NERC

NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Electric Power Infrastructure: Status and Challenges for the Future

Mark Lauby
Director, Reliability Assessments and Performance Analysis

to ensure the reliability of the bulk power system

Owners, Operators, and Users

- 2005 Energy Policy Act:
  - *All users, owners, and operators of the bulk-power system shall comply with reliability standards*
- FERC Rule
  - *All entities subject to the Commission's reliability jurisdiction… (users, owners, and operators of the bulk-power system) shall comply with applicable Reliability Standards …*

U.S. Energy Policy Act of 2005 Reliability Legislation

- One industry self-regulatory ERO
- FERC oversight
  - Delegates authority to set and enforce mandatory standards to ERO
  - ERO may delegate authority to regional entities
- Standards apply to all users, owners, and operators of bulk power system
- Independent governance and compliance program

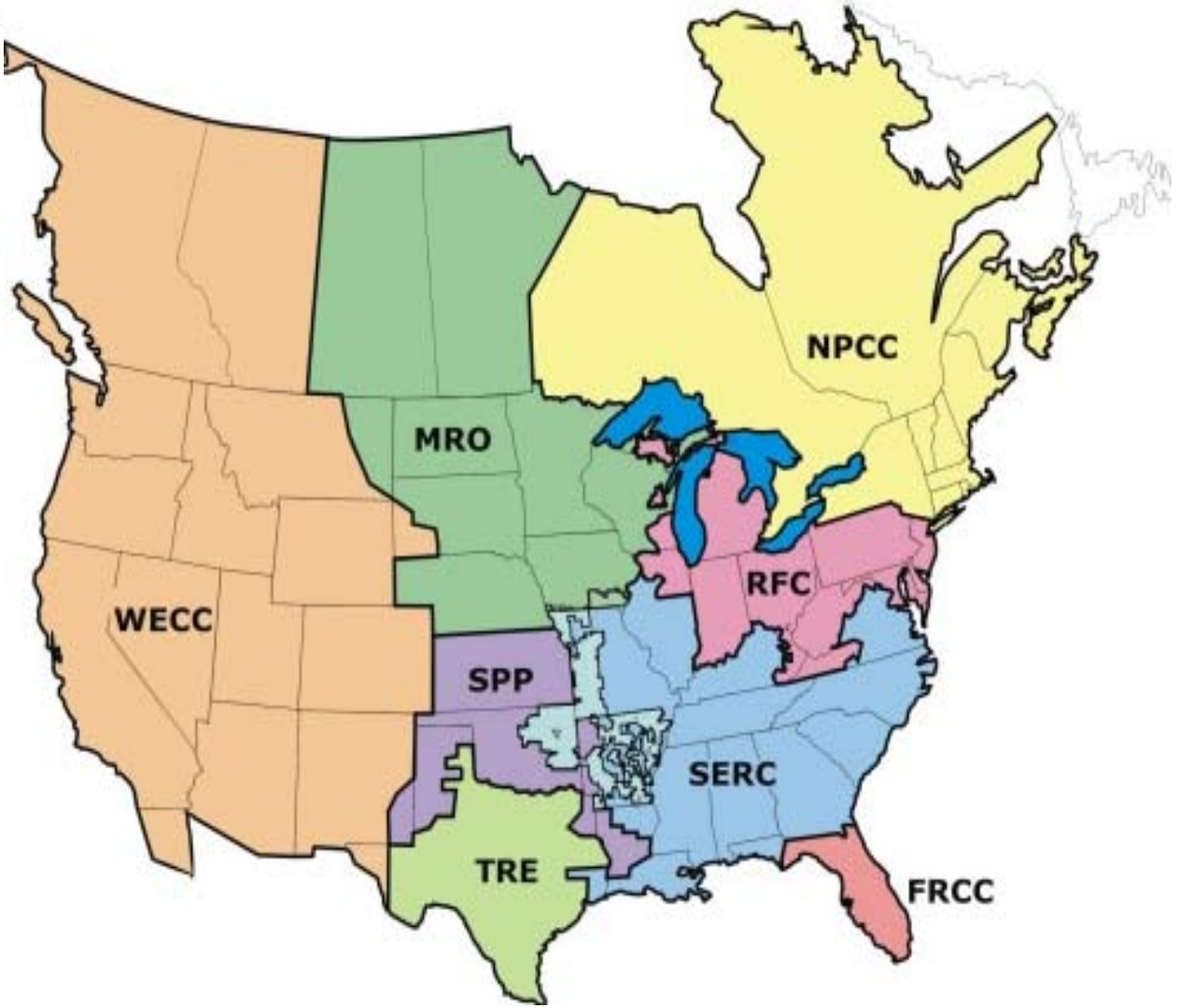
North American Electric Reliability Corporation (NERC)

