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| VCMRR Number | [037](https://www.ercot.com/mktrules/issues/VCMRR037) | VCMRR Title | Related to NPRR1172, Fuel Adder Definition, Mitigated Offer Caps, and RUC Clawback |
| Date Posted | April 11, 2023 |
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| Requested Resolution  | Normal |
| Verifiable Cost Manual Sections Requiring Revision  | 2.5.1, Startup Costs3.4, Additional Rules for Submitting Fuel Costs3.5, Minimum Requirements FeeAppendix 6, Calculation and Application of Proxy Heat Rate and the Value of X for the ResourceAppendix 7, Calculation of the Variable O&M Value and Incremental Heat Rate used in Real Time Mitigation for Quick Start Generation Resources (QSGRs) |
| Related Documents Requiring Revision/Related Revision Requests | Nodal Protocol Revision Request (NPRR) 1172, Fuel Adder Definition, Mitigated Offer Caps, and RUC Clawback |
| Revision Description | This Verifiable Cost Manual Revision Request (VCMRR) applies the defined term “Fuel Adder” pursuant to NPRR1172.  |
| 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). Market efficiencies or enhancements Administrative Regulatory requirements Other: (explain)*(please select all that apply)* |
| Business Case | This VCMRR clarifies and aligns Verifiable Cost Manual terminology with the Protocols through consistent use of the new defined term, Fuel Adder |

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| Proposed Verifiable Cost Manual Language Revision |

***2.5.1 Startup Costs***

(1) Startup O&M cost values used for Real Time Mitigation are based on either Generic or approved O&M costs from a cold start position in Quick Start mode.

(2) Startup Fuel costs are determined by using 90% of the approved startup fuel (MMBtu) for a cold start, times the sum of the average fuel price for the first 15 days of the previous month and the Fuel Adder.

(3) Startup Cost will equal the sum of the Startup O&M cost plus the Startup Fuel Cost.

**3.4 Additional Rules for Submitting Fuel Costs**

(1) Filing Entities that have been approved for verifiable costs will receive a default Fuel Adder of $0.50/MMBtu, unless the Filing Entity elects to submit an actual Fuel Adder ($/MMBtu) for each Resource for verification and approval by ERCOT. For a coal-fired or lignite-fired Resource, the default Fuel Adder will be set quarterly to the maximum of $0.50/MMBtu or the Coal Fuel Adder (CF)($/MMBtu), where CF is determined by ERCOT quarterly as described in Section 14, Appendices, Appendix 11, Procedure for Determining the Fuel Adder for Coal and Lignite Resources with Approved Verifiable Costs. The default Fuel Adder will remain the default amount specified above until the Filing Entity establishes an actual Fuel Adder in those verifiable costs and the Filing Entity must continue to provide actual fuel costs as prescribed in paragraph (2) below. The Fuel Adder is included in the value of X for the Resource (VOXR) as described in Section 14, Appendix 6, Calculation and Application of Proxy Heat Rate and the Value of X for the Resource.

(2) Any Filing Entity that submits an actual Fuel Adder must provide documentation that establishes the historical costs for fuel, including transportation, spot fuel, and any additional verifiable cost associated with fuel contracts that can be easily differentiated from the standard commodity cost of fuel and clearly attributable to the Resource for the period. The Fuel Adder for a rolling 12-month period is the difference between the Filing Entity’s average fuel price paid (including all fees) during the period and the fuel price utilized by ERCOT for the corresponding Resource. The Filing Entity shall provide rolling 12-month supporting data to verify total fuel price for all purchased volumes to support the actual Resource fuel consumption. Data to support these costs should include, but are not limited to, accounting ledger entries, invoices, and copies of fuel contracts. In addition, the actual costs used to calculate the Fuel Adder may include, but are not limited to, the following categories: transportation, deliveries, storage, injection, withdrawal, imbalance, and minimum requirements fees. Other costs not described herein may be included and approved by ERCOT.

