ELECTRIC TRANSMISSION 101: Bulk Power System Reliability

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• Meet all expected demand under normal conditions and reasonably foreseeable contingencies

• Maintain balance of generation and demand from second to second

• Plan and operate system so that all elements are within thermal and stability limits

• Plan and operate system so that loss of any element in the system results in remaining elements still being within thermal and stability limits (N-1)

• Protect equipment from physical damage when disturbances do occur, so system can be promptly restored
Avoid
Learn and Reduce
Severity
Frequency
Reporting Threshold
Inverse
Cost-Benefit

The Character of Harms

Harms

Inverse Cost-Benefit

"Pick important problems and fix them."
Dr. Malcolm Sparrow
John F Kennedy School of Government
NERC Reliability Risk Metrics

Harms: Load, Line, Generation Loss

- February cold weather
- September southwest
- October snow event

Graph showing historical benchmark days.

8/4/2003 Eastern Interconnection Blackout
8/10/1996 Western Disturbance
3/13/1989 Québec - Solar Flare
7/2/1996 Western Disturbance
2/26/2008 South Florida Event
• Reliability – to address events and identifiable risks, thereby improving BPS reliability
• Assurance – to provide assurance to the public, industry, and government for the reliable performance of BPS
• Learning – to promote learning and continuous improvement of operations and adapt to lessons learned for improvement of BPS reliability
• Risk-based Approach – to focus attention, resources, and actions on issues most important to BPS reliability
Program areas

- Developing and enforcing reliability standards
- Assessing seasonal and long-term reliability
- Maintaining system awareness of the bulk power system
- Analyzing disturbances and off-normal events
- Training and certifying industry personnel
- Operating ES-ISAC
• A private, nonprofit corporation, governed by an independent board of trustees, elected by the membership

• Ensure and improve the reliability of the bulk power system of North America

• Subject to oversight in U.S. by Federal Energy Regulatory Commission; comparable arrangements with regulatory authorities in Canada
- Investor-owned utilities
- State/municipal utilities
- Cooperative utilities
- Federal or provincial utilities/Federal PMAs
- Transmission-dependent utilities
- Merchant electricity generators

- Electricity marketers
- Large end-use electricity customers
- Small end-use electricity customers
- ISOs/RTOs
- Regional entities
- Government representatives