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| NPRR Number | [1167](https://www.ercot.com/mktrules/issues/NPRR1167) | NPRR Title | Improvements to Firm Fuel Supply Service Based on Lessons Learned |
| Date Posted | March 8, 2023 |
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| Requested Resolution  | Normal |
| Nodal Protocol Sections Requiring Revision  | 2.1, Definitions3.14.5, Firm Fuel Supply Service6.6.14.1, Firm Fuel Supply Service Fuel Replacement Costs Recovery6.6.14.2, Firm Fuel Supply Service Hourly Standby Fee Payment and Fuel Replacement Cost Recovery8.1.1.2.1.6, Firm Fuel Supply Service Resource Qualification, Testing, and Decertification |
| Related Documents Requiring Revision/Related Revision Requests | None |
| Revision Description | This Nodal Protocol Revision Request (NPRR) implements several improvements to Firm Fuel Supply Service (FFSS). Specific changes include:* Amending the definition of an Availability Plan to include a requirement that, in cases where a Resource is required to have a submitted Availability Plan and has a change in availability, the Availability Plan must be updated within 60 minutes of that change in availability;
* Adding more detailed direction to incorporate the concept of having an alternate Generation Resource that may be designated to become the FFSS Resource (FFSSR) in providing FFSS.
* Adding a requirement for ERCOT to post a disclosure report of FFSS offers after each procurement period, in alignment with the expiration of confidentiality captured in the first FFSS Request for Proposal (RFP);
* Clarifying language regarding procedures for communication between ERCOT and Qualified Scheduling Entities (QSEs) regarding restocking of fuel post deployment of FFSS;
* Changing the directive for ERCOT to report to the Technical Advisory Committee (TAC) at the end of the obligation period (March 15) if deployment(s) occurred instead of within 45 days of each deployment;
* Incorporating requirements for FFSS that were previously only captured in the FFSS RFP;
* Enhancing language and processes around the qualification process, including moving the obligation to test prospective FFSSRs (both primary or alternate Generation Resources) to be prior to the FFSS procurement process. Results from this test will then be used to limit the MW quantity that the QSE can offer for that Resource into the FFSS procurement process; and
* Introducing language and processes for disqualification and decertification of a generator in being an FFSSR, including a process for remediation and recertification.
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| 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 NPRR is intended to improve several processes related to FFSS, including testing, qualification, procurement, communication during and following deployment, and reporting by ERCOT. These changes are intended to reflect aspects of the service that were previously captured solely in the RFP, provide clarity regarding existing Protocol provisions, and address areas for improvement that have been identified by stakeholders or ERCOT since the introduction of FFSS last year. |

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| Market Segment | Not applicable |

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| Proposed Protocol Language Revision |

## 2.1 DEFINITIONS

**Availability Plan**

An hourly representation of availability of Reliability Must-Run (RMR) Units or an hourly representation of the capability of Black Start Resources as submitted to ERCOT by 0600 in the Day-Ahead by Qualified Scheduling Entities (QSEs) representing RMR Units or Black Start Resources. An hourly representation of availability of Firm Fuel Supply Service Resources (FFSSRs) as submitted to ERCOT 14 days prior to the Operating Day by QSEs representing FFSSRs. QSEs must update the Availability Plan to reflect current operating conditions within 60 minutes after identifying the change in availability of the Resource.

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| ***[NPRR885: Replace the above definition “Availability Plan” with the following upon system implementation:]*****Availability Plan**An hourly representation of availability of Reliability Must-Run (RMR) Units, Must-Run Alternatives (MRAs), or an hourly representation of the capability of Black Start Resources as submitted to ERCOT by 0600 in the Day-Ahead by Qualified Scheduling Entities (QSEs) representing RMR Units, MRAs, or Black Start Resources. An hourly representation of availability of Firm Fuel Supply Service Resources (FFSSRs) as submitted to ERCOT 14 days prior to the Operating Day by QSEs representing FFSSRs. QSEs must update the Availability Plan to reflect current operating conditions within 60 minutes after identifying the change in availability of the Resource. |

**Firm Fuel Supply Service Resource (FFSSR)**

A Generation Resource that has an obligation to provide Firm Fuel Supply Service (FFSS). A primary Generation Resource that was awarded through the FFSS procurement process is the FFSSR unless the Qualified Scheduling Entity (QSE) representing the Generation Resource has met the reqirements to change the FFSSR to an approved alternate Generation Resource to reflect the manner in which the FFSS obligation is being provided.

***3.14.5 Firm Fuel Supply Service***

(1) Each Generation Resource providing or offering to provide Firm Fuel Supply Service (FFSS) , including the primary and any alternate Generation Resources identified in the FFSS Offer Submission Form, must meet technical requirements specified in Section 8.1.1, QSE Ancillary Service Performance Standards, and Section 8.1.1.1, Ancillary Service Qualification and Testing.

(2) ERCOT shall issue an RFP by August 1 of each year soliciting offers from QSEs for Generation Resources to provide FFSS. The RFP shall require offers to be submitted on or before September 1of each year.

