|  |  |  |  |
| --- | --- | --- | --- |
| NPRR Number | [1128](https://www.ercot.com/mktrules/issues/NPRR1128) | NPRR Title | Allow FFR Procurement up to FFR Limit Without Proration |
|  |  |
| Date | July 15, 2022 |
|  |  |
| Submitter’s Information |
| Name | Nitika Mago |
| E-mail Address | nitika.mago@ercot.com |
| Company | ERCOT |
| Phone Number | 512-248-6601 |
| Cell Number |  |
| Market Segment | Not applicable |

|  |
| --- |
| Comments |

ERCOT appreciates the stakeholder input and feedback on Nodal Protocol Revision Request (NPRR) 1128. ERCOT reiterates that, as has been shown[[1]](#footnote-1) in ERCOT’s presentations on Fast Frequency Response (FFR), there are reliability benefits to having FFR available in Real-Time, specifically during certain times of the year and Operating Hours when it is more common to see lower levels of inertia on the ERCOT System. Hence, a preference for FFR procurement should be limited to the hours/months wherein FFR provides reliability benefits, i.e. times of expected low inertia. Based on feedback from discussions at the June Performance, Disturbance, Compliance Working Group (PDCWG) and Wholesale Market Working Group (WMWG) meetings, ERCOT is filing these comments with additional edits that limit the proposed preferential procurement of FFR to certain hours only.

|  |
| --- |
| Revised Cover Page Language |

|  |  |
| --- | --- |
| Nodal Protocol Sections Requiring Revision  | 3.16, Standards for Determining Ancillary Service Quantities4.4.7.2.1, Ancillary Service Offer Criteria4.4.7.2.3, Ancillary Service Only Offer Criteria |
| Revision Description | This Nodal Protocol Revision Request (NPRR) sets a -$0.01 per MW lower Ancillary Service Offer floor for Fast Frequency Response (FFR) Responsive Reserve (RRS) rather than for other RRS categories during certain Operating Hours, thereby allowing, depending on relative Ancillary Service Offers, FFR procurement up to the current FFR limit without proration with other RRS categories in the Ancillary Service procurement process.This NPRR also requires ERCOT to, at least on annual basis, specify the Operating Hours where prioritizing procurement of FFR up to the maximum FFR amount is beneficial in improving reliability. Beyond this, ERCOT may add more hours where FFR prioritization is in effect closer to Real-Time if it believes that these additional hours are vulnerable to low system inertia. |
| Business Case | The Public Utility Commission of Texas (PUCT) has prioritized FFR advancement in their Phase I implementation. Additionally, ERCOT in their “Feb 2021 Winter Event” presentation to PDCWG on August 11, 2021, state the benefit of FFR-RRS over other categories of FFR as follows: 1. Early response from FFR aids in preserving Load Resource providing RRS for more severe events;
2. Short restoration time for resources providing FFR will limit ERCOT’s exposure (i.e. inability to respond) to next event of similar magnitude; and
3. FFR can help mitigate critical inertia and facilitate further increased penetration levels of Inverter-Based Resources (IBRs) in ERCOT.

ERCOT has advocated for FFR since 2015 as part of the Future Ancillary Service (FAS) design for the reliability benefits described above.ERCOT inertia analysis presented to PDCWG on March 16, 2022, concludes that:* All other factors being constant, inertia would decline in proportion to installed capacity of inverter-based generation;
* In 2021, a variety of factors may have affected thermal unit availability; there was an overall decline in inertia from combined cycle units and relatively lower inertia compared to past years.