Mission: *"To ensure the reliability of the North American bulk power system"*

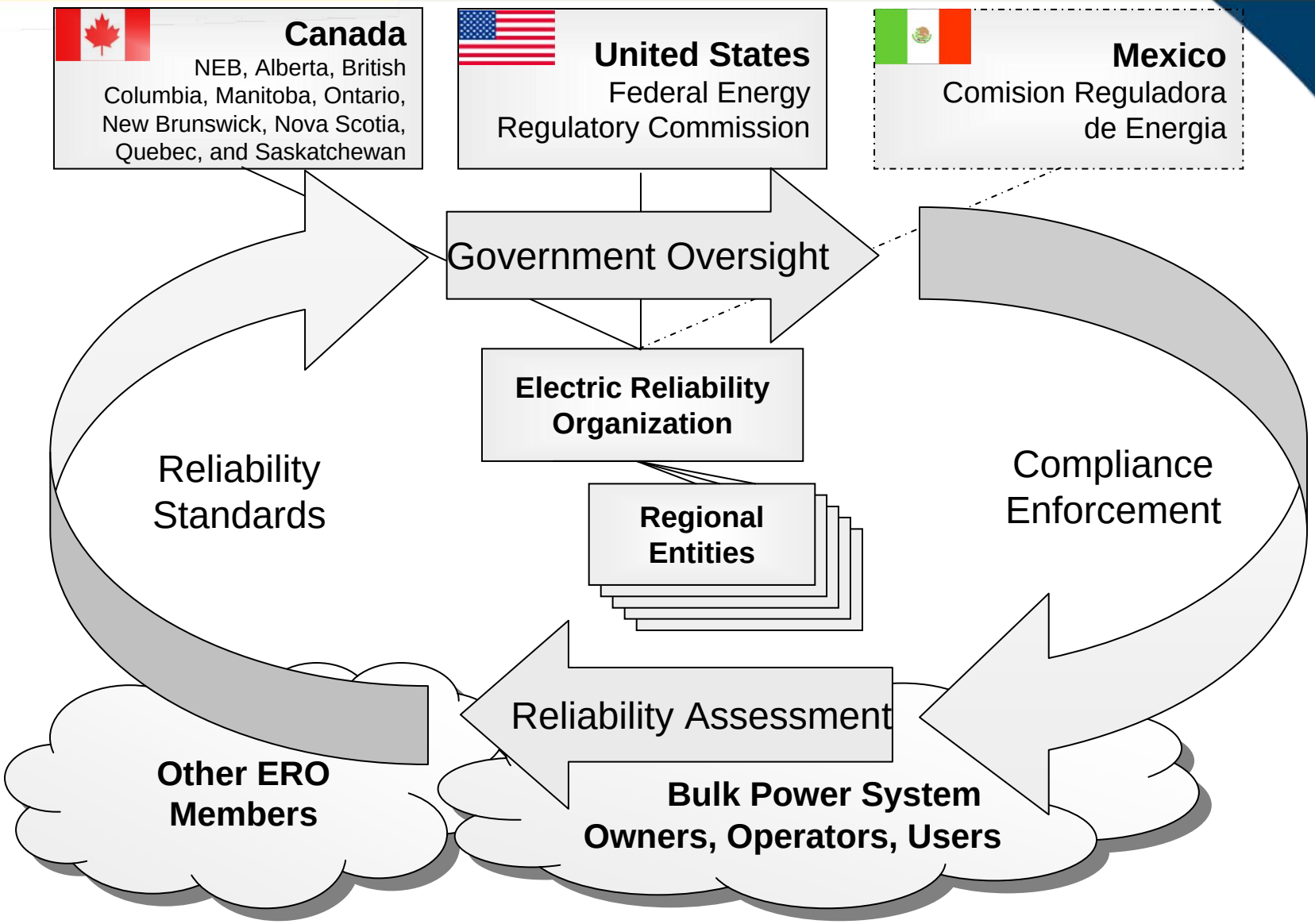
- Formed in 1968
- U.S. Electric Reliability Organization
- Working to gain similar recognition in Canada

