

WECC

Overview of System Operations

6 | Balancing Authority and Regulation Overview

- Regulatory Authorities
 - FERC
 - NERC
 - WECC
 - NAESB
- Evolution of Regulation
- Balancing Authority
 - Definition
 - Responsibilities

Regulatory Authorities



FERC

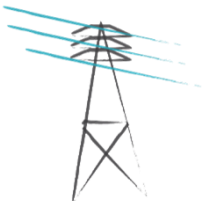
Federal Energy Regulatory
Commission

NERC

NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

NERC

North American Electric
Reliability Corporation



WECC

WECC

Western Electricity Coordinating
Council

Federal Energy Regulatory Commission (FERC)

- Established in 1920 as the FPC
- Reorganized in 1977 as FERC
- Independent agency that reports to
- Regulates high voltage interstate transmission of electricity and natural gas transportation
- Transmission Open Access
- Office of Markets & Reliability



FERC → NERC

How does FERC govern?

Delegated Authority to an Electric Reliability
Organization (ERO)

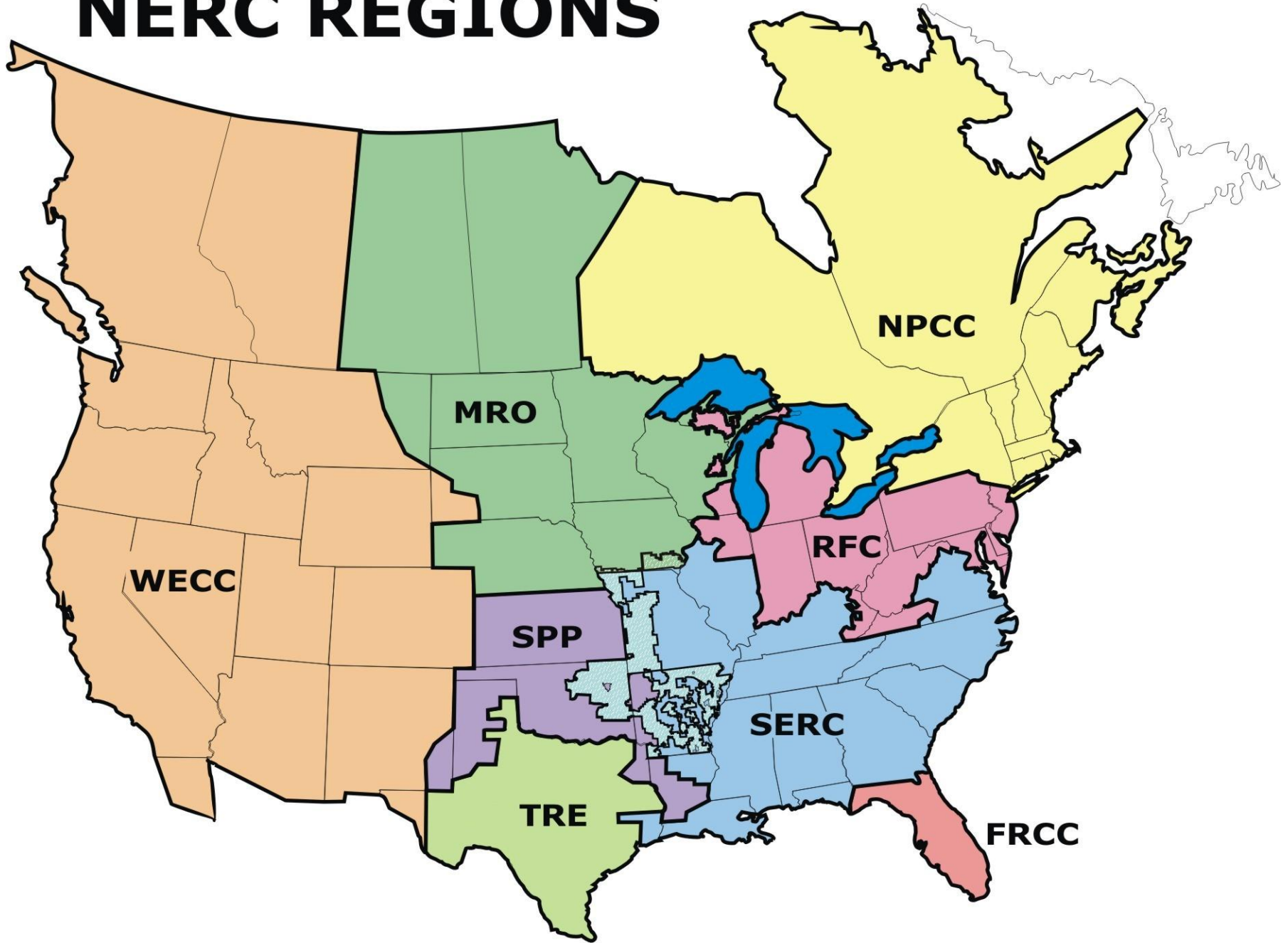


North American Electric Reliability Corporation (NERC)

NERC

- Established in the late 1960's
- 2007 established as the Electric Reliability Organization (ERO) with oversight from FERC
- Develops and enforces Reliability Standards
- Compliance Enforcement with Sanctions
- Oversees Eight Regional Reliability Entities
- North America including Canada & northern part of Mexico
- Delegates authority to WECC

NERC REGIONS



Mission

To improve the reliability & security of bulk electric system in North America. To achieve that:

- Develops & enforces reliability standards;
- Monitors bulk electric system;
- Assesses future adequacy;
- Audits owners, operators, & users for preparedness;
- Educates & trains industry personnel

NERC relies on diverse & collective expertise of industry participants

FERC → NERC → WECC

How does FERC govern?

