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| NPRR Number | [1172](https://www.ercot.com/mktrules/issues/NPRR1172) | NPRR Title | Fuel Adder Definition, Mitigated Offer Caps, and RUC Clawback |
| Date Posted | April 11, 2023 |
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| Requested Resolution  | Normal |
| Nodal Protocol Sections Requiring Revision  | 2.1, Definitions3.14.1.2, ERCOT Evaluation Process3.14.1.20, Budgeting Fuel Costs4.4.9.4.1, Mitigated Offer Cap 5.6.1.1, Verifiable Startup Costs5.6.1.2, Verifiable Minimum-Energy Costs5.7.2, RUC Clawback Charge6.6.6.2, RMR Payment for Energy6.6.6.9, MRA Payment for Deployment Event6.6.12.1, Switchable Generation Make-Whole Payment9.14.7, Disputes for RUC Make-Whole Payment for Fuel Costs9.14.9, Incremental Fuel Costs for Switchable Generation Make-Whole Payment Disputes 25.5.2, Market Suspension Make-Whole Payment |
| Related Documents Requiring Revision/Related Revision Requests | Verifiable Cost Manual Revision Request (VCMRR) 037, Related to NPRR1172, Fuel Adder Definition, Mitigated Offer Caps, and RUC Clawback |
| Revision Description | This Nodal Protocol Revision Request (NPRR) creates a definition for Fuel Adder to provide clarity for which costs are included as routine and predictable versus which costs are exceptional. This NPRR also removes the Mitigated Offer Cap (MOC) multipliers, and creates a 100% clawback for Reliability Unit Commitment (RUC).  |
| Reason for Revision |  Addresses current operational issues. Meets Strategic goals (tied to the [ERCOT Strategic Plan](https://www.ercot.com/files/docs/2018/12/13/ERCOT_Strategic_Plan_2019-2023.pdf) or directed by the ERCOT Board). X Market efficiencies or enhancements Administrative Regulatory requirements Other: (explain)*(please select all that apply)* |
| Business Case | By resolving the definition of Fuel Adder and its use throughout the Protocols, this NPRR improves recovery of fuel costs and reduces potential confusion among Market Participants. Without the definition, exceptional fuel costs and RUC Make-Whole Charges would be paid twice, as both include the Fuel Adder. The MOC multipliers are outdated and reflect a market design prior to the inclusion of the Operating Reserve Demand Curve (ORDC) Fuel Adder and the Exceptional Fuel Cost process.A 100%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. |

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| 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)(f) 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.

(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 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 an estimated Fuel 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 Fuel 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 Fuel 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 Fuel 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:

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| ***[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* = Max [GIHR *q, r* \* Max(FIP, WAFP *q, r, h*), (IHR *q, r* \* FPRC *q, r* + OM *q, r*)]

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| ***[NPRR1058: Replace the formula “MOC q, r, h” above with the following upon system implementation:]***MOC *q, r, h* = Max [GIHR *q, r* \* 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* = Max(WAFP *q, r, h*, FIP + FA *q, r*) \* RTPERFIP *q, r* / 100 + FOP \* RTPERFOP *q, r* / 100

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* = 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 |
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| 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, 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, 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, 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. |
| FA *q, r* | $/MMBtu | *Fuel Adder*—The Fuel Adder as defined in Section 2.1, Definitions, for the Resource *r.*  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, 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. |
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| ***[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 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.

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| ***[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.

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| ***[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).

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| ***[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. |

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

(d) 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.

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

(e) 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 Fuel Adder. For Resources without approved verifiable costs, the Fuel 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) 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) 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.

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

(g) 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.

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

(h) 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, 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).

(i) 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.

(j) 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 (i) above. The attestation must state that the costs associated with the Exceptional Fuel Cost are not routine costs.

(k) 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 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.

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

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 Fuel Adder 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 Fuel Adder 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 Fuel Adder 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 the difference calculated in paragraph (1) above.

(3) 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.

(4) 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.

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| ***[NPRR1014: Insert paragraph (5) below upon system implementation and renumber accordingly:]***(5) Energy Storage Resources (ESRs) are not subject to RUC Clawback Charges.  |

(5) 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, RUCMEREV96 *q, r, i* + Max(0, 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. |
| 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 paragraph (2) 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 paragraph (2) 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. |

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:

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

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| [NPRR885: Insert Section 6.6.6.9 below upon system implementation:]**6.6.6.9 MRA Payment for Deployment Event**(1) The deployment event payment to each QSE representing a Generation Resource MRA:MRADEAMT *q, r, h* = (-1) \* Max{EDPRICE *q, r, m*, (FIP + MRACEFA *q, r*) \* MRAPSUFQ *q, r*} \* MRAFLAG *q, r, h* */* MRAH *q, r*(2) The deployment event payment to each QSE representing a Demand Response MRA or Other Generation MRA:MRADEAMT *q, r, h* = (-1) \* Max{EDPRICE *q, r*, (FIP + MRACEFA *q, r*) \*  MRAPSUFQ *q, r*} \* MRAEPRF *q, r, m* */* MRAH *q, r*The above variables are defined as follows:

| **Variable** | **Unit** | **Definition** |
| --- | --- | --- |
| MRADEAMT *q, r, h* | $ | *Must-Run Alternative Deployment Event Amount per QSE per Resource by hour*—The deployment event payment to QSE *q* for MRA *r*, for the MRA Contracted Hour *h*. Where for a Combined Cycle Train, the Resource r is the Combined Cycle Train. |
| FIP | $/MMBtu | *Fuel Index Price*—The FIP for the Operating Day. |
| EDPRICE *q, r* | $ | *Event Deployment Price per QSE per Resource*—The event deployment price to QSE *q* for MRA *r*, as specified in the MRA Agreement. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| MRAEPRF *q, r, m* | None | *Must-Run Alternative Event Performance Reduction Factor per QSE per Resource* —The event performance reduction factor of the MRA *r* represented by QSE *q*, for each hour of the month *m*, as calculated per Section 3.14.4.6.5, MRA Event Performance Measurement and Verification. If the MRAEPRF for the month is not available then the most recent MRAEPRF prior to the month of the Operating Day shall be used. If no previous MRAEPRF is available then MRAEPRF shall be set to 1. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| MRAPSUFQ *q, r* | MMBtu | *Must-Run Alternative Proxy Startup Fuel Quantity per QSE per Resource*⎯The proxy start up fuel quantity specified in the MRA Agreement for MRA *r* represented by QSE *q*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| MRAH *q, r* | Hour | *Must-Run Alternative Hours*—The number of hours during which MRA *r* represented by QSE *q* received a deployment instruction for each deployment event for the Operating Day. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| MRAFLAG *q, r, h* | none | *Must-Run Alternative Flag –* An indicator to signify that an MRA *r* represented by QSE *q* followed the deployment instruction for the event for the hour *h*. An MRAFLAG value of 1 represents followed and a 0 represents did not follow the deployment. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| MRACEFA*q, r* | $/MMBtu | *Must-Run Alternative Contractual Estimated Fuel Adder*—The 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* = Max [0, (RTSPP*p, i* \* RTMG*q, r, i* + (-1) \* (EMREAMT *q, r, p, i*  + VSSVARAMT *q, r, i*+ VSSEAMT *q, r, i*) + Max(0, (RTOLHSLRA *q, r, p, i* – RTMGA *q, r, p, i*) \* (RTRSVPOR *i* + RTRDP *i*)))]

SWAC *q, r, d* = SWFC *q, r, d* + SWEIC *q, r, d* + SWASIC *q, r, d* + SWMWDC *q, r, d* + SWFIPC *q, r, d*

SWPSLR *q, r, d* = (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* = ((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* \* 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* = ((PAHR *r, i* \* FIP + STOM *rc*) \* AENG *r, i*)

The above variables are defined as follows:

| Variable | Unit | Definition |
| --- | --- | --- |
| SWMWAMT *q, r* | $ | *Switchable Generation Make-Whole Payment*—The Switchable Generation Make-Whole Payment to the QSE *q,* for Resource *r*, for the hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| SWCG *q, r, d* | $ | *Switchable Generation Cost Guarantee*—The sum of eligible Startup Costs, minimum-energy costs, operating costs, and other Switchable Generation approved costs for Resource *r* represented by QSE *q* for all instructed hours, for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| OPC *r, d* | $ | *Operational Cost* – The operational cost for the Resource *r* for the Operating Day *d* in the non-ERCOT Control Area. The operating costs represent the costs the Resource would have incurred to generate the awarded energy in the non-ERCOT Control Area Day-Ahead market absent a request to switch to ERCOT. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| AENG *r, i* | MWh | *Awarded Energy Non-ERCOT Day-Ahead Market* – The awarded energy in the non-ERCOT Day-Ahead Market for the Resource *r* during the Interval *i*. The awarded energy in the non-ERCOT Control Area Day-Ahead market represents the energy award for the interval that was not generated by the Resource due to the switch to ERCOT. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| SWSUC *q ,r, d*  | $ | *Switchable Generation* *Start-Up Cost* —The Startup Costs for Resource *r* represented by QSE *q* for startup hours, for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| SWPSLR *q ,r, d*  | $ | *Switchable Generation Physical Switch Lost Revenue –* The loss of revenue, net of any saved costs including avoided fuel consumption, experienced by the QSE when the Combined Cycle Generation Resource operating in ERCOT must reduce its output to accommodate a switch from a non-ERCOT Control Area of one or more turbines needed to achieve a Combined Cycle Generation Resource configuration instructed by ERCOT. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| RTLPX *q, r, i* | MWh | *Real-Time Proxy Generation per QSE per Resource by Settlement Interval*—The Real-Time energy that was not generated in ERCOT by Combined Cycle Train, *r*, represented by QSE *q*, for the 15-minute Settlement Interval *i*, due to a reduction in output that was necessary to facilitate a switch of another unit in the same Combined Cycle Train to the ERCOT System from a non-ERCOT Control Area, or to a non-ERCOT Control Area from the ERCOT System, when the switch is instructed by ERCOT.During a shutdown to switch to ERCOT, the value of RTLPX will be determined based on the reduced generation, by interval, for the period starting from the commencement of the shutdown sequence in the non-ERCOT Control Area until breaker close in ERCOT. The reduction in generation shall be determined based on the last metered output value for the Combined Cycle Generation Resource operating in ERCOT immediately prior to the commencement of the shutdown sequence in the non-ERCOT Control Area as compared with the actual metered output during the relevant period, but only to the extent ERCOT determines the reduction in output was necessary to facilitate the switch. During a shutdown after an ERCOT release of the SWGR, the value of RTLPX will be determined based on the reduced generation, by interval, for the period starting from the commencement of the shutdown sequence in the ERCOT Control Area until breaker close in the non-ERCOT Control Area, with a maximum duration equal to the duration of the switch from the non-ERCOT Control Area to ERCOT pursuant to the RUC instruction. This proxy value will apply only if the QSE shuts down the unit within 60 minutes after the ERCOT release. The reduction in generation shall be determined based on the last metered output value for the Combined Cycle Generation Resource operating in ERCOT immediately prior to the commencement of the shutdown sequence in ERCOT, as compared with the actual metered output during the relevant period, but only to the extent ERCOT determines the reduction in output was necessary to facilitate the switch.  |
| SFC *d* | MMBtu | *Saved Fuel Consumption* — Fuel quantity saved due to an output reduction of the combustion turbine(s) operating in ERCOT during the relevant period if necessary to accommodate the switch to and from the ERCOT area. |
| SWSF | none | *Switchable Generation* *Startup Factor* —The Switchable Generation Startup Factor for an SWGR. The SWSF shall be set to a value of 2 if the SWGR has a COP Resource Status of EMRSWGR within 24 hours of being released by the ERCOT Operator. Otherwise, the SWSF shall be set to a value of 1. |
| SWMEC *q, r, d* | $ | *Switchable Generation* *Minimum Energy Cost* —The minimum energy costs for Resource *r* represented by QSE *q* during instructed hours, for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| SWOC *q, r, d* | $ | *Switchable Generation* *Operating Cost* —The operating costs for Resource *r* represented by QSE *q* during instructed hours, for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. Switchable generation operating cost represents the Real-Time operating costs in ERCOT reduced by the savings in operating costs not incurred due to the switch from the non-ERCOT Control Area. |
| SWAC *q, r, d* | $ | *Switchable Generation Approved Costs –* The total amount of the calculation of financial loss, as submitted by the QSE *q* for the Resource *r,* as approved by ERCOT for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| SWFC *q, r, d*  | $ | *Switchable Generator* *Fuel Cost* —The incremental fuel costs and fees for Resource *r* represented by QSE *q* for all instructed hours, for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. Incremental fuel costs must be based on those costs incurred as described in Section 9.14.9, Incremental Fuel Costs for Switchable Generation Make-Whole Payment.  |
| SWFIPC *q, r, d*  | $ | *Switchable Generator Fuel Imbalance Penalty Cost* —The fuel imbalance penalty cost for Resource *r* represented by QSE *q*, for the Operating Day, arising from the SWGR not consuming its contracted fuel quantities as a result of a switch from a non-ERCOT Control Area as requested by ERCOT. Fuel imbalance penalty costs are limited to those costs assessed for the period starting at the initiation of the ramp-down in the non-ERCOT Control Area to two hours following the time ERCOT released the SWGR. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| SWEIC *q, r, d*  | $ | *Switchable Generator* *Energy Imbalance Cost* —The energy imbalance costs for Resource *r* represented by QSE *q* for instructed hours, for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. Energy imbalance costs represent Real-Time imbalance charges for the amount of energy the SWGR was not able to provide as required by its DAM commitment from the non-ERCOT Control Area, starting from the beginning of the ramp-down period in the other grid to two hours following the time ERCOT released the Resource. |