Regional Entities

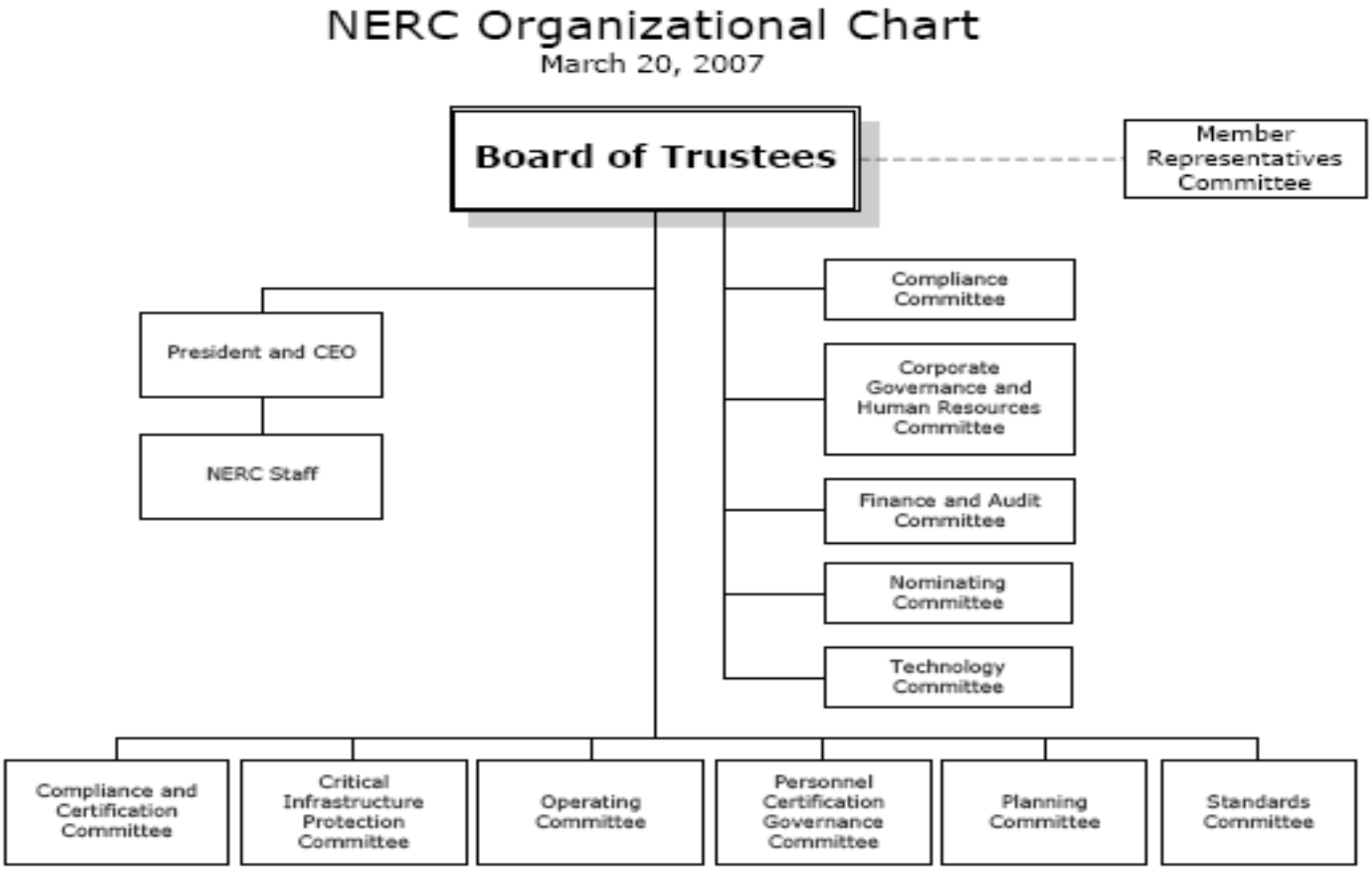
NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION



