Make-Whole Payment***

(1) To compensate QSEs representing Generation Resources for providing energy during a Market Suspension, ERCOT shall calculate a Market Suspension Make-Whole Payment for the Operating Day as follows:

***[NPRR1029: Replace paragraph (1) above with the following upon system implementation:]***

(1) To compensate QSEs representing Generation Resources or Energy Storage Resources (ESRs) for providing energy during a Market Suspension, ERCOT shall calculate a Market Suspension Make-Whole Payment for the Operating Day as follows:

$$MSMWAMT_{q,r,d} = (-1) * (MSSUC_{q,r,d} + MSOC_{q,r,d} - MSSUCADJ_{q,r,d} + MSOCADJ_{q,r,d})$$

Where,

The startup cost (MSSUC) is calculated as follows:

For Black Start Resources:

$$MSSUC_{q,r,d} = \$0.00$$

For Combined Cycle Trains:

$$MSSUC_{q,r,d} = \sum_{s} MSSUPR_{q,r,s} - \sum_{i} (MAX(0, MSSUPR_{afterCCGR} - MSSUPR_{beforeCCGR}))$$

For all other Resources:

$$MSSUC_{q,r,d} = \sum_{s} MSSUPR_{q,r,s}$$

The startup price (MSSUPR) and operating cost (MSOC) are calculated as follows:

If ERCOT has approved verifiable costs for the Generation Resource:

For Firm Fuel Supply Resources (FFSRs) starting with a reserved fuel

$$MSSUPR_{q,r,s} = RVOMS_{q,r,s}$$

$$MSOC_{q,r,d} = \sum_{i} (ROM_{q,r}) * MSGEN_{q,r,i}$$

Otherwise,

$$MSSUPR_{q,r,s} = RABCFCRS_{q,r,s} * (MSAVGFP + FA_{q,r}) - RVOMS_{q,r,s}$$

$$MSOC_{q,r,d} = \sum_{i} (AHR_{q,r,i} * (MSAVGFP - FA_{q,r}) + ROM_{q,r}) * MSGEN_{q,r,i}$$

If ERCOT has not approved verifiable costs for the Generation Resource:

For FFSRs starting with a reserved fuel

$$MSSUPR_{q,r,s} = RCGSC$$

$$MSOC_{q,r,d} = \sum_{i} (STOM_{rc}) * MSGEN_{q,r,i}$$

Otherwise,

$$MSSUPR_{q,r,s} = RCGSC$$

$$MSOC_{q,r,d} = \sum_{i} (PAHR_{r,i} * (MSAVGFP \quad PFA_{rc}) + STOM_{rc}) * MSGEN_{q,r,i}$$

Where,

MSAVGFP = MSAVGFIP for Generation Resources that indicate in the Resource Registration process or the verifiable cost process to start on natural gas

***[NPRR1029: Replace the formula for "MSAVGP" above with the following upon system implementation:]***

MSAVGFP = MSAVGFIP for Generation Resources that indicate in the Resource Registration process or the verifiable cost process to start on natural gas. For ESRs, the MSAVGFIP shall be set to zero.

Or,

MSAVGFP = MSAVGFOP for Generation Resources that indicate in the Resource Registration process or through the verifiable cost process to start on fuel oil

The above variables are defined as follows:

| Variable | Unit | Definition |
|---|---|---|
| $MSMWAMT_{q,r,d}$ | $ | *Market Suspension Make-Whole Payment* The Market Suspension Make-Whole Payment to the QSE $q$, for Resource $r$, for the Operating Day $d$. Where for a Combined Cycle Train, the Resource $r$ is the Combined Cycle Train. |

# Board Report

| Variable | Unit | Definition |
|---|---|---|
| $MSSUCADJ_{q,r,d}$ | $ | *Market Suspension Startup Costs Adjustment* – Adjustment to the Market Suspension Make-Whole Payment to pay or charge the QSE *q* for actual costs related to starting up Resource *r*, for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| $MSOCADJ_{q,r,d}$ | $ | *Market Suspension Operating Costs Adjustment* – Adjustment to the Market Suspension Make-Whole Payment to pay or charge the QSE *q* for actual costs for operating Resource *r*, for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| $MSSUC_{q,r,d}$ | $ | *Market Suspension Startup Cost* – The Startup Costs for Resource *r* represented by QSE *q* during restart hours, for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| $MSSUPR_{q,r,s}$ | $ | *Market Suspension Startup Price per Start* – The Market Suspension Settlement price for Resource *r* represented by QSE *q* for the start *s*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| $RABCFCRS_{q,r,s}$ | MMBtu / start | *Raw Actual Breaker Close Fuel Consumption Rate per Start* – The raw actual verifiable fuel consumption rate, from first fire to breaker close, for the Resource *r* represented by QSE *q*, per start *s*, for the warmth state, as submitted through the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| $MSOC_{q,r,d}$ | $ | *Market Suspension Operating Cost* – The Market Suspension operating cost for Resource *r* represented by QSE *q* for operations after breaker close for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| $RVOMS_{g,r,s}$ | $/start | *Raw Verifiable Operations and Maintenance Cost per Start* – The raw verifiable Operations and Maintenance (O&M) cost for the Resource *r* represented by QSE *q*, per start *s*, for the warmth state, as submitted through the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| $ROM_{g,r}$ | $/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. |
| $STOM_{rc}$ | $/MWh | *Standard Operations and Maintenance Cost* – The standard O&M cost for the Resource category *rc* for operations above LSL, shall be set to the minimum energy variable O&M costs, as described in paragraph (6)(c) of Section 5.6.1, Verifiable Costs.<br><br>***[NPRR1029: Replace the definition above with the following upon system implementation:]***<br><br>*Standard Operations and Maintenance Cost* – The standard O&M cost for the Resource category *rc* for operations above LSL, shall be set to the minimum energy variable O&M costs, as described in paragraph (6)(c) of Section 5.6.1, Verifiable Costs. 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. |

# Board Report

| Variable | Unit | Definition |
|---|---|---|
| MSAVGFP | $/MMBtu | *Market Suspension Average Fuel Price* – The Market Suspension average fuel price calculated based on MSAVGFIP or MSAVGFOP. |
| MSAVGFIP | $/MMBtu | *Market Suspension Average Fuel Index Price* The Market Suspension average Fuel Index Price (FIP) calculated as the average price of FIP for the 15 days prior to the Market Suspension event, calculated on a daily rolling basis for Operating Days the index price is available to ERCOT. |
| MSAVGFOP | $/MMBtu | *Market Suspension Average Fuel Oil Price* – The Market Suspension average Fuel Oil Price (FOP) calculated as the average price of FOP for the 15 days prior to the Market Suspension event, calculated on a daily rolling basis for Operating Days the index price is available to ERCOT. |
| 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. |
| $FA_{q,r}$ | $/MMBtu | *Verifiable Average ~~Verifiable Average~~ Fuel Adder* – The verifiable average fuel price adder for the Resource *r* represented by QSE *q*. The fuel adder shall be set to the actual approved verifiable fuel adder or the standard value defined in the Verifiable Cost Manual. ~~The Fuel Adder as defined in Section 2.1, Definitions, for the Resource r. The verifiable average fFuel price Aadder for the Resource r represented by QSE q. The fuel adder shall be set to the actual approved verifiable fuel adder or the standard value defined in the Verifiable Cost Manual.~~ Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| $PFA_{rc}$ | $/MMBtu | *Proxy Fuel Adder* – The proxy fuel price adder for the Resource category *rc*. For all thermal Generation Resources, the fuel adder shall be set to $0.50/MMBtu; otherwise, the fuel adder shall be set to $0.00/MMBtu. |
| $AHR_{q,r,i}$ | MMBtu / MWh | *Average Heat Rate per Resource* The verifiable 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. |
| $PAHR_{r,i}$ | MMBtu / MWh | *Proxy Average Heat Rate* – The proxy average heat rate for the Resource *r* for the 15-minute Settlement Interval *i*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| $MSGEN_{q,r,i}$ | MWh | *Market Suspension Generation per Resource* – The generation for the Resource *r* represented by QSE *q* for the 15-minute Settlement Interval *i*. |
| *q* | None | A QSE. |
| *r* | None | A Generation Resource.<br>***[NPRR1029: Replace the definition above with the following upon system implementation:]***<br>A Generation Resource or ESR. |
| *d* | None | An Operating Day during a Market Suspension event. |
| *i* | None | A 15-minute Settlement Interval within the hour of an Operating Day of a Market Suspension event. |

| Variable | Unit | Definition |
|---|---|---|
| *s* | None | A Generation Resource start during an Operating Day of a Market Suspension event. |
| *t* | None | A transition that is eligible to have its costs included in the Market Suspension Startup Cost. |
| *rc* | None | A Resource category. |
| *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. |

