|  |  |  |  |
| --- | --- | --- | --- |
| PGRR Number | 042 | PGRR Title | Regional Transmission Plan Model Reserve Requirement and Load-Generation Imbalance Methodology |

|  |  |
| --- | --- |
| Date | February 17, 2015 |

|  |  |
| --- | --- |
| Submitter’s Information | |
| Name |  |
| E-mail Address |  |
| Company |  |
| Phone Number |  |
| Cell Number |  |
| Market Segment |  |

|  |
| --- |
| Comments |

The PLWG reviewed PGRR-042 as submitted by ERCOT on February 5, 2015 and the comments filed by Calpine, NRG, Luminant and LCRA. Although there was general agreement on moving the PGRR forward, there was a lack of consensus on specific sections recommended for revision.

Items with consensus have no comments.

Items without consensus and having no alternative are provided with a comment stating “non-consensus.” These items may each be accepted or rejected on their own merits (i.e. they stand alone in relation to other changes).

Items without consensus and having alternative language are labled with a comment stating “Option X-Y” where “X” indicates the set and “Y” indicates the option within the set.

There are two sets of options:

The first set of options are labeled Option 1a and Option 1b and relate to a new paragraph (4) that adopts of modeling a level of operational reserves in the power flow cases used for the Regional Transmission Plan Studies. The two options differ primarily in that Option 1b would reduces the capacity of generation units in the model through the application of an Equivalent Forced Outage Rate (EFOR). If a new paragraph (4) is not approved, then paragraph (9) and its subparts may be deleted in their entirety.

The second set of options are lableled Option 2a, Option 2b, and Option 2c and are part of paragraph (9). These options apply differing approaches for achieving a generation/load balance in the Regional Transmission Plan powerflow model while maintaining the reserves specified in new paragraph (4). Option 2a proposes to adjust wind and solar generation output followed by reducing load outside a study region, with no limits placed on load scaling outside the study region. Option 2b proposes to reduce load followed by making generation adjustments with limits placed on the amount of load reduction that can be applied. Option 2c ties the adjustment to wind and solar outside a study region to Section 3.2.6.2.2, Total Capacity Estimate of the Nodal Protocols, applies the same load scaling language proposed in Option 2a, and specifies specific study area definitions.

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

None proposed at this time.

|  |
| --- |
| Revised Proposed Guide Language |

**3.1.1.2 Regional Transmission Plan**

(1) The Regional Transmission Plan is developed annually by ERCOT, in coordination with the RPG and Transmission Service Providers (TSPs). The Regional Transmission Plan addresses regional and ERCOT-wide reliability and economic transmission needs and the planned improvements to meet those needs for the upcoming six years starting with the SSWG base cases. These planned improvements include projects previously approved by the ERCOT Board, projects previously reviewed by the RPG, new projects that will be refined at the appropriate time by TSPs in order to complete RPG review, and the local projects currently planned by TSPs. Combined, these projects represent ERCOT’s plan which addresses the reliability and efficiency of the ERCOT System in order to meet North American Electric Reliability Corporation (NERC) Reliability Standards, the Protocols, Operating Guides and this Planning Guide. Projects that are included in the Regional Transmission Plan are not considered to have been endorsed by ERCOT until they have undergone the appropriate level of RPG Project Review as outlined in Protocol Section 3.11.4, Regional Planning Group Project Review Process, if required. The process used by ERCOT to develop the Regional Transmission Plan is outlined in Section 3.1.4, Regional Transmission Plan Development Process.

(2) ERCOT shall post the Regional Transmission Plan to the Market Information System (MIS) Secure Area by December 31 of each year.

(3) ERCOT shall include in the Regional Transmission Plan report a list of Transmission Facilities that are loaded above 95% of their applicable Ratings for the following conditions:

(a) Normal system conditions; or

(b) Following the contingency loss of a single generating unit, transmission circuit, transformer, or common tower outage.

***3.1.3 Project Evaluation***

(1) Proposed transmission projects will be evaluated using a variety of tools and techniques to ensure that the system is able to meet applicable reliability criteria in a cost-effective manner. For most proposed projects, several alternatives will be identified to meet the reliability criteria or other performance improvement objectives that the proposed project is designed to meet. The project alternative with the expected lowest cost over the life of the project is generally recommended, subject to consideration of the expected long-term system needs in the area (as identified in the LTSA), and consideration of the relative operational impacts of the alternatives. Impact of returning mothballed generation to service or adding a generator with an active GINR when the information is not protected under the Protocols may be reported.

(2) In some cases, one alternative may be to dispatch the system in such a way that all reliability requirements are met, even without the proposed transmission project or any transmission alternative, resulting in a less efficient dispatch than what would be required to meet the reliability requirements if the proposed project was in place. Consideration of the merits of this alternative relative to the proposed transmission project is more complex. To facilitate the discussion and consideration of these alternatives, ERCOT has adopted certain definitions and practices, described in paragraph (4) of Protocol Section 3.11.2, Planning Criteria, and Sections 3.1.3.1, Definitions of Reliability-Driven and Economic-Driven Projects, and 3.1.3.2, Reliability-Driven Project Evaluation below.