Given the significant amount of wind and solar under development and thermal Resource response potentially being too slow to timely arrest frequency under lower inertia conditions, the critical importance of FFR for system reliability during certain times of the year and Operating Hours when it is more common to see lower levels of inertia is obvious.However, due to the current implementation of the Ancillary Service procurement process for various categories of RRS, Energy Storage Resources (ESRs) are economically disincented to provide FFR-RRS instead of Primary Frequency Response-RRS. The changes in this NPRR allow, depending on relative Ancillary Service Offers, during certain specific Operating Hours, FFR procurement up to the current FFR limit without proration with other RRS categories in the Ancillary Service procurement process. |

|  |
| --- |
| Revised Proposed Protocol Language |

3.16 Standards for Determining Ancillary Service Quantities

(1) ERCOT shall comply with the requirements for determining Ancillary Service quantities as specified in these Protocols and the ERCOT Operating Guides.

(2) ERCOT shall, at least annually, determine with supporting data, the methodology for determining the quantity requirements for each Ancillary Service needed for reliability, including:

|  |
| --- |
| ***[NPRR863: Insert item (a) below upon system implementation and renumber accordingly:]***(a) The percentage or MW limit of ERCOT Contingency Reserve Service (ECRS) allowed from Load Resources providing ECRS;  |

(a) The maximum amount (MW) of Responsive Reserve (RRS) that can be provided by Resources capable of Fast Frequency Response (FFR) and specify the Operating Hours where prioritizing procurement of FFR up to the maximum FFR amount is beneficial in improving reliability;

(b) The maximum amount (MW) of Regulation Up Service (Reg-Up) that can be provided by Resources providing Fast Responding Regulation Up Service (FRRS-Up); and

(c) The maximum amount (MW) of Regulation Down Service (Reg-Down) that can be provided by Resources providing Fast Responding Regulation Down Service (FRRS-Down).

|  |
| --- |
| ***[NPRR1007: Delete items (b) and (c) above upon system implementation of the Real-Time Co-Optimization (RTC) project and renumber accordingly.]*** |

(d) The minimum capacity required from Resources providing RRS using Primary Frequency Response shall not be less than 1,150 MW.

(3) The ERCOT Board shall review and approve ERCOT's methodology for determining the minimum Ancillary Service requirements, any minimum capacity required from SCED dispatchable Resources to provide Non-Spin, the minimum capacity required from Resources providing Primary Frequency Response to provide RRS, the maximum amount of RRS that can be provided by Resources capable of FFR, the Operating Hours where prioritizing procurement of FFR up to the maximum FFR amount is beneficial in improving reliability and the maximum amount of Reg-Up and Reg-Down that can be provided by Resources providing FRRS-Up and FRRS-Down.

|  |
| --- |
| ***[NPRR1007: Replace paragraph (3) above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project:]***(3) The ERCOT Board shall review and approve ERCOT's methodology for determining the minimum Ancillary Service requirements, any minimum capacity required from SCED dispatchable Resources to provide Non-Spin, the minimum capacity required from Resources providing Primary Frequency Response to provide RRS and the maximum amount of RRS that can be provided by Resources capable of FFR. |

(4) If ERCOT determines a need for additional Ancillary Service Resources under these Protocols or the ERCOT Operating Guides, after an Ancillary Service Plan for a specified day has been posted, ERCOT shall inform the market by posting notice on the ERCOT website, of ERCOT’s intent to procure additional Ancillary Service Resources under Section 6.4.9.2, Supplemental Ancillary Services Market. ERCOT shall post the reliability reason for the increase in service requirements.

|  |
| --- |
| ***[NPRR1007: Delete paragraph (4) above upon system implementation of the Real-Time Co-Optimization (RTC) project and renumber accordingly.]*** |

(5) Monthly, ERCOT shall determine and post on the Market Information System (MIS) Secure Area a minimum capacity required from Resources providing RRS using Primary Frequency Response. The remaining capacity required for RRS may be supplied by all Resources qualified to provide RRS, provided that RRS from Load Resources on high-set under-frequency relays and Resources providing FFR shall be limited to 60% of the total ERCOT RRS requirement. ERCOT may increase the minimum capacity required from Resources providing RRS using Primary Frequency Response if it believes that the current posted quantity will have a negative impact on reliability or if it would require additional Regulation Service to be deployed. ERCOT may add more Operating Hours where prioritizing procurement of FFR up to the maximum FFR amount is beneficial in improving reliability if it believes that these additional hours are vulnerable to low system inertia. ERCOT will issue an operations notice when such a change is made.