(2) The total compensation to each QSE for the Market Suspension Make-Whole Payment for an Operating Day is calculated as follows:

$$\mathbf{MSMWAMTQSETOT}_{q,d} = \sum_{r} \mathbf{MSMWAMT}_{q,r,d}$$

And,

$$\mathrm{MSMWAMTTOT}_{d} = \sum_{q} \mathrm{MSMWAMTQSETOT}_{q,d}$$

The above variables are defined as follows:

| Variable | Unit | Definition |
|---|---|---|
| $\mathrm{MSMWAMTQSETOT}_{q,d}$ | $ | *Market Suspension Make-Whole Payment per QSE* – The total payment to QSE *q* for Market Suspension Make-Whole Payment for the Operating Day *d*. |
| $\mathrm{MSMWAMTTOT}_{d}$ | $ | *Market Suspension Make-Whole Payment Total* – The total payment to all QSEs for Market Suspension Make-Whole Payment for the Operating Day. |
| $\mathrm{MSMWAMT}_{q,r,d}$ | $ | *Market Suspension Make-Whole Payment* The Market Suspension Make-Whole Payment to the QSE *q*, for Resource *r*, for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| *q* | none | A QSE. |
| *r* | none | A Generation Resource.<br>***[NPRR1029: Replace the definition above with the following upon system implementation:]***<br>A Generation Resource or ESR. |
| *d* | none | An Operating Day during a Market Suspension event. |

(3) During a Market Suspension, ERCOT may cease making payments in accordance with this Section in the event that funds are not available to make such payments.

# Revised ERCOT Impact Analysis Report

| NPRR Number | 1172 | NPRR Title | Fuel Adder Definition, Mitigated Offer Caps, and RUC Clawback |
|---|---|---|---|
| **Impact Analysis Date** | | October 17, 2023 | |
| **Estimated Cost/Budgetary Impact** | | Phase 1:<br>Less than $5k, which will be absorbed by the Operations & Maintenance (O&M) budgets of affected department.<br><br>Phase 2:<br>Between $65k and $85k<br><br>See Comments | |
| **Estimated Time Requirements** | | Phase 1:<br>No project required. Phase 1 of this Nodal Protocol Revision Request (NPRR) can take effect following Public Utility Commission of Texas (PUCT) approval.<br><br>Phase 2:<br>The timeline for implementing Phase 2 of this NPRR is dependent upon Public Utility Commission of Texas (PUCT) prioritization and approval.<br><br>Estimated project duration: 4 to 7 months<br><br>See Comments | |
| **ERCOT Staffing Impacts (across all areas)** | | Implementation Labor: 100% ERCOT; 0% Vendor<br><br>Ongoing Requirements: No impacts to ERCOT staffing. | |
| **ERCOT Computer System Impacts** | | The following ERCOT systems would be impacted:<br><br>• Settlements & Billing Systems 35%<br>• Market Operation Systems 29%<br>• Data Management & Analytic Systems 25%<br>• ERCOT Website and MIS Systems 7%<br>• Channel Management Systems 4% | |
| **ERCOT Business Function Impacts** | | ERCOT will update its business processes to implement this NPRR. | |
| **Grid Operations & Practices Impacts** | | No impacts to ERCOT grid operations and practices. | |

# Revised ERCOT Impact Analysis Report

| Evaluation of Interim Solutions or Alternatives for a More Efficient Implementation |
|---|
| None offered. |

| Comments |
|---|
| Phase 1 will implement changes to the following:<br>• Section 5.5.2, Reliability Unit Commitment (RUC) Process<br>• Section 5.7.2, RUC Clawback Charge<br>• Section 6.6.12.1, Switchable Generation Make-Whole Payment<br><br>Phase 2 will implement changes to the following:<br>• Section 4.4.9.4.1, Mitigated Offer Cap<br>• Paragraphs (2) and (4) of Section 5.7.2, RUC Clawback Charge |

# Board Report

| NPRR Number | 1181 | NPRR Title | Submission of Coal and Lignite Inventory Notifications |
|---|---|---|---|
| **Date of Decision** | | December 19, 2023 | |
| **Action** | | Recommended Approval | |
| **Timeline** | | Normal | |
| **Proposed Effective Date** | | First of the month following Public Utility Commission of Texas (PUCT) approval | |
| **Priority and Rank Assigned** | | Not applicable | |
| **Nodal Protocol Sections Requiring Revision** | | 1.3.1.1, Items Considered Protected Information<br>3.24, Notification of Low Coal and Lignite Inventory Levels (new) | |
| **Related Documents Requiring Revision/Related Revision Requests** | | None | |
| **Revision Description** | | This Nodal Protocol Revision Request (NPRR) adds the requirement for Qualified Scheduling Entities (QSEs) to notify ERCOT if the coal or lignite inventory level available for Real-Time operations is projected to fall below 15 days of operation at the High Sustained Limit (HSL). If the coal or lignite inventory level available for Real-Time operations is projected to fall below 10 days of operation at HSL, QSEs will be required to provide ERCOT daily inventory updates until the inventory level projection increases above 15 days. For coal or lignite Generation Resources located within 15 miles of their fuel supply or that were originally designed to be located within 15 miles of their fuel supply and are not capable of storing onsite inventory for at least 30 days of operation at the HSL, the QSE must notify ERCOT of any disruption to the coal or lignite supply operations that could impact operations of the Generation Resource within two days of such disruption and provide an explanation. | |
| **Reason for Revision** | | [X] Addresses current operational issues.<br>[ ] Meets Strategic goals (tied to the ERCOT Strategic Plan or directed by the ERCOT Board).<br>[ ] Market efficiencies or enhancements<br>[ ] Administrative | |

# Board Report

| | |
|---|---|
| | ☐ Regulatory requirements<br>☐ Other: (explain)<br>*(please select all that apply)* |
| **Business Case** | Coal and lignite provided nearly 17% of the energy used in ERCOT in 2022. ERCOT currently has no visibility into coal and lignite inventory levels at power plants, and the only way for ERCOT to obtain this information is through an ad hoc process of contacting individual QSEs or Resource Entities. Such an ad hoc process is prone to errors and inconsistent reporting. This NPRR will remedy this information gap by establishing notification processes that will provide ERCOT vital information on low coal and lignite inventory levels. This information will allow ERCOT to have better awareness of coal and lignite inventory levels so that ERCOT can assess associated risks and inform state leadership and regulators as needed. |
| **PRS Decision** | On 6/14/23, PRS voted unanimously to table NPRR1181 and refer the issue to WMS. All Market Segments participated in the vote.<br>On 10/12/23, PRS voted unanimously to recommend approval of NPRR1181 as amended by the 9/19/23 Luminant comments. All Market Segments participated in the vote.<br>On 11/9/23, PRS voted unanimously to endorse and forward to TAC the 10/12/23 PRS Report and 5/16/23 Impact Analysis for NPRR1181. All Market Segments participated in the vote. |
| **Summary of PRS Discussion** | On 6/14/23, participants reviewed NPRR1181 and the 6/12/23 LCRA comments. Participants questioned whether certain reporting requirements provided meaningful information and value, and requested the issue be discussed further at WMS.<br>On 10/12/23, participants reviewed the 9/19/23 Luminant comments.<br>On 11/9/23, participants reviewed the 5/16/23 Impact Analysis. |
| **TAC Decision** | On 12/4/23, TAC voted unanimously to recommend approval of NPRR1181 as recommended by PRS in the 11/9/23 PRS Report. All Market Segments participated in the vote. |
| **Summary of TAC Discussion** | On 12/4/23, TAC reviewed the ERCOT Opinion, ERCOT Market Impact Statement, and Independent Market Monitor (IMM) Opinion for NPRR1181. |
| **ERCOT Board Decision** | On 12/19/23, the ERCOT Board voted unanimously to recommend approval of NPRR1181 as recommended by TAC in the 12/4/23 TAC Report. |

# Board Report

| Opinions | |
|---|---|
| **Credit Review** | ERCOT Credit Staff and the Credit Finance Sub Group (CFSG) have reviewed NPRR1181 and do not believe that it requires changes to credit monitoring activity or the calculation of liability. |
| **Independent Market Monitor Opinion** | IMM supports NPRR1181. |
| **ERCOT Opinion** | ERCOT supports approval of NPRR1181. |
| **ERCOT Market Impact Statement** | ERCOT Staff has reviewed NPRR1181 and believes the market impact for NPRR1181 establishes visibility into coal and lignite inventory levels at power plants, increases awareness and facilitates ERCOT's ability to assess associated risks, and informs state leadership and regulators as needed. |

| Sponsor | |
|---|---|
| **Name** | Jim Stevens |
| **E-mail Address** | james.stevens@ercot.com |
| **Company** | ERCOT |
| **Phone Number** | 512-248-3198 |
| **Cell Number** | |
| **Market Segment** | Not applicable |

| Market Rules Staff Contact | |
|---|---|
| **Name** | Erin Wasik-Gutierrez |
| **E-Mail Address** | Erin.Wasik-Gutierrez@ercot.com |
| **Phone Number** | 413-886-2474 |

| Comments Received | |
|---|---|
| **Comment Author** | **Comment Summary** |
| LCRA 061223 | Proposed language revisions that modified the triggers for and frequency of reporting coal and lignite inventory levels to better align the requirements with industry practice and goals of the NPRR |
| Joint Commenters 062923 | Did not support seasonal declaration of coal and lignite inventory and proposed corresponding language revisions |

# Board Report

| | |
|---|---|
| WMS 071223 | Requested PRS continue to table NPRR1181 for further review by the Wholesale Market Working Group (WMWG) |
| ERCOT 080723 | Accepted the 6/29/23 Joint Commenters comments and added a different notification trigger for Generation Resources with offsite coal and lignite supplies |
| Luminant 091923 | Extended certain notification provisions to Resources that were originally designed to be in close proximity to their fuel source |
| WMS 101123 | Endorsed NPRR1181 as amended by the 9/19/23 Luminant comments |

**Market Rules Notes**

Administrative changes to the language were made and authored as "ERCOT Market Rules."

