Cyber Infrastructure for the Smart Grid

Dr. Anurag K. Srivastava, Dr. Carl Hauser, and Dr. Dave Bakken,

Smart Grid Operational Structure

Washington State University
World Class. Face to Face.
Organization to Ensure Power Grid Operation

- Federal Energy Regulatory Council (FERC)
- North American Electric Reliability Council (NERC)
- State legislature
- Regional reliability council
- Independent System Operators (ISOs)
- Regional Transmission Organizations (RTOs)
- Control area operators
The Federal Energy Regulatory Commission, or FERC, is an independent agency that regulates the interstate transmission of electricity, natural gas, and oil.

FERC also reviews proposals to build liquefied natural gas (LNG) terminals and interstate natural gas pipelines as well as licensing hydropower projects.

The Commission's main industry/program areas are summarized below:

- **Electricity** (reliability, rates) including hydropower (dam safety, licensing, compliance)
- **Natural gas** (pipeline, rates, storage)
- **Oil** (pipeline, rates)
- **Market oversight and enforcement hotline for these energy market (Market Power)**
Electricity:

- Regulation of wholesale electricity market (regulation, encourage competition, market based rate authorization).
- Policy for smart grid, demand response and advanced metering
- Oversight of mandatory reliability standards for the bulk power system. Reliability and security standard requirement (cybersecurity, blackout).
- Promotion of strong national energy infrastructure, including adequate transmission facilities (line building permits).
- Electric transmission planning and cost allocation requirements for public utility transmission providers.
- Regulation of mergers for energy corporation (in line with public interest).

Don’t

- Regulation of retail electricity and gas to consumer, approval for the physical construction of electric generation, Regulation of Nuclear plants; merger for gas/oil companies; Tree trimming near local distribution lines
The North American Electric Reliability Corporation’s (NERC) mission is to ensure the reliability of the North American bulk power system.

From its creation in 1968 until approximately July 2006, NERC operated as a voluntary industry organization.

In July 2006, FERC certified NERC as the “electric reliability organization” for the U.S.

In June 2007, compliance with NERC Reliability Standards become a legal requirement for bulk power system owners, operators and users.

NERC develops and enforces reliability standards; assesses adequacy annually via a 10-year forecast, and summer and winter forecasts; monitors the bulk power system; and educates, trains and certifies industry personnel.
NERC Reliability Regions

Florida Reliability Coordinating Council (FRCC)
Midwest Reliability Organization (MRO)
Northeast Power Coordinating Council (NPCC)
ReliabilityFirst Corporation (RFC)
SERC Reliability Corporation (SERC)
Southwest Power Pool, RE (SPP)
Texas Regional Entity (TRE)
Western Electricity Coordinating Council (WECC)

Source: NERC
Regional reserve margin estimates and targeted levels for summer 2013

- **Northwest**: 25%, 15%
- **California**: 19%, 15%
- **Southwest**: 22%, 14%
- **Central**: 39%, 14%
- **Midwest**: 19%, 14%
- **TVA**: 20%, 15%
- **Gulf**: 46%, 15%
- **Southern**: 38%, 15%
- **Florida**: 28%, 15%
- **Mid-Atlantic**: 29%, 16%
- **New York**: 19%, 17%
- **New England**: 22%, 15%
- **Carolinias**: 23%, 15%