| SWASIC *q, r, d* | $ | *Switchable Generator* *Ancillary Services Imbalance Cost* —The Ancillary Service imbalance costs for Resource *r* represented by QSE *q* for instructed hours, for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. Ancillary Service imbalance costs represent Real-Time imbalance charges for the amount of Ancillary Services the SWGR was not able to provide as required by its Day-Ahead commitment from the non-ERCOT Control Area, starting from the time of shutdown in the other grid to two hours following the time ERCOT released the Resource. |
| SWMWDC *q, r, d* | $ | *Switchable Generator* *Make-Whole Payment Distribution Cost* —The Make-Whole Payment distribution costsfor Resource *r* represented by QSE *q* for instructed hours, for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. Make-Whole Payment distribution costs represent charges from non-ERCOT Control Area from the time of shutdown in the other grid to two hours following the time ERCOT released the Resource. |
| SWRTREV *q, r, d* | $ | *Switchable Generation Real-Time Revenues –* The sum of energy revenues for the Resource *r,* represented by QSE *q,* during all instructed hours for the Operating Day *d.*  Where for a Combined Cycle Train, Resource *r* is the Combined Cycle Train. |
| GASPERSU *r, s* | none | *Percent of Natural Gas to Operate per Start*—The percentage of natural gas used by Resource *r* to operate per start *s*, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| OILPERSU *r, s* | none | *Percent of Oil to Operate per Start*—The percentage of fuel oil used by Resource *r* to operate per start *s*, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| SFPERSU *r, s* | none | *Percent of Solid Fuel to Operate per Start*—The percentage of solid fuel used by Resource *r* to operate per start *s*, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| GASPERME *r* | None | *Percent of Natural Gas to Operate at LSL*—The percentage of natural gas used by Resource *r* to operate at LSL, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| OILPERME *r* | None | *Percent of Oil to Operate at LSL*—The percentage of fuel oil used by Resource *r* to operate at LSL, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| SFPERME *r* | None  | *Percent of Solid Fuel to Operate at LSL*—The percentage of solid fuel used by Resource *r* to operate at LSL, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| DAFCRS *r, s* | MMBtu/Start | *Day-Ahead Actual Fuel Consumption Rate per Start*—The actual fuel consumption rate for Resource *r* to startup per start type *s*, adjusted by VOXR as defined in the Verifiable Cost Manual. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. For additional information, see Verifiable Cost Manual Section 3.3, Startup Fuel Consumption. |
| VOMS *r, s* | $/Start | *Variable Operations and Maintenance Cost per Start*—The operations and maintenance cost for Resource *r* to startup, per start *s*, including an adjustment for emissions costs. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. For additional information, see Verifiable Cost Manual Section 3.2, Submitting Startup Costs. |
| VOMLSL *r* | $/MWh | *Variable Operations and Maintenance Cost at LSL*—The operations and maintenance cost for Resource *r* to operate at LSL, including an adjustment for emissions costs. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. For additional information, see Verifiable Cost Manual Section 4.2, Submitting Minimum Energy Costs. |
| LSL *q, r, i* | MW | *Low Sustained Limit*—The LSL of Generation Resource *r* represented by QSE *q* for the hour that includes the Settlement Interval *i*, as submitted in the COP. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.  |
| RTMG *q, r, i* | MWh | *Real-Time Metered Generation per QSE per Resource by Settlement Interval by hour*—The Real-Time energy from Resource *r* represented by QSE *q*, for the 15-minute Settlement Interval *i*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| AHR *r, i* | MMBtu / MWh | *Average Heat Rate per Resource*– The verifiable average heat rate for the Resource *r*, for the operating level, for the 15-minute Settlement Interval *i*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| OM *r* | $/MWh | *Verifiable Operations and Maintenance Cost Above LSL*– The O&M cost for Resource *r* to operate above LSL. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. See the Verifiable Cost Manual for additional information.  |
| SWIHR *q, r, d* | none | *Switchable Generation Instructed Hours*—The total number of Switchable Generation instructed hours, for Resource *r* represented by QSE *q,* for the Operating Day *d*. When one or more Combined Cycle Generation Resources are committed by ERCOT, the total number of instructed hours is calculated for the Combined Cycle Train for all switchable instructed Combined Cycle Generation Resources. |
| SFP | $/MMBtu | *Solid Fuel Price*—The solid fuel index price is $1.50.  |
| GASPEROL *r* | none | *Percent of Natural Gas to Operate Above LSL*—The percentage of natural gas used by Resource *r* to operate above LSL, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| OILPEROL *r* | none | *Percent of Oil to Operate Above LSL*—The percentage of fuel oil used by Resource *r* to operate above LSL, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| SFPEROL *r* | none | *Percent of Solid Fuel to Operate Above LSL*—The percentage of solid fuel used by Resource *r* to operate above LSL, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| ADJSWSUC *q, r, d* | $ | *Adjustment to Switchable Generation* *Start-Up Cost* — Adjustment to Switchable Generation Start-up Cost for Resource *r* represented by QSE *q*, for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. This adjustment may include eligible startup transition costs for a Combined Cycle Train or costs for any SWGR not captured in other billing determinants. |
| RCGSC s, *rc* | $/Start | *Resource Category Generic Startup Cost*—The Resource Category Generic Startup Cost cap for the category of the Resource *rc*, according to Section 4.4.9.2.3, Startup Offer and Minimum-Energy Offer Generic Caps, for the Operating Day. |
| RCGMEC *i, rc* | $/MWh | *Resource Category Generic Minimum-Energy Cost*—The Resource Category Generic Minimum Energy Cost cap for the category of the Resource *rc*, according to Section 4.4.9.2.3, for the Operating Day. |
| PAHR *r, i* | MMBtu / MWh | *Proxy Average Heat Rate-* The proxy average heat rate for the Resource *r* for the 15-minute Settlement Interval *i*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| STOM *rc* | $/MWh | *Standard Operations and Maintenance Cost -* The standard O&M cost for the Resource Category *rc* for operations above LSL, shall be set to the minimum energy variable O&M costs, as described in paragraph (6)(c) of Section 5.6.1, Verifiable Costs.  |
| RTSPP *p, i* | $/MWh | *Real-Time Settlement Point Price*—The Real-Time Settlement Point Price at Settlement Point *p*, for the 15-minute Settlement Interval *i*. |
| FIP | $/MMBtu | *Fuel Index Price*—As defined in Section 2.1, Definitions. |
| FOP | $/MMBtu | *Fuel Oil Price*—As defined in Section 2.1. |
| FA *r* | $/MMBtu | *Fuel Adder* —The Fuel Adder as defined in Section 2.1, Definitions, for the Resource *r.*  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. |

