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# National Reliability Standards

Sherina Maye, Commissioner  
Illinois Commerce Commission

Day 2 - 9:45



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## **NERC Chosen as ERO**

- The Federal Power Act provides authority for the Federal Energy Regulatory Commission (FERC) to regulate interstate electricity transmission and wholesale power sales (a/k/a "sales for resale).
- The Energy Policy Act of 2005 (EPAct 2005) further amended the Federal Power Act to extend FERC's jurisdiction to the reliability of electric service.
- The EPAct 2005 added Section 215 to the Federal Power Act requiring a FERC-certified Electric Reliability Organization (ERO) to develop enforceable mandatory reliability standards, which are subject to FERC review and approval.
- In July 2006, FERC certified the North American Electric Reliability Corporation (NERC) as the ERO for the United States.
- As ERO, NERC's jurisdiction includes users, owners, and operators of the bulk power system. Propose, monitor compliance with and enforce mandatory reliability standards.



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## **What is NERC?**

- The North American Electric Reliability Corporation (NERC) is a not-for-profit international regulatory authority whose mission is to assure the reliability of the bulk power system in the continental United States, Canada, and the northern portion of Baja California, Mexico. NERC allocates its operating costs and those of the Regional Entities to “load-serving entities”—those owners, operators and users of the Bulk-Power System responsible for delivering electricity to retail customers
- NERC is run by an Executive Management Group and governed by an eleven-member independent Board of Trustees.



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## **NERC Responsibilities**

- Propose, monitor compliance with and enforce mandatory reliability standards;
- Conduct near-term and long-term assessments of the reliability and future adequacy of bulk power;
- Certify bulk power system operators as having and maintaining the necessary knowledge and skills;
- Maintain situational awareness of events and conditions that may threaten the reliability of the bulk power system;
- Coordinate efforts to improve physical and cyber security;
- Conduct detailed analyses and investigations of system disturbances;
- And, based on lessons learned identify the potential need for new or modified reliability standards, improved compliance, or other initiatives.



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## **NERC Bulk Power Oversight**

- The “bulk-power system” is facilities and control systems necessary for operating an interconnected electric energy transmission network (or any portion thereof); and (B) electric energy from generation facilities needed to maintain transmission system reliability. The term does not include facilities used in the local distribution of electric energy.
- NERC oversees more than 1,900 bulk power system owners and operators, which serve more than 334 million people, includes installed electricity production capacity of approximately 1,200 gigawatts and operates 211,000 miles of high voltage transmission lines.



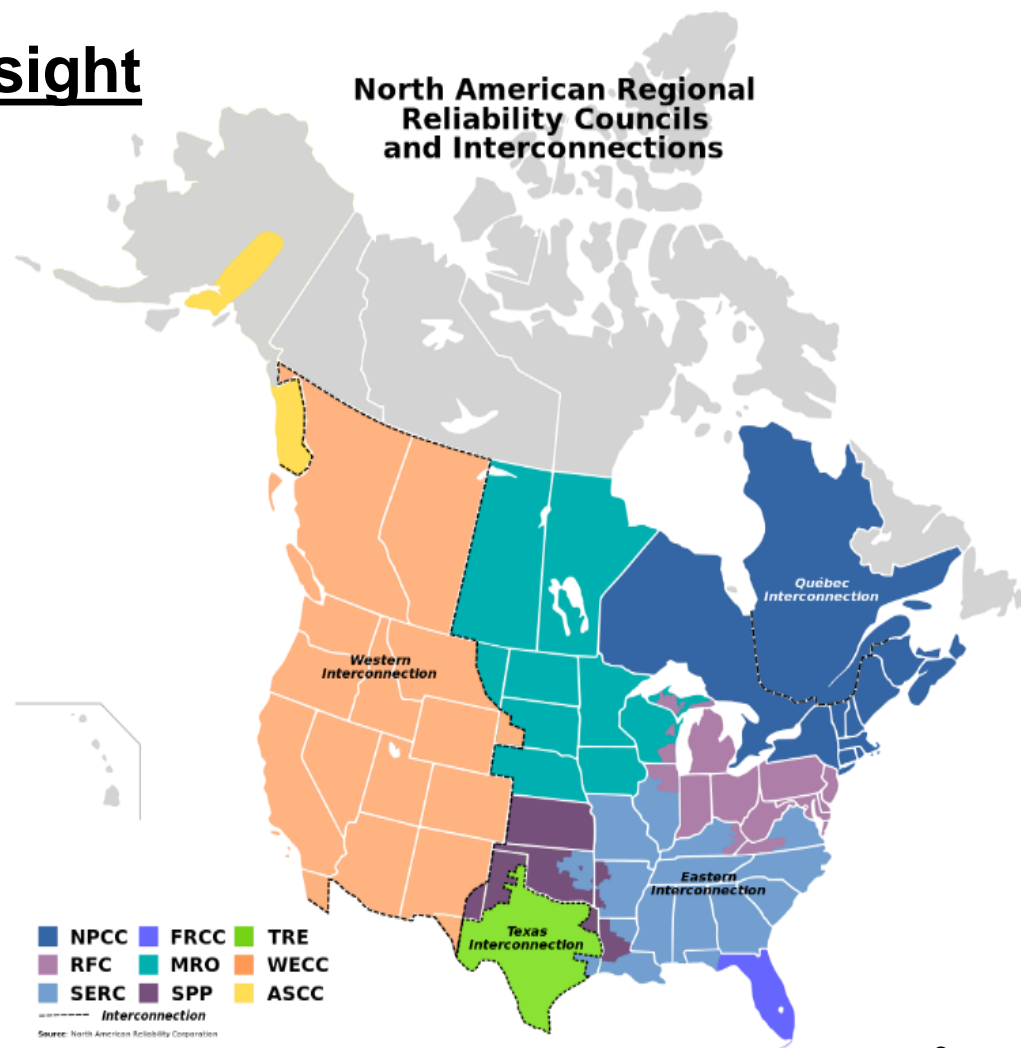
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## NERC Regional Oversight