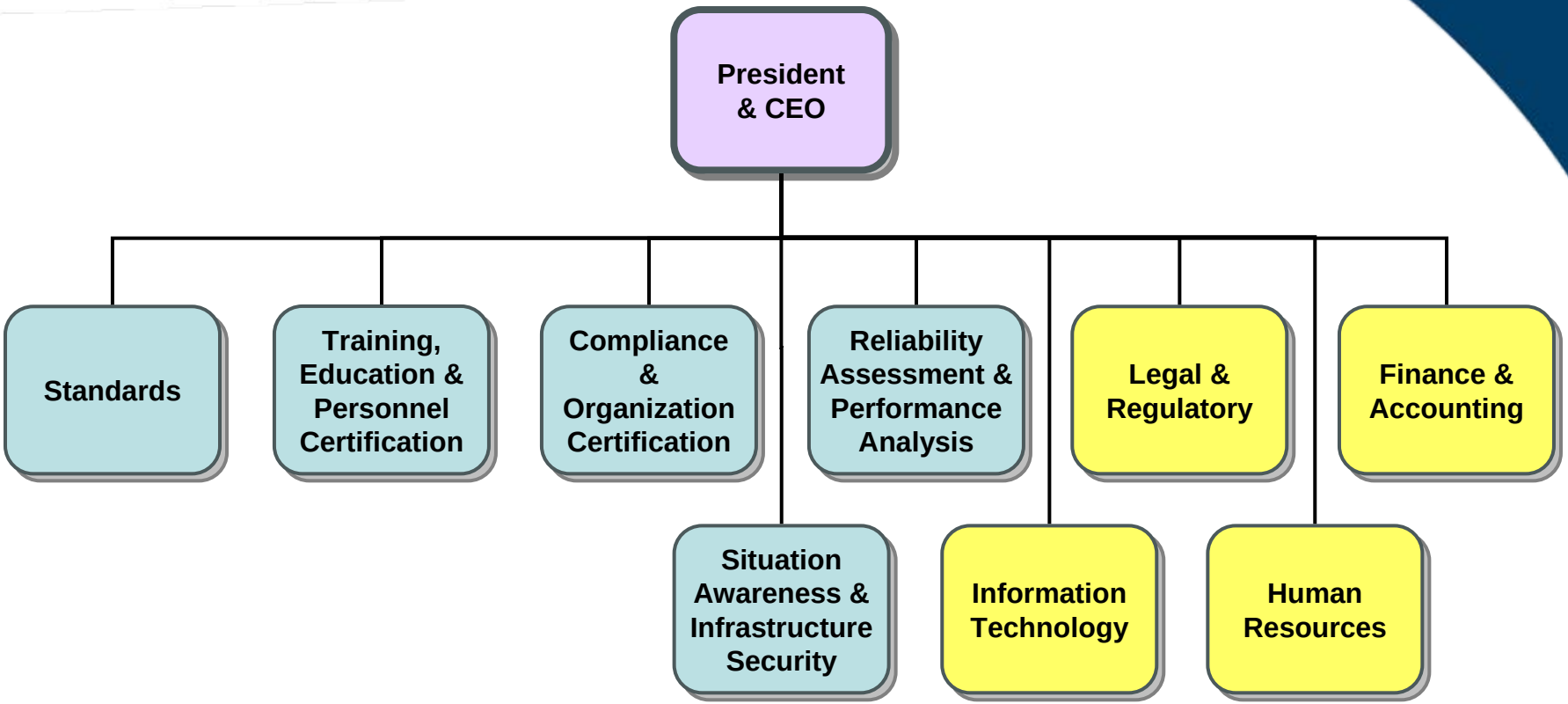
Electric Reliability Organization Overview



NERC Overview



NERC Organization

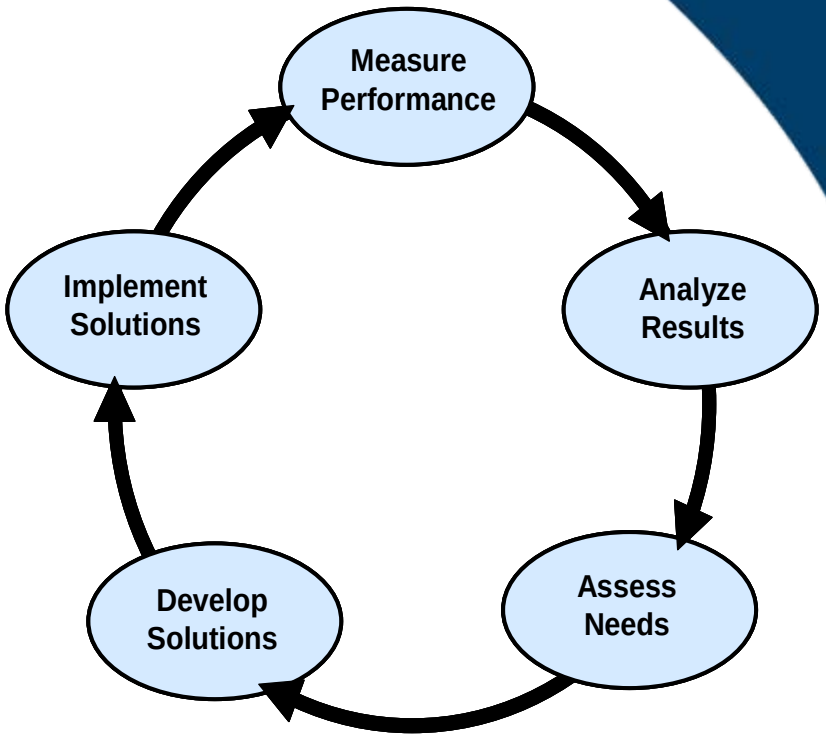


Funding

- Funding for ERO and regional delegated functions allocated to load-serving entities
  - Bulk power system users
  - Based on Net Energy for Load (NEL)
- ERO will fund regions for delegated functions
- Penalties offset costs
  - Funded regardless of penalty collections