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| [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:**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* = 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* + 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*) \* 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* = ((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* \* 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* = ((PAHR *r, i* \* FIP + STOM *rc*) \* AENG *r, i*) The above variables are defined as follows:

| **Variable** | **Unit** | **Definition** |
| --- | --- | --- |
| SWMWAMT *q, r* | $ | *Switchable Generation Make-Whole Payment*—The Switchable Generation Make-Whole Payment to the QSE *q,* for Resource *r*, for the hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| SWCG *q, r, d* | $ | *Switchable Generation Cost Guarantee*—The sum of eligible Startup Costs, minimum-energy costs, operating costs, and other Switchable Generation approved costs for Resource *r* represented by QSE *q* for all instructed hours, for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| OPC *r, d* | $ | *Operational Cost* – The operational cost for the Resource *r* for the Operating Day *d* in the non-ERCOT Control Area. The operating costs represent the costs the Resource would have incurred to generate the awarded energy in the non-ERCOT Control Area Day-Ahead market absent a request to switch to ERCOT. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| AENG *r, i* | MWh | *Awarded Energy Non-ERCOT Day-Ahead Market* – The awarded energy in the non-ERCOT Day-Ahead Market for the Resource *r* during the Interval *i*. The awarded energy in the non-ERCOT Control Area Day-Ahead market represents the energy award for the interval that was not generated by the Resource due to the switch to ERCOT. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| SWSUC *q ,r, d*  | $ | *Switchable Generation* *Start-Up Cost* —The Startup Costs for Resource *r* represented by QSE *q* for startup hours, for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| SWPSLR *q ,r, d*  | $ | *Switchable Generation Physical Switch Lost Revenue –* The loss of revenue, net of any saved costs including avoided fuel consumption, experienced by the QSE when the Combined Cycle Generation Resource operating in ERCOT must reduce its output to accommodate a switch from a non-ERCOT Control Area of one or more turbines needed to achieve a Combined Cycle Generation Resource configuration instructed by ERCOT. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| RTLPX *q, r, i* | MWh | *Real-Time Proxy Generation per QSE per Resource by Settlement Interval*—The Real-Time energy that was not generated in ERCOT by Combined Cycle Train, *r*, represented by QSE *q*, for the 15-minute Settlement Interval *i*, due to a reduction in output that was necessary to facilitate a switch of another unit in the same Combined Cycle Train to the ERCOT System from a non-ERCOT Control Area, or to a non-ERCOT Control Area from the ERCOT System, when the switch is instructed by ERCOT.During a shutdown to switch to ERCOT, the value of RTLPX will be determined based on the reduced generation, by interval, for the period starting from the commencement of the shutdown sequence in the non-ERCOT Control Area until breaker close in ERCOT. The reduction in generation shall be determined based on the last metered output value for the Combined Cycle Generation Resource operating in ERCOT immediately prior to the commencement of the shutdown sequence in the non-ERCOT Control Area as compared with the actual metered output during the relevant period, but only to the extent ERCOT determines the reduction in output was necessary to facilitate the switch. During a shutdown after an ERCOT release of the SWGR, the value of RTLPX will be determined based on the reduced generation, by interval, for the period starting from the commencement of the shutdown sequence in the ERCOT Control Area until breaker close in the non-ERCOT Control Area, with a maximum duration equal to the duration of the switch from the non-ERCOT Control Area to ERCOT pursuant to the RUC instruction. This proxy value will apply only if the QSE shuts down the unit within 60 minutes after the ERCOT release. The reduction in generation shall be determined based on the last metered output value for the Combined Cycle Generation Resource operating in ERCOT immediately prior to the commencement of the shutdown sequence in ERCOT, as compared with the actual metered output during the relevant period, but only to the extent ERCOT determines the reduction in output was necessary to facilitate the switch.  |
| SFC *d* | MMBtu | *Saved Fuel Consumption* — Fuel quantity saved due to an output reduction of the combustion turbine(s) operating in ERCOT during the relevant period if necessary to accommodate the switch to and from the ERCOT area. |