(3) QSEs may submit offers individually for one or more Generation Resources to provide FFSS using the FFSS Offer Submission Form posted on the ERCOT website. A QSE may not submit an offer for a given Generation Resource unless it is the QSE designated by the Resource Entity associated with that Generation Resource. ERCOT must evaluate offers using criteria identified in an appendix to the RFP. ERCOT will issue FFSS awards by September 30 and will post the awards to the MIS Certified Area for each QSE that is awarded an FFSS obligation. The posting will include information such as, but not limited to, the identity of the primary Generation Resource and any alternate Generation Resource(s), the FFSS clearing price, the amount of reserved fuel associated with the FFSS award, the MW amount awarded, and the Generation Resource’s initial minimum LSL when providing FFSS. The RFP awards shall cover a period beginning November 15 of the year in which the RFP is issued and ending on March 15 of the second calendar year after the year in which the RFP is issued. A QSE may submit an offer for one or more Generation Resources to provide FFSS beginning in the same year the RFP is issued or as otherwise specified in the RFP. An FFSS Resource (FFSSR) shall be considered an FFSSR and is required to provide FFSS from November 15 through March 15 for each year of the awarded FFSS obligation period. ERCOT shall ensure FFSSRs are procured and deployed as necessary to maintain ERCOT System reliability during, or in preparation for, a natural gas curtailment or other fuel supply disruption.

(a) On the FFSS Offer Submission Form, the QSE shall disclose information including, but not limited to, the Generation Resource and any alternate Generation Resource(s), the amount of reserved fuel offered, the MW available from the capacity offered, an estimate of the time to restock fuel reserves, and each limitation of the offered Generation Resource that could affect the Generation Resource’s ability to provide FFSS.

(b) For a Generation Resource to be eligible to receive an FFSS award, the primary Generation Resource and any alternate Generation Resource(s) identified in the FFSS Offer Submission Form shall complete all applicable testing requirements as specified in Section 8.1.1.2.1.6, Firm Fuel Supply Service Resource Qualification, Testing, Decertification, and Recertification.

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| ***[NPRR1154: Replace paragraph (b) above with the following upon system implementation:]***(b) For a Generation Resource to be eligible to receive an FFSS award, the primary Genertion Resource and any alternate Generation Resource(s) identified in the FFSS Offer Submission Form shall complete all applicable testing requirements as specified in Section 8.1.1.2.1.6, Firm Fuel Supply Service Resource Qualification, Testing, Decertification, and Recertifiction. A QSE representing a FFSSR is allowed to provide the FFSS with an alternate Resource previously approved by ERCOT to replace the FFSSR. |

(c) An offer to provide FFSS is an offer to supply an awarded amount of capacity, maintain a sufficient amount of reserved fuel to meet that award for the duration requirement specified in the RFP, and to designate a specific number of emissions hours that will be reserved for the awarded FFSSR in meeting its obligation to perform in the event that FFSS is deployed. Reserved fuel, emissions hours, and other attributes, in excess of what is needed to meet the FFSS obligation can be used at the discretion of the QSE as long as sufficient fuel reserves and emissions hours are maintained for the purposes of ERCOT deployment of FFSS.

(d) Within ten Business Days of issuing FFSS awards, ERCOT will post on the ERCOT website the identity of all Generation Resources that were offered as primary Generation Resources or alternate Generation Resources to provide FFSS for the most recent procurement period, including prices and quantities offered.

(4) The QSE for an FFSSR shall ensure that the Resource is prepared and able to come On-Line or remain On-Line in order to maintain Resource availability in the event of a natural gas curtailment or other fuel supply disruption.

(a) When ERCOT issues a Watch for winter weather, ERCOT will notify all Market Participants, including all QSEs representing FFSSRs, to begin preparation for potential FFSS deployment. Such preparation may include, but is not limited to, circulation of alternate fuel to its facilities, if applicable; heat fuel oil to appropriate temperatures, if applicable; call out additional personnel as necessary, and be ready to receive a Dispatch Instruction to provide FFSS. An FFSSR may begin consuming a minimum amount of alternate fuel to validate it is ready for an FFSS deployment.

(b) In anticipation of or in the event of a natural gas curtailment or other fuel supply disruption to an FFSSR, the QSE shall notify ERCOT as soon as practicable and may request approval to deploy FFSS to generate electricity. ERCOT shall evaluate system conditions and may approve the QSE’s request. The QSE shall not deploy the FFSS unless approved by ERCOT. Upon approval to deploy FFSS, ERCOT shall issue an FFSS VDI to the QSE. ERCOT may issue separate VDIs for each Operating Day for each FFSSR that is deployed for FFSS.

(c) In conjunction with a QSE notification under paragraph (b) above, the QSE shall also report to ERCOT any environmental limitations that would impair the ability of the FFSSR to provide FFSS for the required duration of the FFSS award.

(d) ERCOT may issue an FFSS VDI without a request from the QSE, however ERCOT shall not issue an FFSS VDI without evidence of an impending or actual fuel supply disruption affecting the FFSSR.

(e) If the FFSSR is generating at a level above the FFSS MW awarded amount and that level of output cannot be sustained for the required duration of the FFSS award, ERCOT may use a manual High Dispatch Limit (HDL) override to ensure the FFSSR can continue to generate at the FFSS MW award level for the entire FFSS duration requirement specified in the RFP.

(f) The FFSSR shall continuously deploy FFSS to generate electricity until the earlier of (i) the exhaustion of the fuel reserved to generate at the FFSS MW award level for the duration requirement specified in the RFP, including any fuel that was restocked following approval or instructon from ERCOT, (ii) the fuel supply disruption no longer exists, or (iii) ERCOT determines the FFSS deployment is no longer needed. Upon satisfying one of these qualifications, ERCOT shall terminate the VDI and the FFSSR shall not be obligated to continue its FFSS deployment for the remainder of the Watch.