Delegated Authority to an Electric Reliability Organization (ERO)



North American Electric Reliability Corporation (NERC)

How does NERC govern?

Delegated Authority to eight Regional Entities (RE)



Western Electricity Coordinating Council (WECC)

WECC



1967

Originally formed 40 power systems, then known as the Western Systems Coordinating Council (WSCC).

2002

Thirty-five years later in 2002, the WSCC became WECC when three regional transmission associations merged.

2007

Designated a Regional Entity for the Western Interconnection

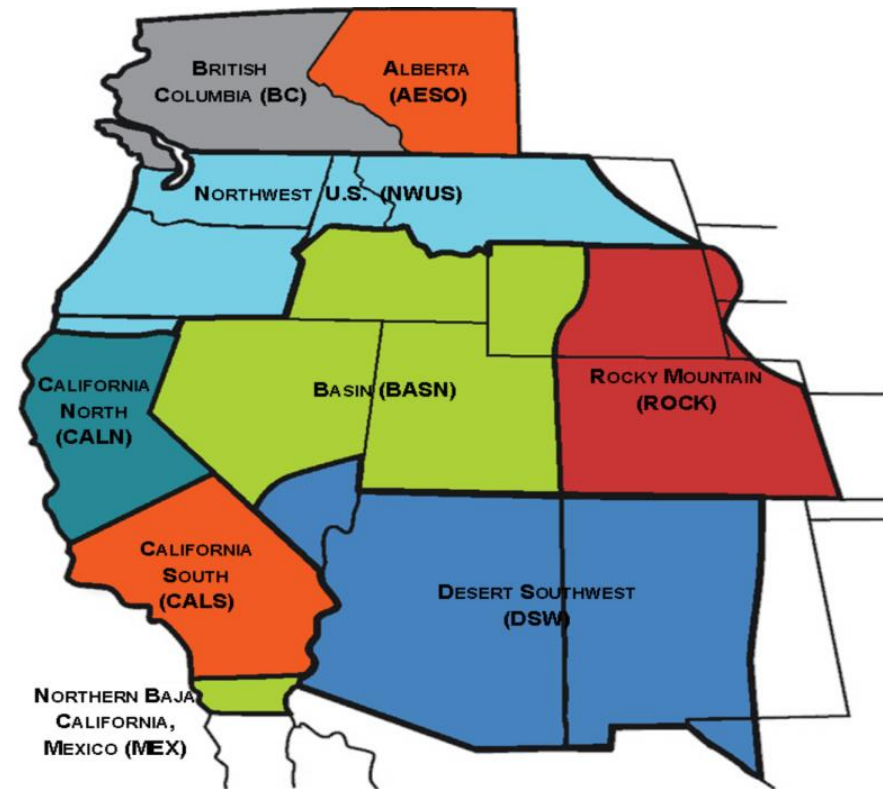
WECC

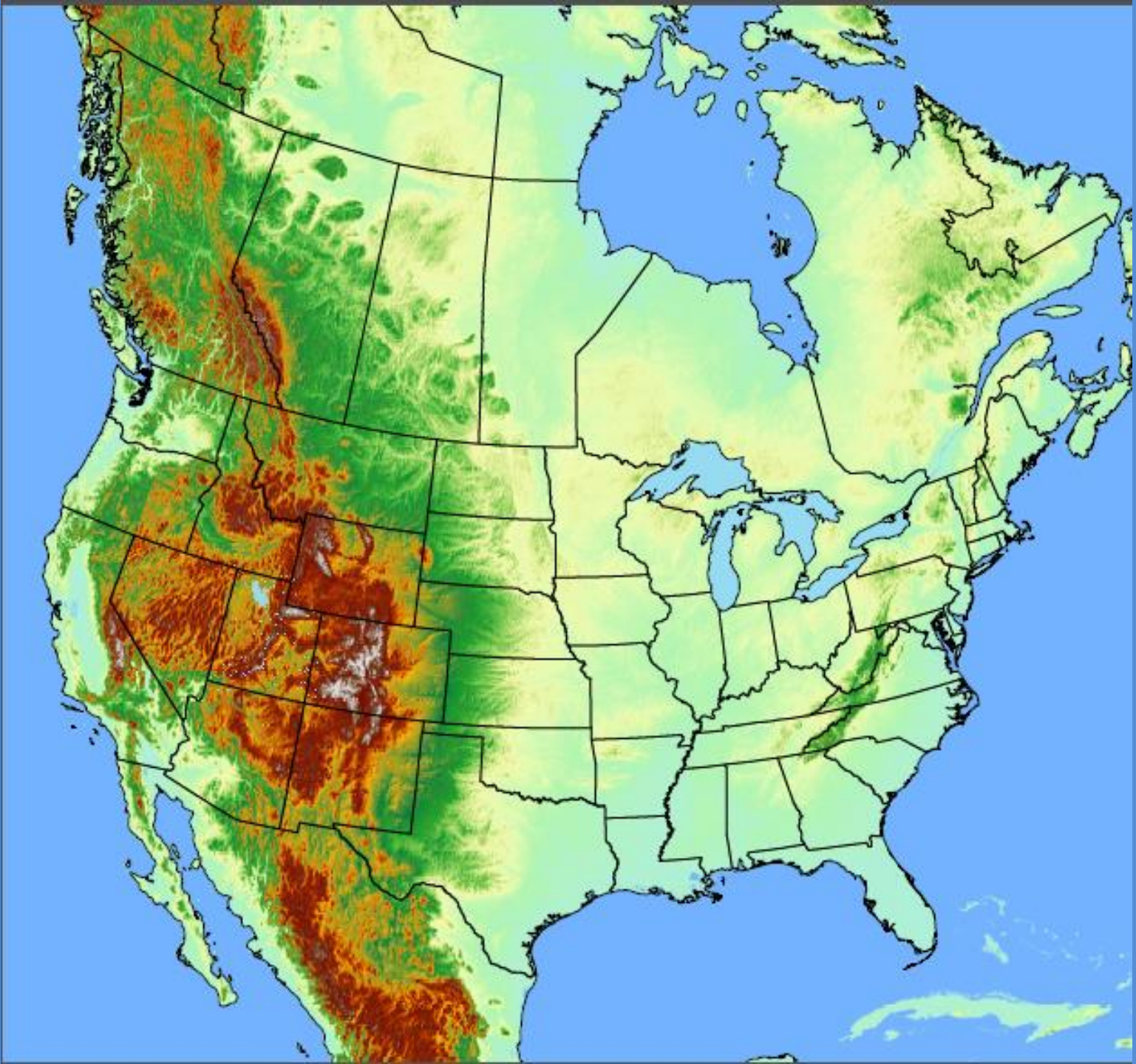


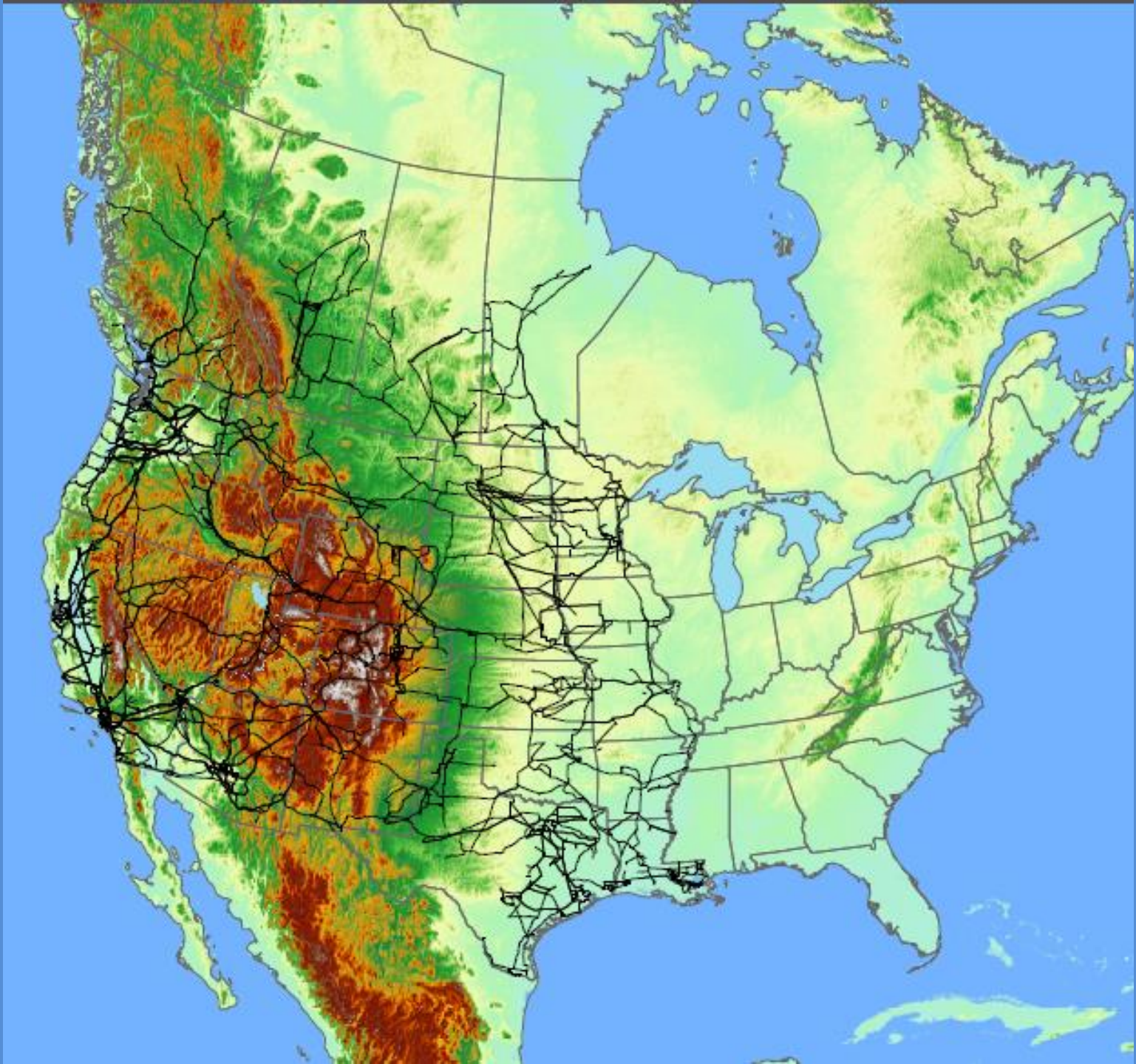
- Regional Entity (RE) with delegated authority from NERC responsible for compliance and enforcement of NERC standards
- Coordinates the Bulk Electric System (BES) reliability in the Western Interconnection
- Approximately 345 member organizations
- Headquarters in Salt Lake City, Utah