(6) The amount of RRS that a Qualified Scheduling Entity (QSE) can self-arrange using a Load Resource excluding Controllable Load Resources and Resources providing FFR is limited to its Load Ratio Share (LRS) of the capacity allowed to be provided by Resources not providing RRS using Primary Frequency Response established in paragraph (5) above, provided that RRS from these Resources shall be limited to 60% of the total ERCOT RRS requirement.

(7) However, a QSE may offer more RRS from Load Resources and Resources capable of providing FFR above the percentage limit established by ERCOT for sale of RRS to other Market Participants. The total amount of RRS Service using the Load Resource (excluding Controllable Load Resources) or Resources providing FFR procured by ERCOT is also limited to the capacity established in paragraph (5) above, up to the lesser of the 60% limit or the limit established by ERCOT in paragraph (5) above.

|  |
| --- |
| ***[NPRR863: Replace paragraph (7) above with the following upon system implementation:]***(7) However, a QSE may offer more of the Load Resource above the percentage limit established by ERCOT for sale of RRS to other Market Participants. The total amount of RRS using the Load Resource procured by ERCOT is also limited to the capacity established in paragraph (5) above, up to the lesser of the 60% limit or the limit established by ERCOT in paragraph (5) above. |

|  |
| --- |
| ***[NPRR863: Insert paragraphs (8)-(10) below upon system implementation and renumber accordingly:]***(8) Monthly, ERCOT shall determine and post on the MIS Secure Area a minimum capacity required from Resources providing ECRS. The amount of Load Resources excluding Controllable Load Resources that may or may not be on high-set under-frequency relays providing ECRS is limited to 50% of the total ERCOT ECRS requirement. (9) The amount of ECRS that a QSE can self-arrange using a Load Resource excluding Controllable Load Resources is limited to the lower of: (a) 50% of its ECRS Ancillary Service Obligation; or(b) A reduced percentage of its ECRS Ancillary Service Obligation based on the limit established by ERCOT in paragraph (8) above. (10) A QSE may offer more of the Load Resource above the percentage limit established by ERCOT for sale of ECRS to other Market Participants. The total amount of ECRS using the Load Resource excluding Controllable Load Resources procured by ERCOT is also limited to the lesser of the 50% limit or the limit established by ERCOT in paragraph (9) above. |

(8) The maximum MW amount of capacity from Resources providing FRRS-Up is limited to 65 MW. ERCOT may reduce this limit if it believes that this amount will have a negative impact on reliability or if this limit would require additional Regulation Service to be deployed.

(9) The maximum MW amount of capacity from Resources providing FRRS-Down is limited to 35 MW. ERCOT may reduce this limit if it believes that this amount will have a negative impact on reliability or if this limit would require additional Regulation Service to be deployed.

(10) Resources can only provide FRRS-Up or FRRS-Down if awarded Regulation Service in the Day-Ahead Market (DAM) for that particular Resource, up to the awarded quantity.

|  |
| --- |
| ***[NPRR1007: Delete paragraphs (8)-(10) above upon system implementation of the Real-Time Co-Optimization (RTC) project.]*** |

4.4.7.2.1 Ancillary Service Offer Criteria

(1) Each Ancillary Service Offer must be submitted by a QSE and must include the following information:

(a) The selling QSE;

(b) The Resource represented by the QSE from which the offer would be supplied;

(c) The quantity in MW and Ancillary Service type from that Resource for this specific offer and the specific quantity in MW and Ancillary Service type of any other Ancillary Service offered from this same capacity;

(d) An Ancillary Service Offer linked to a Three-Part Supply Offer from a Resource designated to be Off-Line for the offer period in its COP may only be struck if the Three-Part Supply Offer is struck. The total capacity struck must be within limits as defined in item (4)(c)(iii) of Section 4.5.1, DAM Clearing Process;