...and through the “Virtuous Circle”

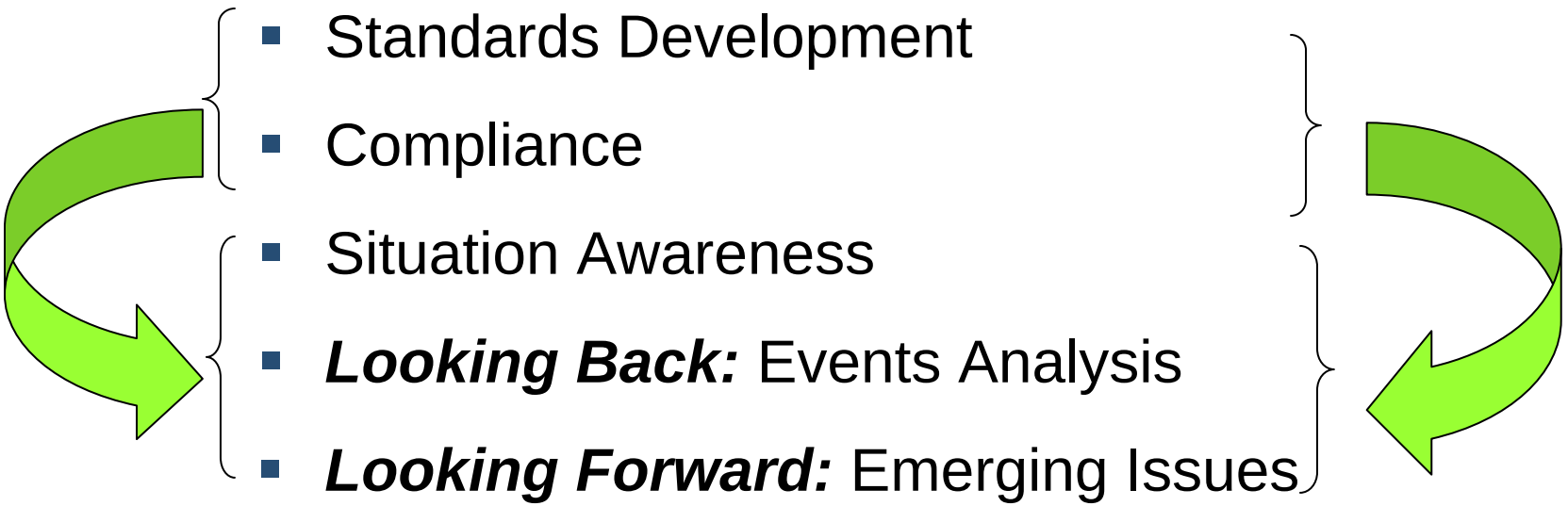
- Standards
- Enforcement
- Readiness Program
- Situation Awareness
- Training
- Assessments



Regional Delegation Agreements

- **Delegated functions**
  - Compliance
  - Standards
  - Organization registration
  - Reliability assessment
  - Reliability readiness and improvement
- **Regional consistency is key**
  - Transparency
  - Predictability
  - Uniform outcomes