NERC delegates certain authorities to regional reliability councils (account for virtually all the electricity supplied in the United States, Canada, and a portion of Baja California Norte, Mexico).





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## **Reliability Standards**

- NERC reliability standards are the planning and operating rules that electric utilities follow to support and maintain a reliable electric system.
- Reliability standards are developed by industry using a balanced, open, fair, and inclusive process accredited by the American National Standards Institute (“ANSI”).
- NERC has nearly 50 committees, subcommittees, working groups and task forces populated by industry experts that serve an active role in the development of standards.





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## **Defining Reliability**

- NERC defines the reliability of the interconnected Bulk-Power System in terms of two basic and functional aspects. These aspects are:
  - Adequacy: The ability of the electricity system to supply the aggregate electrical demand and energy requirements of the end-use customers at all times, taking into account scheduled and reasonably expected unscheduled outages of system elements.
  - Operating Reliability: The ability of the Bulk-Power System to withstand sudden disturbances, such as electric short circuits or the unanticipated loss of system elements from credible contingencies, while avoiding uncontrolled cascading blackouts or damage to equipment.





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## **NERC Reliability Standards – Examples**

### **PRC-005-1.1b - Transmission and Generation Protection System Maintenance and Testing**

- Each Transmission Owner and any Distribution Provider that owns a transmission Protection System and each Generator Owner that owns a generation or generator interconnection Facility Protection System shall have a Protection System maintenance and testing program for Protection Systems that affect the reliability of the Bulk Electric System. The program shall include: Maintenance and testing intervals and their basis, and Summary of maintenance and testing procedures.
- Each Transmission Owner and any Distribution Provider that owns a transmission Protection System and each Generator Owner that owns a generation or generator interconnection Facility Protection System shall provide documentation of its Protection System maintenance and testing program and the implementation of that program to its Regional Entity on request (within 30 calendar days). The documentation of the program implementation shall include: Evidence Protection System devices were maintained and tested within the defined intervals, and Date each Protection System device was last tested/maintained.



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## **Approval Process**

- NERC Board of Trustees considers the adoption of reliability standards.
- Once the board has approved a reliability standard, the board will direct the standard to be filed with applicable governmental authorities in the United States, Canada, and Mexico for approval.
- In the United States, the applicable governmental authority is generally FERC.



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## **NERC Enforcement**

- All bulk power system owners, operators, and users must comply with NERC-approved Reliability Standards. These entities are required to register with NERC through the appropriate Regional Entity.
- Among its compliance efforts is Compliance Enforcement: the process by which NERC issues sanctions and ensures mitigation of confirmed violations of mandatory NERC Reliability Standards. NERC can also issue directives to immediately address and deter new or further violations. Entities found in violation of any standard must submit a mitigation plan for approval by NERC and, once approved, must execute this plan as submitted.