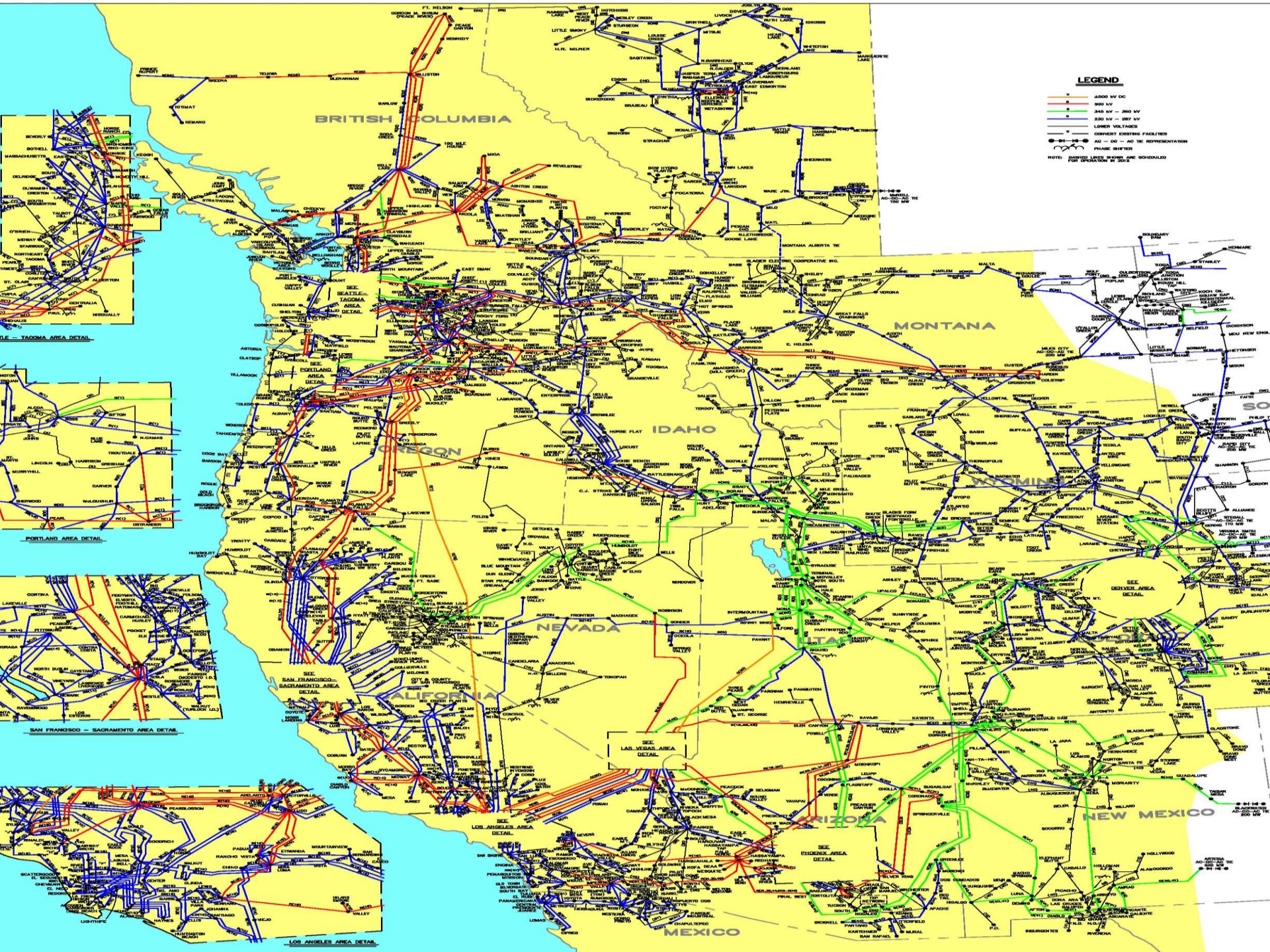
WECC

- Geographically the largest & most diverse of the Eight Regional Entities in NERC.
- Service territory extends from Canada to Mexico & includes provinces of Alberta & British Columbia, northern portion of Baja California, Mexico, & all or portions for 14 Western states in between.