(3) Review and approval of fuel costs follows the same timeline as verifiable costs; however, ERCOT may require additional time to verify the fuel costs based on the complexity of the submission. In such case, ERCOT will notify the Filing Entity within 15 Business Days of submission if additional time is needed. For clarification on the submission timeline for the Fuel Adder, please see the table below. The Fuel Adder will be implemented the first day of the month after fuel costs have been approved.

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| **Submission Months** | **Submission Period** | **Review and Approval Period** |
| March of previous year to February of current year | April | May-June |
| September of previous year to August of current year |  October | November-December |

**3.5 Minimum Requirements Fee**

(1) A cost incurred by a Resource for transporting less fuel than the minimum required volume for the given time period, based on the contract terms.

(2) Represents a portion of the total costs of the Fuel Adder.

(3) Allocated to the total volume of fuel transported per the terms of the contract. The fee will be calculated as shown below:

**MRF ($/MMBtu) = TMRFD ($) / TF (MMBtu)**

Where:

MRF = Minimum Requirements Fee

TMRFD = Total Minimum Requirements Fee Dollars

TF = Total Fuel Transported to storage, to a Resource net of supply from storage, and for third-party sales net of supply from storage.

**Appendix 6: Calculation and Application of Proxy Heat Rate and the Value of X for the Resource**

Proxy Heat Rate Monthly (PHRM) (MMBtu/MWh) = Average (based on values for one standard deviation from the Arithmetic Mean) ERCOT Day-Ahead Hub Price (in period) (DASPPERCOT345BUS )/Average Fuel Price Index (AVGFIP)($/MMBtu) for the same period. The PHR shall be based on the 12 month rolling average of the PHRM values. The value of X for the Resource (VOXR) = Fuel Adder (FA) / Average Fuel Price Index (AVGFIP) ($/MMBtu) (in period).

The PHR is used to estimate the payments received in Real Time by Resources ramping from breaker close to LSL (see Section 14, Appendices, Appendix 5, Specification of Relevant Equations, for additional details). These estimated payments are removed from the RUC Guarantee indirectly by subtracting the product of the PHR and average generation (from breaker close to LSL) from the Resource’s approved fuel rate, which is used to establish the RUC Guarantee.

The value of X for the Resource (VOXR) is used to compensate Resources for the actual cost of transporting and purchasing spot fuel. VOXR = Fuel Adder ($/MMBtu) / Average Fuel Index Price (AVGFIP) ($/MMBtu) (in a 15 day period – see item 2 below).

For additional information on the Fuel Adder, see Section 3, Verifiable Startup Costs.

1. The period for the FIP and DASPP data used in calculating the PHR and VOXR is the first 15 days of the month prior to the effective month.

2. ERCOT shall publish the results for PHR 8 days prior to the first day of each effective month.

3. ERCOT publishes the PHR on the ERCOT website and on the Market Information System (MIS) Secure Area as Public Reference Data Extract (PRDE).

**Appendix 7: Calculation of the Variable O&M Value and Incremental Heat Rate used in Real Time Mitigation for Quick Start Generation Resources (QSGRs)**

Variable O&M rate ($/MWh) = Variable O&M (above LSL) + Startup Costs ($) / G (MWh)

Where

Variable O&M (above LSL) = approved Variable O&M above LSL if filed in a resources verifiable costs filing or 0 if not filed.

Startup Costs = Startup O&M Cost + Startup Fuel Cost

Startup O&M Cost = Approved Startup O&M Costs in a cold start position (Verified (QSGR mode) or Standard) or Resource Specific Generic Startup O&M Costs

Startup Fuel Cost = 90% of the approved fuel rate in a cold start position times the sum of the average fuel price for the first 15 days of the previous month and the Fuel Adder.

