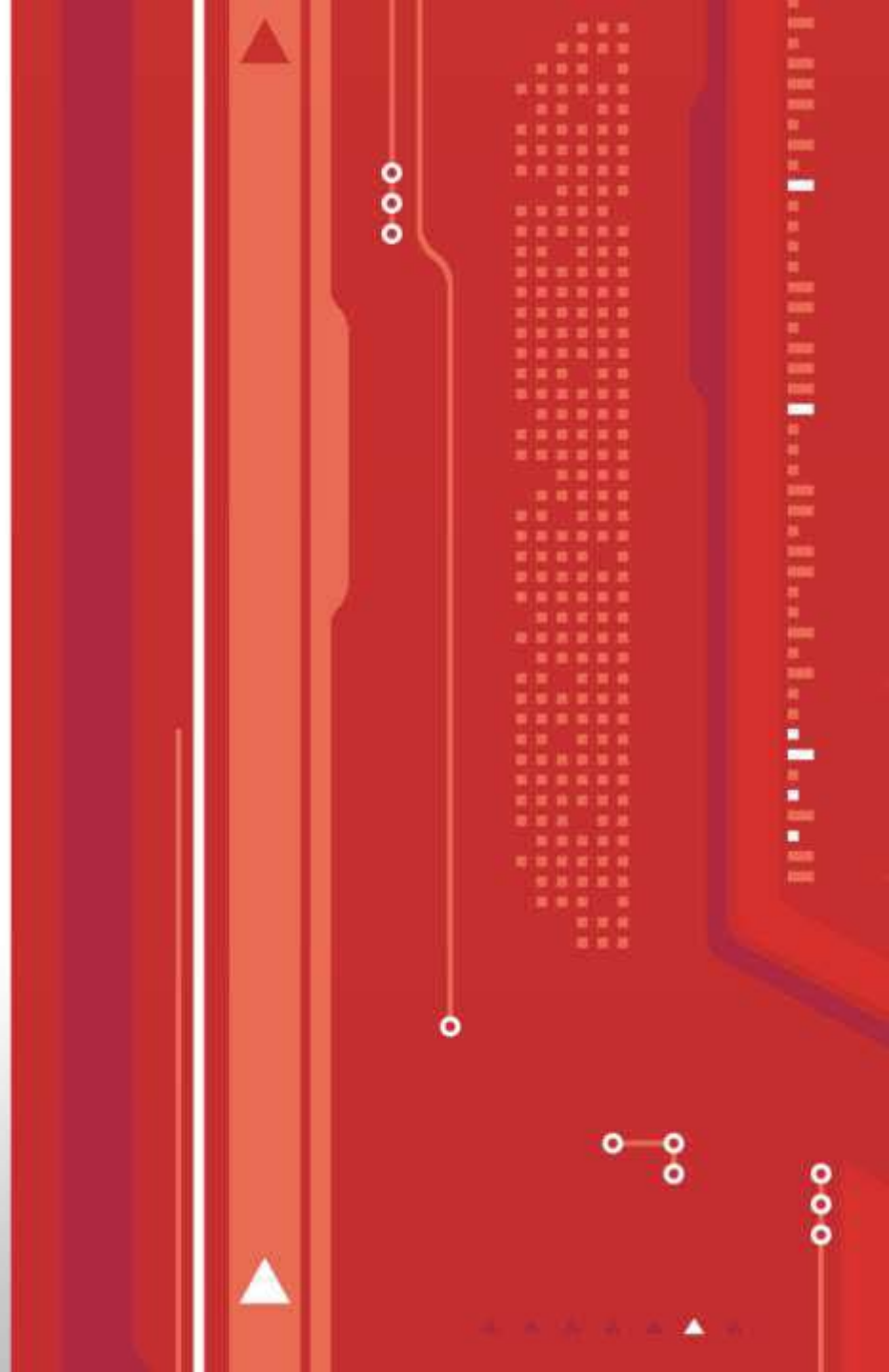



Southwest Power Pool's Webinar on the EPA's Clean Power Plan



A nighttime photograph of a city skyline with several illuminated skyscrapers and buildings. The lights are reflected in a body of water in the foreground. A bridge is visible on the left side of the frame.