LEGEND

- 500 kV DC
 - 500 kV
 - 345 kV - 360 kV
 - 230 kV - 287 kV
 - LOWER VOLTAGES
 - CONVERT EXISTING FACILITIES
 - PHASE SHIFTERS
 - AD - DC - AC TIE REPRESENTATION
- NOTE: DASHED LINES SHOW ARE SCHEDULED FOR OPERATION IN 2012

BRITISH COLUMBIA

MONTANA

IDAHO

NEVADA

CALIFORNIA

ARIZONA

NEW MEXICO

MEXICO

TADOMA AREA DETAIL

PORTLAND AREA DETAIL

SAN FRANCISCO - SACRAMENTO AREA DETAIL

SEE LAS VEGAS AREA DETAIL

SEE DENVER AREA DETAIL

LOS ANGELES AREA DETAIL

AC - DC TIE REPRESENTATION

Governance

Board of Directors

Committees

Operating Committee (OC)

Planning Coordination Committee (PCC)

Market Interface Committee (MIC)

Training & Workshops

Regional Standards Development

Open / Inclusive / Transparent / Accepted by NERC/FERC

Compliance Enforcement & Audits

WECC Organizational Review

Reliability Standards

Section 5 Delegation Agreement
Exhibit C WECC Bylaws

Standards Development 5(a)(ii)

Standards Review & Approval

Standards Interpretation

Standards Library

Compliance & Enforcement

Section 6 Delegation Agreement
Exhibit D WECC Bylaws

Compliance Monitoring

Compliance Enforcement &
Mitigation

Compliance Audits

Compliance Tools & Resources

Compliance Training & Outreach

Compliance Violation Statistics

Delegated Activities

Section 7 Delegation Agreement
Exhibit E WECC Bylaws

BES Certification

BES Registration

Reliability Assessment &
Performance Analysis

Event Analysis &
Reliability Improvement

Training & Education

Situational Awareness &
Infrastructure Security

The term **WECC** has two connotations:

1. The organization which develops regional reliability standards, reviews and enforces compliance, and promotes electric system reliability through delegated operations and planning activities.
2. The generators, transmission lines, substations, and other physical facilities making up the Western Interconnection.

Mission

WECC is a 501c(4) non-profit Utah corporation with the mission to do the following consistent with its Bylaws:

1. Maintain a reliable electric power system in the Western Interconnection that supports efficient competitive power markets (“Reliability Mission”); and
2. Assure open and non-discriminatory transmission access among Members and provide a forum for resolving transmission access disputes between Members consistent with FERC policies where alternative forums are unavailable or where the Members agree to resolve a dispute using the mechanism provided in the Bylaws (“Transmission Access Mission”).



Evolution of the North American Electric System



Late 1880's

- 1889 The first long distance transmission of DC electricity in the United States was switched on at Willamette Falls Station in Oregon City, Oregon.
- 1890 Destroyed by flood
- 1891 Replaced with AC power system



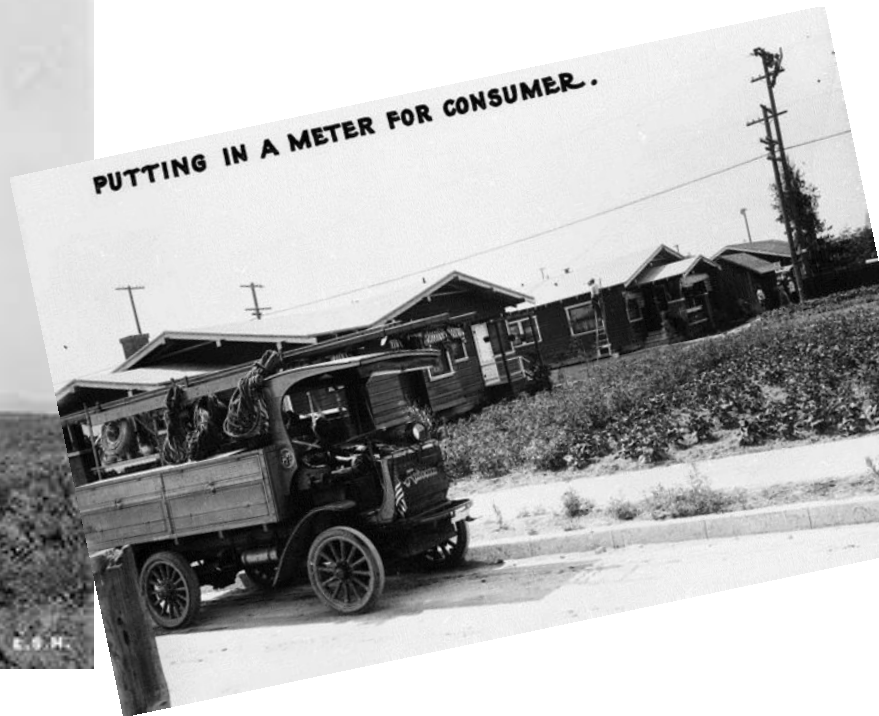
1889



1891

1920

Federal Power Commission (FPC) is established.
No standards are in place.



