Helping our members work together to keep the lights on… today and in the future

SPP *Southwest Power Pool*

ISO/RTO Challenges and Opportunites

DOE Transmission Workshop

Crystal City, VA

November 1, 2012

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SPP *Southwest Power Pool*

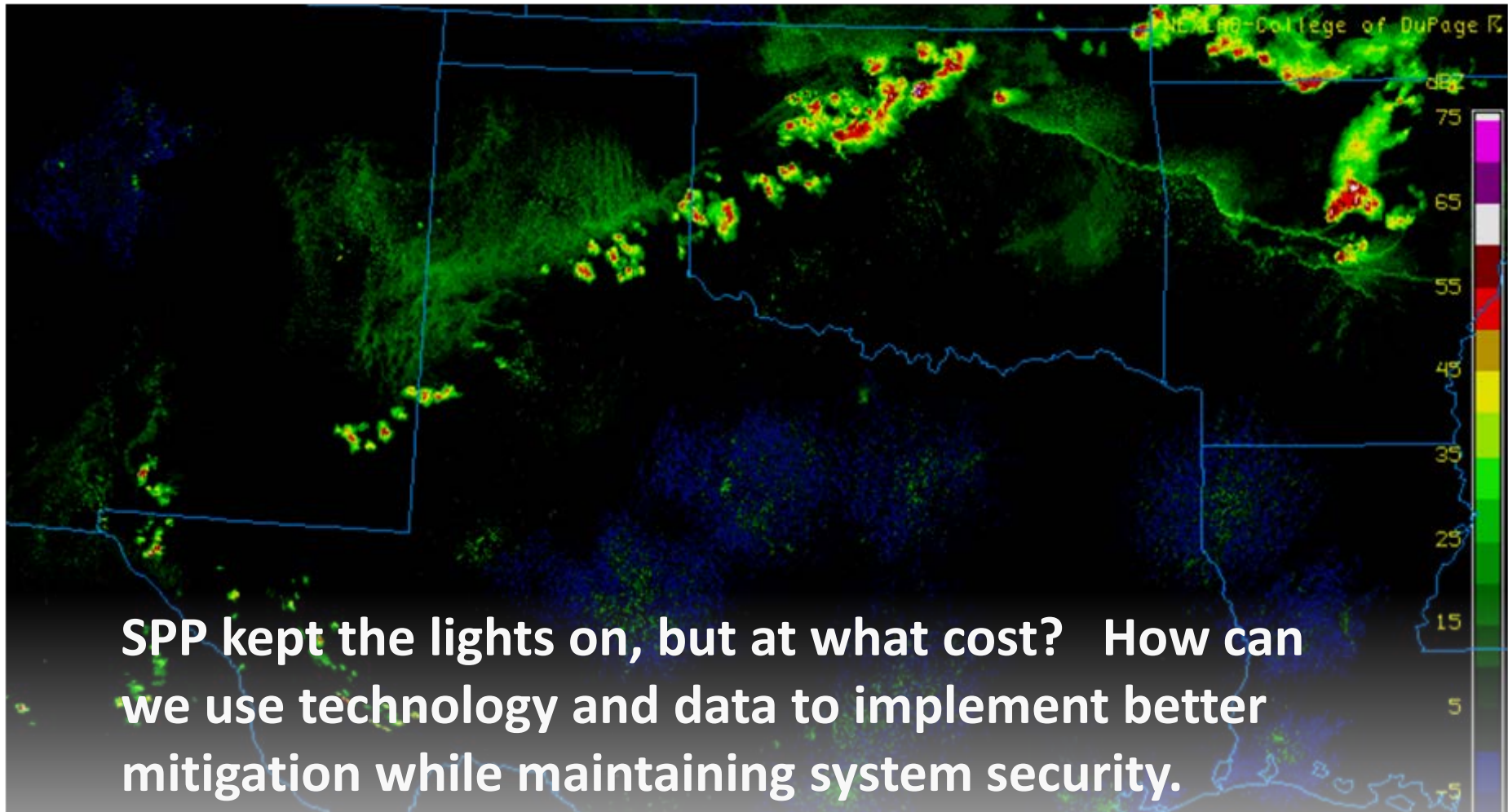# Independent System Operator (ISO) / Regional Transmission Organization (RTO) Map
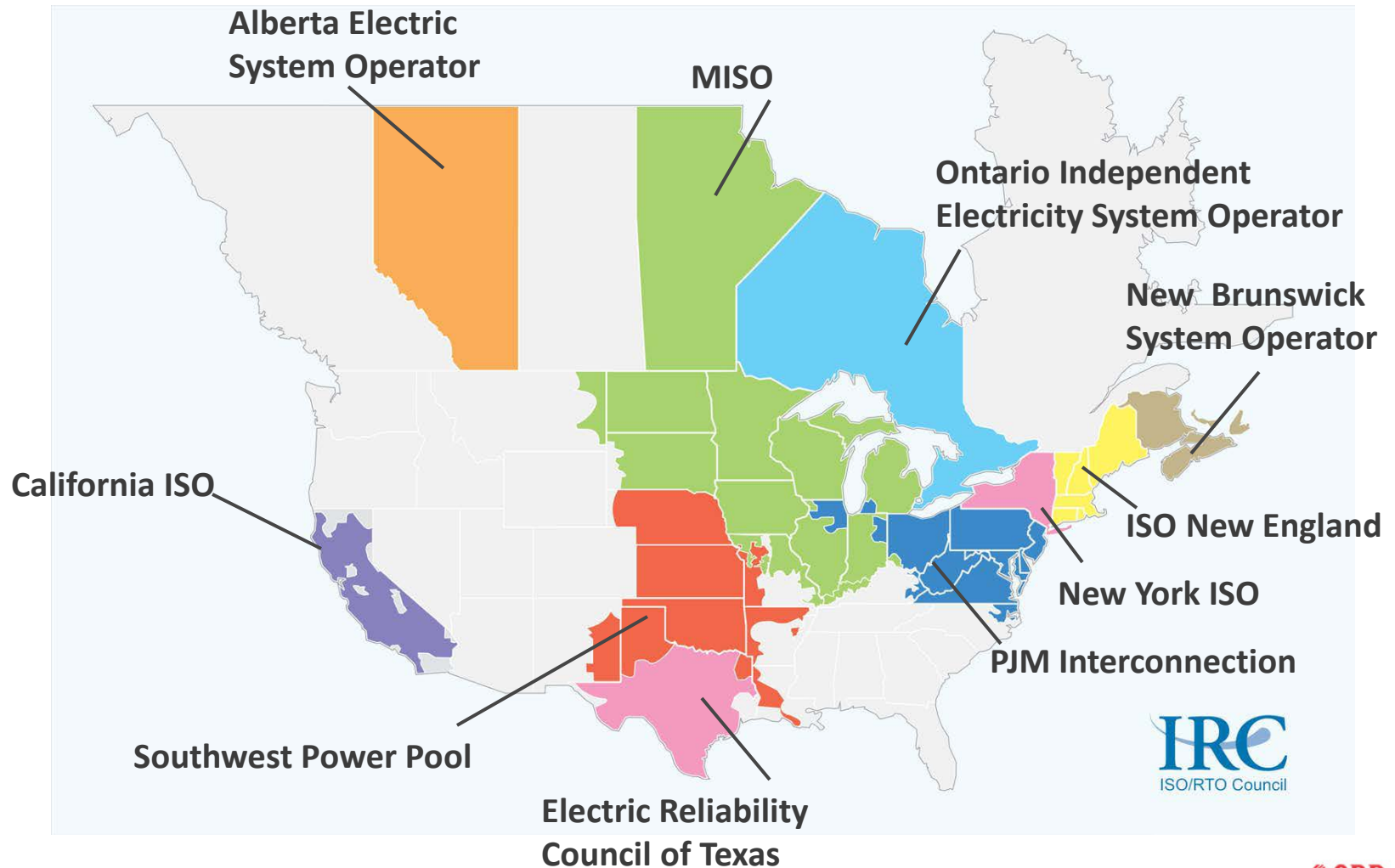
Improving Visibility and Understanding