(e) An Ancillary Service Offer linked to other Ancillary Service Offers or an Energy Offer Curve from a Resource designated to be On-Line for the offer period in its COP may only be struck if the total capacity struck is within limits as defined in item (4)(c)(iii) of Section 4.5.1;

(f) The first and last hour of the offer;

(g) A fixed quantity block, or variable quantity block indicator for the offer:

(i) If a fixed quantity block, not to exceed 150 MW, which may only be offered by a Load Resource controlled by high-set under-frequency relay providing RRS, and which may clear at a Market Clearing Price for Capacity (MCPC) below the Ancillary Service Offer price for that block, the single price (in $/MW) and single quantity (in MW) for all hours offered in that block; or

(ii) If a variable quantity block, which may be offered by a Generation Resource or a Load Resource, the single price (in $/MW) and single “up to” quantity (in MW) contingent on the purchase of all hours offered in that block; and

(h) The expiration time and date of the offer.

(2) A valid Ancillary Service Offer in the DAM must be received before 1000 for the effective DAM. A valid Ancillary Service Offer in an SASM must be received before the applicable deadline for that SASM.

(3) No Ancillary Service Offer price may exceed the System-Wide Offer Cap (SWCAP) (in $/MW). During the Operating Hours in which prioritizing the procurement of Fast Frequency Response (FFR) up to the maximum FFR amount is in effect, an FFR Ancillary Service Offer price may not be less than -$0.01 per MW. FFR Ancillary Service Offer prices at all other times and any other Ancillary Service Offer prices may not be less than $0 per MW.

(4) The minimum amount per Resource for each Ancillary Service product that may be offered is one-tenth (0.1) MW.

(5) A Resource may offer more than one Ancillary Service.

(6) Offers for Load Resources may be adjusted to reflect Distribution Losses in accordance with Section 8.1.1.2, General Capacity Testing Requirements.

(7) A Load Resource that is qualified to perform as a Controllable Load Resource may not offer to provide Ancillary Services as a Controllable Load Resource and a Load Resource controlled by high-set under-frequency relay simultaneously behind a common breaker.