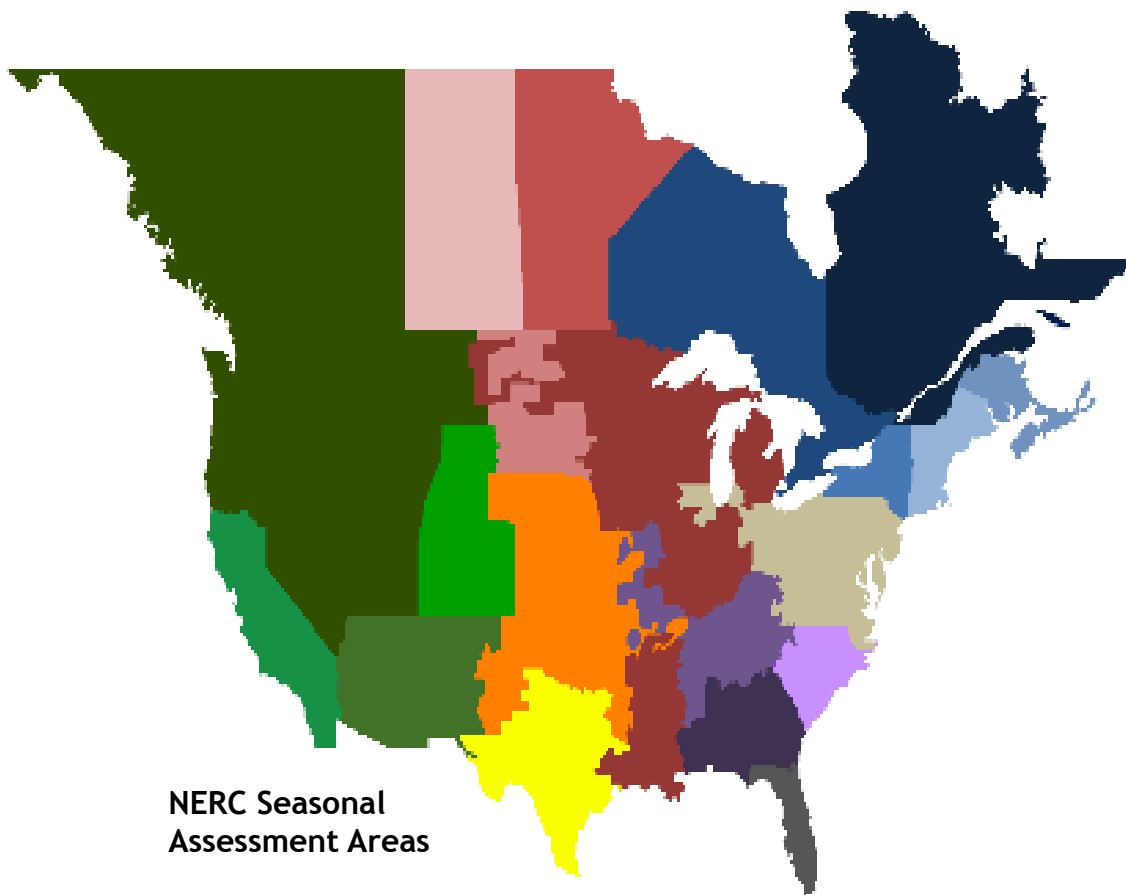
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## NERC Reliability Assessments

NERC prepares seasonal and long-term assessments (over ten years) of the overall reliability and adequacy of the North American bulk power system.





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# NERC Reliability Assessments