This August 2011 storm caused more than a dozen concurrent transmission and generation outages

Improving Visibility and Understanding

SPP kept the lights on, but at what cost?   How can we use technology and data to implement better mitigation while maintaining system security.
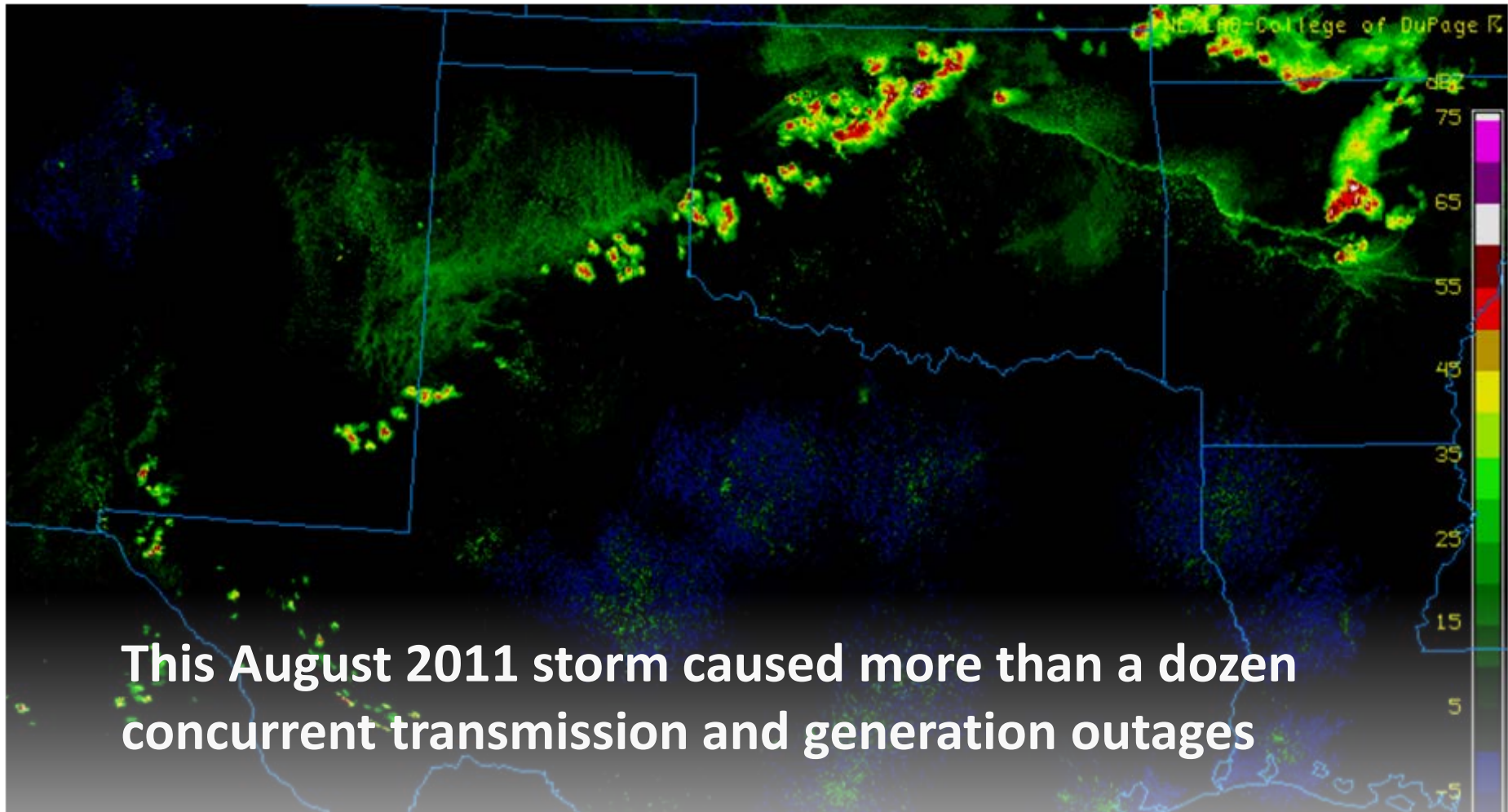
Synchrophasor Deployment