1963

North American Power Systems Interconnection Committee (NAPSIC) is formed as an informal voluntary organization. (later to become NERC)

1965

The Great Northeast Blackout



"Northeast Blackout of 1965" by 08OceanBeach SD - Own work. Licensed under CC BY-SA 3.0 via Wikimedia Commons - http://commons.wikimedia.org/wiki/File:Northeast_Blackout_of_1965.svg#/media/File:Northeast_Blackout_of_1965.svg

1967

Western Systems Coordinating Council (WSCC) is formed as a trade organization.

(35 years later the WSCC becomes WECC in 2002.)

1968

National Electric Reliability Council (NERC) is formed in response to the 1965 Blackout.

The utilities maintain voluntary NAPSIC operating guidelines.

1970's

The nation faces an energy crisis with chronic brownouts and the OPEC embargo (1970's) calling for a reorganization of the FPC which ultimately happens in 1977 (FERC).

1977

New York Blackout

New York Times Report:



D. Gorton/ The New York Times

Emergency surgery was performed outdoors on dozens of injured New Yorkers at the Brooklyn Jewish Hospital under spotlights powered by Fire Department generators.

[BACK](#) | [NEXT](#)

1977

Federal Energy Regulatory Commission (FERC) is reorganized from the FPC.



FERC is empowered by the Department of Energy (DOE) to propose voluntary standards.

1981

In recognition of Canada's participation in voluntary compliance, NERC changes its name from:

National Electric Reliability Council

to

North American Electric Reliability Council

1989

Hydro Quebec Blackout



1992

NERC for the first time states that conformance to regional reliability policies should be mandatory.

1996

Two major blackouts in the western United States prompt the formation of the (WSCC),

Western Systems Coordinating Council

The WSCC creates a voluntary reliability management system.

2002

Western Systems Coordinating Council (WSCC)

Becomes

Western Electricity Coordination Council (WECC)

2003

The Great Northeast Blackout



The New York Times
POWER SURGE BLACKS OUT NORTHEAST HITTING CITIES IN 8 STATES AND CANADA MIDDAY SHUTDOWNS DISRUPT MILLIONS



In Frustration, Homes and Grocers, A Powerless New York Endures



Follow Renewed Grid System, Experts Believe

The Big Blackout



U.S. Reports Arrest of 'Al Qaeda' Chief For Southern Ops

U.S. Reports Arrest of 'Al Qaeda' Chief For Southern Ops

The Boston Globe
Great blackout of '03
Outage hits millions in U.S., Canada



Officials find few answers but grid's fragility



New York takes chaos in stride

Tears, memories in NH service for slain pair



Chicago Tribune
50 million lose power
Largest blackout in history hits U.S., Canada cities



Local problems pull plug on broad area in instant



Liberia's wait ends; U.S. troops land

Key Al Qaeda figure captured

The Philadelphia Inquirer
POWERLESS



Blackout hits 50 million in U.S., Canada

HOW MANY KEYS? A Blackout for 50 million and more of motorists



SAFETY MEASURES: Electricity interrupted, operators of trains, airports



PHILADELPHIA: A city of 2.5 million is in the dark


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DAILY NEWS
NEW YORK'S HOMETOWN NEWSPAPER



BLACKOUT

- 50 MILLION LOSE POWER
- CITY SWELTERS TO A HALT
- RUSH-HOUR CHAOS TODAY

LIVE FROM NEW YORK CITY



BREAKING NEWS

VOICE OF DARYN KAGAN NEW YORK

TRAFFIC RUNNING SMOOTHLY; PEDESTRIANS CALMLY DISPERSE

5:40p ET

NEW YORK POST
SPECIAL EDITION

PARALYZED



NY'ers stranded by huge blackout



2004

Investigation of the 2003 blackout report concludes:

The single most important recommendation for preventing blackouts is for the U.S. government to make Reliability Standards mandatory and enforceable.

2005

U.S. Legislation Following 2003 Blackout:

- Energy Policy Act of 2005

- Principle feature:

 - Mandatory standards with economic sanctions via FERC

2007

The North American Reliability **Council** (NERC)
Becomes
The North American Reliability **Corporation** (NERC)

FERC approves NERC's reliability standards and delegates authority to enforce compliance.

NERC Reliability standards become mandatory.

NERC delegates authority to 8 regional entities.

WECC is the Western Regional Entity.

2008

South Florida Blackout



"Map of USA highlighting Florida". Licensed under CC BY-SA 3.0 via Wikimedia Commons - http://commons.wikimedia.org/wiki/File:Map_of_USA_highlighting_Florida.png#/media/File:Map_of_USA_highlighting_Florida.png

2008

First non-compliance fine was issued to Florida Power and Light (FPL)

2011 Southwest Blackout



"Southwest Blackout of 2011" by Own work - File:Southwest Blackout of 2011.png. Via Wikimedia Commons - http://commons.wikimedia.org/wiki/File:Southwest_Blackout_of_2011.svg#/media/File:Southwest_Blackout_of_2011.svg

Check Your Knowledge: The Interconnected System

- What is FERC and what is their role?
- What is NERC and what is their role?
- What is WECC and what is their role?
- How do these organizations interact?
- How do these organizations impact the electric utility industry?

Boundaries are approximate and for illustrative purposes only.