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

- NPRR1170, Capturing Natural Gas Delivery Information for Natural Gas Generation Resources
  - Section 1.3.1.1
- NPRR1188, Implement Nodal Dispatch and Energy Settlement for Controllable Load Resources
  - Section 1.3.1.1

Please note the baseline Protocol language in the following sections has been updated to reflect the incorporation of the following NPRRs into the Protocols:

- NPRR1166, Protected Information Status of DC Tie Schedule Information (incorporated 8/1/23)
  - Section 1.3.1.1
- NPRR1169, Expansion of Generation Resources Qualified to Provide Firm Fuel Supply Service in Phase 2 of the Service (incorporated 7/1/23)
  - Section 1.3.1.1
- NPRR1175, Revisions to Market Entry Financial Qualifications and Continued Participation Requirements (incorporated 11/1/23)
  - Section 1.3.1.1

**Proposed Protocol Language Revision**

**1.3.1.1 Items Considered Protected Information**

**Commented [EWG1]:** Please note NPRRs 1170 and 1188 also propose revisions to this section.

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

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

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

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

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

(iii) Energy Offer Curve prices and quantities for each Settlement Interval by Resource. The Protected Information status of this information shall expire within seven days after the applicable Operating Day if required to be posted as part of paragraph (5) of Section 3.2.5 and within two days after the applicable Operating Day if required to be posted as part of paragraph (7) of Section 3.2.5;

*[NPRR1013: Replace paragraph (b) above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project:]*

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

(i) Ancillary Service Offers by Operating Hour or Security-Constrained Economic Dispatch (SCED) interval for each Resource for all Ancillary Services submitted for the Day-Ahead Market (DAM) or Real-Time Market (RTM);

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

(iii) A Resource's Energy Offer Curve prices and quantities by Operating Hour or SCED interval. The Protected Information status of this information shall expire within seven days after the applicable Operating Day if required to be posted as part of paragraph (5) of Section 3.2.5 and within two days after the applicable Operating Day if required to be posted as part of paragraph (7) of Section 3.2.5;

(c) Status of Resources, including Outages, limitations, or scheduled or metered Resource data. The Protected Information status of this information shall expire as follows:

(i) For each Forced Outage, Maintenance Outage, or Forced Derate of a Generation Resource or Energy Storage Resource (ESR) that occurs during or extends into an Operating Day, the Protected Information status of the following information shall expire three days after the applicable Operating Day:

(A) The name and unit code of the Resource affected;

(B) The Resource's fuel type;

(C) The type of Outage or derate;

(D) The start date/time and the planned and actual end date/time;

(E) The Resource's applicable Seasonal net maximum sustainable rating;

(F) The available and outaged MW during the Outage or derate; and

(G) The entry in the "nature of work" field in the Outage Scheduler and any other information concerning the cause of the Outage or derate;

(ii) For each Resource Outage or Forced Derate that occurs during, or that extends into, any time period in which ERCOT has declared an Energy Emergency Alert (EEA), ERCOT may immediately disclose the information identified in paragraph (i) above to a state Governmental Authority, the office of the Governor of Texas, the office of the Lieutenant Governor of Texas, or any member of the Texas Legislature, if requested; and

(iii) For all other information, the Protected Information status shall expire 60 days after the applicable Operating Day;

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

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

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

*[NPRR1013: Replace paragraph (f) above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project:]*

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

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

(h) Raw and Adjusted Metered Load (AML) data (demand and energy) identifiable to:

(i) A specific QSE or Load Serving Entity (LSE). The Protected Information status of this information shall expire 180 days after the applicable Operating Day; or

(ii) A specific Customer or Electric Service Identifier (ESI ID);

(i) Wholesale Storage Load (WSL) data identifiable to a specific QSE. The Protected Information status of this information shall expire 60 days after the applicable Operating Day;

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

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

(l) Information related to generation interconnection requests, to the extent such information is not otherwise publicly available. The Protected Information status of certain generation interconnection request information expires as provided in Section 1.3.1.4, Expiration of Protected Information Status;

(m) Resource-specific costs, design and engineering data, including such data submitted in connection with a verifiable cost appeal;

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

(i) The Protected Information status of the identities of CRR bidders that become CRR Owners and the number and type of CRRs that they each

own shall expire at the end of the CRR Auction in which the CRRs were first sold; and

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

(o) Renewable Energy Credit (REC) account balances. The Protected Information status of this information shall expire three years after the REC Settlement period ends;

(p) Credit limits identifiable to a specific QSE;

(q) Any information that is designated as Protected Information in writing by Disclosing Party at the time the information is provided to Receiving Party except for information that is expressly designated not to be Protected Information by Section 1.3.1.2 or that, pursuant to Section 1.3.1.4, is no longer confidential;

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

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

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

*[NPRR857: Replace item (t) above with the following upon system implementation and satisfying the following conditions: (1) Southern Cross provides ERCOT with funds to cover the entire estimated cost of the project; and (2) Southern Cross has signed an interconnection agreement with a TSP and the TSP gives ERCOT written notice that Southern Cross has provided it with: (a) Notice to proceed with the construction of the interconnection; and (b) The financial security required to fund the interconnection facilities;]*

(t) QSE, Transmission Service Provider (TSP), Direct Current Tie Operator (DCTO), and Distribution Service Provider (DSP) backup plans collected by ERCOT under the Protocols or Other Binding Documents;

(u) Direct Current Tie (DC Tie) Schedule information. The Protected Information status of this information shall expire on the date on which ERCOT files the report with the PUCT that is required by P.U.C. SUBST. R. 25.192, Transmission Rates for Export from ERCOT, relating to energy imported and exported over DC Ties interconnected to the ERCOT System;

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

(i) PUCT Substantive Rules on performance measure reporting;

(ii) These Protocols or Other Binding Documents; or

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

(w) Information concerning a Mothballed Generation Resource's probability of return to service and expected lead time for returning to service submitted pursuant to Section 3.14.1.9, Generation Resource Status Updates;

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

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

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

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

(bb) Emergency operations plans submitted pursuant to P.U.C. SUBST. R. 25.53, Electric Service Emergency Operations Plans;

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

(dd) Any data related to Load response capabilities that are self-arranged by the LSE or pursuant to a bilateral agreement between a specific LSE and its Customers, other than data either related to any service procured by ERCOT or non-LSE-specific aggregated data. Such data includes pricing, dispatch instructions, and other proprietary information of the Load response product;

(ee) Status of Settlement Only Generators (SOGs), including Outages, limitations, or scheduled or metered output data, except that ERCOT may disclose output data from an SOG as part of an extract or forwarded TX SET transaction provided to the LSE associated with the ESI ID of the Premise where the SOG is located. The Protected Information status of this information shall expire 60 days after the applicable Operating Day;

***[NPRR829 and NPRR995: Replace applicable portions of paragraph (ee) above with the following upon system implementation:]***

(ee) Status of Settlement Only Generators (SOGs) and Settlement Only Energy Storage System (SOESS), including Outages, limitations, schedules, metered output and withdrawal data, or data telemetered for use in the calculation of Real-Time Liability (RTL) as described in Section 16.11.4.3.2, Real-Time Liability Estimate, except that ERCOT may disclose metered output and withdrawal data from an SOG or SOESS as part of an extract or forwarded TX SET transaction provided to the LSE associated with the ESI ID of the Premise where the SOG is located. The Protected Information status of this information shall expire 60 days after the applicable Operating Day;

(ff) Any documents or data submitted to ERCOT in connection with an Alternative Dispute Resolution (ADR) proceeding. The Protected Information status of this information shall expire upon ERCOT's issuance of a Market Notice indicating the disposition of the ADR proceeding pursuant to paragraph (1) of Section 20.9, Resolution of Alternative Dispute Resolution Proceedings and Notification to Market Participants, except to the extent the information continues to qualify as Protected Information pursuant to another paragraph of this Section 1.3.1.1;