## Regional Reliability Assessments – Summary

### Projected Demand, Resources, and Reserve Margins<sup>21</sup>

Assessment Area / Interconnection	Total Internal Demand (MW)	Net Internal Demand (MW)	Anticipated Resources (MW)	Prospective Resources (MW)	Anticipated Reserve Margin (%)	Prospective Reserve Margin (%)	NERC Reference Margin Level (%)
FRCC	45,759	42,663	55,035	57,969	29.00	35.88	15.00
MISO*	127,247	122,504	140,892	143,882	15.01	17.45	14.80
MRO-Manitoba	3,408	3,196	4,380	4,569	37.05	42.97	12.00
MRO-MAPP*	5,056	4,958	6,265	6,268	26.35	26.41	15.00
MRO-SaskPower	3,232	3,147	3,941	3,941	25.23	25.23	11.00
NPCC-Maritimes	3,738	3,417	6,231	6,231	82.35	82.35	15.00
NPCC-New England	26,658	25,958	32,120	32,342	23.74	24.59	15.20
NPCC-New York	33,666	32,477	40,112	40,112	23.51	23.51	17.00
NPCC-Ontario	23,025	23,025	28,536	28,536	23.93	23.93	18.60
NPCC-Québec	21,100	21,100	30,759	30,759	45.78	45.78	10.00
PJM*	157,141	145,981	182,866	185,077	25.27	26.78	16.20
SERC-E	43,547	41,890	51,904	51,904	23.90	23.90	15.00
SERC-N*	41,804	39,777	50,258	50,698	26.35	27.45	15.00
SERC-SE*	46,488	44,377	60,836	61,164	37.09	37.83	15.00
SPP*	49,614	48,575	66,796	69,478	37.51	43.03	13.60
TRE-ERCOT	68,096	66,179	76,091	76,091	14.98	14.98	13.75
WECC-CAMX	52,353	50,398	65,916	65,916	30.79	30.79	15.00
WECC-NWPP*	66,424	65,351	85,597	85,597	30.98	30.98	14.79
WECC-RMRG	11,943	11,408	15,136	15,136	32.68	32.68	14.45
WECC-SRSG*	22,706	22,318	27,507	27,507	23.25	23.25	13.90
EASTERN INTERCONNECTION	610,383	581,442	730,169	742,168	25.58	27.64	-
QUÉBEC INTERCONNECTION	21,100	21,100	30,759	30,759	45.78	45.78	10.00
TEXAS INTERCONNECTION	68,096	66,179	76,091	76,091	14.98	14.98	13.75
WECC INTERCONNECTION	153,426	149,475	194,156	194,156	29.89	29.89	15.00
<b>TOTAL-NERC</b>	<b>853,005</b>	<b>818,196</b>	<b>1,031,175</b>	<b>1,043,174</b>	<b>26.03</b>	<b>27.50</b>	<b>-</b>

\*Footprint changes since the 2013 Summer Reliability Assessment.



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## **Proposed Clean Power Plan**

- On June 2, 2014 the US Environmental Protection Agency (US EPA) issued its proposed *Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Generating Units*, commonly referred to as the Clean Power Plan.
- NERC performed a study to assess Potential Reliability Impacts of the EPA's proposed Clean Power Plan.



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## **NERC Findings**

- Consistent with NERC's Initial Reliability Review, the proposed CPP is expected to accelerate a fundamental change in electricity generation mix and transform grid-level reliability services, diversity, and flexibility
- Industry needs more time to develop coordinated plans to address shifts in generation and corresponding transmission reinforcements to address proposed CPP CO2 interim and other emission targets
- Implementation plans may change the use of the remaining coal-fired generating fleet from baseload to seasonal peaking, potentially eroding plant economics and operating feasibility, and
- Energy and capacity will shift to gas-fired generation, requiring additional infrastructure and pipeline capacity.





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## **NERC Recommendations**

Among NERC's recommendations is that:

State and regional plans should be developed in consultation with reliability authorities—Planning Coordinators and Transmission Planners—to review plans and demonstrate their reliability through established planning analyses and processes.



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## **NERC's Draft 2015 Business Plan**

### High Priority Risk Projects:

- Changing Resource Mix
- Extreme Physical Events
- Protection System Misoperations
- Cold Weather Preparedness
- Right-of-Way Clearances
- 345-kV Breaker Failures



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## Questions and Answers



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## **NERC References and Resources**

NERC Website:

<http://www.nerc.com/Pages/default.aspx>

EPA Clean Power Plan Proposed Rule

<http://www2.epa.gov/carbon-pollution-standards/clean-power-plan-proposed-rule>

Response to the General Assembly Concerning House Resolution 1146

<http://www.icc.illinois.gov/electricity/hr1146.aspx>

Bill Status of HB2607 *99th General Assembly*

<http://www.ilga.gov/legislation/BillStatus.asp?DocNum=2607&GAID=13&DocTypeID=HB&LegId=88134&SessionID=88&GA=99>

NERC Assessment Uses Scenario Analysis to Identify Potential Reliability Risks from Proposed Clean Power Plan

<http://www.nerc.com/news/Pages/Assessment-Uses-Scenario-Analysis-to-Identify-Potential-Reliability-Risks-from-Proposed-Clean-Power-Plan.aspx>