

# NERC

NORTH AMERICAN ELECTRIC  
RELIABILITY CORPORATION

## Ensuring a Reliable Bulk Electric System

U.S. DOE Electricity Advisory Committee

May 20, 2008

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the reliability of the  
bulk power system

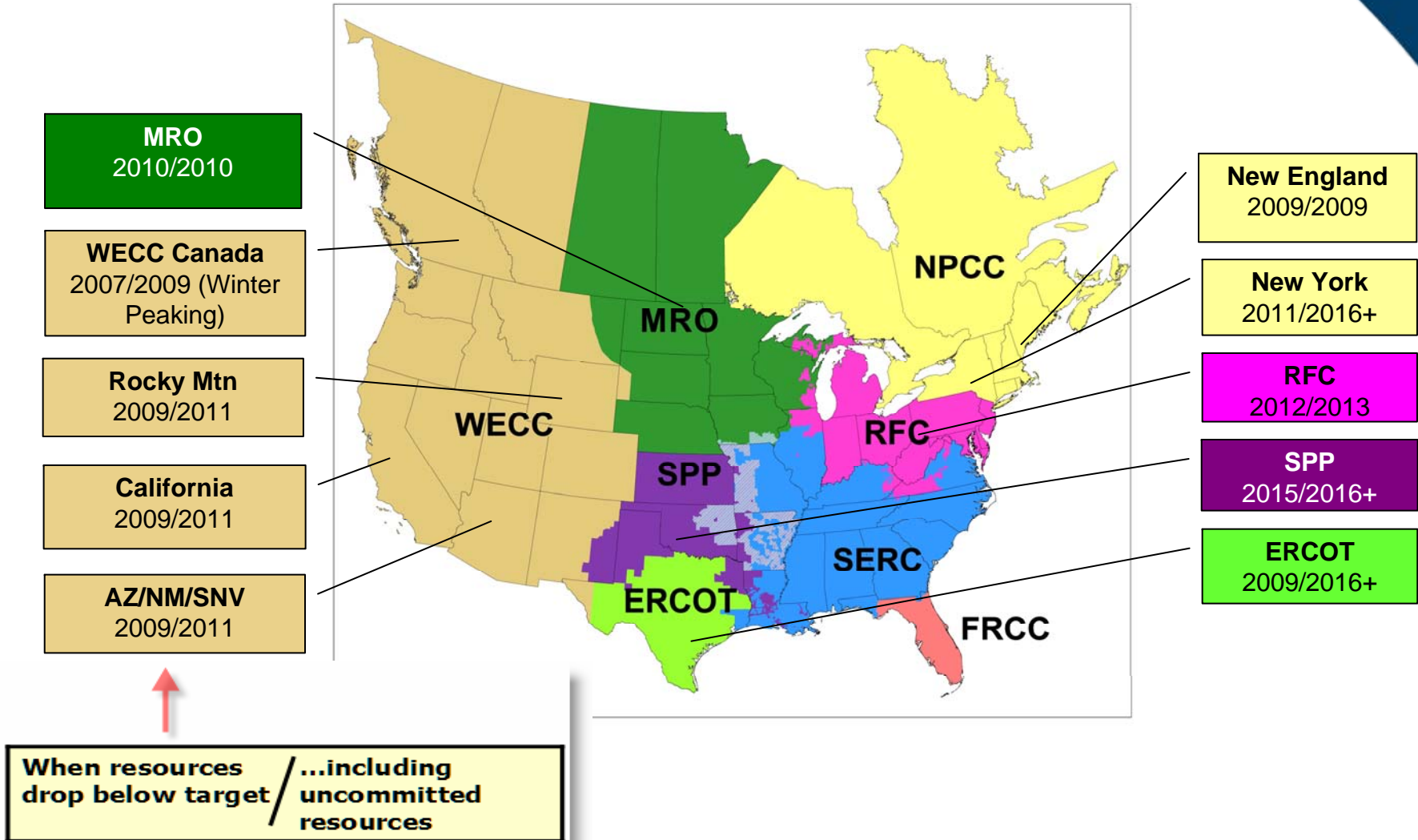
# What is the LTRA?