(gg) Reasons for and future expectations of overrides to a specific Resource's High Dispatch Limit (HDL) or Low Dispatch Limit (LDL). The Protected Information status of this information shall expire 60 days after the applicable Operating Day;

(hh) Information provided to ERCOT under Section 16.18, Cybersecurity Incident Notification, except that ERCOT may disclose general information concerning a Cybersecurity Incident in a Market Notice in accordance with paragraph (5) of Section 16.18 to assist Market Participants in mitigating risk associated with a Cybersecurity Incident;

(ii) Information disclosed in response to paragraphs (1)-(4) of the Natural Gas Pipeline Coordination section of Section 22, Attachment K, Declaration of

Natural Gas Pipeline Coordination, submitted to ERCOT in accordance with Section 3.21, Submission of Declarations of Natural Gas Pipeline Coordination. The Protected Information status of Resource Outage information shall expire as provided in paragraph (1)(c) of Section 1.3.1.1;

(jj) Information concerning weatherization activities submitted to, obtained by, or generated by ERCOT in connection with P.U.C. SUBST. R. 25.55, Weather Emergency Preparedness, if such information allows the identification of any Resource or Resource Entity;

(kk) Information provided to ERCOT:

(i) By a QSE under paragraph (3) of Section 3.14.5, Firm Fuel Supply Service, as part of an offer to provide Firm Fuel Supply Service (FFSS), except that within ten Business Days of issuing FFSS awards, ERCOT may disclose the identity of all Generation Resources that were offered as primary Generation Resources or alternate Generation Resources to provide FFSS for the most recent procurement period, including prices and quantities offered;

(ii) By a Resource Entity under paragraph (2) of Section 8.1.1.2.1.6, Firm Fuel Supply Service Resource Qualification, Testing, and Decertification, as part of the voluntary process for ERCOT certification of a FFSS Qualified Contract; or

(iii) By a Resource Entity in a Force Majeure Event report required under paragraph (14) of Section 8.1.1.2.6; ~~and~~

(ll) Information provided to ERCOT pursuant to Section 16.2.1.1, QSE Background Check Process, or Section 16.8.1.1, CRR Account Holder Background Check Process~~.~~; and

(~~kk~~mm) Information concerning coal or lignite inventory provided by a QSE under Section 3.24, ~~Submission~~Notification of Low~~Seasonal~~ Coal and Lignite Inventory ~~Declaration~~Levels.

**3.24 ~~Submission~~Notification of ~~Seasonal~~ Low Coal and Lignite Inventory Levels~~Declaration~~**

(1) Each Qualified Scheduling Entity (QSE) representing a Generation Resource that uses coal or lignite as its primary fuel, except as provided in paragraph (2) below, shall ~~submit to~~notify ERCOT ~~the declaration in Section 22, Attachment P, Declaration of Coal and Lignite Inventory Levels, according to the following schedule~~of the following:

| ~~Season~~ | ~~Declaration Time Period~~ | ~~Submission Deadline~~ |
|---|---|---|
| ~~Spring~~ | ~~March—May~~ | ~~February 18~~ |
| ~~Summer~~ | ~~June—August~~ | ~~May 21~~ |

| | | |
|---|---|---|
| Fall | September – November | August 21 |
| Winter | December – February | November 20 |

A QSE representing a Generation Resource that shares coal or lignite inventory with other Generation Resources shall submit to ERCOT a single Declaration of Coal and Lignite Inventory Levels form (Section 22, Attachment P) for all Generation Resources that share inventory.

For purposes of calculating the inventory level in the Declaration of Coal and Lignite Inventory Levels form (Section 22, Attachment P), the inventory shall be calculated as the number of days all Generation Resources that share inventory can operate at their High Sustainable Limit (HSL) before the usable inventory has been exhausted, rounded down to the nearest day.

The target inventory level in the Declaration of Coal and Lignite Inventory Levels form (Section 22, Attachment P), shall be the minimum amount of on-site reserves of coal or lignite that the QSE or Resource Entity intends to have available throughout the Season.

(2a) If the coal or lignite inventory level available for Rreal-Ttime operations is projected to fall below the higher of the target level indicated in the most recently submitted Declaration of Coal and Lignite Inventory Levels form (Section 22, Attachment P) or 3015 days of operation at the High Sustained Limit (HSL) within the next 90 days, the QSE shall notify ERCOT within five Businessthree Ddays of such a projection and provide an explanation of any disruption to the coal or lignite supply and provide weekly inventory updates to ERCOT until the inventory level projection increases above the higher of either the target level or 30 days. Notifications to ERCOT should be via email, sent to FuelSupply@ERCOT.com.

(3b) If the coal or lignite inventory level available for Rreal-tTime operations is projected to fall below 10 days of operation at the HSL within the next 90 days, the QSE shall notify ERCOT immediately of such a projection, provide an explanation of any disruption to the coal or lignite supply, and provide weeklydailydaily inventory updates to ERCOT until the inventory level projection increases above 15 days. Notifications to ERCOT should be via email, sent to FuelSupply@ERCOT.com.

(2) The requirements of paragraph (1) above do not apply to a QSE of a Generation Resource that uses coal or lignite as its primary fuel if the Generation Resource is located within fifteen15 miles proximity toof its fuel supply or was originally designed to be located within 15 miles proximity of its fuel supply and does not have the capability of storing onsite inventory for at least 30 days of operation at the HSL. The QSE of a Generation Resource located within fifteen15 miles toof its fuel supply or that was originally designed to be located within 15 miles proximity of its fuel supply and does not have the capability of storing onsite inventory for at least 30 days of operation at the HSL must

notify ERCOT of any disruption to the coal or lignite supply operations that could impact operations of the Generation Resource within two days of such disruption and provide an explanation of such disruption. Notifications to ERCOT should be via email, sent to FuelSupply@ERCOT.com.

Board Report

~~ERCOT Nodal Protocols~~

~~Section 22~~

~~Attachment P: Declaration of Coal and Lignite Inventory Levels~~

~~[Effective date to be determined]~~

~~This declaration applies to the following Generation Resources (list by Resource Site Code):~~

~~Date this declaration was completed:~~

~~Season this declaration applies to (select one):~~

~~☐ Spring (March, April, May)~~

~~☐ Summer (June, July, August)~~

~~☐ Fall (September, October, November)~~

~~☐ Winter (December, January, February)~~

~~Target coal or lignite inventory in days for the Generation Resources listed in (1) above:~~

~~Current coal or lignite inventory projection in days for the first day of the season indicated in (3) above:~~

~~Source of coal or lignite inventory replenishment (check all that apply):~~

~~☐ Rail, sourced more than five miles from Generation Resource(s)~~

~~☐ Mine, located within five miles from Generation Resource(s)~~

~~(Optional question) Do you anticipate any disruptions to the coal or lignite supply during the season indicated in (3) above? If so, please describe.~~

# ERCOT Impact Analysis Report

| NPRR Number | 1181 | NPRR Title | Submission of Seasonal Coal and Lignite Inventory Declaration |
|---|---|---|---|
| **Impact Analysis Date** | | May 16, 2023 | |
| **Estimated Cost/Budgetary Impact** | | None. | |
| **Estimated Time Requirements** | | No project required. This Nodal Protocol Revision Request (NPRR) can take effect following Public Utility Commission of Texas (PUCT) approval. | |
| **ERCOT Staffing Impacts (across all areas)** | | Ongoing Requirements: No impacts to ERCOT staffing. | |
| **ERCOT Computer System Impacts** | | No impacts to ERCOT computer systems. | |
| **ERCOT Business Function Impacts** | | ERCOT will update its business processes to implement this NPRR. | |
| **Grid Operations & Practices Impacts** | | No impacts to ERCOT grid operations and practices. | |

| Evaluation of Interim Solutions or Alternatives for a More Efficient Implementation |
|---|
| None offered. |

| Comments |
|---|
| None. |

# Board Report

| NPRR Number | 1192 | NPRR Title | Move OBD to Section 22 – Requirements for Aggregate Load Resource Participation in the ERCOT Markets |
|---|---|---|---|
| **Date of Decision** | December 19, 2023 | | |
| **Action** | Recommended Approval | | |
| **Timeline** | Normal | | |
| **Proposed Effective Date** | Upon system implementation | | |
| **Priority and Rank Assigned** | Not Applicable | | |
| **Nodal Protocol Sections Requiring Revision** | 6.5.7.6.2.3, Non-Spinning Reserve Service Deployment<br>8.1.1.2, General Capacity Testing Requirements<br>10.9, Standards for Metering Facilities<br>Section 22, Attachment O, Requirements for Aggregate Load Resource Participation in the ERCOT Markets (new) | | |
| **Related Documents Requiring Revision/Related Revision Requests** | Requirements for Aggregate Load Resource Participation in the ERCOT Markets | | |
| **Revision Description** | This Nodal Protocol Revision Request (NPRR) incorporates the Other Binding Document "Requirements for Aggregate Load Resource Participation in the ERCOT Markets" into the Protocols. | | |
| **Reason for Revision** | ☐ Addresses current operational issues.<br>☐ Meets Strategic goals (tied to the ERCOT Strategic Plan or directed by the ERCOT Board).<br>☐ Market efficiencies or enhancements<br>☒ Administrative<br>☐ Regulatory requirements<br>☐ Other: (explain)<br>*(please select all that apply)* | | |
| **Business Case** | This NPRR is published for transparency and to standardize the approval process for all binding language. Upon approval of this NPRR, | | |