Major progress due to SGIG and other utility (e.g., OG&E, SDG&E, TVA) projects

- *WECC*: 250 PMUs *($108M)*: *PG&E, BPA, SCE, SRP, IP*

- *NY ISO*: 39 PMUs *($74M)*

- *PJM*: 90 PMUs *($28M)*

- *MISO*: 150 PMUs *($35M)*

- *ATC*: 5 PMUs *($28M)*

- *Entergy:* 41 PMUs *($10M)*

- *ISO New England*: 30 PMUs *($9M)*

- *Duke Energy*: 45 PMUs *($8M)*
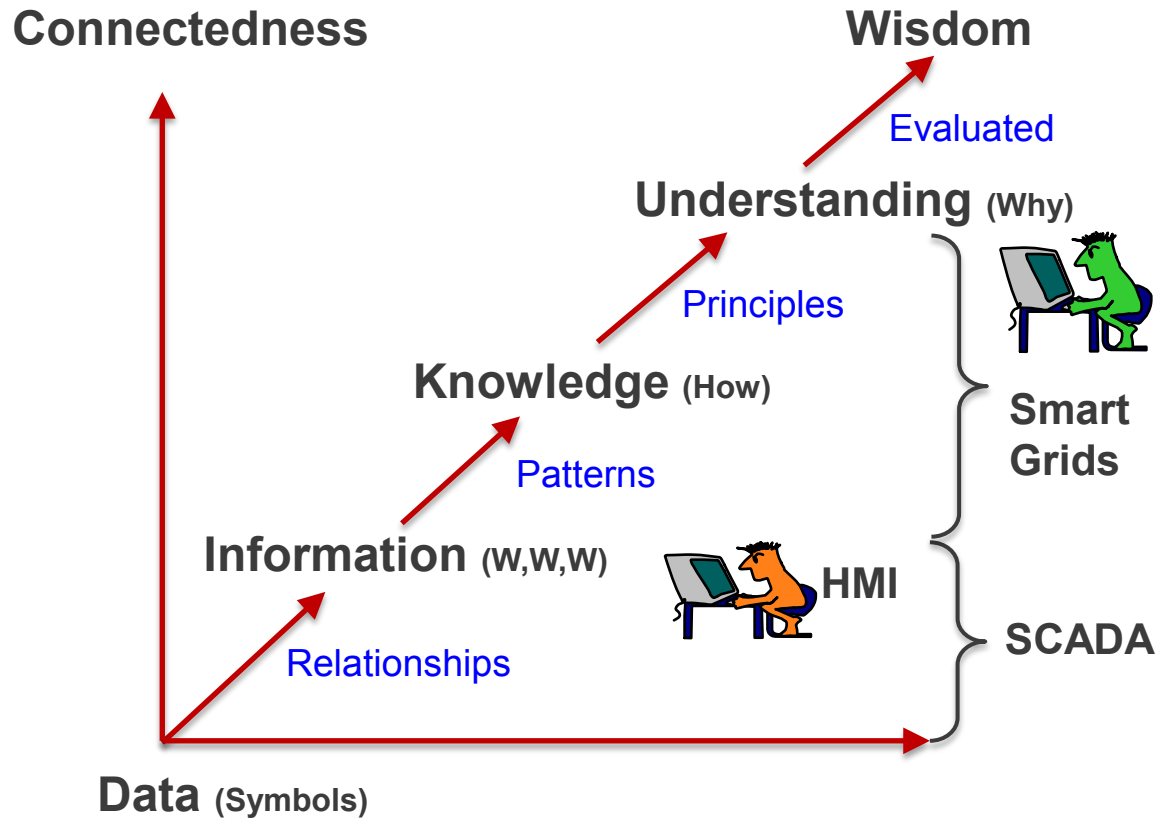
- *Midwest Energy:* 1 sub *($1.5M)*
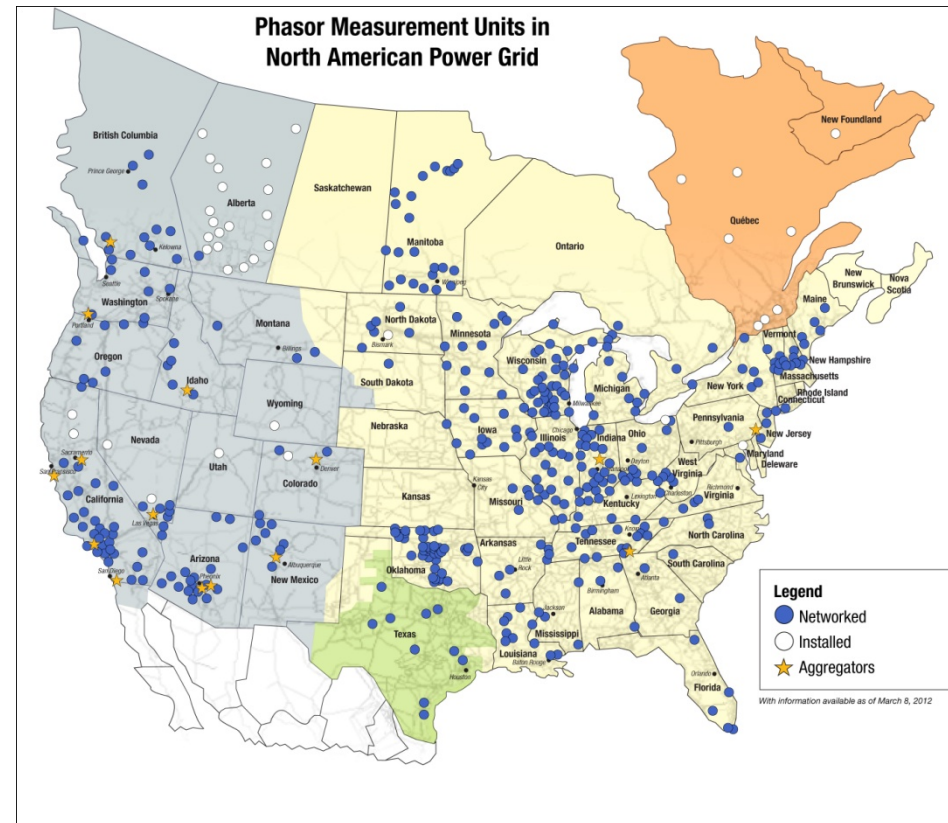
Source: NASPI

Challenge is Creating Understanding from Data

- Data helps understanding that needs to be addressed now and in the near future due to increased grid connectivity and complexity regarding controls and system response

- Manage data to create actionable information to improve grid operations, markets and planning

- DOE needs to pursue RD&D that will create opportunities for development of applications to improve grid efficiency and reliability

Wide Area Monitoring to Wide Area *Situation Awareness*

Connectedness

Wisdom

Evaluated

Understanding (Why)

Principles

Knowledge (How)

Patterns

Information (w,w,w)

HMI

Relationships

Data (Symbols)

Smart Grids

SCADA

Russell L. Ackoff

SPP

Future Technology and Data Needs

- Enhanced collaboration and cooperation to leverage computing capabilities, development of improved algorithms and standards to enhance interoperability, i.e., Electrical Systems Hub(s)

- FACTs devices and controls to improve flexibility and resiliency for grid operations, e.g., system optimization / reconfiguration tools, power electronics to manage loadings on critical facilities, etc.

- Improved diagnostics and analytical capabilities using phasor data, using interconnection-wide phasor data for effective baselining and pattern recognition to develop SOL and alarm specifications and operator decision support tools.