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| NPRR Number | 686 | NPRR Title | Changing the IRR Forecast from Next 48 Hours to Next 168 Hours |
| Date Posted | March 9, 2015 |
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| Requested Resolution  | Normal  |
| Nodal Protocol Sections Requiring Revision  | Section 3.9.1, Current Operating Plan (COP) Criteria; Section 4.2.2, Wind-Powered Generation Resource Production Potential |
| Other Binding Documents Requiring Revision or Related Revision Requests | Current Operating Plan Practices By Qualified Scheduling Entities (QSEs). |
| Revision Description | The Protocols currently require Qualified Scheduling Entities (QSEs) representing Wind-powered Generation Resources (WGRs) to submit a Current Operating Plan (COP) with a High Sustained Limit (HSL) value that is no higher than ERCOT’s Short-Term Wind Power Forecast (STWPF) for any of the first 48 hours covered by the COP. Nodal Protocol Revision Request (NPRR) 615, PVGR Forecasting, introduced a similar requirement that QSEs representing PhotoVoltaic Generation Resources (PVGRs) must submit an HSL that is no higher than the Short-Term PhotoVoltaic Power Forecast (STPPF) for the first 48 hours of the Resource’s COP. (Implementation of this NPRR is pending.) ERCOT’s supplier of the wind forecasts has recently added capability to provide an extended forecast that covers 7 days, or 168 hours. ERCOT has concluded that requiring QSEs to limit their HSLs to the STWPF and STPFF values for each of the next 168 hours could improve ERCOT’s operational visibility and help inform the Reliability Unit Commitment (RUC) process and the coordination of outages, while imposing little additional cost on QSEs. Additionally there is recognized benefit in publishing these forecast and providing them to all ERCOT particpants.Accordingly, ERCOT submits this NPRR to require QSEs representing WGRs or PVGRs to limit the HSL values submitted for the entire 168-hour range of the Current Operating Plan (COP) to the values provided in the most recent STWPF or STPFF, as applicable. As required by the Protocols, ERCOT will post these extended forecasts to the Market Information System (MIS), just as with the current 48-hour forecasts. |
| Reason for Revision |  Addresses current operational issues. Meets Strategic goals (tied to the [ERCOT Strategic Plan](http://www.ercot.com/content/news/presentations/2013/ERCOT%20Strat%20Plan%20FINAL%20112213.pdf) or directed by the ERCOT Board). Market efficiencies or enhancements Administrative Regulatory requirements Other: (explain)*(please select all that apply)* |

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| **Business Case** |
| **Qualitative Benefits** | * ERCOT’s operations will benefit by using accurate WGR and PVGR COPs beyond 48 hours. The 168-hour forecasts can be used in short-term outage coordination studies and grid operations studies that expand beyond the 48-hour horizon.
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| **Quantitative Benefits** |  |
| **Impact to Market Segments** | * Resources are required to submit the COP for a rolling 168-hour period. A large majority of WGRs are automatically updating the HSL values in their COPs to reflect the forecast values ERCOT is posting to the MIS. Based on input received from Market Participants, extending the range of the forecasts from 48 hours to 168 hours would require minimal additional cost and effort provided the current format is continued.
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| **Credit Implications** |  |
| **Other** |  |

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| Market Segment | Not Applicable. |

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| Proposed Protocol Language Revision |

3.9.1 Current Operating Plan (COP) Criteria

(1) Each QSE that represents a Resource must submit a COP to ERCOT that reflects expected operating conditions for each Resource for each hour in the next seven Operating Days.

(2) Each QSE that represents a Resource shall update its COP reflecting changes in availability of any Resource as soon as reasonably practicable, but in no event later than 60 minutes after the event that caused the change.

(3) The Resource capacity in a QSE’s COP must be sufficient to supply the Ancillary Service Supply Responsibility of that QSE.

(4) Load Resource COP values may be adjusted to reflect Distribution Losses in accordance with Section 8.1.1.2, General Capacity Testing Requirements.

(5) A COP must include the following for each Resource represented by the QSE:

(a) The name of the Resource;

(b) The expected Resource Status:

(i) Select one of the following for Generation Resources synchronized to the ERCOT System that best describes the Resource’s status. These Resource Statuses are to be used for COP and/or Real-Time telemetry purposes, as appropriate.