Helping our members work together to keep the lights on...
today and in the future

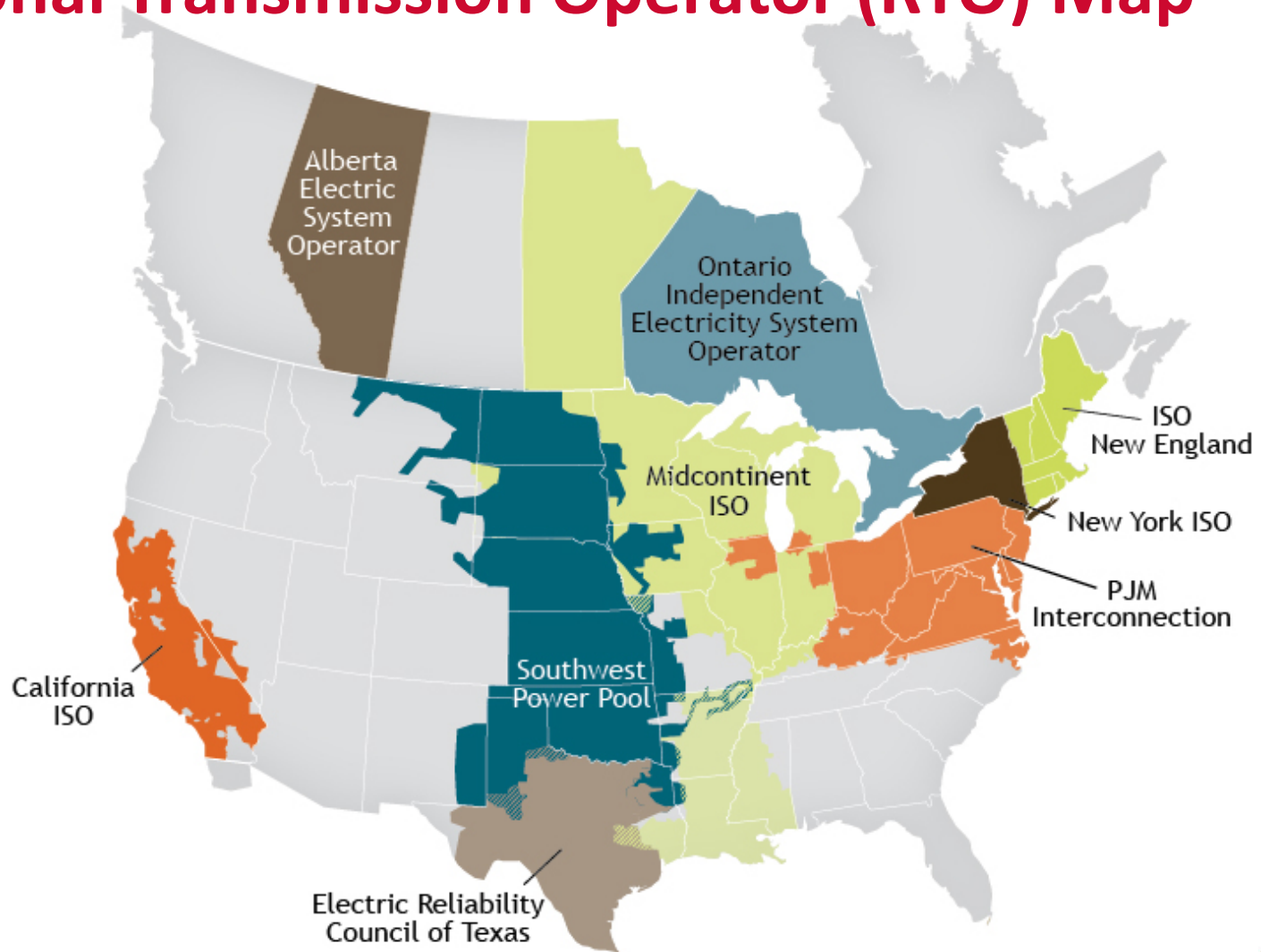
 **SPP** *Southwest
Power Pool*

Agenda

- Welcome and Introduction to SPP.....Mike Ross
- Overview of SPP
 - Operations.....Bruce Rew
 - Transmission Planning.....Lanny Nickell
- SPP's Clean Power Plan Analyses.....Lanny Nickell
- Clean Power Plan Reliability Provisions.....Matt Morais
- Future Coordination between SPP and States.....Lanny Nickell

INTRODUCTION TO SPP

Independent System Operator (ISO) / Regional Transmission Operator (RTO) Map



SPP is a FERC-Approved RTO

- Regional Transmission Organizations (RTOs) are independent, non-profit organizations that ensure transmission grid reliability, provide non-discriminatory access to the transmission system, and optimize supply and demand bids for wholesale electric power
- Minimum characteristics and functions of an RTO are specified in FERC's Order 2000
- Services provided in accordance with a FERC approved transmission tariff
- Reliability functions performed in accordance with mandatory FERC approved reliability standards

New York World-Telegram LATEST WALL ST. PRICES Real Estate, Page 21 PRICE THIRTY-CENT

1500 DEAD IN HAWAII CONGRESS VOTES WAR

Tally in Senate Is 82 to 0, In House 388 to 1, with Miss Rankin Sole Objector

By LYLE C. WELLS

WASHINGTON, Dec. 8.—Congress today passed a declaration of a state of war between the United States and the Japanese Empire 73 minutes after President Roosevelt's usual before a joint session to ask such action and pledge that we will struggle "to the hilt, to the last drop of blood."