- Annual 10-year assessment of future bulk power system reliability in North America
- Since 1970 – 2<sup>nd</sup> as the Electric Reliability Organization
- Report identifies long-term reliability issues and makes recommendations to address them before problems occur
- Does not recommend or require specific resources or projects or make projections regarding electricity prices

# 2007 Assessment Highlights

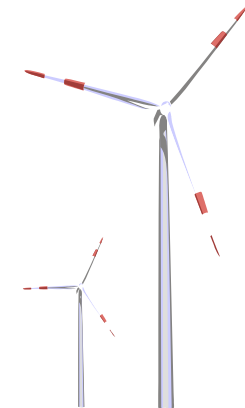
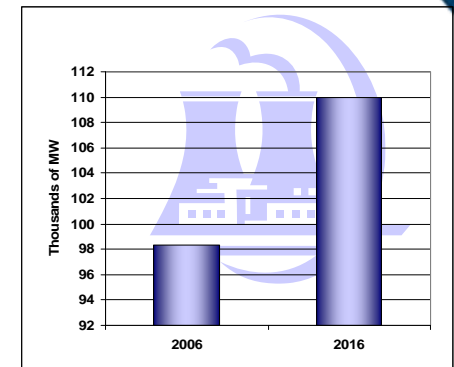
- U.S. electricity use projected to grow twice as fast as committed resources
- Canadian electricity use projected to grow slower than supply, but significant differences across provinces
- Some areas could fall below target margin levels within 2-3 years unless additional resources are brought into service
- System being operated at or near its physical limits more of the time, limiting its ability to handle severe unplanned events and extreme weather

# Capacity Margins





- Wind and solar increasingly attractive resource options - fuel mix diversity and CO<sub>2</sub> reduction
- Require new transmission and special operating considerations
- Large nuclear units require grid expansion and reinforcement
- **Need active support for and investment in transmission to provide for integration of renewables and nuclear units**



- Florida, Northeast, Southern California, & Texas highly dependent on natural gas
- Increased competition for gas supply/delivery & decreased Canadian imports
- LNG is one option; siting/construction of terminals has its challenges
- Resource planners and generation owners – take gas supply/delivery issues into account in resource adequacy assessments
- Resource planners – ensure fuel diversification
- Government – remove obstacles to development of new gas supply/delivery, including LNG terminals
- NERC – study fuel supply/delivery interruption scenarios

“Transmission is a vital enabling infrastructure of a reliable bulk power system, and its modernization is vital to the system of the future.”

