GR-23-06: Phasor Measurement Unit Based Methods for Implementing Dynamic Line Rating Capabilities

1. Company or University Name, as well as partnering organizations
University of Arkansas, Southwest Power Pool and Oklahoma Gas & Electric

2. Project Title
GR-23-06: Phasor Measurement Unit Based Methods for Implementing Dynamic Line Rating Capabilities

3. Project PI/Contact
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4. Technology Roadmap Target Area
Power Flow Control

5. Project Summary
This project develops a method for implementing dynamic line rating of high-voltage electric power transmission lines. The method uses statistical signal processing methods for deriving conductor temperatures from phasor measurement units (PMU). Real-time monitoring of ambient air temperatures and wind speed are also incorporated to further improve the accuracy of conductor temperature estimates. The estimated conductor temperatures are then used to estimate line sag and infer the amount the line ratings can be adjusted to ensure maximum utilization of transmission assets.

6. Technology Gap/Market Need
This project develops a product that fills industry need created by FERC Order 881 that is lower cost to install and operate.

8. Target Application
Transmission

8. Accomplishments/Deliverables
Results verified using phasor measurement data provided by partnering organizations.

10. Impact/Benefits
This project provides algorithms and software tools to implement a low-cost method for achieving the benefits of maximized transmission asset utilization. This method particularly benefits transmission lines that are subject to congestion resulting in curtailment of wind generation resources.

11. Images