## Board Report

| | |
|---|---|
| | "Requirements for Aggregate Load Resource Participation in the ERCOT Markets" will be removed from the Other Binding Documents List. |
| **PRS Decision** | On 9/13/23, PRS voted unanimously to recommend approval of NPRR1192 as revised by PRS. The Independent Retail Electric Provider (IREP) Market Segment did not participate in the vote.<br>On 10/12/23, PRS voted unanimously to endorse and forward to TAC the 9/13/23 PRS Report and 9/12/23 Revised Impact Analysis for NPRR1192. All Market Segments participated in the vote. |
| **Summary of PRS Discussion** | On 9/13/23, participants offered correction to a typographical error.<br>On 10/12/23, there was no discussion. |
| **TAC Decision** | On 10/24/23, TAC voted unanimously to recommend approval of NPRR1192 as recommended by PRS in the 10/12/23 PRS Report. All Market Segments participated in the vote. |
| **Summary of TAC Discussion** | On 10/24/23, participants reviewed the ERCOT Opinion, ERCOT Market Impact Statement, and Independent Market Monitor (IMM) Opinion for NPRR1192. |
| **ERCOT Board Decision** | On 12/19/23, the ERCOT Board voted unanimously to recommend approval of NPRR1192 as recommended by TAC in the 10/24/23 TAC Report. |

| **Opinions** | |
|---|---|
| **Credit Review** | ERCOT Credit Staff and the Credit Finance Sub Group (CFSG) have reviewed NPRR1192 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 NPRR1192. |
| **ERCOT Opinion** | ERCOT supports approval of NPRR1192. |
| **ERCOT Market Impact Statement** | ERCOT Staff has reviewed NPRR1192 and believes it has a positive market impact by standardizing the approval process for binding language. |

| **Sponsor** | |
|---|---|
| **Name** | Ann Boren |

# Board Report

| | |
|---|---|
| **E-mail Address** | Ann.Boren@ercot.com |
| **Company** | ERCOT |
| **Phone Number** | 512-248-6465 |
| **Cell Number** | |
| **Market Segment** | Not Applicable |

| **Market Rules Staff Contact** | |
|---|---|
| **Name** | Brittney Albracht |
| **E-Mail Address** | Brittney.Albracht@ercot.com |
| **Phone Number** | 512-225-7027 |

| **Comments Received** | |
|---|---|
| **Comment Author** | **Comment Summary** |
| **None** | |

**Market Rules Notes**

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

- NPRR1188, Implement Nodal Dispatch and Energy Settlement for Controllable Load Resources
  - Section 6.5.7.6.2.3

**Proposed Protocol Language Revision**

**6.5.7.6.2.3 Non-Spinning Reserve Service Deployment**

**Commented [BA1]:** Please note NPRR1188 also proposes revisions to this section.

(1) ERCOT shall deploy Non-Spin Service by operator Dispatch Instruction for the portion of On-Line Generation Resources that is only available through power augmentation and participating as Off-Line Non-Spin, Off-Line Generation Resources and Load Resources. ERCOT shall develop a procedure approved by TAC to deploy Resources providing Non-Spin Service. ERCOT Operators shall implement the deployment procedure when a specified threshold(s) in MW of capability available to SCED to increase generation is reached. ERCOT Operators may implement the deployment procedure to recover deployed RRS, ECRS, or when other Emergency Conditions exist. The deployment of Non-Spin must always be 100% of that scheduled on an individual Resource.

(2) Once Non-Spin capacity from Off-Line Generation Resources providing Non-Spin is deployed and the Generation Resources are On-Line, ERCOT shall use SCED to determine the amount of energy to be dispatched from those Resources.

(3) Off-Line Generation Resources providing Non-Spin (OFFNS Resource Status) are required to provide an Energy Offer Curve for use by SCED.

(4) Non-Spin can be provided by Controllable Load Resources that are SCED qualified or by Load Resources that are not Controllable Load Resources but do not have an under-frequency relay or the under-frequency relay is not armed.

(a) A Controllable Load Resource providing Non-Spin shall have an RTM Energy Bid for SCED and shall be capable of being Dispatched to its Non-Spin Ancillary Service Resource Responsibility within 30 minutes of a deployment instruction for capacity, using the Resource's Normal Ramp Rate curve. An Aggregate Load Resource must comply with all requirements in ~~the document titled~~Section 22, Attachment O~~)~~, "Requirements for Aggregate Load Resource Participation in the ERCOT Markets."

(b) A Load Resource that is not a Controllable Load Resources shall be capable of being Dispatched to its Non-Spin Ancillary Service Resource Responsibility within 30 minutes of a deployment instruction for capacity. Following a deployment instruction, the QSE shall reduce the Non-Spin Ancillary Service Schedule by the amount of the deployment.

(5) ERCOT shall post a list of Off-Line Generation Resources and Load Resources that are not Controllable Load Resources on the MIS Certified Area immediately following the Day-Ahead Reliability Unit Commitment (DRUC) for each QSE with a Load Resource Non-Spin award. The list will be broken into groups of approximately 500 MW increments. ERCOT shall develop a process for determining which individual Resource to place in each group based on a random sampling of individual Load Resources that are not Controllable Load Resources awarded Non-Spin and Generation Resources carrying Off-Line Non-Spin. At ERCOT's discretion, ERCOT may deploy all groups as specified in the Other Binding Document titled "Non-Spinning Reserve Deployment and Recall Procedure."

(a) On-Line Generation Resources participating in Off-Line Non-Spin using power augmentation will be randomly distributed in Real-Time among the groups created in the Day-Ahead for the purpose of manual deployment of Non-Spin by operator Dispatch Instruction.

(b) Any Generation Resource providing Off-Line Non-Spin that did not previously receive group assignment will be automatically considered in Group 1. Any Load Resource that is not a Controllable Load Resource providing Non-Spin in Real-Time that did not previously receive group assignment will be automatically considered in Group 1. ERCOT may assign a Generation Resource providing Off-Line Non-Spin or a Load Resource that is not a Controllable Load Resource

to another group if that Resource did not previously receive group assignment and, in ERCOT's reasonable judgment, Group 1 is too large.

(6) Subject to the exceptions described in paragraphs (a) and (b) below, On-Line Generation Resources that are assigned Non-Spin Ancillary Service Resource Responsibility during an Operating Hour shall always be deployed in that Operating Hour. This deployment shall be considered as a standing Protocol-directed Non-Spin deployment Dispatch Instruction. Within the 30-second window prior to the top-of-hour clock interval described in paragraph (2) of Section 6.3.2, Activities for Real-Time Operations, the QSE shall respond to the standing Non-Spin deployment Dispatch Instruction for those Generation Resources assigned Non-Spin Ancillary Service Resource Responsibility effective at the top-of-hour by adjusting the Non-Spin Ancillary Service Schedule telemetry. The QSE shall set the Non-Spin Ancillary Service Schedule telemetry equal to the portion of Non-Spin being provided from power augmentation if the portion being provided from power augmentation is participating as Off-Line Non-Spin, otherwise it shall be set to 0. As described in Section 6.5.7.2, Resource Limit Calculator, ERCOT shall adjust the HASL and LASL based on the QSE's telemetered Non-Spin Ancillary Service Schedule to account for such deployment and to make the energy from the full amount of the Non-Spin Ancillary Service Resource Responsibility available to SCED. A Non-Spin deployment Dispatch Instruction from ERCOT is not required and these Generation Resources must be able to Dispatch their Non-Spin Ancillary Service Resource Responsibility in response to a SCED Base Point deployment instruction. The provisions of this paragraph (5) do not apply to:

(a) QSGRs assigned Off-Line Non-Spin Ancillary Service Resource Responsibility and provided to SCED for deployment, which must follow the provisions of Section 3.8.3, Quick Start Generation Resources; or

(b) The portion of On-Line Generation Resources that is only available through power augmentation if participating as Off-Line Non-Spin.