G = average generation during Minimum up time (MWh)

Where

G (MWh) = 75% \* HSL (MW) \* L (Hr)

 and

HSL (MW) = average of the seasonal HSL in the Resource Registration data

 L = Max {Resource Registration Min Up Time, Average number of running hours per start in period, or 2} (hr)

 Where:

Average number of running hours per start in period = average run time per start over the 20 consecutive day period for electrical and physically similar QSGRs at the same plant site. The average run time per start shall be determined by dividing the total running hours by the total number of starts during the 20 consecutive day period. For Resources operating on the first interval of the first day of the 20 consecutive day period, an additional start shall be considered in the calculation of the average run time.

The equation for calculating Variable O&M rate for QSGR in the MOC is as follows:

Variable O&M rate ($/MWh) = Variable O&M (above LSL) + Startup Costs ($) / {75% \* HSL (MW) \* L (HR)}

**Adj. Incremental Heat Ratep (MMBtu/MWh)** = (Incremental Heat ratep + Minimum Energy Component)

Where

Incremental Heat ratep (IHRp)= approved incremental heat rate (IHR) points file in the resource verifiable cost filing or the generic IHR in the Protocols

Where:

p = number of incremental heat rate point pairs (i.e. MW and IHR) used to describe the cost of the next MW of generation

Minimum Energy Component (MEC) = the difference between the Average Heat Rate (AHR) and the Incremental Heat Rate (IHR) at the Midpoint of the QSGR Dispatch Range. These heat rate values shall be based on the values provided in the resource verifiable cost filing or 0 if the resource has not filed for verifiable costs.

Where:

 Midpoint of QSGR Dispatch Range (MDR) = HSL - (HSL – LSL) \* 50%

MEC = AHR@MDR – IHR@MDR

The equation for calculating Adj. Incremental Heat Rate for QSGR used in the MOC calculations is as follows:

Adj. Incremental Heat Ratep (MMBtu/MWh) = IHRp + MEC

**Sample Calculation**

 HSL = 70 MW

 Start O&M = $1,505/Start

 Start Fuel = 100 MMBtu

 Variable O&M (above LSL) = $1.5/MWh

 Resource Registration Min Up Time = 1 hour

 Actual Run Time = 1 hour

 Fuel Index Price (FIP) = $5/MMBtu

 Resource Fuel Adder = $0.50/MMBtu

 IHR = 10 MMBtu/MWh

 MEC = 2.5 MMBtu/MWh

 Fuel Adder = $0.50/MMBtu

Start Fuel adjusted for energy produced during startup = Start Fuel \* 90%

**Therefore to determine Variable O&M rate:**

Variable O&M rate ($/MWh) = Variable O&M (above LSL) + Startup Costs ($) / {75% \* HSL (MW) \* L (Hr)}

 Startup costs = $1,505 + (100 MMBtu + (100 MMBtu\* 0.1)) \* 90% \* $5/MMBtu

=$1,505 + (110 MMBtu) \* 90% \* $5/MMBtu

=$1,505 + $495 = $2,000

 L = Max {Resource Registration Min Up Time, Average number of running hours in period, or 2} (hr)

= Max{1, 1, 2} = 2

 Variable O&M rate ($/MWh) = $1.50/MWh + $2,000 / (75% \* 70 \* 2)

 = $ 20.55/MWh

**And to calculate Incremental Heat Rate for one point:**

Adj. Incremental Heat Ratep (MMBtu/MWh) = IHRp + MEC

 IHRp1 = 10 MMBtu/MWh + 2.5 MMBtu/MWh

= 12.5 MMBtu/MWh

**Therefore the Mitigated Offer Cap (MOC) calculations are as follows:**

 MOC ($/MWh) = (IHRp \* (FIP + FA) + Variable O&M rate) \* W

Where

 W = Capacity Factor Multiplier (range of multipliers defined in Protocol Section 4.4.9.4.1, Mitigated Offer Cap) = 1.40

 MOC = (12.5 MMBtu/MWh \* ($5/MMBtu + $0.50) + $20.55/MWh) \* 1.4

= ($68.75/MWh + $20.55/MWh) \* 1.4

= ($89.30) \* 1.4 = $12