

Increasing Competitiveness of FERC 1000 Proposals

Inclusion of a Dynamic Line Rating (DLR) solution as part of a FERC 1000 transmission project positively impacts competitiveness on new line construction costs, and increases the likelihood of qualifying for incentive rate treatment. DLR may be of additional benefit to incumbent utilities.

LOWER LINE CONSTRUCTION COST

Developing a competitive proposal for a FERC 1000 project is a complex undertaking. Key aspects are the material and construction cost of the line. DLR, when integral to the line's design, can offer significant reductions in line costs.

- Numerous studies, including those by the DOE, show that lines equipped with DLR can regularly carry 10 - 25% more power than their designed static rating¹.
- When DLR is integral to the line's design, this additional capacity can be included. For example, a 1000MW line could be designed at a lower rating, for example, 900MW, knowing the additional capacity would be available through DLR.
- Savings would follow from a variety of sources including the use of a less expensive, smaller conductor. The lighter conductor loads may allow the use of lighter, less expensive line hardware and towers. Lighter towers and conductor loads may extend to less expensive foundations which may reduce construction cost and installation time.

INCUMBENT UTILITY ADVANTAGE

Installing DLR proactively on existing lines will provide an incumbent utility a history of operational DLR data and the additional capacity identified by the DLR deployment. When included in a FERC 1000 proposal this data offers strong rationale supporting the use of the additional DLR capacity as a base of the line design. While this logic can be used for any company submitting a proposal, the incumbent utility operator may have an advantage of validating the additional DLR capacity on their own system under the same climatic conditions that the proposed line may be constructed.

WHAT IS DYNAMIC LINE RATING?

Dynamic Line Rating, or DLR, is a transmission line's actual real-time or forecast power carrying capacity based on real-time line behavior and weather conditions. A line's DLR is typically 10 - 25% higher than its static rating.

This additional capacity provides opportunities in economic dispatch, trading, operations, and congestion mitigation.

Application of DLR is also a powerful tool for improving N-1 contingency planning, cost effectively addressing lines with slow load growth, and can also defer or eliminate the need for line upgrades or reconductoring.

Implementing DLR is straightforward. Installation of sensors to monitor real-time line behavior is required and software which analyzes the collected data to compute the dynamic ratings.

SMARTLINE® is Lindsey's next generation DLR. Compared to other DLR packages, the SMARTLINE DLR and line rating forecasting system is simple to install, easy to integrate into engineering or EMS systems, and provides continuous line clearance monitoring.

QUALIFICATION FOR INCENTIVE RATES

DLR is specifically identified in a recent FERC Policy Statement as an advanced technology that would qualify a project for incentive rate treatment². DLR is noted in this Policy Statement as a technology that creates "additional incremental capacity without significant construction." This approach may be used for rate treatment filings for both the installation of DLR on existing lines and for FERC 1000 projects.

¹"Dynamic Line Rating Systems for Transmission Lines: Topical Report," Smart Grid Demonstration Program, US DOE, April 25, 2014, page vi

²"Promoting Transmission Investment Through Pricing Reform", FERC Policy Statement 141 FERC ¶ 61,129, November 15, 2012, p15, footnote 28.

SMARTLINE Dynamic Line Rating System

SMARTLINE is the next generation dynamic line rating (DLR) system providing transmission line operators and RTOs reliable, real-time and forecast, transmission line capacity ratings.

Unlike conventional dynamic line rating (DLR) methods, SMARTLINE ratings are developed by actively learning how the conductor behaves with regard to conductor temperature, weather, current, and the conductor’s exact clearance-to-ground.

SIMPLE INTERPRETATION

Traditional DLR systems produce a graph of a transmission line’s instantaneous power rating. By nature, this changes constantly, appears quite erratic, and is difficult to interpret for real-time operation. SMARTLINE eliminates the variability and provides power line capacity readings that are easy to interpret and act upon in the control room, on the trading floor, or an engineer’s desk.

THREE UNIQUE RATINGS FOR OPERATIONS, TRADING, PLANNING, AND COMPLIANCE

SMARTLINE RBR; Reliability Based Rating

The Reliability Based Rating (RBR) is a statistically stabilized DLR rating and acts as a reduced risk line rating alternative. SMARTLINE RBR is designed for operators to ensure the transmission line is operating over time within both clearance and thermal parameters. Unique to SMARTLINE.

SMARTLINE RBF; Reliability Based Forecast

SMARTLINE’s Reliability Based Forecast (RBF) ratings are SMARTLINE RBR line capacity ratings adjusted for forecasted future weather conditions. Available for any timeframe for which weather forecasts are available, SMARTLINE RBF ratings are tailored to address energy dispatch and trading needs.

SMARTLINE DLR; Dynamic Line Rating

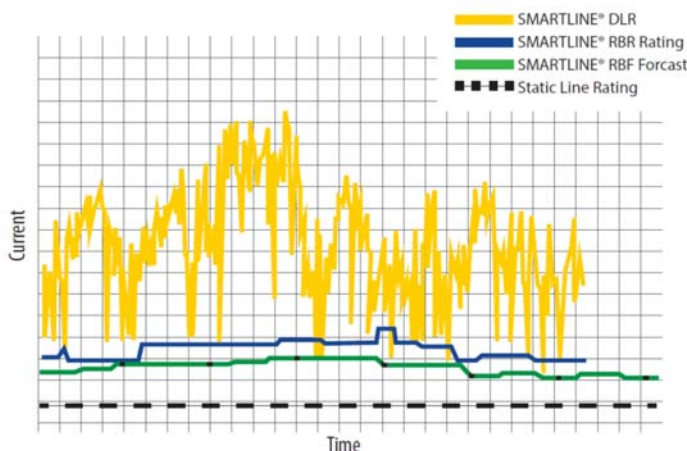
SMARTLINE DLR provides a line’s maximum instantaneous current carrying capacity while ensuring clearance requirements are not violated, and eliminating risk of conductor thermal damage. SMARTLINE DLR is the heart of SMARTLINE RBR and RBF ratings. Clearance enhanced DLR is unique to SMARTLINE.

MEANINGFUL AND RELIABLE DATA

- Uses continuous direct LiDAR measurement of conductor clearance-to-ground.
- Utilizes only directly measured conductor data, unlike other DLR systems which interpolate values from look-up tables, relying on data such as vibration to infer critical span sag.
- Ensures dependable data feed even in remote locations via simple and reliable satellite or mesh radio communications.

SIMPLE INSTALLATION

- Fast, live line installation. No line outage or dead-end structure modifications required.
- Suitable for installation on lines up to 765kV.
- Suitable for single and bundled conductors.



LINDSEY TLM® Conductor Monitor

The Lindsey TLM® Conductor Monitor provides a complete picture of conductor behavior to SMARTLINE. Data collected includes actual conductor clearance-to-ground through built-in LiDAR, conductor temperature, line current, vibration, tilt and roll. The TLM monitor is an easily installed, self-powered conductor monitoring solution for system voltages up to 765kV.