**3.1.3.1 Definitions of Reliability-Driven and Economic-Driven Projects**

(1) Proposed transmission projects are categorized for evaluation purposes into two types:

(a) Reliability-driven projects; and

(b) Economic-driven projects.

(2) The differentiation between these two types of projects is based on whether a simultaneously-feasible, security-constrained generating unit commitment and Load Resource dispatch is expected to be available for all hours of the planning horizon that can resolve the system reliability issue that the proposed project is intended to resolve. If it is not possible to forecast a dispatch of the Resources such that all reliability criteria are met without the project, and the addition of the project allows the reliability criteria to be met, then the project is classified as a reliability-driven project. If it is possible to simulate a dispatch of the Resources in such a way that all reliability criteria are met without the project, but the project may allow the reliability criteria to be met at a lower total cost, then the project is classified as an economic-driven project.

**3.1.4.1 Development of Regional Transmission Plan**

(1) The starting base cases for the Regional Transmission Plan development are created by removing all Tier 1, 2 and 3 projects that have not undergone RPG Project Review from the most recent SSWG summer peak base cases to address the planning horizon. The planning process begins with computer modeling studies of the generation and Transmission Facilities and substation Loads under normal conditions in the ERCOT System. Contingency conditions along with changes in Load and generation that might be expected to occur in operation of the ERCOT Transmission Grid are also modeled. To maintain adequate service and minimize interruptions during Outages, model simulations are used to identify adverse results based upon the planning criteria and to examine the effectiveness of various problem-solving alternatives.

(2) The effectiveness of each alternative will be evaluated under a variety of possible operating environments because Loads and operating conditions cannot be predicted with certainty. As a result, repeated simulations under different conditions are often required. In addition, options considered for future installation may affect other alternatives so that several different combinations must be evaluated, thereby multiplying the number of simulations required.

(3) Once feasible alternatives have been identified, the process is continued with a comparison of those alternatives. To determine the most favorable, the short-range and long-range benefits of each alternative must be considered including operating flexibility and compatibility with future plans.

Reliability-driven and economic-driven analyses will be performed using at least the minimum planning reserve margin established by ERCOT Protocol Section 3.2.6.1, Minimum ERCOT Planning Reserve Margin Criterion.

(4) The total generation capacity in a Regional Transmission Plan base case shall be greater than or equal to the peak Load in the case plus losses plus an operating reserve equal to the two largest units in the case. ERCOT shall set all non-seasonal mothballed generation to out of service. ERCOT shall add all generation that has met the criteria for inclusion according to Section 6.9, Addition of Proposed Generation Resources to the Planning Models.

(4) The total generation capacity in a Regional Transmission Plan base case, adjusted for technology-specific EFOR based on GADs data, shall be greater than or equal to the peak Load in the case plus losses plus an operating reserve equal to the two largest units in the case. ERCOT shall set all non-seasonal mothballed generation to out of service. The EFOR will not be used to change the available capacity of an individual unit. ERCOT shall add all generation that has met the criteria for inclusion according to Section 6.9, Addition of Proposed Generation Resources to the Planning Models.

(4)

(5) In the Regional Transmission Plan base case, the DC ties and hydro will be dispatched to the levels described in Protocol Section 3.2.6.2.2, Total Capacity Estimate.

(6)For economic-driven projects, an 8,760-hour profile will be used for hydro, wind, and solar units. Vendor profiles will be used for wind, vendor solar curves will be used for solar, and average historical dispatch during the summer season for the past 3 years will be used to create the hydro unit and DC tie profiles.

(7) Per Protocol Section 16.5.4, Maintaining and Updating Resource Entity Information, and upon receipt of a written notice, Switchable Generation Resource parameters used in the Regional Transmission Plan cases, whether they are reliability-driven or economic-driven projects, will be updated to appropriately reflect the amount of switchable generation available to ERCOT for the study cases.

(8) The load utilized in the Regional Transmission Plan cases shall be organized and evaluated by weather zones. ERCOT’s 90th percentile weather zone peak load forecast, plus self-serve load, for the study year shall be used for each weather zone. XX% of the Load Resources providing Responsive and Non-Spinning Reserve service, as calculated in Protocol Section 3.2.6.2.2, Total Capacity Estimate, shall be subtracted from the appropriate weather zone load forecasts. XX% of the Emergency Response Service, Controllable Load Resources, and Energy Efficiency, as calculated in Protocol Section 3.2.6.2.2, shall be subtracted from the appropriate weather zone load forecasts.

(9) If the total generation capacity in a Regional Transmission Plan base case is not sufficient to satisfy the requirement in paragraph (4) above, ERCOT shall group one or more weather zones into no less than four study regions and create a separate base case for each study region for the season and year being studied.