| SWSF | None | *Switchable Generation* *Startup Factor* —The Switchable Generation Startup Factor for an SWGR. The SWSF shall be set to a value of 2 if the SWGR has a COP Resource Status of EMRSWGR within 24 hours of being released by the ERCOT Operator. Otherwise, the SWSF shall be set to a value of 1. |
| SWMEC *q, r, d* | $ | *Switchable Generation* *Minimum Energy Cost* —The minimum energy costs for Resource *r* represented by QSE *q* during instructed hours, for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| SWOC *q, r, d* | $ | *Switchable Generation* *Operating Cost* —The operating costs for Resource *r* represented by QSE *q* during instructed hours, for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. Switchable generation operating cost represents the Real-Time operating costs in ERCOT reduced by the savings in operating costs not incurred due to the switch from the non-ERCOT Control Area. |
| SWAC *q, r, d* | $ | *Switchable Generation Approved Costs –* The total amount of the calculation of financial loss, as submitted by the QSE *q* for the Resource *r,* as approved by ERCOT for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| SWFC *q, r, d*  | $ | *Switchable Generator* *Fuel Cost* —The incremental fuel costs and fees for Resource *r* represented by QSE *q* for all instructed hours, for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. Incremental fuel costs must be based on those costs incurred as described in Section 9.14.9, Incremental Fuel Costs for Switchable Generation Make-Whole Payment.  |
| SWFIPC *q, r, d*  | $ | *Switchable Generator Fuel Imbalance Penalty Cost* —The fuel imbalance penalty cost for Resource *r* represented by QSE *q*, for the Operating Day, arising from the SWGR not consuming its contracted fuel quantities as a result of a switch from a non-ERCOT Control Area as requested by ERCOT. Fuel imbalance penalty costs are limited to those costs assessed for the period starting at the initiation of the ramp-down in the non-ERCOT Control Area to two hours following the time ERCOT released the SWGR. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| SWEIC *q, r, d*  | $ | *Switchable Generator* *Energy Imbalance Cost* —The energy imbalance costs for Resource *r* represented by QSE *q* for instructed hours, for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. Energy imbalance costs represent Real-Time imbalance charges for the amount of energy the SWGR was not able to provide as required by its DAM commitment from the non-ERCOT Control Area, starting from the beginning of the ramp-down period in the other grid to two hours following the time ERCOT released the Resource. |
| SWASIC *q, r, d* | $ | *Switchable Generator* *Ancillary Services Imbalance Cost* —The Ancillary Service imbalance costs for Resource *r* represented by QSE *q* for instructed hours, for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. Ancillary Service imbalance costs represent Real-Time imbalance charges for the amount of Ancillary Services the SWGR was not able to provide as required by its Day-Ahead commitment from the non-ERCOT Control Area, starting from the time of shutdown in the other grid to two hours following the time ERCOT released the Resource. |
| SWMWDC *q, r, d* | $ | *Switchable Generator* *Make-Whole Payment Distribution Cost* —The Make-Whole Payment distribution costsfor Resource *r* represented by QSE *q* for instructed hours, for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. Make-Whole Payment distribution costs represent charges from non-ERCOT Control Area from the time of shutdown in the other grid to two hours following the time ERCOT released the Resource. |
| SWRTREV *q, r, d* | $ | *Switchable Generation Real-Time Revenues –* The sum of energy revenues for the Resource *r,* represented by QSE *q,* during all instructed hours for the Operating Day *d.*  Where for a Combined Cycle Train, Resource *r* is the Combined Cycle Train. |
| GASPERSU *r, s* | none | *Percent of Natural Gas to Operate per Start*—The percentage of natural gas used by Resource *r* to operate per start *s*, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| OILPERSU *r, s* | none | *Percent of Oil to Operate per Start*—The percentage of fuel oil used by Resource *r* to operate per start *s*, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| SFPERSU *r, s* | none | *Percent of Solid Fuel to Operate per Start*—The percentage of solid fuel used by Resource *r* to operate per start *s*, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| GASPERME *r* | None | *Percent of Natural Gas to Operate at LSL*—The percentage of natural gas used by Resource *r* to operate at LSL, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| OILPERME *r* | None | *Percent of Oil to Operate at LSL*—The percentage of fuel oil used by Resource *r* to operate at LSL, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| SFPERME *r* | None  | *Percent of Solid Fuel to Operate at LSL*—The percentage of solid fuel used by Resource *r* to operate at LSL, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| DAFCRS *r, s* | MMBtu/Start | *Day-Ahead Actual Fuel Consumption Rate per Start*—The actual fuel consumption rate for Resource *r* to startup per start type *s*, adjusted by VOXR as defined in the Verifiable Cost Manual. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. For additional information, see Verifiable Cost Manual Section 3.3, Startup Fuel Consumption. |
