A Primer on NERC's Long-Term Reliability Assessment (LTRA)
Reference Margin Level

Background on the Reference Margin Level

The North American Electric Reliability Corporation (NERC) prepares and publishes on an annual basis its Long-Term Reliability Assessment (LTRA). As part of the LTRA reporting effort, Regional Entities provide NERC with a capacity planning reserves "Reference Margin Level" along with capacity and demand data for the 10-year assessment period. NERC's description and reporting instructions for the Reference Margin Level is provided in Figure 1. As mentioned in the Instructions, if a Regional Entity does not provide a Reference Margin Level for the LTRA data submission, then NERC will apply a default value of 15% for "predominately thermal" systems.

Figure 1. NERC Reference Margin Level Definition and Reporting Instructions

Reference Margin Level: the assumptions of this metric vary by Assessment Area. Generally, the Reference Margin Level is typically based on load, generation, and transmission characteristics for each Assessment Area and, in some cases, the Reference Margin Level is a requirement implemented by the respective state(s), provincial authorities, ISO/RTO, or other regulatory bodies. If such a requirement exists, the respective Assessment Area generally adopts this requirement as the Reference Margin Level. In some cases, the Reference Margin Level will fluctuate over the duration of the assessment period, or may be different for the summer and winter seasons.

Instructions
Enter, as a decimal, the Reference Margin Level for all seasons/years of the assessment period. If this data is not provided, NERC will apply a 15 percent Reference Margin Level for predominately thermal systems and 10 percent for predominately hydro systems.

Source: NERC 2017 Long-Term Reliability Assessment, Data Form Instructions, January 25, 2017.

The purpose of the Reference Margin Level is to serve as the threshold indicating whether there is a forecasted seasonal (summer and/or winter) shortfall of system peak-hour capacity reserves during the LTRA's assessment period. (Note that the Reference Margin Level is also used for NERC's summer and winter reliability assessment reports.)

As the designated Assessment Area[1] for the Texas Reliability Entity (TRE) Region, ERCOT reports to NERC the current ERCOT Board of Directors' approved value of 13.75% for all assessment years. The Reference Margin Level is compared to what NERC refers to as the Anticipated Planning Reserve Margin. This Margin, expressed as a percentage, is defined as:

$$Anticipated\ PRM = \left(\frac{Anticipated\ Resource\ Capacity\ +\ Net\ Expected\ Capacity\ Transfers\ -\ Net\ Internal\ Demand}{Net\ Internal\ Demand}\right) x\ 100$$

where,

[1] Assessment Areas are the entities responsible for providing NERC with resource adequacy data that is incorporated in NERC's LTRA report and other reliability assessment reports. One or more Assessment Areas make up each of the eight NERC Regional Entities. A map of the current NERC Assessment Areas is available at: http://www.nerc.com/AboutNERC/keyplayers/PublishingImages/NERC_Assessment_Areas_2016.jpg.

Anticipated Resource Capacity = existing available capacity plus planned capacity that meets specified Assessment Area requirements such as having a signed Interconnection Agreement;
Net Expected Capacity Transfers = expected imports less exports;
Net Internal Demand = system demand reduced by the projected impacts of Controllable and Dispatchable Demand Response programs.

Use of the Reference Margin Level in NERC Reliability Assessments

If the Anticipated Planning Reserve Margin falls below the Reference Margin for any year, then NERC requires the Regional Entity/Assessment Area(s) to identify any potential reliability impacts of the forecasted capacity deficit, along with mitigation plans. This reporting requirement is outlined in NERC's Rules of Procedure:

> The assessment shall determine if the resource information submitted represents a reasonable and attainable plan for the Regional Entity and its members. For cases of inadequate capacity or reserve margin, the Regional Entity will be requested to analyze and explain any resource capacity inadequacies and its plans to mitigate the reliability impact of the potential inadequacies. The analysis may be expanded to include surrounding areas. If the expanded analysis indicates further inadequacies, then an interregional problem may exist and will be explored with the applicable Regions. The results of these analyses shall be described in the assessment report.[2]

The foundation of ERCOT's annual LTRA data submission to NERC is the May version of the Capacity, Demand and Reserves (CDR) report. Because the CDR report's resource outlook relies only on project data associated with interconnection requests, ERCOT makes sure that the LTRA narrative section that describes the ERCOT Region's overall resource adequacy situation has sufficient caveats regarding out-year planning reserve margin trends. For example, the 2016 LTRA report includes the following statement:

> Note that project developers typically submit interconnection requests to ERCOT no more than three to four years before the facility is expected to enter commercial operations. As a result, the Texas RE-ERCOT Region will always show a flat level of capacity additions and typically declining reserve margins starting four to five years into the LTRA forecast period.[3]

Coordination with NERC Staff

Both ERCOT and TRE have representatives on NERC's Reliability Assessment Subcommittee (RAS). The primary purpose of the RAS is to support NERC staff's efforts to develop the annual and seasonal reliability assessment reports by (1) providing data and narrative "self-assessment" material for the NERC assessment reports, (2) conducting peer reviews of report material provided by other Regions/Assessment Areas, and (3) reviewing and commenting on the draft reliability reports prior to submission to the NERC Planning Committee. At the last RAS meeting, held in mid-April, 2017, ERCOT and

[2]Section 805.1, Rules of Procedure of the North American Electric Reliability Corporation (Effective October 31, 2016), p. 68.
[3] NERC, 2016 Long-Term Reliability Assessment (December 2016), p. 147.

TRE notified NERC staff and other RAS members that the Public Utility Commission of Texas directed ERCOT to calculate and publish Economically Optimum and Market Equilibrium Reserve Margins in lieu of Reserve Margins based on a physical reliability standard (1-event-in-10-year Loss of Load Expectation, or LOLE).

The topic of how to address the PUCT's new reserve margin reporting requirement for future LTRA development will be discussed at upcoming RAS meetings. Note that some members of the SERC Reliability Corporation (Southern Company subsidiaries) incorporate economic impacts into their target reserve margin calculation process, and have chosen to let NERC apply the 15% default Reference Margin Level for the LTRA. Southern Company's economic optimum reserve margin is higher than the NERC default value.

ERCOT staff will keep Commission staff, SAWG members and other Market Participant groups apprised of discussions with NERC staff regarding the TRE Region's Reference Margin Level and associated messaging in the NERC reliability assessment reports.