# Transmission Purposes

## *Physical*

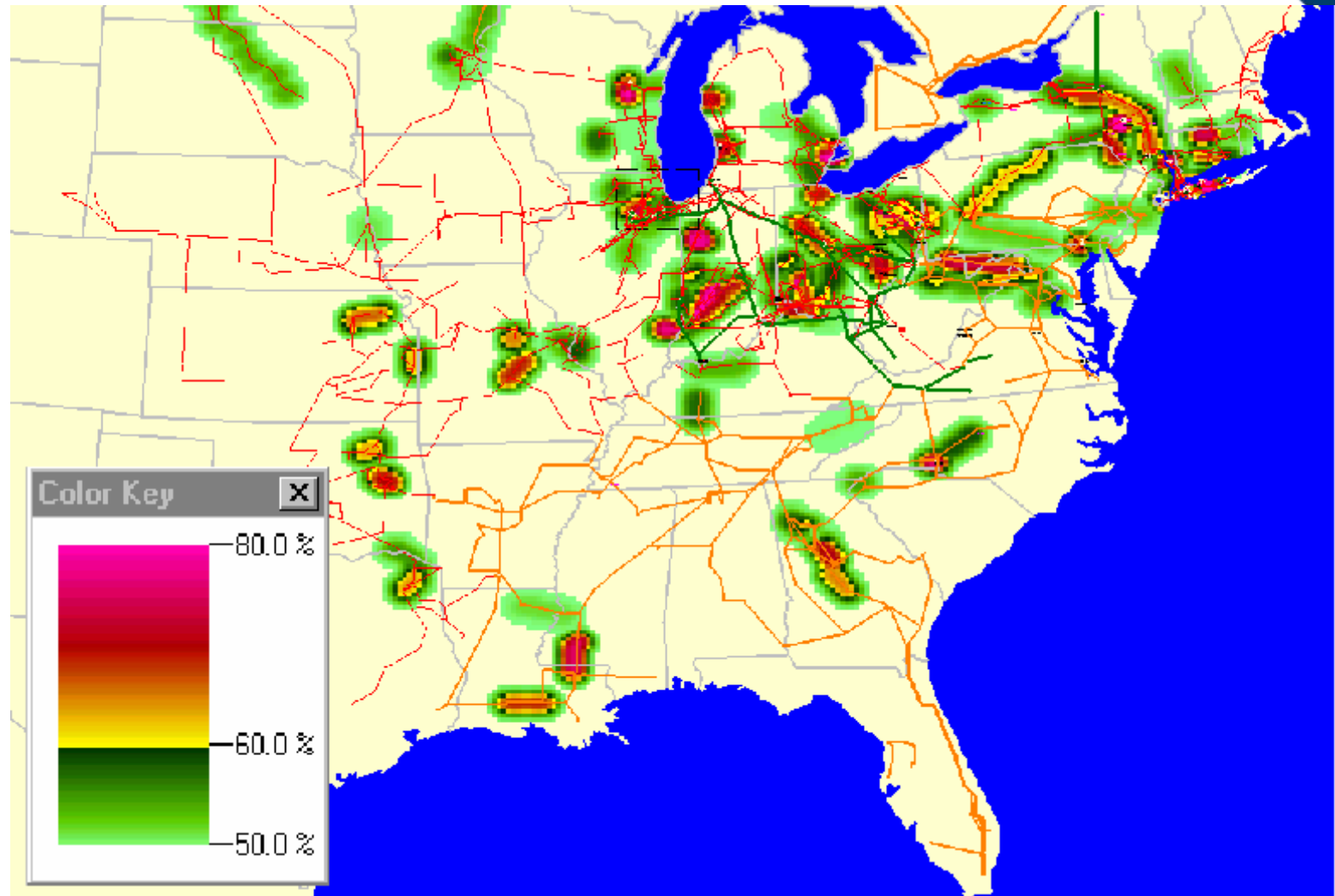
- Integrate and move power from remote generating sources to customers
- Maintain operational reliability of the grid

## *Economic*

- Facilitate economic operation of resources
- Support supply source diversity
- Provide necessary infrastructure for efficient competitive market operation