| VOMS *r, s* | $/Start | *Variable Operations and Maintenance Cost per Start*—The operations and maintenance cost for Resource *r* to startup, per start *s*, including an adjustment for emissions costs. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. For additional information, see Verifiable Cost Manual Section 3.2, Submitting Startup Costs. |
| VOMLSL *r* | $/MWh | *Variable Operations and Maintenance Cost at LSL*—The operations and maintenance cost for Resource *r* to operate at LSL, including an adjustment for emissions costs. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. For additional information, see Verifiable Cost Manual Section 4.2, Submitting Minimum Energy Costs. |
| LSL *q, r, i* | MW | *Low Sustained Limit*—The LSL of Generation Resource *r* represented by QSE *q* for the hour that includes the Settlement Interval *i*, as submitted in the COP. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.  |
| RTMG *q, r, i* | MWh | *Real-Time Metered Generation per QSE per Resource by Settlement Interval by hour*—The Real-Time energy from Resource *r* represented by QSE *q*, for the 15-minute Settlement Interval *i*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| AHR *r, i* | MMBtu / MWh | *Average Heat Rate per Resource*– The verifiable average heat rate for the Resource *r*, for the operating level, for the 15-minute Settlement Interval *i*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| OM *r* | $/MWh | *Verifiable Operations and Maintenance Cost Above LSL*– The O&M cost for Resource *r* to operate above LSL. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. See the Verifiable Cost Manual for additional information.  |
| SWIHR *q, r, d* | none | *Switchable Generation Instructed Hours*—The total number of Switchable Generation instructed hours, for Resource *r* represented by QSE *q,* for the Operating Day *d*. When one or more Combined Cycle Generation Resources are committed by ERCOT, the total number of instructed hours is calculated for the Combined Cycle Train for all switchable instructed Combined Cycle Generation Resources. |
| SFP | $/MMBtu | Solid Fuel Price—The solid fuel index price is $1.50.  |
| GASPEROL *r* | none | *Percent of Natural Gas to Operate Above LSL*—The percentage of natural gas used by Resource *r* to operate above LSL, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| OILPEROL *r* | none | *Percent of Oil to Operate Above LSL*—The percentage of fuel oil used by Resource *r* to operate above LSL, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| SFPEROL *r* | none | *Percent of Solid Fuel to Operate Above LSL*—The percentage of solid fuel used by Resource *r* to operate above LSL, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| ADJSWSUC *q, r, d* | $ | *Adjustment to Switchable Generation* *Start-Up Cost* — Adjustment to Switchable Generation Start-up Cost for Resource *r* represented by QSE *q*, for the Operating Day *d*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. This adjustment may include eligible startup transition costs for a Combined Cycle Train or costs for any SWGR not captured in other billing determinants. |
| RCGSC s, *rc* | $/Start | *Resource Category Generic Startup Cost*—The Resource Category Generic Startup Cost cap for the category of the Resource *rc*, according to Section 4.4.9.2.3, Startup Offer and Minimum-Energy Offer Generic Caps, for the Operating Day. |
| RCGMEC *i, rc* | $/MWh | *Resource Category Generic Minimum-Energy Cost*—The Resource Category Generic Minimum Energy Cost cap for the category of the Resource *rc*, according to Section 4.4.9.2.3, for the Operating Day. |
| PAHR *r, i* | MMBtu / MWh | *Proxy Average Heat Rate-* The proxy average heat rate for the Resource *r* for the 15-minute Settlement Interval *i*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| STOM *rc* | $/MWh | *Standard Operations and Maintenance Cost -* The standard O&M cost for the Resource Category *rc* for operations above LSL, shall be set to the minimum energy variable O&M costs, as described in paragraph (6)(c) of Section 5.6.1, Verifiable Costs.  |
| RTSPP *p, i* | $/MWh | *Real-Time Settlement Point Price*—The Real-Time Settlement Point Price at Settlement Point *p*, for the 15-minute Settlement Interval *i*. |
| FIP | $/MMBtu | *Fuel Index Price*—As defined in Section 2.1, Definitions. |
| FOP | $/MMBtu | *Fuel Oil Price*—As defined in Section 2.1. |
| FA *r* | $/MMBtu | *Fuel Adder* — The Fuel Adder as defined in Section 2.1, Definitions, for the Resource r. 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 forResource *r* for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| RTRDREV *q, r* | $ | *Real-Time Reg-Down Revenue*— The 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

