

**UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION**

Managing Transmission Line Ratings)	
Technical Conference)	Docket No. AD19-15-000
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)	

PLANNED TECHNICAL CONFERENCE REMARKS OF NATIONAL GRID

National Grid provides these planned remarks in advance of the technical conference convened by the Federal Energy Regulatory Commission (“FERC” or the “Commission”) on September 10 and 11, 2019 (in the above captioned docket), which will discuss the issues related to transmission line ratings, with a focus on dynamic and ambient-adjusted line ratings.

I. Communications

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II. Background

On June 28, 2019, the Commission announced that it would hold a technical conference to discuss the issues related to transmission line ratings, with a focus on dynamic and ambient-adjusted line ratings.¹ Commission staff seeks to explore what transmission line rating methodologies and related practices might constitute best practices, and what, if any, Commission action in these areas might be appropriate.

III. Planned Remarks

National Grid is one of the world's largest investor owned utilities focused on transmission and distribution of electricity and gas. National Grid has more than 7 million gas and electricity customers in the US serving communities of over 20 million residents. With an electricity transmission network of roughly 9,000 miles of lines and almost 400 transmission substations, National Grid is one of the largest transmission owners, operating in the ISO New England ("ISO-NE") and New York ISO ("NYISO") control areas. National Grid's network connects over 300 generators, public and municipal utilities, and neighboring transmission owners safely, reliably, and efficiently. National Grid also owns and operates one of the largest high voltage direct current ("HVDC") transmission interconnectors across the US and Canada, supplying New England's electricity markets with almost 2,000 MW of clean energy. In the UK, we own and operate the electricity transmission network in England and Wales and operate the electricity networks for all Great Britain.

¹ <https://www.ferc.gov/CalendarFiles/20190628135408-Notice4.pdf>

ISO-NE and NYISO administer National Grid's transmission network reliable grid operations in New England and New York. National Grid plans and operates its US transmission network based on seasonal ratings. In NE, on a case by case basis, upon request from ISO-NE, day-ahead forecast ambient adjusted rating ("AAR") may be considered for reliable operations. In NY, National Grid's NY electric transmission operations may consider real-time temperature-based ratings for reliable grid operation of the transmission system, but this is not considered in the day ahead capacity forecast by NYISO.

To evaluate the benefits and challenges of dynamic line rating ("DLR") over static line rating or ambient adjusted rating, National Grid installed DLR technologies on two 115kV transmission lines. The technologies we deployed utilize different approaches to estimate the dynamic ratings of the lines. For instance, one of the technologies uses sensors that are mounted on the towers; and the other utilizes sensors that are installed on the line itself. The preliminary findings and observations are indicated below.

Preliminary findings:

National Grid's DLR technologies have been in service since August 1, 2019. Below are lists of challenges and benefits that National Grid has observed to date.

Challenges:

- 1) Cyber Security: Not all DLR vendors have their equipment certified to meet utilities' digital risk and security requirements and so integration to Energy Management Systems ("EMS") may require additional time and resources. Compliance with NERC Critical Infrastructure Protection ("CIP") standards for line and tower-based devices

communicating with bulk power system substation remote terminal units (“RTUs”) can also pose challenges.

- 2) Ability of the ISOs to accept and utilize DLR data in their administration of electricity markets and reliable grid operations.
- 3) DLR forecast data calibration may take a few weeks after the installation as the vendors utilize neural network for their forecast models. Risks or issues associated with the real-time variability of ratings due to changing environmental conditions (irradiance, wind speed, etc.)
 - a. Impacts to real-time security constrained dispatch. This is another variable with “frequent” changes impacting the electric system on top of renewables that may require regulation and reserve to be re-examined long term.
 - b. Transmission Owners and ISOs need the correct tools to dynamically rate and redispatch in real-time adding complexity to market and grid operations.
 - c. Market tariffs may need to be changed to allow customers to be compensated for additional capacity. e.g. How will National Grid NY customers that hold Transmission Congestion Contracts be compensated for additional capacity and what are the financial risks associated with increased variability caused by real-time changes in ratings?
- 4) Need for adequate coverage of line segments with sensors to yield the right answer. The geographic location of the line spans plays a key role in the DLR data estimation. Therefore, more than one sensor may be needed to adequately cover the line segments.

Benefits:

- 1) The DLR data associated with the two National Grid installations indicate that the real-time line rating is generally higher than the seasonal static rating. This available capacity above the static rating is critical during operations and system contingencies. However, there were limited periods when the dynamic rating of the line was lower than the static rating. This happened during hot days with little to no wind. This highlights the importance of DLR technologies as they provide better visibility over line capacity for RTOs/ISOs.
- 2) Economic benefits and potential congestion relief: This potential benefit depends on ISOs changing market rules such that incentives are provided to those entities that create capacity above static ratings.
- 3) Renewable integration: Additional line capacity allows higher integration of renewable generation on the electric transmission system.

Recommendations:

National Grid supports use of DLR where it can reasonably provide value to customers; we encourage the Commission to continue to explore policies that would drive adoption to improve system operations and create economic benefits. National Grid believes that the Commission's transmission incentives policy is an available mechanism to facilitate greater deployment. In our comments in the response to the Commission's Notice of Inquiry on Transmission Incentives, we highlighted the trends changing the future of the transmission system, including the challenges of adapting to increasing renewable energy generation, ambitious state clean energy goals, evolving customer expectations, and role increased adoption of technology can play.

National Grid suggested that the Commission look specifically at new ways to incentivize advanced technologies that will make the grid more efficient, improve operational flexibility, and reduce congestion costs. We noted that technologies like dynamic line rating could help fulfill the

Commission’s statutory mandate under Section 219 of the Federal Power Act to “encourage deployment of transmission technologies to increase the capacity and efficiency of existing transmission facilities and improve the operation of the facilities.” We highlighted that DLR could produce significant real-time capacity gains above static line ratings. Consequently, investments in dynamic rating could improve transmission operation utilization and flexibility, as well as maximize the economic value of the transmission system.

As the subject of this conference is to consider appropriate action with respect to line rating, we would encourage the Commission to use input from these discussions in its assessment of transmission incentives.

Respectfully submitted:

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