(7) Off-Line Generation Resources providing Non-Spin, while Off-Line and before the receipt of any deployment instruction, shall be capable of being dispatched to their Non-Spin Resource Responsibility within 30 minutes of a deployment instruction. Following a deployment instruction, the QSE shall reduce the Non-Spin Ancillary Service Schedule by the amount of the deployment. An Off-Line Generation Resource providing Non-Spin must also be brought On-Line with an Energy Offer Curve at an output level greater than or equal to P1 multiplied by LSL where P1 is defined in the "ERCOT and QSE Operations Business Practices During the Operating Hour." These actions must be done within a time frame that would allow SCED to fully dispatch the Resource's Non-Spin Resource Responsibility within the 30 minute period using the Resource's Normal Ramp Rate curve. The Resource Status indicating that a Generation Resource has come On-Line with an Energy Offer Curve is ON as described in paragraph (5)(b)(i) of Section 3.9.1, Current Operating Plan (COP) Criteria.

(8) For DSRs providing Non-Spin, on deployment of Non-Spin, the DSR's QSE shall adjust its Resource Output Schedule to reflect the amount of deployment. For non-DSRs with Output Schedules providing Non-Spin, on deployment of Non-Spin, ERCOT shall adjust the Resource Output Schedule for the remainder of the Operating Period to reflect the amount of deployment. ERCOT shall notify the QSEs representing the non-DSR of the adjustment through the MIS Certified Area.

(9) For On-Line Generation Resources providing Non-Spin, Base Points include Non-Spin energy as well as any other energy dispatched as a result of SCED. These Resources' Non-Spin Ancillary Service Resource Responsibility and Normal Ramp Rate curve should allow SCED to fully Dispatch the Resource's Non-Spin Resource Responsibility within the 30-minute time frame according to the Resources' Normal Ramp Rate curve. For the portion of the Non-Spin Ancillary Service Resource Responsibility provided from power augmentation participating as Off-Line, SCED should be able to be dispatch it within 30 minutes of the Non-Spin deployment instruction.

(10) Each QSE providing Non-Spin from a Resource shall inform ERCOT of the Non-Spin Resource availability using the Resource Status and Non-Spin Ancillary Service Resource Responsibility indications for the Operating Hour using telemetry and shall use the COP to inform ERCOT of Non-Spin Resource Status and Non-Spin Ancillary Service Resource Responsibility for hours in the Adjustment Period through the end of the Operating Day.

(11) ERCOT may deploy Non-Spin at any time in a Settlement Interval.

(12) ERCOT's Non-Spin deployment Dispatch Instructions must include:

(a) The Resource name;

(b) A MW level of capacity deployment for Generation Resources with Energy Offer Curve, a MW level of energy for Generation Resources with Output Schedules, and a Dispatch Instruction for Load Resources equal to their awarded Non-Spin Ancillary Service Resource Responsibility; and

(c) The anticipated duration of deployment.

(13) ERCOT shall provide a signal via ICCP to the QSE of a deployed Generation or Load Resource indicating that its Non-Spin capacity has been deployed.

(14) ERCOT shall, as part of its TAC-approved Non-Spin deployment procedure, provide for the recall of Non-Spin energy including descriptions of changes to Output Schedules and release of energy obligations from On-Line Resources with Output Schedules and from On-Line Resources that were previously Off-Line Resources providing Non-Spin capacity.

(15) ERCOT shall provide a notification to all QSEs via the ERCOT website when any Non-Spin capacity is deployed on the ERCOT System showing the time, MW quantity and the anticipated duration of the deployment.

***[NPRR1000, NPRR1010, and NPRR1131: Replace applicable portions of Section 6.5.7.6.2.3 above with the following upon system implementation for NPRR1000 or NPRR1131; or upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1010:]***

**6.5.7.6.2.3 Non-Spinning Reserve Service Deployment**

(1) ERCOT shall deploy Non-Spin Service by operator Dispatch Instruction for the portion of On-Line Generation Resources that is only available through power augmentation and participating as Off-Line Non-Spin and Off-Line Generation Resources. ERCOT shall develop a procedure approved by TAC to deploy Resources providing Non-Spin Service. ERCOT Operators shall implement the deployment procedure when a specified threshold(s) in MW of capability available to SCED to increase generation is reached. ERCOT Operators may implement the deployment procedure to recover deployed RRS, ECRS, or when other Emergency Conditions exist. The deployment of Non-Spin must always be 100% of that awarded on an individual Resource.

(2) Once Non-Spin capacity from Off-Line Generation Resources awarded Non-Spin is deployed and the Generation Resources are On-Line, ERCOT shall use SCED to determine the amount of energy to be dispatched from those Resources.

(3) Off-Line Generation Resources offering to provide Non-Spin must provide an Energy Offer Curve for use by SCED.

(4) Non-Spin can be provided by Controllable Load Resources that are SCED qualified or by Load Resources that are not Controllable Load Resources but do not have an under-frequency relay or the under-frequency relay is unarmed.

(a) Controllable Load Resources awarded Non-Spin shall have an RTM Energy Bid for SCED and shall be capable of being Dispatched to its Non-Spin Ancillary Service award within 30 minutes, using the Resource's Normal Ramp Rate curve. An Aggregate Load Resource must comply with all requirements in ~~the document titled~~Section 22, Attachment O, "Requirements for Aggregate Load Resource Participation in the ERCOT Markets."

(b) A Load Resource that is not a Controllable Load Resource shall be capable of being Dispatched to its Non-Spin Ancillary Service Resource Responsibility within 30 minutes of a deployment instruction for capacity.

(5) Off-Line Generation Resources awarded Non-Spin, while Off-Line and before the receipt of any deployment instruction, shall be capable of being dispatched to their

Non-Spin award within 30 minutes of a Dispatch Instruction. On-Line Generation Resources awarded Non-Spin on the power augmentation capacity shall be capable of being dispatched to their Non-Spin award within 30 minutes of a Dispatch Instruction.

(6) ERCOT may deploy Non-Spin at any time in a Settlement Interval.

(7) ERCOT shall develop a process to place Off-Line Generation Resources and Load Resources that are not Controllable Load Resources with Non-Spin award in a group based on a random sampling for the purpose of deploying these Resources manually. At ERCOT's discretion, ERCOT may deploy all groups as specified in the Other Binding Document titled "Non-Spinning Reserve Deployment and Recall Procedure."

(a) On-Line Generation Resources participating in Off-Line Non-Spin using power augmentation will be randomly distributed in Real-Time among the groups created in the Day-Ahead for the purpose of manual deployment of Non-Spin by operator Dispatch Instruction.

(b) Any Generation Resource providing Off-Line Non-Spin that did not previously receive group assignment will be automatically considered in Group 1. Any Load Resource that is not a Controllable Load Resource providing Non-Spin in Real-Time that did not previously receive group assignment will be automatically considered in Group 1. ERCOT may assign a Generation Resource providing Off-Line Non-Spin or a Load Resource that is not a Controllable Load Resource to another group if that Resource did not previously receive group assignment and, in ERCOT's reasonable judgment, Group 1 is too large.

(8) ERCOT's Non-Spin deployment Dispatch Instructions must include:

(a) The Resource name;

(b) A MW level of capacity deployment for Generation Resources with Energy Offer Curve and a MW level of energy for Generation Resources with Output Schedules and a Dispatch Instruction for Load Resources, excluding Controllable Load Resources, at a minimum equal to their awarded Non-Spin Ancillary Service amount; and

(c) The anticipated duration of deployment.

(9) ERCOT shall provide a signal via ICCP to the QSE of a deployed Generation or Load Resource indicating that its Non-Spin capacity has been deployed.

(10) ERCOT shall, as part of its TAC-approved Non-Spin deployment procedure, provide for the recall of Non-Spin from On-Line Resources that were previously Off-Line

Resources providing Non-Spin capacity and from On-Line Resources providing Non-Spin through power augmentation.

(11) ERCOT shall provide a notification to all QSEs via the ERCOT website when any Non-Spin capacity is deployed on the ERCOT System showing the time, MW quantity and the anticipated duration of the deployment.

**8.1.1.2 General Capacity Testing Requirements**

(1) Within the first 15 days of each Season, each QSE shall provide ERCOT a Seasonal HSL for any Generation Resource with a capacity greater than ten MW that will be operated during that Season. ERCOT shall provide an appropriate form for QSEs to submit their Seasonal HSL data. The Seasonal HSL form shall take into account auxiliary Load and gross and net real power capability of the Generation Resource. Each QSE shall update its COP and telemetry, as necessary, to reflect the HSL of each of its Generation Resources in a given operating interval as well as other operational limitations. The HSL shown in the COP for a Generation Resource may not be ramp rate-limited while the Real-Time telemetered value of HSL for the Generation Resource may be ramp rate-limited by the QSE representing the Generation Resource in order for the Generation Resource to meet its HSL using the testing process described in paragraph (2) below.