(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 Fuel Adder, X, described 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 oil adder, X, described 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.

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| ***[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 Switchable Generation Resource (SWGR) natural gas 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:

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| ***[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* = MSSUPR *q, r,* s + (MAX (0, MSSUPR afterCCGR –

MSSUPR beforeCCGR))

For all other Resources:

MSSUC *q, r, d* =  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* = (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* = (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* = (STOM *rc*) \* MSGEN *q, r, i*

Otherwise,

MSSUPR *q, r, s* = RCGSC

MSOC *q, r, d* = (PAHR *r, i* \* (MSAVGFP + 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

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| ***[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 SuspensionMake-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. |
| MSSUCADJ *q, r, d* | $ | *Market Suspension Startup Costs Adjustment –* Adjustment to the Market SuspensionMake-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 SuspensionMake-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 MarketSuspensionSettlement 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 MarketSuspensionoperating 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 *q, 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 *q, r* | $/MWh | *Raw Verifiable Operations and Maintenance Cost Above LSL –* The raw verifiable O&M cost for the Resource *r* represented by QSE *q* for operations above Low Sustained Limit (LSL). Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| 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.

|  |
| --- |
| ***[NPRR1029: Replace the definition above with the following upon system implementation:]****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. |

 |
| MSAVGFP | $/MMBtu | *Market Suspension Average Fuel Price* *–* The Market Suspensionaverage fuel price calculated based on MSAVGFIP or MSAVGFOP. |
| MSAVGFIP | $/MMBtu | *Market Suspension Average Fuel Index Price* *–* The Market Suspensionaverage Fuel Index Price (FIP) calculated as the average price of FIP for the 15 days prior to the Market Suspensionevent, 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 Suspensionevent, 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 | *Fuel Adder* *–* The Fuel Adder as defined in Section 2.1, Definitions, for the Resource *r*. 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.

|  |
| --- |
| ***[NPRR1029: Replace the definition above with the following upon system implementation:]***A Generation Resource or ESR. |

 |
| *d* | None | An Operating Day during a Market Suspensionevent. |
| *i* | None | A 15-minute Settlement Interval within the hour of an Operating Day of a Market Suspensionevent. |
| *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 SuspensionMake-Whole Payment for an Operating Day is calculated as follows:

**MSMWAMTQSETOT *q, d* =** **MSMWAMT *q, r, d***

And,

MSMWAMTTOT *d* =  MSMWAMTQSETOT *q, d*

The above variables are defined as follows:

| **Variable** | **Unit** | **Definition** |
| --- | --- | --- |
| MSMWAMTQSETOT*q, d*  | $ | *Market Suspension Make-Whole Payment per QSE –* The total payment to QSE *q* for MarketSuspensionMake-Whole Payment for the Operating Day *d*. |
| MSMWAMTTOT *d* | $ | *Market Suspension Make-Whole Payment Total –* The total payment to all QSEs for MarketSuspensionMake-Whole Payment for the Operating Day.  |
| MSMWAMT *q, r, d* | $ | *Market Suspension Make-Whole Payment –* The MarketSuspensionMake-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.

|  |
| --- |
| ***[NPRR1029: Replace the definition above with the following upon system implementation:]***A Generation Resource or ESR. |

 |
| *d* | none | An Operating Day during a Market Suspensionevent. |

(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.