Balancing Authority



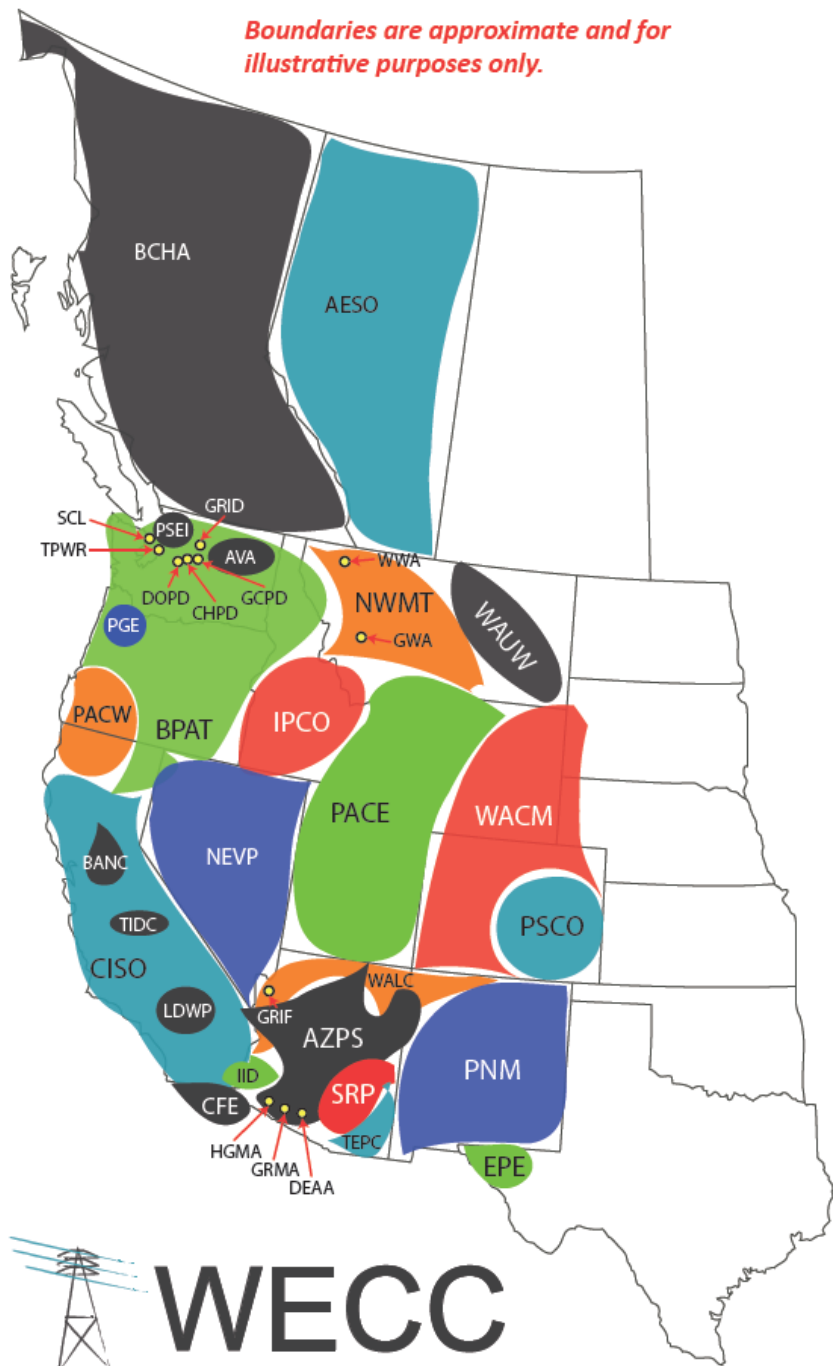
Balancing Authority Overview

Definition

What Is A Balancing Authority (BA)?

- A Balancing Authority is defined by a set of resources and interchange meters.
- Traditional Balancing Authorities have dispatchable generation, load, and interchange.

Boundaries are approximate and for illustrative purposes only.