(A) ONRUC – On-Line and the hour is a RUC-Committed Hour;

(B) ONREG – On-Line Resource with Energy Offer Curve providing Regulation Service;

(C) ON – On-Line Resource with Energy Offer Curve or Off-Line Quick Start Generation Resource (QSGR) available for Security-Constrained Economic Dispatch (SCED) Dispatch;

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| ***[NPRR272: Replace paragraph (5)(b)(i)(C) above with the following upon system implementation:]***(C) ON – On-Line Resource with Energy Offer Curve;  |

(D) ONDSR – On-Line Dynamically Scheduled Resource (DSR);

(E) ONOS – On-Line Resource with Output Schedule;

(F) ONOSREG – On-Line Resource with Output Schedule providing Regulation Service;

(G) ONDSRREG – On-Line DSR providing Regulation Service;

(H) ONTEST – On-Line blocked from SCED for operations testing (while ONTEST, a Generation Resource may be shown on Outage in the Outage Scheduler);

(I) ONEMR – On-Line EMR (available for commitment or dispatch only for ERCOT-declared Emergency Conditions; the QSE may appropriately set LSL and High Sustained Limit (HSL) to reflect operating limits);

(J) ONRR – On-Line as a synchronous condenser (hydro) providing Responsive Reserve (RRS) but unavailable for Dispatch by SCED and available for commitment by RUC;

(K) ONOPTOUT – On-Line and the hour is a RUC Buy-Back Hour;

(L) SHUTDOWN – The Resource is On-Line and in a shutdown sequence, and has no Ancillary Service Obligations other than Off-Line Non-Spinning Reserve (Non-Spin) which the Resource will provide following the shutdown. This Resource Status is only to be used for Real-Time telemetry purposes; and

(M) STARTUP – The Resource is On-Line and in a start-up sequence and has no Ancillary Service Obligations. This Resource Status is only to be used for Real-Time telemetry purposes.

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| ***[NPRR272: Insert paragraph (5)(b)(i)(N) upon system implementation:]***(N) OFFQS – Off-Line but available for SCED deployment. Only qualified QSGRs may utilize this status.  |

(ii) Select one of the following for Off-Line Generation Resources not synchronized to the ERCOT System that best describes the Resource’s status. These Resource Statuses are to be used for COP and/or Real-Time telemetry purposes, as appropriate.

(A) OUT – Off-Line and unavailable;

(B) OFFNS – Off-Line but reserved for Non-Spin;

(C) OFF – Off-Line but available for commitment in the Day-Ahead Market (DAM) and RUC; and

(D) EMR – Available for commitment only for ERCOT-declared Emergency Condition events; the QSE may appropriately set LSL and HSL to reflect operating limits; and

(iii) Select one of the following for Load Resources. These Resource Statuses are to be used for COP and/or Real-Time telemetry purposes.

(A) ONRGL – Available for Dispatch of Regulation Service by Load Frequency Control (LFC) and, for any remaining Dispatchable capacity, by SCED with an Real-Time Market (RTM) Energy Bid;

(B) ONCLR – Available for Dispatch as a Controllable Load Resource by SCED with an RTM Energy Bid;

(C) ONRL – Available for Dispatch of RRS Service, excluding Controllable Load Resources; and

(D) OUTL – Not available;

(c) The HSL;

(d) The LSL;

(e) The High Emergency Limit (HEL);

(f) The Low Emergency Limit (LEL); and

(g) Ancillary Service Resource Responsibility capacity in MW for:

(i) Regulation Up (Reg-Up);

(ii) Regulation Down (Reg-Down);

(iii) RRS Service; and

(iv) Non-Spin.

(6) For Combined Cycle Generation Resources, the above items are required for each operating configuration. In each hour only one Combined Cycle Generation Resource in a Combined Cycle Train may be assigned one of the On-Line Resource Status codes described above.

(a) During a RUC study period, if a QSE’s COP reports multiple Combined Cycle Generation Resources in a Combined Cycle Train to be On-Line for any hour, then until the QSE corrects its COP, the On-Line Combined Cycle Generation Resource with the largest HSL is considered to be On-Line and all other Combined Cycle Generation Resources in the Combined Cycle Train are considered to be Off-Line. Furthermore, until the QSE corrects its COP, the Off-Line Combined Cycle Generation Resources as designated through the application of this process are ineligible for RUC commitment or de-commitment Dispatch Instructions.