(2) To verify that the HSL reported by telemetry is achievable, ERCOT may, at its discretion, conduct an unannounced Generation Resource test. At a time determined solely by ERCOT, ERCOT will issue a Verbal Dispatch Instruction (VDI) to the QSE to operate the designated Generation Resource at its HSL as shown in the QSE's telemetry at the time the test is initiated. The QSE shall immediately upon receiving the VDI release all Ancillary Service Obligations carried by the unit to be tested and shall telemeter Resource Status as "ONTEST." The QSE shall not be required to start the designated Generation Resource if it is not already On-Line when ERCOT announces its intent to test the Resource. If the designated Generation Resource is operating at its LSL when ERCOT sends the VDI to begin the test, the QSE shall have up to 60 minutes to allow the Resource to reach 90% of its HSL as shown by telemetry and up to an additional 20 minutes for the Resource to reach the HSL shown by telemetry at the time the test is initiated. This time requirement does not apply to nuclear-fueled Generation Resources. If the designated Generation Resource is operating between its LSL and 50% of its HSL shown by telemetry when ERCOT begins the test, the QSE shall have 60 minutes for the Resource to reach its HSL. If the Resource is operating at or above 50% of its HSL shown by telemetry when ERCOT begins the test, the QSE shall have 30 minutes for the Resource to reach its HSL. Once the designated Generation Resource reaches its HSL, the QSE shall hold it at that output level for a minimum of 30 minutes. The HSL for the designated Generation Resource shall be determined based on the Real-Time averaged MW telemetered by the Resource during the 30 minutes of constant output. After each test, the QSE representing the Generation Resource will complete and submit the test form using the Net Dependable Capability and Reactive Capability

(NDCRC) application located on the Market Information System (MIS) Secure Area within two Business Days.

*[NPRR1011: Replace paragraph (2) above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project:]*

(2) To verify that the HSL reported by telemetry is achievable, ERCOT may, at its discretion, conduct an unannounced Generation Resource test. At a time determined solely by ERCOT, ERCOT will issue a Verbal Dispatch Instruction (VDI) to the QSE to operate the designated Generation Resource at its HSL as shown in the QSE's telemetry at the time the test is initiated. Immediately upon receiving the VDI, the QSE shall telemeter Resource Status as "ONTEST." The QSE shall not be required to start the designated Generation Resource if it is not already On-Line when ERCOT announces its intent to test the Resource. If the designated Generation Resource is operating at its LSL when ERCOT sends the VDI to begin the test, the QSE shall have up to 60 minutes to allow the Resource to reach 90% of its HSL as shown by telemetry and up to an additional 20 minutes for the Resource to reach the HSL shown by telemetry at the time the test is initiated. This time requirement does not apply to nuclear-fueled Generation Resources. If the designated Generation Resource is operating between its LSL and 50% of its HSL shown by telemetry when ERCOT begins the test, the QSE shall have 60 minutes for the Resource to reach its HSL. If the Resource is operating at or above 50% of its HSL shown by telemetry when ERCOT begins the test, the QSE shall have 30 minutes for the Resource to reach its HSL. Once the designated Generation Resource reaches its HSL, the QSE shall hold it at that output level for a minimum of 30 minutes. The HSL for the designated Generation Resource shall be determined based on the Real-Time averaged MW telemetered by the Resource during the 30 minutes of constant output. After each test, the QSE representing the Generation Resource will complete and submit the test form using the Net Dependable Capability and Reactive Capability (NDCRC) application located on the Market Information System (MIS) Secure Area within two Business Days.

(3) ERCOT may test multiple Generation Resources within a single QSE within a single 24-hour period. However, in no case shall ERCOT test more than two Generation Resources within one QSE simultaneously. All Resources On-Line in a Combined-Cycle Configuration will be measured on an aggregate capacity basis. All QSEs associated with a jointly owned unit will be tested simultaneously. Hydro, wind, and PhotoVoltaic (PV) generation will be excluded from unannounced generation capacity testing. ERCOT shall not perform an unannounced Generation Resource test during a Watch or Energy Emergency Alert (EEA) event. If an unannounced Generation Resource test is underway when a Watch or EEA event commences, ERCOT may cancel the test.

(4) Should the designated Generation Resource fail to reach its HSL shown in its telemetry within the time frame set forth herein, the Real-Time averaged MW telemetered during the test shall be the basis for the new HSL for the designated Generation Resource for that Season. The QSE shall have the opportunity to request another test as quickly as

possible (at a time determined by ERCOT) and may retest up to two times per month. The QSE may also demonstrate an increased value of HSL by operating the Generation Resource at an Output Schedule for at least 30 minutes. In order to raise an Output Schedule above the Seasonal HSL, the QSE may set the Resource telemetered HSL equal to its output temporarily for the purposes of the demonstration tests. After either a retest or a demonstration test, the MW capability of the Generation Resource based on the average of the MW production telemetered during the test shall be the basis for the new HSL for the designated Generation Resource for that Season. Any requested retest must take place within three Business Days after the request for retest.

(5) The telemetered value of HSL for the Generation Resource shall only be used for testing purposes as described in this Section or for system reliability calculations.

(6) A Resource Entity owning a Generation Resource operating in the synchronous condenser fast response mode to provide RRS or ECRS shall evaluate the maximum capability of the Resource each Season.

(7) ERCOT shall maintain historical records of unannounced Generation Resource test results, using the information contained therein to adjust the Reserve Discount Factor (RDF) subject to the approval of the appropriate TAC subcommittee. ERCOT shall report to the Reliability and Operations Subcommittee (ROS) annually or as requested by ROS the aggregated results of such unannounced testing (excluding retests), including, but not limited to, the number and total capacity of Resources tested, the percentage of Resources that met or exceeded their HSL reported by telemetry, the percentage that failed to meet their HSL reported by telemetry, and the total MW capacity shortfall of those Resources that failed to meet their HSL reported by telemetry.

(8) QSEs who receive a VDI to operate the designated Generation Resource for an unannounced Generation Resource test may be considered for additional compensation under Section 6.6.9, Emergency Operations Settlement. Any unannounced Generation Resource test VDI that ERCOT issues as a result of a QSE-requested retest will not be considered for additional compensation under Section 6.6.9.

(9) All unannounced Generation Resource test VDIs will be considered as an instructed deviation for compliance purposes.

(10) Before the start of each Season, a QSE shall provide ERCOT a list identifying each Controllable Load Resource that is expected to operate in a Season as a provider of Ancillary Service. Prior to the beginning of each Season, QSEs shall identify the Controllable Load Resources to be tested during the Season and the specific week of the test if known. Any Controllable Load Resource for which the QSE desires qualification to provide Ancillary Services shall have its Net Dependable Capability verified prior to providing Ancillary Services.

(11) ERCOT shall verify the telemetry attributes of each qualified Load Resource as follows:

(a) ERCOT shall annually verify the telemetry attributes of each Load Resource providing RRS or ECRS using a high-set under-frequency relay. In addition, once every two years, any Load Resource qualified to provide RRS or ECRS using a high-set under-frequency relay shall test the correct operation of the under-frequency relay or the output from the solid-state switch, whichever applies. However, if a Load Resource's performance has been verified through response to an actual event, the data from the event can be used to meet the annual telemetry verification requirement for that year and the biennial relay-testing requirement.

(b) ERCOT shall periodically validate the telemetry attributes of each Controllable Load Resource. In the case of an Aggregate Load Resource (ALR), ERCOT will follow the validation procedures described in ~~the document titled~~Section 22, Attachment O, "Requirements for Aggregate Load Resource Participation in the ERCOT Markets." If a QSE fails to meet its telemetry validation requirements, ERCOT may suspend the QSE and/or the Controllable Load Resource from participation in the applicable services or markets. If disqualified pursuant to this paragraph, a QSE or Controllable Load Resource may reestablish its qualification by submitting a corrective action plan to ERCOT that identifies actions taken to correct performance deficiencies and by successfully passing a new ERCOT telemetry validation test.

(12) Telemetry values of a Load Resource may be adjusted to reflect Distribution Losses, based on the ERCOT-forecasted Distribution Loss Factors (DLFs). Load Resources may be adjusted for Distribution Losses using the same distribution loss code as assigned to the ESI ID.

(13) A specific Load Resource to be used for the first time to provide Regulation Service, RRS, ECRS, Non-Spin, or energy by following Security-Constrained Economic Dispatch (SCED) Base Points, must be tested to ERCOT's reasonable satisfaction using actual Demand response as part of its qualification. The test must take place at a time mutually selected by the QSE representing the Load Resource and ERCOT. ERCOT shall make available its standard test document for Load Resource qualification required under this Section on the ERCOT website.

(14) Any changes to a Load Resource including changes to its capability to provide Ancillary Service requires updates by the Load Resource to the registration information detailing the change. For Non-Opt-In Entities (NOIEs) representing specific Load Resources that are located behind the NOIE Settlement Metering points, the NOIE shall provide an alternative unique descriptor of the qualified Load Resource for ERCOT's records.