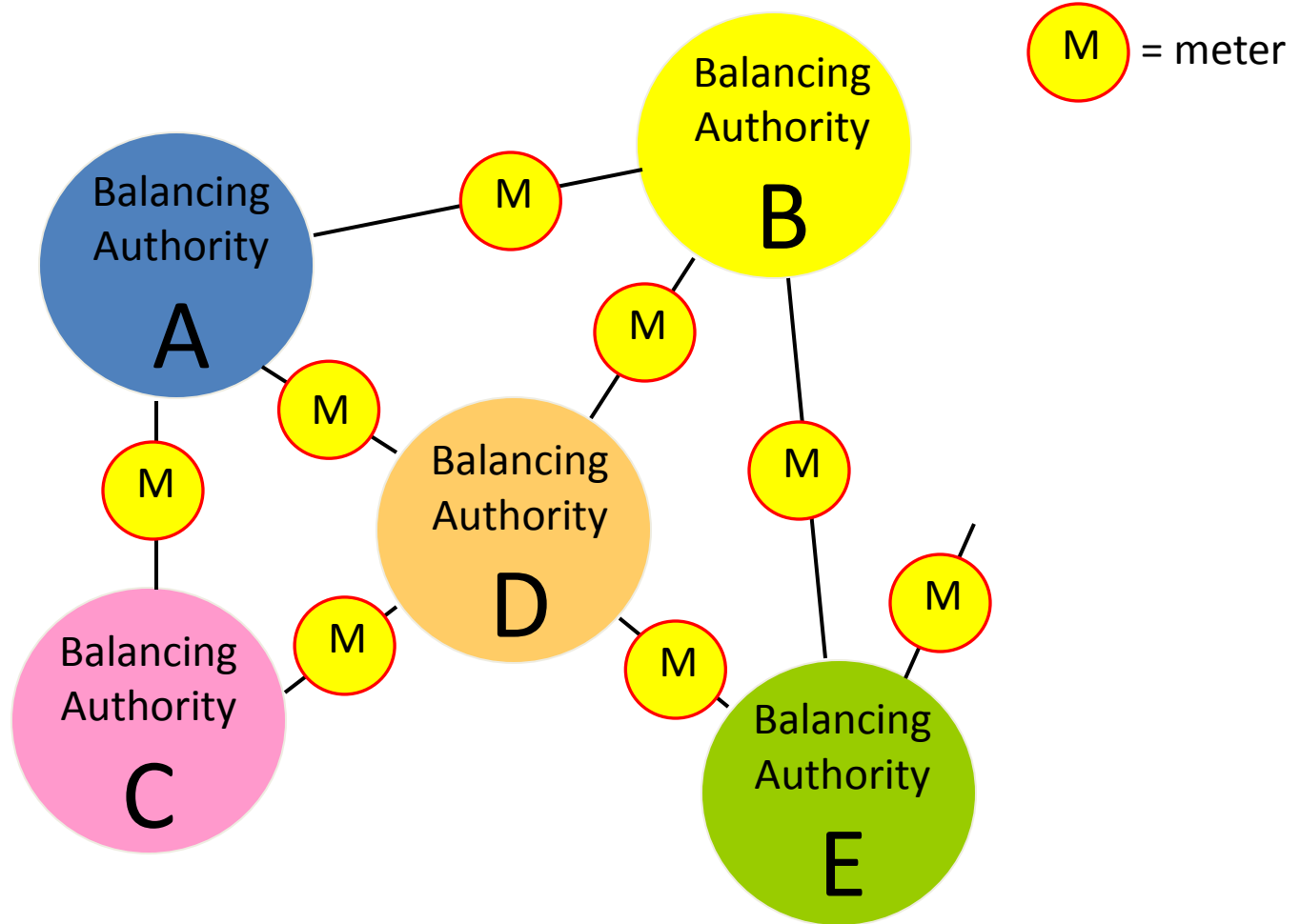


Western Interconnection Balancing Authorities (38)

- AESO - Alberta Electric System Operator
- AVA - Avista Corporation
- AZPS - Arizona Public Service Company
- BANC - Balancing Authority of Northern California
- BCHA - British Columbia Hydro Authority
- BPAT - Bonneville Power Administration - Transmission
- CFE - Comision Federal de Electricidad
- CHPD - PUD No. 1 of Chelan County
- CISO - California Independent System Operator
- DEAA - Arlington Valley, LLC
- DOPD - PUD No. 1 of Douglas County
- EPE - El Paso Electric Company
- GCPD - PUD No. 2 of Grant County
- GRID - Gridforce
- GRIF - Griffith Energy, LLC
- GRMA - Sun Devil Power Holdings, LLC
- GWA - NaturEner Power Watch, LLC
- HGMA - New Harquahala Generating Company, LLC
- IID - Imperial Irrigation District
- IPCO - Idaho Power Company
- LDWP - Los Angeles Department of Water and Power
- NEVP - Nevada Power Company
- NWMT - NorthWestern Energy
- PACE - PacifiCorp East
- PACW - PacifiCorp West
- PGE - Portland General Electric Company
- PNM - Public Service Company of New Mexico
- PSCO - Public Service Company of Colorado
- PSEI - Puget Sound Energy
- SCL - Seattle City Light
- SRP - Salt River Project
- TEPC - Tucson Electric Power Company
- TIDC - Turlock Irrigation District
- TPWR - City of Tacoma, Department of Public Utilities
- WACM - Western Area Power Administration, Colorado-Missouri Region
- WALC - Western Area Power Administration, Lower Colorado Region
- WAWJ - Western Area Power Administration, Upper Great Plains West
- WWA - NaturEner Wind Watch, LLC

WECC

Balancing Authorities



Balancing Authority Overview

Basic Responsibilities

Why Balancing Authorities Are Needed:

- Load and Generation Balancing
- Required for good control of frequency
- Short term balancing called “load-frequency regulation.”
- Longer term balancing is called “load following.”
- Balancing Authorities and their AGC systems coordinate this control.

Balancing Authority Overview

Basic Responsibilities

- Balance Load, Generation, and Net Interchange.
- Control Frequency and Time Error.
- Implement Interchange Transactions.

Balancing Authority Overview

Industry Restructuring

- Balancing Authorities
- Reliability Coordinators
- Transmission Operators
- Independent System Operators (ISO)
- Regional Transmission Organizations (RTO)

RECAP: Balancing Authority and Regulation Overview

1. How many Balancing Authorities are in the Western Interconnection?
2. What do BAs balance?
3. How does a generation-only BA balance load and generation?