(g) The QSE for the FFSSR is responsible for communicating with the ERCOT Control Room the anticipated exhaustion of the reserved fuel at least six hours before that anticipated exhaustion and upon the exhaustion of that fuel.

(h) A QSE shall notify the ERCOT Control Room of the anticipated exhaustion of emissions credits or permit allowances at least six hours before the exhaustion of those credits or allowances. Upon receiving such notification, ERCOT shall modify the VDI so the FFSS deployment is terminated upon exhaustion of those credits or allowances.

(i) Upon deployment or recall of FFSS, ERCOT shall notify all Market Participants that such deployment or recall has been made, including the MW capacity of service deployed or recalled.

(5) Following the deployment of FFSS, the QSE for an FFSSR may request an approval from ERCOT to restock their fuel reserve to restore their ability to generate at the FFSS MW award level for the duration requirement specified in the RFP. Following approval from ERCOT, a QSE must restock their fuel reserve to restore their ability to generate at the FFSS MW award level for the specified duration requirement. In the event ERCOT does not receive the request to restock from a QSE representing an FFSSR, but the QSE no longer has sufficient reserved fuel to generate at the FFSS MW award level for the specified duration requirement, the QSE shall communicate to the ERCOT Control Room this reduced capability and ERCOT may instruct the QSE to restock the fuel reserve.

(6) For a Resource to be considered as an alternate for providing FFSS, the following requirements must be met. The alternate Resource must:

(a) Be able to provide net real power sufficient to generate at the same FFSS MW award level as the primary Resource for the duration requirement specified in the RFP;

(b) Be a single Generation Resource, as registered with ERCOT; and

(c) Use the same source of fuel reserve for providing FFSS as the primary Resource.

(7) An FFSS Offer Submission Form may have up to three alternate Generation Resources per primary Resource offering to provide FFSS.

(8) For FFSSRs with approved alternate Generation Resources if the FFSSR becomes unavailable, the QSE must

(a) As soon as practicable, call the ERCOT Control Room and inform an Operator that the FFSSR will be replaced by one of the alternate Generation Resource, specify which alternate Generation Resource (if multiple alternate Generation Resources have been designated), and provide an estimate of how long the replacement will be in effect;

(b) Update the Availability Plans for these Generation Resources to reflect current operating conditions within 60 minutes after identifying the change in availability of the FFSSR; and

(c) Update the Current Operating Plans (COPs) for these Generation Resources within 60 minutes after identifying the change in availability of the FFSSR.

(9) An FFSSR providing BSS must have sufficient fuel reserved to generate at the FFSS MW award level for the duration requirement specified in the RFP in addition to any fuel required for the Generation Resource to meet the contracted BSS obligation. Any remaining fuel reserve in addition to that required for meeting FFSS and BSS obligations can be used at the QSE’s discretion.

(10) If ERCOT issues an FFSS VDI to an FFSSR for the same Operating Hour where a RUC instruction was issued, then for Settlement purposes ERCOT will consider the RUC instruction as cancelled.

(11) If FFSS is deployed, then ERCOT will provide a report to the TAC or its designated subcommittee within 30 days of of the end of the FFSS obligation period. The report must include the Resources deployed and the reason for any deployments.

(12) Any QSE that submits an offer or receives an award for a SWGR to provide FFSS, and the Resource Entity that owns or controls that SWGR, shall:

(a) Not nominate the SWGR to satisfy supply adequacy or capacity planning requirements in any Control Area other than the ERCOT Region during the period of the FFSS obligation; and

(b) Take any further action requested by ERCOT to ensure that ERCOT will be classified as the “Primary Party” for the SWGR under any agreement between ERCOT and another Control Area Operator during the period of the FFSS obligation.

(13) On an annual basis after the FFSS season, ERCOT will provide a report separately for the total amounts from Section 6.6.14.1, Firm Fuel Supply Service Fuel Replacement Costs Recovery, and Section 6.6.14.2, Firm Fuel Supply Service Hourly Standby Fee Payment and Fuel Replacement Cost Recovery, to the TAC or its designated subcommittee.

**6.6.14.1 Firm Fuel Supply Service Fuel Replacement Costs Recovery**

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

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

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

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

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

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

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

(iv) The heat content of the fuel, in terms of MMBtu/gal or similar units of measurement;

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

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

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

(2) The Firm Fuel Supply Service Fuel Replacement Cost shall only represent the replacement fuel costs not recovered during the FFSS deployment period through Day-Ahead energy sales and Real-Time energy imbalance settlement revenues related to the Resource with the FFSS award.

(3) ERCOT shall allocate any approved fuel replacement costs to the hours of the corresponding FFSS deployment period when the fuel was consumed following ERCOT’s approval to switch to utilize the awarded FFSS.

**6.6.14.2 Firm Fuel Supply Service Hourly Standby Fee Payment and Fuel Replacement Cost Recovery**

(1) ERCOT shall pay the Firm Fuel Supply Service (FFSS) Hourly Standby Fee to the QSE representing the primary Generation Resource. This standby fee is determined through a competitive bidding process, with an adjustment for reliability based on an Hourly Rolling Equivalent Availability Factor, as well as adjustments for capacity and deployment.