|  |
| --- |
| ***[NPRR863, NPRR1008, NPRR1014, and NPRR1093: Replace applicable portions of Section 4.4.7.2.1 above with the following upon system implementation for NPRR863, NPRR1014, or NPRR1093; or upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1008:]***4.4.7.2.1 Resource-Specific Ancillary Service Offer Criteria(1) Each Resource-Specific Ancillary Service Offer must be submitted by a QSE and must include the following information:(a) The selling QSE;(b) The Resource represented by the QSE from which the offer would be supplied;(c) The quantity in MW and Ancillary Service type from that Resource for this specific offer and the specific quantity in MW and Ancillary Service type of any other Ancillary Service offered from this same capacity; (d) A Resource-Specific Ancillary Service Offer linked to a Three-Part Supply Offer from a Resource designated to be Off-Line for the offer period in its COP may only be struck if the Three-Part Supply Offer is struck. The total capacity struck must be within limits as defined in item (4)(c)(iii) of Section 4.5.1, DAM Clearing Process; (e) A Resource-Specific Ancillary Service Offer linked to other Resource-Specific Ancillary Service Offers or an Energy Offer Curve or Energy Bid/Offer Curve from a Resource designated to be On-Line for the offer period in its COP may only be struck if the total capacity struck is within limits as defined in item (4)(c)(iii) of Section 4.5.1;(f) The first and last hour of the offer; (g) A fixed quantity block or variable quantity block indicator for the offer:(i) If a fixed quantity block, not to exceed 150 MW, which may only be offered by a Load Resource that is not a Controllable Load Resource and that is offering to provide RRS, ECRS, or Non-Spin, and which may clear at a Market Clearing Price for Capacity (MCPC) below the Resource-Specific Ancillary Service Offer price for that block, the single price (in $/MW) and single quantity (in MW) for all hours offered in that block. This fixed quantity block indicator will only be considered in the DAM and will be ignored for awarding of Ancillary Services in the Real-Time Market (RTM); or (ii) If a variable quantity block, which may be offered by a Generation Resource, an ESR, or a Load Resource, the single price (in $/MW) and single “up to” quantity (in MW) contingent on the purchase of all hours offered in that block. This variable quantity block indicator will only be considered in the DAM and will be ignored for awarding of Ancillary Services in the RTM; and(h) The expiration time and date of the offer.(2) A valid Resource-Specific Ancillary Service Offer in the DAM must be received before 1000 for the effective DAM. (3) No Resource-Specific Ancillary Service Offer received before 1000 in the Day-Ahead may contain a price exceeding the Day-Ahead System-Wide Offer Cap (DASWCAP) (in $/MW). No Resource-Specific Ancillary Service Offer received after 1430 in the Day-Ahead may contain a price exceeding the Real-Time System-Wide Offer Cap (RTSWCAP) (in $/MW). During the Operating Hours in which prioritizing the procurement of Fast Frequency Response (FFR) up to the maximum FFR amount is in effect, an FFR Ancillary Service Offer price may not be less than -$0.01 per MW. FFR Ancillary Service Offer prices at all other times and any other Ancillary Service Offer prices may not be less than $0 per MW.(4) The minimum amount per Resource for each Ancillary Service product that may be offered is one-tenth (0.1) MW.(5) A Resource may offer more than one Ancillary Service. (6) A Load Resource, that is not a Controllable Load Resource, may simultaneously offer RRS, ECRS, and Non-Spin in a DAM and be awarded RRS, ECRS, and Non-Spin for the same Operating Hour in the DAM, but will not be awarded Non-Spin and RRS on the same Load Resource simultaneously in Real-Time.(7) Offers for Load Resources may be adjusted to reflect Distribution Losses in accordance with Section 8.1.1.2, General Capacity Testing Requirements.(8) A Load Resource that is qualified to perform as a Controllable Load Resource may not offer to provide Ancillary Services as a Controllable Load Resource and a Load Resource controlled by high-set under-frequency relay simultaneously behind a common breaker. |

|  |
| --- |
| ***[NPRR1008: Insert Section 4.4.7.2.3 below upon system implementation of the Real-Time Co-Optimization (RTC) project:]******4.4.7.2.3*** ***Ancillary Service Only Offer Criteria***(1) Each Ancillary Service Only Offer must be submitted by a QSE and must include the following information:(a) The selling QSE;(b) The quantity in MW and Ancillary Service type; (c) The first and last Operating Hour of the offer; (2) A valid Ancillary Service Only Offer in the DAM must be received before 1000 in the Day-Ahead. (3) No Ancillary Service Only Offer price may exceed the DASWCAP (in $/MW). During the Operating Hours in which prioritizing the procurement of Fast Frequency Response (FFR) up to the maximum FFR amount is in effect, an FFR Ancillary Service Offer price may not be less than -$0.01 per MW. FFR Ancillary Service Offer price at all other times and any other Ancillary Service Only Offer prices may not be less than $0 per MW.(4) The minimum amount that may be offered is one-tenth (0.1) MW. |

1. PDCWG | Aug 11, 2021 | [Presentation Link](https://www.ercot.com/files/docs/2021/08/12/Winter_Event_2021_PDCWG_08112021_v2.pptx)

PDCWG | May 18, 2022 | [Presentation Link](https://www.ercot.com/files/docs/2022/05/18/NPRR_1128_PDCWG_Discussion_v1_PostMeeting.pptx)

WMWG | May 20, 2022 | [Presentation Link](https://www.ercot.com/files/docs/2022/05/19/NPRR_1128_WMWG_Discussion_v1.pptx) [↑](#footnote-ref-1)