Ensuring Reliability



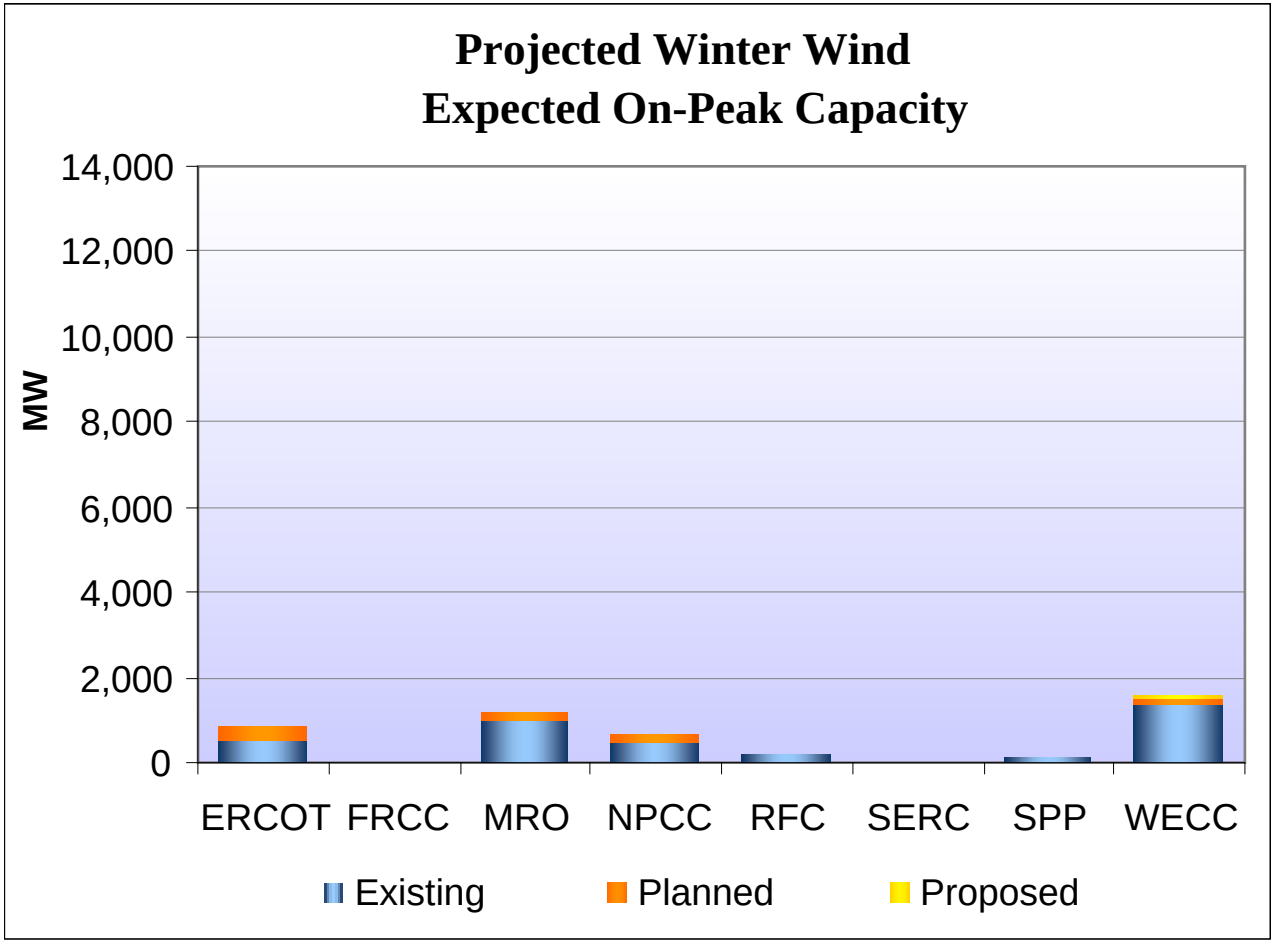
- Standards Development
- Compliance
- Situation Awareness
- ***Looking Back:*** Events Analysis
- ***Looking Forward:*** Emerging Issues