(15) Qualification of a Resource, including a Load Resource, remains valid for that Resource in the event of a change of QSE for the Resource, provided that the new QSE demonstrates to ERCOT's reasonable satisfaction that the new QSE has adequate communications and control capability for the Resource.

(16) For purposes of qualifying Quick Start Generation Resources (QSGRs), ERCOT shall issue a unit-specific VDI for the MW amount that the QSE is requesting to qualify its QSGR to provide. The QSE shall telemeter an ONTEST Resource Status. The QSGR will only be qualified to provide an amount not to exceed the observed output at the end of a ten-minute test period.

(17) ERCOT may revoke the QSGR qualification of any QSGR for failure to comply with the following performance standard:

(a) A QSGR, available for deployment by SCED, is deemed to have failed to start for the purpose of this performance measure if the QSGR fails to achieve at least 90% of the minimum ERCOT SCED Base Point, including zero Base Points, within ten minutes of the initial ERCOT SCED Base Point that dispatched the QSGR above zero MW output.

(b) ERCOT may revoke a QSGR's qualification if within a rolling 90-day period the number of QSGR failures to start, as determined by paragraph (a) above, exceeds the higher of three failures or 10% of the number of quick start mode startups made in response to SCED deployments.

(18) If disqualified pursuant to paragraph (17) above, a QSGR may reestablish its QSGR qualification by submitting a corrective action plan to ERCOT that identifies actions taken to correct performance deficiencies and by successfully passing a new ERCOT QSGR test.

(19) If an Energy Storage Resource (ESR) is telemetering a non-zero ECRS Ancillary Service Responsibility and/or non-zero Non-Spin Ancillary Service Responsibility, to verify that the Ancillary Service Responsibility reported by telemetry is achievable based on the state of charge the Resource is maintaining in Real-Time, ERCOT may, at its discretion, conduct an unannounced ECRS/Non-Spin capability test. At a time determined solely by ERCOT, ERCOT will issue a VDI to the QSE to operate the designated ESR an output level that delivers the total state of charge the ESR was obligated to provide based on sum of the ECRS Ancillary Service Responsibility and Non-Spin Ancillary Service Responsibility as shown in the ESR's telemetry at the time the test is initiated. The QSE shall immediately upon receiving the VDI release all Ancillary Service Obligations carried by the ESR to be tested and shall telemeter Resource Status as "ONTEST." Once the designated ESR reaches the target output level, the QSE shall hold at that output level for a minimum duration required to verify ESR's state of charge capability to meet the ECRS Ancillary Service Responsibility and Non-Spin Ancillary Service Responsibility. The two-hour and/or four-hour capability for the designated ESR shall be determined based on the Real-Time averaged MW telemetered by the Resource during the constant output (i.e., hold) phase of the test. After each test, the QSE representing the ESR will complete and submit the test form using the NDCRC application located on the MIS Secure Area within two Business Days. Should the designated ESR fail to demonstrate the state of charge level needed to meet the sum of ECRS Ancillary Service Responsibility and Non-Spin Ancillary Service Responsibility shown in its telemetry within the time frame set forth herein, the Real-Time averaged MW telemetered during

the test shall be the basis for the ECRS and Non-Spin capacity that the Resource may provide. The QSE shall have the opportunity to request another test as quickly as possible (at a time determined by ERCOT) and may retest up to two times per month. After either a retest or a demonstration test, the average of the MW output telemetered during the test shall be the basis for the new ECRS and Non-Spin capability for the designated ESR. Any requested retest must take place within three Business Days after the request for retest or a mutually agreeable date.

**10.9 Standards for Metering Facilities**

(1) For Transmission Service Provider (TSP) and Distribution Service Provider (DSP) Metered Entities, an Interval Data Recorder (IDR) Meter is required on any of the following locations/sites:

(a) Non-Opt-In Entity (NOIE) or External Load Serving Entity (ELSE) metering points used to determine the total Load for that NOIE or ELSE; and

(b) Block Load Transfer (BLT) metering points, registered for Settlements in accordance with Section 6.5.9.5.1, Registration and Posting of BLT Points.

(2) For TSP and DSP Metered Entities, an IDR is required on any of the following locations/sites:

(a) Load Resources participating in the Ancillary Services markets, with the exception of Aggregate Load Resources (ALRs) for which statistical sampling is used to validate telemetry, as detailed in ~~the document titled~~Section 22, Attachment O, ~~"~~Requirements for Aggregate Load Resource Participation in the ERCOT Markets~~"~~;

(b) Settlement Only Distribution Generators (SODGs); and

(c) Locations meeting IDR requirements defined in Section 18, Load Profiling.

**PRS Report**

# ERCOT Nodal Protocols

## Section 22

## Attachment O: Requirements for Aggregate Load Resource Participation in the ERCOT Markets

**Date TBD**

~~**Version 1.3**~~

~~**Effective Date: 9/1/20**~~

# Board Report

## Revision History

| Date Approved | Version | Description | Author(s) | Approved By | Effective Date |
|---|---|---|---|---|---|
| 9/5/13 | 1.0 | Adapted from White Paper "Functional Description of Aggregated Load Resources" v. 0.1.4 | ERCOT Staff (Market Design & Development, Demand Integration) | TAC | Upon System Implementation of NPRR532, Performance Measurement and Verification and Telemetry Requirements for Load Resources Providing Non-Spin |
| 5/29/14 | 1.1 | Modify document to create a Section for Telemetry & Meter Data Requirements, including provisions for Device-level telemetry, improvements to language regarding Non-Opt-In Entity (NOIE) metering requirements, and other clarifications<br><br>5/7/14 – WMS recommended approval as amended by the 5/6/14 ERCOT comments and as revised by WMS<br><br>5/29/14 – TAC approved with an effective date of 6/1/14 | ERCOT Staff (Market Design & Development, Demand Integration) | TAC | 6/1/14 |
| 8/11/20 | 1.2 | OBDRR019, Related to NPRR1003, Elimination of References to Resource Asset Registration Form | ERCOT | ERCOT Board | Upon system implementation of NPRR1003 |
| | 1.3 | Unboxing of revisions related to OBDRR019 | ERCOT | | 9/1/20 |

~~PROTOCOL DISCLAIMER~~

~~This Business Practice describes ERCOT systems and the response of these systems to Market Participant submissions incidental to the conduct of operations in the ERCOT Texas Nodal Market implementation and is not intended to be a substitute for the ERCOT Nodal Protocols (available at http://www.ercot.com/mktrules/nprotocols/current), as amended from time to time. If any conflict exists between this document and the ERCOT Nodal Protocols, the ERCOT Nodal Protocols shall control in all respects.~~

# Board Report

## Table of Contents

# Board Report

## 1 BACKGROUND AND INTRODUCTION

Qualification as a Load Resource is a pre-requisite for the provision of Demand response in the Ancillary Services markets and Real-Time Energy Market.

This ~~Other Binding Document~~attachment sets forth the detailed requirements for Aggregations of Loads (more than one single Load site) to qualify as Aggregate Load Resources (ALRs) and maintain such qualification, thus becoming eligible to provide Ancillary Services. The ~~document~~ attachment is limited to ALR qualification for participation in Security-Constrained Economic Dispatch (SCED) and the provision of Non-Spinning Reserve (Non-Spin).

For purposes of this ~~document~~attachment, the following terminology applies:

- A "Device" refers to an appliance, implement, or instrument under control or otherwise being used to provide Demand response. A Device is always located behind a Premise-level meter.
- A "Resource" or "Aggregation" refers to an ALR, as defined in Protocol Section 2, Definitions and Acronyms.
- All references to ALR in this attachment~~document~~ refer to an ALR that is also a Controllable Load Resource.[1]

## ~~2 CHANGE CONTROL PROCESS~~

~~Changes to this document require the approval of the Technical Advisory Committee (TAC) and may be subject to TAC Subcommittee review at TAC's discretion.~~

~~In the following cases, after review and recommendation by TAC, revisions to this document must be approved by the ERCOT Board.~~

- ~~The revisions require an ERCOT project for implementation; and~~
- ~~The revisions are related to a Nodal Protocol Revision Request (NPRR), a Planning Guide Revision Request (PGRR), or a revision request requiring an ERCOT project for implementation.~~

~~Upon approval of revisions, ERCOT shall post the revised procedure to the ERCOT website within three Business Days.~~

## 2~~3~~ TELEMETRY AND METERING REQUIREMENTS

### A QSE Telemetry

A Qualified Scheduling Entity (QSE) representing a Load Resource is required to send Resource-level Real-Time telemetry to ERCOT every two seconds per Protocol Section 6.5.5.2,

[1] Load Resource provision of Non-Spin may be provided only by Controllable Load Resources qualified for SCED.