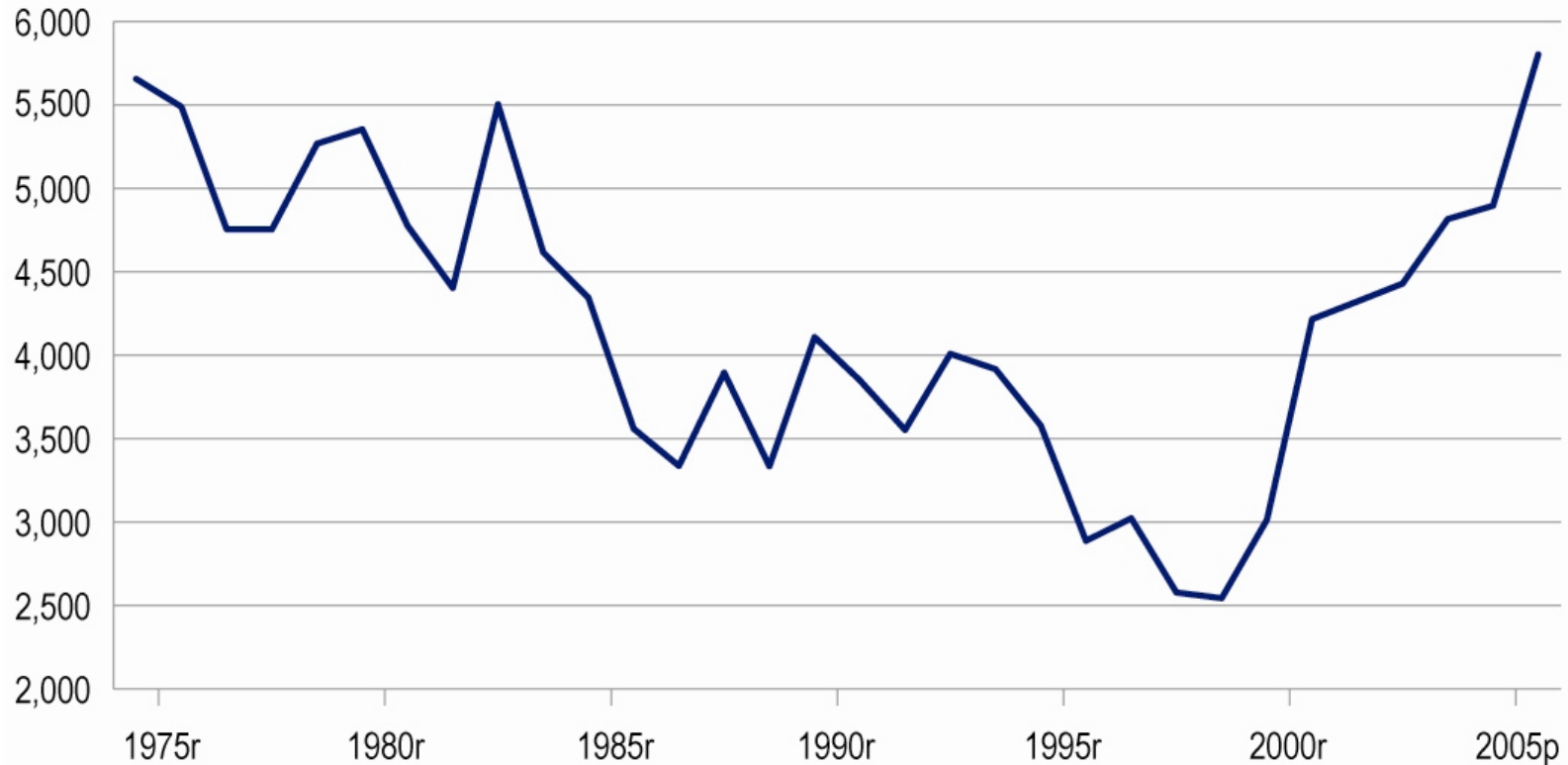


# Line Loadings as % of Thermal Rating



# Transmission Investment 1975-2005

\$ Millions (Real \$2005)