2007 Emerging Issue Recap

Example of Emerging Issue

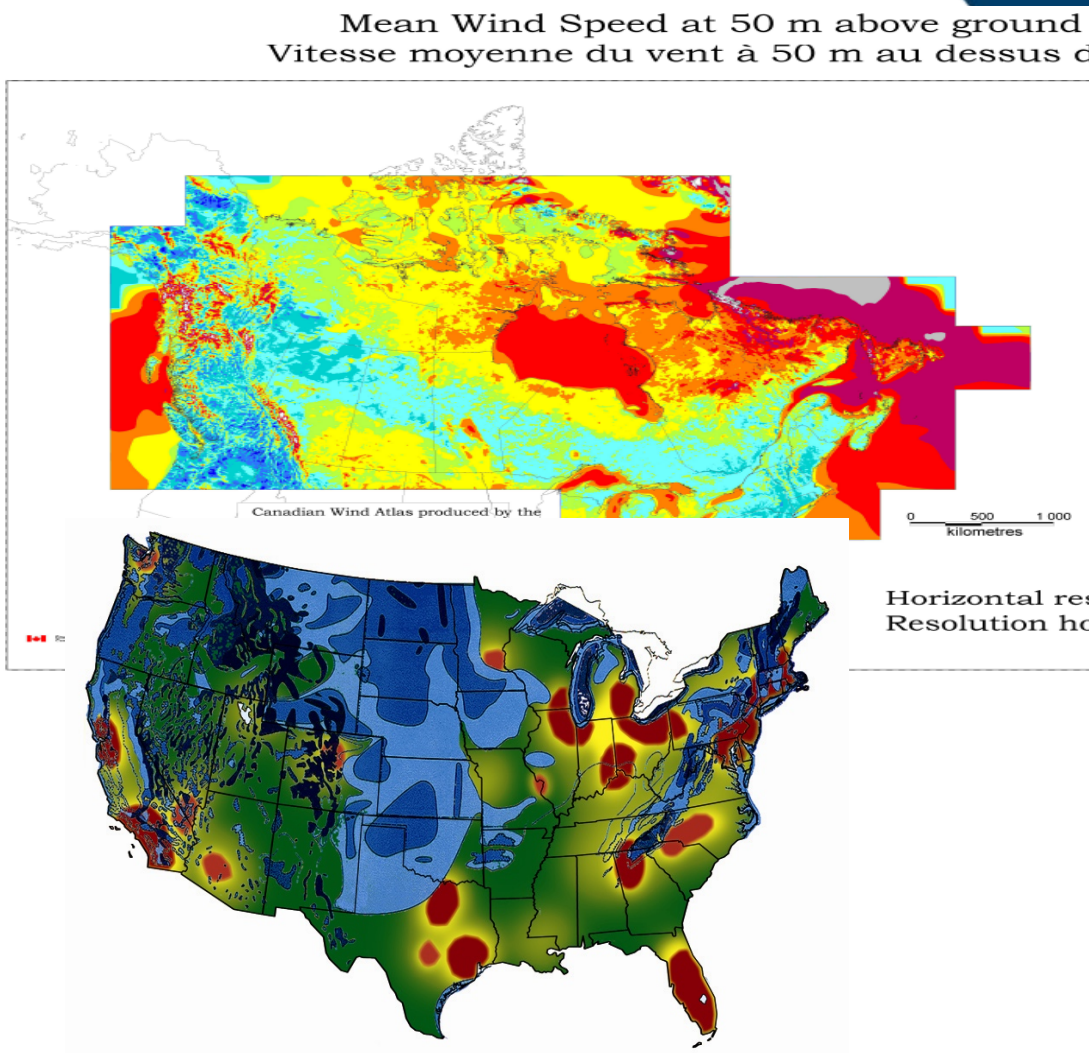
- Wind Resources Integration
- NERC Task Force Status & Recommendations
  - Background
  - Changes needed by Planners and Operators
  - R&D Needs
- Way Forward

Projected 2008/09 Winter Wind



Where is Wind Located?

- Energy is located remote from demand centers
- Unlocking this energy will change:
  - Planning
  - Operations



IVGTF Preliminary Recommendations

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

R&D Recommendations:

- Flexibility
- Forecasting
- Transmission

What Must Change?

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Planners:

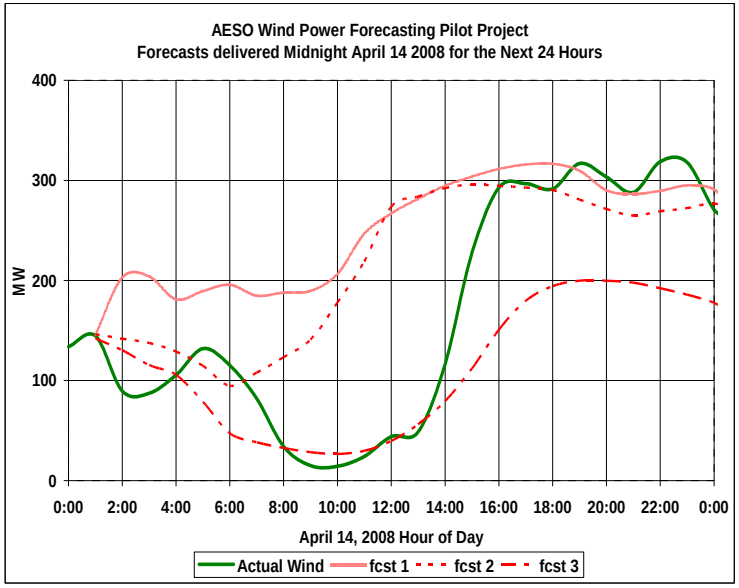
- Consistent methods for energy & capacity
- Add Probabilistic Expansion Analysis
- Design Flexibility during Resource & Transmission Planning to manage variability and uncertainty
- System Design must consider Distributed Variable Resources
- Transmission, PHEVs, storage & demand response provide resource flexibility
- Standard, generic power flow and stability models required
- Reference Manual for Planners needed

What Must Change?

