

# EMPOWER THE GRID

Unlock Your Potential with Scalable Dynamic Line Ratings

We present computational fluid dynamics (CFD) enhanced weather-based dynamic line ratings (DLR) as an enabling smart grid technology that adaptively computes ratings of TLs based on local weather conditions to utilize the additional headroom of line ampacity due to concurrent cooling of existing lines.

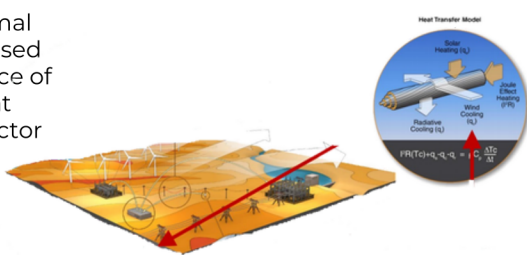
A contactless DLR solution to maximize the ampacity utilization of existing TLs and to delay the need of costly grid upgrades. Moreover, dynamic line ratings help to increase wind energy hosting capacity of the TLs due to the natural synergy between wind generation and increased conductor capacity at times of high local wind speed.

## WHAT ARE DYNAMIC LINE RATINGS?

Simple physics + modeling + monitoring + computing

•The real-time thermal capacity of a line based on dynamic influence of environment to heat and cool the conductor

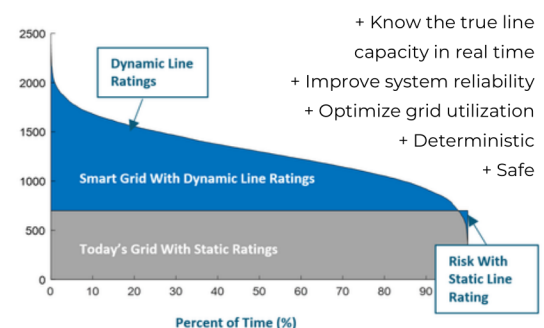
•It is predominantly influenced by wind and ambient temperatures



## HOW DO DLRs PROVIDE A BENEFIT TO TRANSMISSION OPERATIONS?

### Enhanced awareness

- = More capacity
- = More economical dispatch
- = Less congestion
- = More flexibility



## HOW IS WINDSIM POWER LINE DEPLOYED?

### Geographic and physical data

Terrain and conductor properties

### Weather Station Monitoring

Placement and # of sensors depends on terrain

### Computational Fluid Dynamics and Forecasting

WPL uses WindSim Core CFD Integrated DLR System



## WHAT IS UNIQUE ABOUT WINDSIM POWER LINE?

### Scalable

- Only requires weather stations
- Uses CFD for scaling

### Bankable

- 28+ years in wind
- 11+ years co-development with INL