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| ***[NPRR1154: Replace paragraph (1) above with the following upon system implementation:]***(1) ERCOT shall pay the Firm Fuel Supply Service (FFSS) Hourly Standby Fee to the QSE representing the primary Generation Resource. This standby fee is determined through a competitive bidding process, with an adjustment for reliability based on an Hourly Rolling Equivalent Availability Factor, as well as adjustments for capacity and deployment. |

(2) The FFSSR will be considered available when calculating the Firm Fuel Supply Service Hourly Rolling Equivalent Availability Factor:

(a) During each non-FFSS deployment hour for which the FFSSR shows available in its Availability Plan;

(b) During any successful FFSS deployment of the FFSSR in which the FFSSR shows available in its Availability Plan; and

(c) If the reserved fuel was exhausted during an FFSS deployment, during the period when reserved fuel for FFSS is being restocked following an instruction or approval from ERCOT to do so.

(d) Additionally, in the event the FFSSR has consumed all the fuel reserved to provide FFSS and ERCOT does not issue an instruction or approval to restore FFSS capability, the FFSSR shall be considered to be available for Settlement purposes for the remainder of the FFSS obligation period in progress.

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| ***[NPRR1154: Replace paragraph (2) above with the following upon system implementation:]***(2) The Firm Fuel Supply Service Resource will be considered available when calculating the Firm Fuel Supply Service Hourly Rolling Equivalent Availability Factor:(a) During each non-FFSS deployment hour for which the FFSSR shows available in its Availability Plan; (b) During any successful FFSS deployment of the FFSSR in which the FFSSR shows available in its Availability Plan; and (c) If the reserved fuel was exhausted during an FFSS deployment, during the period when reserved fuel for FFSS is being restocked following an instruction or approval from ERCOT to do so. (d) Additionally, in the event the FFSSR has consumed all the fuel reserved to provide FFSS and ERCOT does not issue an instruction or approval to restore FFSS capability, the FFSSR shall be considered to be available for Settlement purposes for the remainder of the FFSS obligation period in progress. |

(3) The FFSS Hourly Standby Fee is subject to reduction and claw-back provisions as described in Section 8.1.1.2.1.6, Firm Fuel Supply Service Resource Qualification, Testing, and Decertification.

(4) ERCOT shall pay an FFSS payment to each QSE for each FFSSR. The FFSS payment for each hour of November 15 through March 15, i.e., during the FFSS obligation period, is calculated as follows:

**FFSSAMT *q, r* = (-1) \* (FFSSSBF *q, r +* FFSSFRC *q, r*)**

Where:

FFSSSBF *q, r* = FFSSPR *q, r* \* FFSSCRF *q, r* \* FFSSARF *q, r* \* (1 - FFSSDRP)

And:

FFSS Capacity Reduction Factor

If (FFSSTCAP *q, r* ≥ FFSSACAP *q, r*)

Then: FFSSCRF *q, r* = 1

Otherwise: FFSSCRF *q, r* = Max (0, 1 – 2 \* (FFSSACAP *q, r* – FFSSTCAP *q, r*) **/**

FFSSACAP *q, r*)

FFSS Availability Reduction Factor

If (FFSSHREAF *q, r* ≥ 0.90)

Then: FFSSARF *q, r* = 1

Otherwise: FFSSARF *q, r* = Max (0, 1 - (0.90 - FFSSHREAF *q, r*) \* 2)

FFSS Hourly Rolling Equivalent Availability Factor

If the FFSSR is a Combined Cycle Resource:

Then: FFSSHREAF *q, train* = [$\sum\_{hr=h-1451}^{h} $max *train, hr* (max(FFSEDFLAG *q, train, hr*,

FFSSAFLAG *q, ccgr, hr*)\* (min(HSL *q, ccgr, hr*, FFSSACAP*q,*

*train*)))] / $\sum\_{hr=h-1451}^{h}($FFSSACAP *q, train*)

Otherwise:

FFSSHREAF *q, r* = $\sum\_{hr=h-1451}^{h}($max(FFSEDFLAG *q, r, hr*, FFSSAFLAG *q, r, hr*)\* (min(HSL *q, r, hr*, FFSSACAP *q, r*))) / $\sum\_{hr=h-1451}^{h}($FFSSACAP *q, r*)

Availability for a Combined Cycle Train will be determined pursuant to terms set forth in the RFP but no more than once per hour.

The above variables are defined as follows:

| **Variable** | **Unit** | **Definition** |
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| FFSSAMT *q, r* | $ | *Firm Fuel Supply Service Amount per QSE per Resource by hour*—The payment to QSE *q* for the FFSS for the primary Generation Resource *r*, for the hour, calculated each hour of November 15 through March 15 during the awarded FFSS obligation period. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| FFSSPR *q, r* | $ per hour | *Firm Fuel Supply Service Price per QSE per Resource*—The standby price of the primary Generation Resource *r* represented by QSE *q*, as specified in the FFSS award. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| FFSSCRF *q, r* | none | *Firm Fuel Supply Service Capacity Reduction Factor per QSE per Resource by hour*—The capacity reduction factor for the primary Generation Resource *r*, represented by QSE *q*, for the hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| HSL *q, r, hi* | MW | *High Sustained Limit*—The HSL of the primary Generation Resource or the alternate Generation Resource *r* represented by QSE *q* as submitted in the COP, for the hour *h*. Where for a combined cycle Resource *r* is a Combined Cycle Generation Resource. |
| FFSSFRC *q, r* | $ per hour | *Firm Fuel Supply Service Fuel Replacement Cost*—The fuel costs and fees to replace the burned fuel by the FFSSR, not recovered during the FFSS deployment period, paid to the primary Generation Resource *r* represented by QSE *q* for each FFSS instructed hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| FFSSDRP *q, r, h* | none | *Firm Fuel Supply Service Deployment Reduction Percentage*—The percentage of the Firm Fuel Supply Service Standby Fee subject to clawback per paragraphs (7) through (14) of Section 8.1.1.2.1.6 for the QSE *q*, for the primary Generation Resource *r*, for the hour *h*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| FFSSSBF *q, r* | $ | *Firm Fuel Supply Service Standby Fee per QSE per Resource by hour*—The standby fee to QSE *q* for the primary Generation Resource *r*, for the hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| FFSSTCAP *q, r* | MW | *Firm Fuel Supply Service Testing Capacity per QSE per Resource*—The tested capacity of the primary Generation Resource *r*, represented by QSE *q*, for the hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| FFSSACAP *q, r* | MW | *Firm Fuel Supply Service Awarded Capacity per QSE per Resource*—The awarded FFSS capacity of the primary Generation Resource *r*, represented by QSE *q* as specified in the FFSS award, applicable to each hour of November 15 through March 15 during the awarded FFSS obligation period. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| FFSSARF *q, r* | none | *Firm Fuel Supply Service Availability Reduction Factor per QSE per Resource by hour*—The availability reduction factor of the primary Generation Resource *r* represented by QSE *q* for the hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| FFSSHREAF *q, r* | none | *Firm Fuel Supply Service Hourly Rolling Equivalent Availability Factor per QSE per Resource by hour*—The equivalent availability factor of the primary Generation Resource *r* represented by QSE *q* over 1,452 hours, for the hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| FFSSAFLAG *q, r, hr* | none | *Firm Fuel Supply Service Availability Flag per QSE per Resource by hour*—The flag of the availability of the primary Generation Resource or the alternate Generation Resource *r* represented by QSE *q*, 1 for available and 0 for unavailable, for the hour. The availability flag shall be determined based on FFSSR availability for the current operating hour and the previous 1,451 hours of November 15 through March 15 during the awarded FFSS obligation period. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| FFSEDFLAG *q, r, hr* | none | *Firm Fuel Supply Event Deployment Flag per QSE per Resource by hour*—The flag of successful FFSS deployment of the primary Generation Resource *r* for the approved hours to restock reserved fuel for providing FFSS following the instruction or approval from ERCOT, or in the event the FFSSR has consumed all the fuel reserved to provide FFSS and ERCOT does not issue an instruction or approval to restock reserved fuel, represented by QSE *q*, 1 for available and 0 for unavailable, for the hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| *q* | none | A QSE. |
| *r* | none | A primary or alternate Generation Resource approved by ERCOT to provide FFSS. |
| *hr* | none | The index of a given hour and the previous 1,451 hours counted only during each hour of November 15 through March 15 during the awarded FFSS obligation period. |
| *h* | none | The Operating Hour. |
| *train* | none  | A Combined Cycle Train. |
| *ccgr* | none | A Combined Cycle Generation Resource within the Combined Cycle Train. |

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| ***[NPRR1154: Replace paragraph (4) above with the following upon system implementation:]***(4) ERCOT shall pay an FFSS payment to each QSE for each FFSSR. The FFSS payment for each hour of November 15 through March 15, i.e., during the FFSS obligation period, is calculated as follows:**FFSSAMT *q, r, h* = (-1) \* (FFSSSBF *q, r, h +* FFSSFRC *q, r, h*)****Where:**FFSSSBF *q, r, h* = FFSSAWARD *q, r, h* \* FFSSCRF *q, r, h* \* FFSSARF *q, r, h* \* (1 - FFSSDRP *q, r, h*)FFSSAWARD *q, r, h* = FFSSPR *q, r, h* \* FFSSACAP *q, r, h* And:FFSS Capacity Reduction FactorIf (FFSSTCAP *q, r, h* ≥ FFSSACAP *q, r, h*) Then: FFSSCRF *q, r, h* = 1Otherwise: FFSSCRF *q, r, h* = Max (0, 1 – 2 \* (FFSSACAP *q, r, h* – FFSSTCAP *q, r, h*) **/** FFSSACAP *q, r, h*)FFSS Availability Reduction FactorIf (FFSSHREAF *q, r, h* ≥ 0.90)Then: FFSSARF *q, r, h* = 1Otherwise: FFSSARF *q, r, h* = Max (0, 1 - (0.90 - FFSSHREAF *q, r, h*) \* 2)FFSS Hourly Rolling Equivalent Availability FactorFFSSHREAF *q, r, h* = $\sum\_{hr=h-1451}^{h}($max(AVCAP *q, r, hr*)) / $\sum\_{hr=h-1451}^{h}($FFSSACAP *q, r, hr*)Where,If the Resource is a Combined Cycle Train:AVCAP*q, r, hr*  = max*train,hr* (max(FFSEDFLAG *q, train, hr*, FFSSAFLAG *q, ccgr, hr*)\* min(HSL *q, ccgr, hr*, FFSSACAP*q, train, hr*))Otherwise:AVCAP *q, r, hr* = max(FFSEDFLAG *q, r, hr*, FFSSAFLAG *q, r, hr*)\* min(HSL *q, r, hr*, FFSSACAP *q, r, hr*)Availability for a Combined Cycle Train will be determined pursuant to terms set forth in the RFP but no more than once per hour. The above variables are defined as follows:

| **Variable** | **Unit** | **Definition** |
| --- | --- | --- |
| FFSSAMT *q, r, h* | $ | *Firm Fuel Supply Service Amount per QSE per Resource by hour*—The payment to QSE *q* for the FFSS for the primary Generation Resource *r*, for the hour, calculated each hour of November 15 through March 15 during the awarded FFSS obligation period. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| FFSSAWARD *q, r, h* | $ | *Firm Fuel Supply Service Award Amount per QSE by hour—*The payment to the QSE *q* for the FFSS awarded to the primary Generation Resource *r* for each hour *h*, during the awarded FFSS obligation period. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| FFSSPR *q, r, h* | $/MW per hour | *Firm Fuel Supply Service Price per QSE per Resource by hour*—The standby price of the primary Generation Resource *r* represented by QSE *q*, as specified in the FFSS award. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| FFSSCRF *q, r, h* | none | *Firm Fuel Supply Service Capacity Reduction Factor per QSE per Resource by hour*—The capacity reduction factor for the primary Generation Resource *r*, represented by QSE *q*, for the hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| HSL *q, r, hr* | MW | *High Sustained Limit*—The HSL of the primary Generation Resource or the alternate Generation Resource *r* represented by QSE *q* as submitted in the COP, for the hour *h*. Where for a combined cycle Resource *r* is a Combined Cycle Generation Resource. |
| FFSSFRC *q, r, h* | $ per hour | *Firm Fuel Supply Service Fuel Replacement Cost*—The fuel costs and fees to replace the burned fuel by the FFSSR, not recovered during the FFSS deployment period, paid to the primary Generation Resource *r* represented by QSE *q* for each FFSS instructed hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| FFSSDRP *q, r, h* | none | *Firm Fuel Supply Service Deployment Reduction Percentage*—The percentage of the Firm Fuel Supply Service Standby Fee subject to clawback per paragraphs (7) through (14) of Section 8.1.1.2.1.6, Firm Fuel Supply Service Resource Qualification, Testing, Decertification, and Recertificationfor the QSE *q*, for the primary Generation Resource *r*, for the hour *h*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| FFSSSBF *q, r, h* | $ | *Firm Fuel Supply Service Standby Fee per QSE per Resource by hour*—The standby fee to QSE *q* for the FFSS for the primary Generation Resource *r*, for the hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| FFSSTCAP *q, r, h* | MW | *Firm Fuel Supply Service Testing Capacity per QSE per Resource*—The tested capacity of the primary Generation Resource *r*, represented by QSE *q*, for the hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| FFSSACAP *q, r, hr* | MW | *Firm Fuel Supply Service Awarded Capacity per QSE per Resource*—The awarded FFSS capacity of the primary Generation Resource *r*, represented by QSE *q* as specified in the FFSS award, applicable to each hour of November 15 through March 15 during the awarded FFSS obligation period. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| FFSSARF *q, r, h* | none | *Firm Fuel Supply Service Availability Reduction Factor per QSE per Resource by hour*—The availability reduction factor of the primary Generation Resource *r* represented by QSE *q* for the hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| FFSSHREAF *q, r, h* | none | *Firm Fuel Supply Service Hourly Rolling Equivalent Availability Factor per QSE per Resource by hour*—The equivalent availability factor of the primary Generation Resource *r* represented by QSE *q* over 1,452 hours, for the hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| FFSSAFLAG *q, r, hr* | none | *Firm Fuel Supply Service Availability Flag per QSE per Resource by hour*—The flag of the availability of the primary Generation Resource or the alternate Generation Resource *r* represented by QSE *q*, 1 for available and 0 for unavailable, for the hour. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| FFSEDFLAG *q, r, hr* | none | *Firm Fuel Supply Event Deployment Flag per QSE per Resource by hour*—The flag of successful FFSS deployment of the primary Generation Resource *r* for the approved hours to restock reserved fuel for providing FFSS following the instruction or approval from ERCOT, or in the event the FFSSR has consumed all the fuel reserved to provide FFSS and ERCOT does not issue an instruction or approval to restock reserved fuel, represented by QSE *q*, 1 for successful and 0 for unsuccessful, for the hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| AVCAP *q, r, hr* | MW | *Available Capacity per Resource by hour*—The available capacity of the primary Generation Resource *r* represented by QSE *q* as calculated for the hour. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| *q* | none | A QSE. |
| *r* | none | A primary or alternate Generation Resource approved by ERCOT to provide FFSS. |
| *hr* | none | The index of a given hour and the previous 1,451 hours counted only during each hour of November 15 through March 15 during the awarded FFSS obligation period. |
| *h* | none | The Operating Hour. |
| *train* | none  | A Combined Cycle Train or an alternate Combined Cycle Train approved by ERCOT. |
| *ccgr* | none | A Combined Cycle Generation Resource within the Combined Cycle Train. |

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

**FFSSAMTQSETOT *q* = FFSSAMT *q, r***

The above variables are defined as follows:

| **Variable** | **Unit** | **Definition** |
| --- | --- | --- |
| FFSSAMTQSETOT *q* | $ | *Firm Fuel Supply Service Amount QSE Total per QSE*⎯The total of the payments to QSE *q* for FFSS provided by all the FFSS Resources represented by this QSE for the hour. |
| FFSSAMT *q, r* | $ | *Firm Fuel Supply Service Amount per QSE per Resource*—The payment to QSE *q* for the FFSS for the primary Generation Resource *r*, for the hour, calculated each hour of November 15 through March 15 during the awarded FFSS obligation period. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| *q* | none | A QSE. |
| *r* | none | A primary or alternate Generation Resource approved by ERCOT to provide FFSS. |