(a) ERCOT shall set Load and generation inside the study regions consistent with the study assumptions for the Regional Transmission Plan. ERCOT shall not change Load or total generation capacity not meeting the Section 6.9 criteria inside a study region to satisfy the requirement in paragraph (4) above. ERCOT may redispatch dispatchable generation inside a study region as necessary. ERCOT may report the impact of returning mothballed generation to service or adding a generator with an active GINR but not meeting Section 6.9 criteria when considered viable alternatives to a transmission circuit upgrades or additions.

(b) ERCOT shall use the following procedures in the order listed to satisfy the requirement in paragraph (4) above:

(i) ERCOT may increase the dispatch level of each Wind-powered Generation Resource (WGR) and solar Resource (PVGR) outside the study region to a level that does not exceed the following maximums.

(A) For a WGR, the maximum dispatch level is the capacity of the WGR multiplied by the seasonal peak average wind capacity for the region in which the WGR is located for the season under study.

(1) The seasonal peak average wind capacity for a region for a season is equal to the average wind capacity available for a region for a season divided by the installed capacity for the region. The average wind capacity available for a region for a season is first calculated as the average capacity during the 20 highest system-wide peak Load hours for a given year’s season. The final value is the average of the previous ten eligible years of seasonal peak average values. Eligible years include 2009 through the most recent year for which COP data is available for the season. If the number of eligible years is less than ten, the average will be based on the number of eligible years available. This calculation is limited to WGRs that have been in operation as of January 1 for each year of the period used for the calculation.

(2) The coastal region is defined as the following counties: Cameron, Willacy, Kenedy, Kleberg, Nueces, San Patricio, Refugio, Aransas, Calhoun, Matagorda, and Brazoria. The non-coastal region is defined as all other counties in the ERCOT Region.

(B) For a solar Resource, the maximum dispatch level is 100% of the nameplate capacity of the solar Resource until a threshold value of 200 MWs of installed and operational wholesale solar capacity is reached. Once the 200 MW threshold is reached, the maximum dispatch level is the nameplate capacity of the solar Resource multiplied by the average solar unit capacity available for the season under study, as determined from the COP, during the highest 20 peak Load hours for each preceding three year period divided by the total operational wholesale solar capacity in the ERCOT Region.

(ii) Load outside the study region may be reduced to a level sufficient to meet the requirement in paragraph (4) irrespective of historical peak Load coincidence factors among weather zones.

(b) Load outside the study region may be reduced sufficient to meet the requirements in paragraph (4) above, however the load scaling reductions outside the study region shall not be greater than the percentage of the weather zone’s non-coincident peak when the study region is at its peak, based on the average of the top 20 hours over the last 3-years.

(c) ERCOT shall use the following procedures in the order listed to satisfy the requirement in paragraph (4) above:

(i) DC ties dispatched to increase transfers into ERCOT to the full capacity of the DC ties,

(iv) Units with interconnection agreements and air permits, but do not meet all of the requirements for inclusion defined in the Planning Guide,

(v) Units with interconnection agreements, but do not meet all of the requirements for inclusion defined in the Planning Guide,

(vi) Publicly announced pursuant to paragraph (2) of Section 5.4.10, , plants without interconnection agreements,

(viii) Increase wind generation dispatch from wind farms in counties bordering the coast by up to 40% of installed capability, but not to exceed the maximum allowable in paragraph (6)(a)(ii) below.

(ix) Increase all other wind generation dispatch by up to 10% of installed capability, but not to exceed the maximum allowable in paragraph (6)(a)(ii) below,

(x) Add generation resources to the 345 kV transmission system near the sites of existing or retired units.

(b) ERCOT may use the following procedures in the order listed to satisfy the requirement in paragraph (4) above.

(i) ERCOT may increase the dispatch level of each Wind-powered Generation Resource (WGR) and solar Resource outside the study region to a level that does not exceed the capacity as calculated by Section 3.2.6.2.2, Total Capacity Estimate of the Nodal Protocols.

(ii) Load outside the study region may be reduced to a level sufficient to meet the requirement in paragraph (4) irrespective of historical peak Load coincidence factors among weather zones.

(c) When one or more weather zones are combined to create a separate base case for each study region, ERCOT shall use one or more of the following combinations:

1. North, North Central, West and Far West
2. North, North Central, East
3. South Central, East, and North Central
4. Coast, South Central, South
5. South, South Central and West
6. A combination of zones that may be unique to the evaluation of an identified constraint or project proposal.

(10)

4.1.1.1 Planning Assumptions

(1) A contingency loss of an element includes the loss of an element with or without a single line-to-ground or three-phase fault.

(2) A common tower outage is the contingency loss of a double-circuit transmission line consisting of two circuits sharing a tower for 0.5 miles or greater.

(3) Unavailability of a single generating unit includes an entire Combined Cycle Train, if no part of the train can operate with one of the units Off-Line as provided in the Resource Registration data.

(4) The contingency loss of a single generating unit shall include the loss of an entire Combined Cycle Train, if that is the expected consequence.