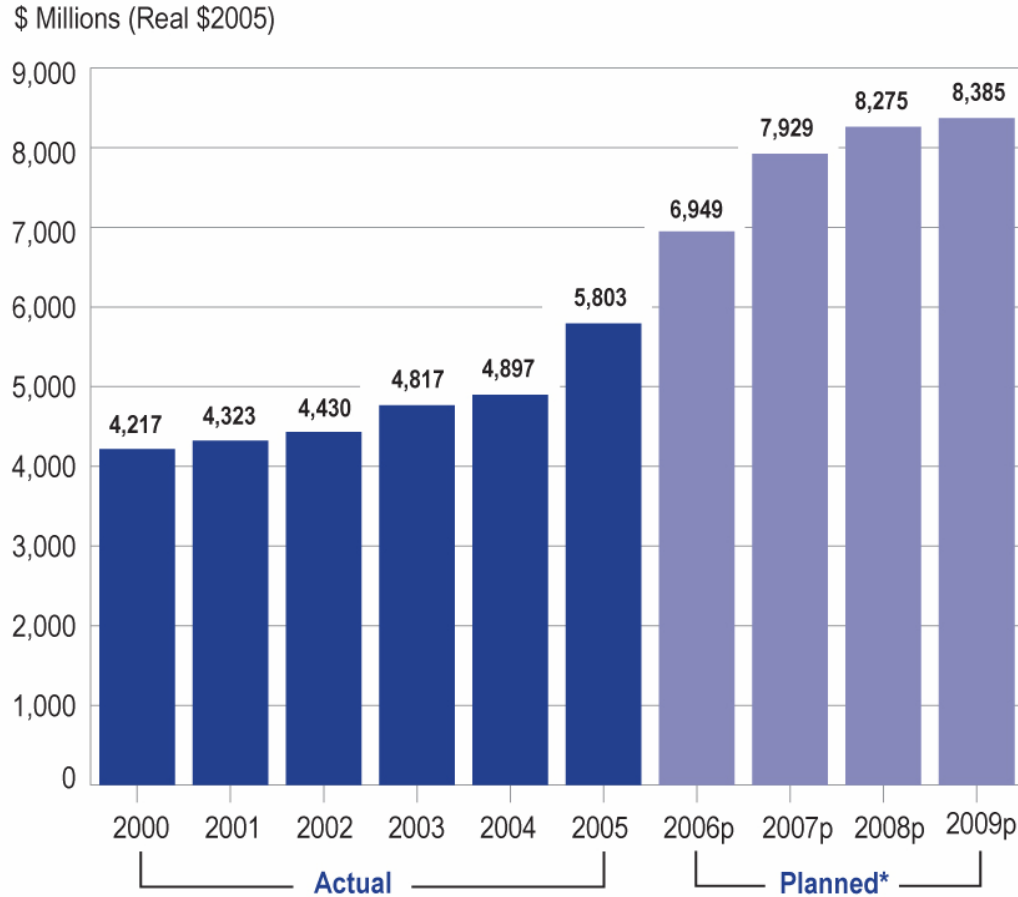


p = Preliminary r = Revised

Note: Real dollar results are shown using the Handy-Whitman Index of Public Utility Construction. Costs to adjust for inflation from year to year.

Sources: Prior to 1999, data are from Edison Electric Institute's "Uniform Statistical Report". For 1999, data are from Edison Electric Institute's Construction Expenditures Survey, the Federal Energy Regulatory Commission (FERC Form 1), and company Annual Reports (10-K). For 2000-2005, data are from Edison Electric Institute's Annual Property & Plant Capital Investment Survey and the Federal Energy Regulatory Commission (FERC Form 1).

# Transmission Investment: 2000-2009



p = preliminary

Note: In 2004 and 2005, the industry exceeded investment projections in their transmission capital budgets. *The Handy-Whitman Index of Public Utility Construction Costs* used to adjust for inflation from year to year. Data represents both vertically integrated and stand-alone transmission companies. \*Planned total industry expenditures are preliminary and estimated from 87% response rate to EEI's Electric Transmission Capital Budget & Forecast Survey. Actual expenditures from EEI's Annual Property & Plant Capital Investment Survey & Form 1s.

Source: Edison Electric Institute

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# Transmission Findings & Recommendations

- Over 160,000 miles in service; ~ 2,000 miles added in last year
- ~15,000 miles planned to be added over next 10 years
- Demand growing at twice the rate of transmission expansion
- Significant constraints in Northeast, Southwest and California
- More will be needed to integrate renewables and nuclear
- New transmission projects continue to face opposition
- **Government agencies – recognize interstate nature of transmission and work to remove obstacles**
- **Utilities – education and outreach to explain benefits of transmission**
- **NERC – continue to support NIETC efforts**

# Transmission Challenges

- Siting is difficult and expensive
- Transmission lines encounter significant local opposition
- Frequent legal battles over interstate lines
- Lack of sufficient incentives to build
- **Public policy process does not recognize interstate and international nature of the grid**

- 7 Issues Identified by NERC Staff & RAS, prioritized:



1. Greenhouse gas reductions
2. Fuel storage & transportation
3. Rising global demand for energy & equipment, increased off-shore manufacturing of raw & finished materials
4. Increasing adoption of demand-side & distributed generation resources
5. Replacing and upgrading transmission infrastructure for the 21st century
6. Water usage
7. Mercury emissions



- Transmission provides critical infrastructure for economical and reliable electricity service
- Resolving transmission bottlenecks must be a high national priority
- State and Federal government agencies need to factor the impact on interstate and international bulk power system reliability into their review and approval processes for new transmission
  - Lines may be needed in one area to support reliability in another
- **Work together to remove obstacles, coordinate and accelerate siting processes, and approve permits for transmission**



- Capacity Margins Are Adequate
  - Southern California Remains a Concern
  - Drought Conditions in SERC are Improving
- Coal Inventories Below Average, Natural Gas Supply is Healthy
- Demand Response Reduces Demand, Provides Ancillary Services
- Wind Resources Contribute to Capacity

# Questions and Discussion