8.1.1.2.1.6 Firm Fuel Supply Service Resource Qualification, Testing, Decertification, and Recertification

(1) Generation Resources that meet the following requirements are eligible to provide Firm Fuel Supply Service (FFSS) and may be selected in the procurement process for FFSS. Both the primary Generation Resource and any alternate Generation Resources, as specified in the FFSS Offer Submission Form, must meet the following requirements prior to submitting an FFSS Offer Submission Form:

(a) Successfully demonstrates dual fuel capability, the ability to establish and burn an alternativeonsite stored fuel, and has onsite fuel storage capability in an amount that satisfies the minimum FFSS capability requirements, as described in paragraph (2) below;

(b) Has an onsite natural gas storage capability in an amount that satisfies the minimum FFSS capability requirements, as defined in paragraph (2) below; or

(c) Successfully demonstrates the ability to provide FFSS in order to maintain Resource availability in the event of a natural gas curtailment or other fuel supply disruption consistent with qualifying technologies identified by the Public Utility Commission of Texas (PUCT).

(2) The minimum FFSS capability requirement is the volume of fuel necessary to operate the Generation Resource at the FFSS MW award level for the duration requirement specified in the RFP. This MW value must be greater than or equal to the Generation Resource’s Low Sustained Limit (LSL) and is a limit on the MW quantity of FFSS that can be offered for the Generation Resource in the FFSS Offer Submission Form.

(3) A Generation Resource will not be considered qualified to provide FFSS if, in a prior obligation period, the Generation Resource was an FFSSR during a Watch for winter weather and the Generation Resource:

(a)        Failed to come On-Line or stay On-Line during an FFSS deployment due to a fuel-related issue for two or more deployments in an awarded FFSS obligation period;

(b)       Came On-Line or continued to generate using reserved fuel during an FFSS deployment, but failed to generate on average at the minimum of either 95% of the MW level instructed by ERCOT or 95% of the awarded FFSS MW value due to a fuel-related issue for two or more deployments in an awarded FFSS obligation period; or

(c)        Failed to maintain an Hourly Rolling Equivalent Availability Factor greater than or equal to 50%.

(d) However, such Generation Resource may nevertheless be considered qualified to provide FFSS if the Generation Resource

(i) Has subsequently been recertified, as provided in paragraph (21) below;or

(ii) The QSE representing the Genertion Resource submits a corrective action plan to ERCOT and has agreement with ERCOT on that plan.

(4) A QSE representing a Generation Resource that will be offered to provide FFSS as a primary Generation Resource or an alternate Generation Resource must annually demonstrate each offered Generation Resource’s capability to use reserved fuel sources identified in paragraphs (1)(a) through (1)(c) above and sustain its output for 60 minutes at the MW value equal to the QSE’s desired level of FFSS qualification for the Resource. The maximum MW of FFSS that can be offered for the designated Resource by the QSE must be limited to the average Real-Time net real power (in MW) telemetered for the Resource during the demonstration period. Each QSE representing an FFSSR or prospective FFSSR must annually complete the test or successfully deploy at the maximum awarded MW amount for at least the demonstration period and inform ERCOT by August 15 of each year. In order to complete this annual process, the QSE representing the Generation Resource(s) shall:

(a) If qualifying by a self test, coordinate the test with the ERCOT Control Room and show the Resource as having a Resource Status of “ONTEST” in its COP and through its Real-Time telemetry for the duration of the demonstration; and

(b) Submit a Resource FFSS qualification form with the date and time of the self test or the successful deployment that the QSE would like considered for qualification.

(5) A QSE representing an FFSSR must ensure the full awarded FFSS capability is available by November 15 of each year awarded in the RFP.

(6) A QSE representing an FFSSR shall update the Availability Plan for a Generation Resource to show it is unavailable to provide FFSS if it is not available to come On-Line or generate using reserved fuel. The QSE representing an FFSSR must also submit an Availability Plan for any alternate Generation Resources that were designated in the FFSS Offer Submssion Form. The QSE shall continue to show the Generation Resource is unavailable to provide FFSS in the Availability Plan until it can successfully come On-Line or generate using the reserved fuel.

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| --- |
| ***[NPRR1154: Replace paragraph (6) above with the following upon system implementation:]***(6) A QSE representing an FFSSR shall update the Availability Plan for a Generation Resource to show it is unavailable to provide FFSS if it is not available to come On-Line or generate using reserved fuel. The QSE representing an FFSSR must submit an Availability Plan for any alternate Generation Resource that were designated in the FFSS Offer Submssion Form. The QSE shall continue to show the Generation Resource is unavailable to provide FFSS in the Availability Plan until it can successfully come On-Line or generate using the reserved fuel. |

(7) An FFSSR that is not available to come On-Line shall inform the ERCOT Control Room as soon as practicable and update the FFSSR Availability Plan within 60 minutes of identifying the unavailability.

(8) If the FFSSR is not available for the hours for which ERCOT has issued a Watch for winter weather, ERCOT shall claw back and/or withhold the FFSS Hourly Standby Fee for 90 days, unless the FFSSR successfully deployed for its entire FFSS award obligation or exhausted emission hours allocated for the FFSSR, as specified in the FFSS Offer Submission Form. Evidence of an FFSSR not being available includes, but is not limited to, an Availability Plan submission of unavailable or other communications to the ERCOT Control Room indicating the FFSSR is not available during the Watch.

