T&D Reliability Study Highlights

- Introduction and Overview
- Transmission System Reliability
- Distribution Reliability
- Investment and Expenditures
- Environmental Regulations
- T&D Reliability Impacts from Policy
- Future T&D Reliability Issues
- Key Findings and Recommendations
Overview of The Electric System
Transmission System Reliability
Distribution System Reliability
Distribution Reliability Metrics

Customer Average Interruption Duration Index (CAIDI)
Number of Customer Hours/Number of Customers Affected

System Average Interruption Frequency Index (SAIFI)
Number of Customer Affected/Number of Customers Served
Distribution Performance

CAIDI for Radial and Network

SAIFI for Radial and Network
Investment and Expenditures
Utility Capital Expenditure ($000s)

Source: DPS
Electric O&M Expenses ($000s)

Source: DPS
Environmental Regulations
Environmental Regulations

- **Existing Rules**
  - NOx RACT Rule
  - Best Available Retrofit Technology (BART) Rule
  - Utility MACT Rule
  - Best Technology Available (BTA) Policy

- **New and Future Rules**
  - Cooling Water Intake Structures
  - Coal Combustion Residuals
  - CO₂ Emission Allowance
Impacts to Reliability
Reliability Impacts From Policies

- **Load**
  - Energy Efficiency
  - Large Load Growth
  - Other Load Varying Mechanisms

- **Generation**
  - Renewable Portfolio Standard
  - Distributed Generation

- **Transmission & Distribution**
  - Bulk Electric System Definition
  - Performance Rate Making, Multi-Year Rate Agreements, and other Departures from Traditional Regulatory Mechanisms

- **Regulatory**
  - Corporate Reorganization of Electric Utilities
Possible Future Reliability Issues

**Generation**
- Retirements
- Environmental Initiatives
- Nuclear Relicensing
- Market Conditions

**Results**
- Fuel Mix Issues/Supply Diversity
- Increases natural gas/electric interdependence and need for coordination

**Transmission**
- Aging Infrastructure
  - 2,300 miles over the next 10 years are nearing design life
  - 1,200 additional miles in next 10 to 20 years

**Results**
- Increases maintenance and downtime
- Increases risk from unavailability

**Load**
- Variations
- Smart Grid and Emerging Technologies
- Electric Vehicles

**Results**
- Transition for both technology and process poses challenges
- Implemented correctly, new technologies could optimize asset use and operational efficiency

**External Forces**
- Sources
  - Security Threats
  - Geomagnetic Disturbances
  - Aging Workforce

**Issues**
- Risks known and estimated
- Mitigation measures developed
- Effectiveness unknown
Key Findings and Recommendations

- As assessed using existing metrics, the electric system meets reliability standards
- Allow system planners and operators flexibility in their response to implement state policies
- Support cost-effective replacement of aging infrastructure
- Support diverse mix of electric generation fuel sources
- Monitor gas/electric interdependence
- Encourage workforce development
- Support distributed generation technologies
- Improve storm mitigation, restoration, and communication
Questions?