(b) For any hour in which QSE-submitted COP entries are used to determine the initial state of a Combined Cycle Generation Resource for a DAM or Day-Ahead Reliability Unit Commitment (DRUC) study and the COP shows multiple Combined-Cycle Generation Resources in a Combined Cycle Train to be in an On-line Resource Status, then until the QSE corrects its COP, the On-Line Combined Cycle Generation Resource that has been On-Line for the longest time from the last recorded start by ERCOT systems, regardless of the reason for the start, combined with the COP Resource Status for the remaining hours of the current Operating Day, is considered to be On-Line at the start of the DRUC study period and all other COP-designated Combined Cycle Generation Resources in the Combined Cycle Train are considered to be Off-Line.

(c) ERCOT systems shall allow only one Combined Cycle Generation Resource in a Combined Cycle Train to offer Off-Line Non-Spin in the DAM or Supplemental Ancillary Services Market (SASM).

(i) If there are multiple Non-Spin offers from different Combined Cycle Generation Resources in a Combined Cycle Train, then prior to execution of the DAM, ERCOT shall select the Non-Spin offer from the Combined Cycle Generation Resource with the highest HSL for consideration in the DAM and ignore the other offers.

(ii) Combined Cycle Generation Resources offering Off-Line Non-Spin must be able to transition from the shutdown state to the offered Combined Cycle Generation Resource On-Line state and be capable of ramping to the full amount of the Non-Spin offered.

(d) The DAM and RUC shall honor the registered hot, intermediate or cold Startup Costs for each Combined Cycle Generation Resource registered in a Combined Cycle Train when determining the transition costs for a Combined Cycle Generation Resource. In the DAM and RUC, the Startup Cost for a Combined Cycle Generation Resource shall be determined by the positive transition cost from the On-Line Combined Cycle Generation Resource within the Combine Cycle Train or from a shutdown condition, whichever ERCOT determines to be appropriate.

(7) ERCOT may accept COPs only from QSEs.

(8) For the first 168 hours of the COP, a QSE representing a Wind-powered Generation Resource (WGR) must enter an HSL value that is less than or equal to the amount for that Resource from the most recent Short-Term Wind Power Forecast (STWPF) provided by ERCOT.

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| ***[NPRR615: Replace paragraph (8) above with the following upon system implementation:]***(8) For the first 168 hours of the COP, a QSE representing a Wind-powered Generation Resource (WGR) must enter an HSL value that is less than or equal to the amount for that Resource from the most recent Short-Term Wind Power Forecast (STWPF) provided by ERCOT, and a QSE representing a PhotoVoltaic Generation Resource (PVGR) must enter an HSL value that is less than or equal to the amount for that Resource from the most recent Short-Term PhotoVoltaic Power Forecast (STPPF) provided by ERCOT. |

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 (9) A QSE representing a Generation Resource that is not actively providing Ancillary Services or is providing Off-Line Non-Spin that the Resource will provide following the shutdown, may only use a Resource Status of SHUTDOWN to indicate to ERCOT through telemetry that the Resource is operating in a shutdown sequence or a Resource Status of ONTEST to indicate in the COP and through telemetry that the Generation Resource is performing a test of its operations either manually dispatched by the QSE or by ERCOT as part of the test. A QSE representing a Generation Resource that is not actively providing Ancillary Services may only use a Resource Status of STARTUP to indicate to ERCOT through telemetry that the Resource is operating in a start-up sequence requiring manual control and is not available for Dispatch.

(10) If a QSE has not submitted a valid COP for any Generation Resource for any hour in the DAM or RUC Study Period, then the Generation Resource is considered to have a Resource Status as OUT thus not available for DAM awards or RUC commitments for those hours.

(11) If a COP is not available for any Resource for any hour from the current hour to the start of the DAM period or RUC study, then the Resource Status for those hours are considered equal to the last known Resource Status from a previous hour’s COP or from telemetry as appropriate for that Resource.

4.2.2 Wind-Powered Generation Resource Production Potential

(1) ERCOT shall produce and update hourly a Short-Term Wind Power Forecast (STWPF) that provides a rolling 168-hour hourly forecast of wind production potential for each Wind-powered Generation Resource (WGR). ERCOT shall produce and update an hourly Total ERCOT Wind Power Forecast (TEWPF) providing a probability distribution of the hourly production potential from all wind-power in ERCOT for each of the next 168 hours. Each Generation Entity that owns a WGR shall install and telemeter to ERCOT the site-specific meteorological information that ERCOT determines is necessary to produce the STWPF and TEWPF forecasts. ERCOT shall establish procedures specifying the accuracy requirements of WGR meteorological information telemetry.