(9) If the FFSSR fails to come On-Line or stay On-Line during an FFSS deployment due to a fuel-related issue, ERCOT shall claw back and/or withhold the FFSS Hourly Standby Feefor 90 days. A QSE representing an FFSSR may coordinate with ERCOT and seek approval to take the FFSSR Off-Line for no more than four hours to perform critical maintenance associated with consuming the reserved fuel. If the QSE coordinates with ERCOT and receives approval to take the FFSSR unit Off-Line and brings the FFSSR back On-Line within four hours or less, this shall not count as failure to stay On-Line for the purpose of this paragraph.

(10) If the FFSSR comes On-Line or continues generating using reserved fuel during an FFSS deployment, but fails to telemeter on average an HSL equal to or greater than 95% of the awarded FFSS MW value due to a fuel-related issue, ERCOT shall claw back and/or withhold the FFSS Hourly Standby Feefor 90 days, in proportion to the difference between the awarded MW value and the average telemetered HSL over the FFSS deployment period.

(11) If the FFSSR comes On-Line or continues generating using reserved fuel during an FFSS deployment but fails to generate on average at the minimum of either 95% of the MW level instructed by ERCOT or 95% of the awarded FFSS MW value due to a fuel-related issue, ERCOT shall claw back and/or withhold the FFSS Hourly Standby Fee for 90 days, in proportion to the difference between the average MW level instructed by ERCOT over the FFSS deployment period and the corresponding average generation of the FFSSR.

(12) If the FFSSR fails to come On-Line or stay On-Line during an FFSS deployment due to a non-fuel related issue, ERCOT shall claw back and/or withhold the FFSS Hourly Standby Feefor 15 days.

(13) If the FFSSR comes On-Line or continues generating using reserved fuel during an FFSS deployment but fails to telemeter on average an HSL equal to or greater than 95% of the awarded FFSS MW value due to a non-fuel related issue, ERCOT shall claw back and/or withhold the FFSS Hourly Standby Feefor 15 days, in proportion to the difference between the awarded MW value and the average telemetered HSL over the FFSS deployment period.

(14) If the FFSSR comes On-Line or continues generating using reserved fuel during an FFSS deployment but fails to generate on average at the minimum of either 95% of the MW level instructed by ERCOT or 95% of the awarded FFSS MW value due to a non-fuel related issue, ERCOT shall claw back and/or withhold the FFSS Hourly Standby Fee for 15 days, in proportion to the difference between the average MW level instructed by ERCOT over the FFSS deployment period and the corresponding average generation of the FFSSR.

(15) Notwithstanding paragraphs (8) through (14) above, if the FFSSR is otherwise available but fails to come On-Line or is forced Off-Line due to a transmission system outage or transmission system limitation that would prevent the unit from being deployed to LSL, ERCOT shall not claw back the FFSS Hourly Standby Fee.

(16) If conditions described in paragraphs (10) and (11) occur for the same deployment period, ERCOT shall only claw back the larger amount calculated in paragraph (10) or (11). If conditions described in paragraphs (13) and (14) occur for the same deployment period, ERCOT shall only claw back the larger amount calculated in paragraph (13) or (14).

(17) ERCOT shall decertify a primary Generation Resource or any alternate Generation Resource that was an FFSSR during a Watch for winter weather for any of the following:

(a) Failure to come On-Line or stay On-Line during an FFSS deployment due to a fuel-related issue for two or more deployments in an awarded FFSS obligation period;

(b) If the FFSSR comes On-Line or continues generating using reserved fuel during an FFSS deployment, failure to generate on average at the minimum of either 95% of the MW level instructed by ERCOT or 95% of the awarded FFSS MW value due to a fuel-related issue for two or more deployments in an awarded FFSS obligation period; or

(c) Failure to maintain an Hourly Rolling Equivalent Availability Factor greater than or equal to 50%.

(18) If ERCOT decertifies a primary Generation Resource, the QSE shall designate an alternate Generation Resource that was awarded through the FFSS procurement process to replace the decertified Generation Resource and continue to provide FFSS. The designated alternate Generation Resource shall satisfy all of the requirements in paragraph (8) of Section 3.14.5, Firm Fuel Supply Service. The designated alternate Generation Resource may no longer be an alternate for another primary Generation Resource.

(19) If ERCOT decertifies an FFSSR that does not have any alternate Generation Resources that were awarded through the FFSS procurement process, ERCOT will cease payments to the QSE under Section 6.6.14.2, Firm Fuel Supply Service Hourly Standby Fee Payment and Fuel Replacement Cost Recovery. ERCOT may issue one or more RFPs to replace the decertified FFSSR’s capacity for the remainder of the FFSS obligation period.

(20) If ERCOT has not replaced a decertified Generation Resource’s FFSSR capacity, the QSE of a decertified Generation Resource may request to reestablish its FFSSR certification by submitting a corrective action plan to ERCOT that identifies actions taken to correct performance deficiencies and by successfully passing a new test, as described in paragraph (4) above. ERCOT shall, in its sole discretion, determine whether a Generation Generation Resource shall be recertified.

(21) A decertified Generation Resource that has not been recertified by ERCOT must submit a corrective action plan to ERCOT and have agreement with ERCOT on that plan in order to be considered qualified to provide FFSS and be selected in the procurement process for any future FFSS obligation period.