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Operators:

- Forecasting should be incorporated into operations
- Larger Balancing Areas impact on Reliability requires Study
- Enhanced Standards and Procedures for interconnection are required:
  - Voltage & Frequency Ride-Through
  - Reactive & Real Power Control
  - Frequency & Inertial Response
- Operators need to know how to manage added variability and uncertainty
- Balancing Areas must have communications to monitor & provide dispatch signals to variable resources
- Reference Manual for Operators needed



Preliminary R&D Recommendations

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

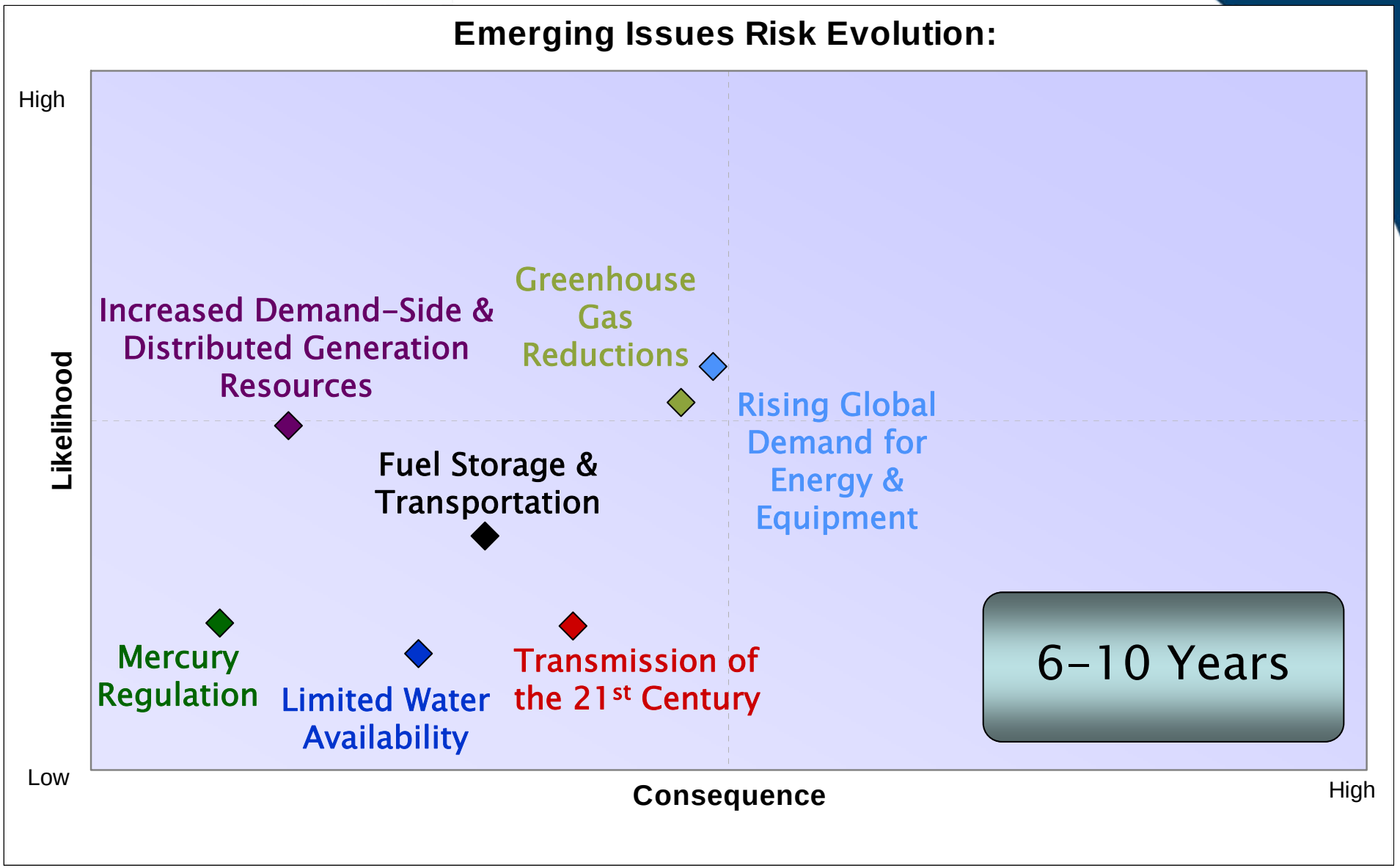
R&D Recommendations:

- Flexibility
  - Probabilistic System Planning
  - Demand Response, Storage and other complementary technologies supporting wind integration
  - Data requirements for Effective Load Carrying Capability calculations
  - Balancing Area size & Ancillary Service Requirements
  - Integrating large amounts of Distributed Generation
- Variable Resource Forecasting
- Transmission
  - Interconnection Requirements
  - Advanced transmission technologies (HVdc, FACTS, etc.)

Detailed Recommendations & Work Plan

- Specific Activities Outlined
  - Three year plan
  - Suggested Assignments
    - Reports
    - Standards Review/Creation
    - Industry Coordination
- Vital next step is the need for an Industry Reference Manual

Emerging Issues



NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Thank you