(2) ERCOT shall use the probabilistic TEWPF and select the forecast that the actual total ERCOT WGR production is expected to exceed 50% of the time (50% probability of exceedance forecast). To produce the STWPF, ERCOT will allocate the TEWPF 50% probability of exceedance forecast to each WGR such that the sum of the individual STWPF forecasts equal the TEWPF forecast. The updated STWPF forecasts for each hour for each WGR are to be used as input into each Reliability Unit Commitment (RUC) process as per Section 5, Transmission Security Analysis and Reliability Unit Commitment.

(3) ERCOT shall produce the Wind-powered Generation Resource Production Potential (WGRPP) forecasts using the information provided by WGR owners including WGR availability, meteorological information, and Supervisory Control and Data Acquisition (SCADA).

(4) Each hour, ERCOT shall provide, through the Messaging System, the STWPF and WGRPP forecasts for each WGR to the QSE that represents that WGR and shall post each STWPF and WGRPP forecast on the MIS Certified Area.

(5) Each hour, ERCOT shall post to the MIS Public Area, on a system-wide and regional basis the hourly actual wind power production, STWPF, WGRPP, and aggregate Current Operating Plan (COP) High Sustained Limits (HSLs) for On-Line WGRs for a rolling historical 48-hour period. The system-wide and regional STWPF, WGRPP, and aggregate COP HSLs for On-Line WGRs will also be posted for the rolling future 168-hour period. ERCOT shall retain the STWPF and WGRPP for each hour.

(6) Every five minutes, ERCOT shall post to the MIS Public Area, on a system-wide and regional basis, five-minute actual wind power production for a rolling historical 60-minute period.

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| ***[NPRR615: Insert Section 4.2.3 below upon system implementation and renumber accordingly:]***4.2.3 PhotoVoltaic Generation Resource Production Potential(1) ERCOT shall produce and update hourly a Short-Term PhotoVoltaic Power Forecast (STPPF) that provides a rolling 168-hour hourly forecast of PhotoVoltaic production potential for each PhotoVoltaic Generation Resource (PVGR). ERCOT shall produce and update an hourly Total ERCOT PhotoVoltaic Power Forecast (TEPPF) providing a probability distribution of the hourly production potential from all PhotoVoltaic Generation Resources in ERCOT for each of the next 168 hours. Each Generation Entity that owns a PVGR shall install and telemeter to ERCOT the site-specific meteorological information that ERCOT determines is necessary to produce the STPPF and TEPPF forecasts. ERCOT shall establish procedures specifying the accuracy requirements of PVGR meteorological information telemetry.(2) ERCOT shall use the probabilistic TEPPF and select the forecast that the actual total ERCOT PVGR production is expected to exceed 50% of the time (50% probability of exceedance forecast). To produce the STPPF, ERCOT will allocate the TEPPF 50% probability of exceedance forecast to each PVGR such that the sum of the individual STPPF forecasts equal the TEPPF forecast. The updated STPPF forecasts for each hour for each PVGR are to be used as input into each RUC process as per Section 5, Transmission Security Analysis and Reliability Unit Commitment. (3) ERCOT shall produce the PhotoVoltaic Generation Resource Production Potential (PVGRPP) forecasts using the information provided by PVGR owners including PVGR availability, meteorological information, and SCADA. (4) Each hour, ERCOT shall provide, through the Messaging System, the STPPF and PVGRPP forecasts for each PVGR to the QSE that represents that PVGR and shall post each STPPF and PVGRPP forecast on the MIS Certified Area.(5) After the aggregated ERCOT PVGR capacity reaches one GW and the maximum PVGR capacity ratio of a single PVGR over the total ERCOT installed PVGR capacity is at or below 60%, each hour ERCOT shall post to the MIS Public Area, on a system-wide basis the hourly actual PhotoVoltaic (PV) power production, STPPF, PVGRPP, and aggregate COP HSLs for On-Line PVGRs for a rolling historical 48-hour period. The system-wide STPPF, PVGRPP, and aggregate COP HSLs for On-Line PVGRs will also be posted for the rolling future 168-hour period. ERCOT shall retain the STPPF and PVGRPP for each hour. However, ERCOT shall post this information no later than June 1, 2016. (6) After the aggregated ERCOT PVGR capacity reaches one GW and the maximum PVGR capacity ratio of a single PVGR over the total ERCOT installed PVGR capacity is at or below 60%, every five minutes, ERCOT shall post to the MIS Public Area, on a system-wide basis, five-minute actual PV power production for a rolling historical 60-minute period. However, ERCOT shall post this information no later than June 1, 2016.  |