100 to 200 Soldiers Killed in Japanese Raid On Luzon in Philippines

By the Staff Writer

MANILA, Dec. 8.—(Press)—Japanese airplanes killed or injured today when Japanese airplanes landed here on the west coast of the island of Luzon, north of the Philippine capital of Manila.

December 7, 1941



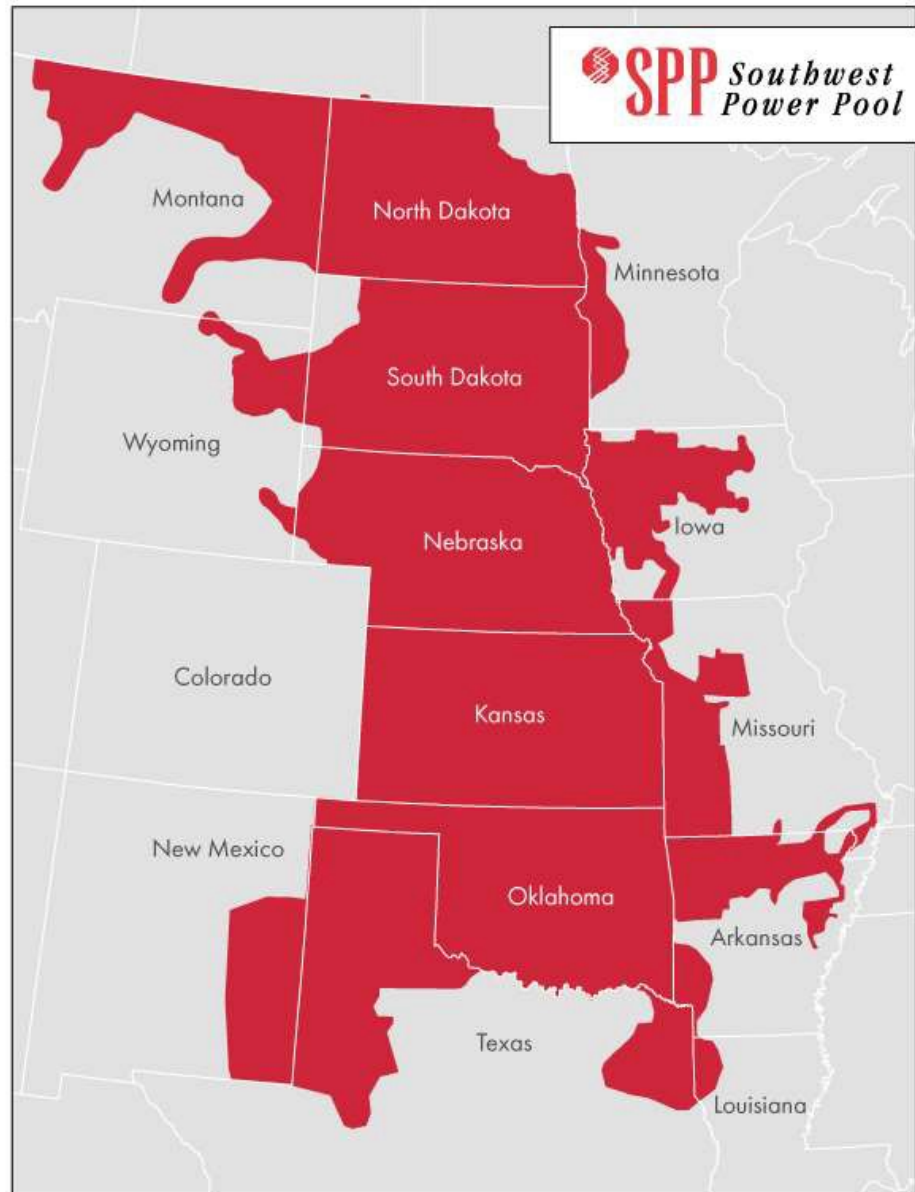
9 Days After the Bombing of Pearl Harbor...

- SPP Founded in 1941 with 11 members
 - Utilities pooled electricity to power Arkansas aluminum plant needed for critical defense
- Maintained after WWII to continue benefits of regional coordination



Members in 14 States

- Arkansas
- Kansas
- Iowa
- Louisiana
- Minnesota
- Missouri
- Montana
- Nebraska
- New Mexico
- North Dakota
- Oklahoma
- South Dakota
- Texas
- Wyoming



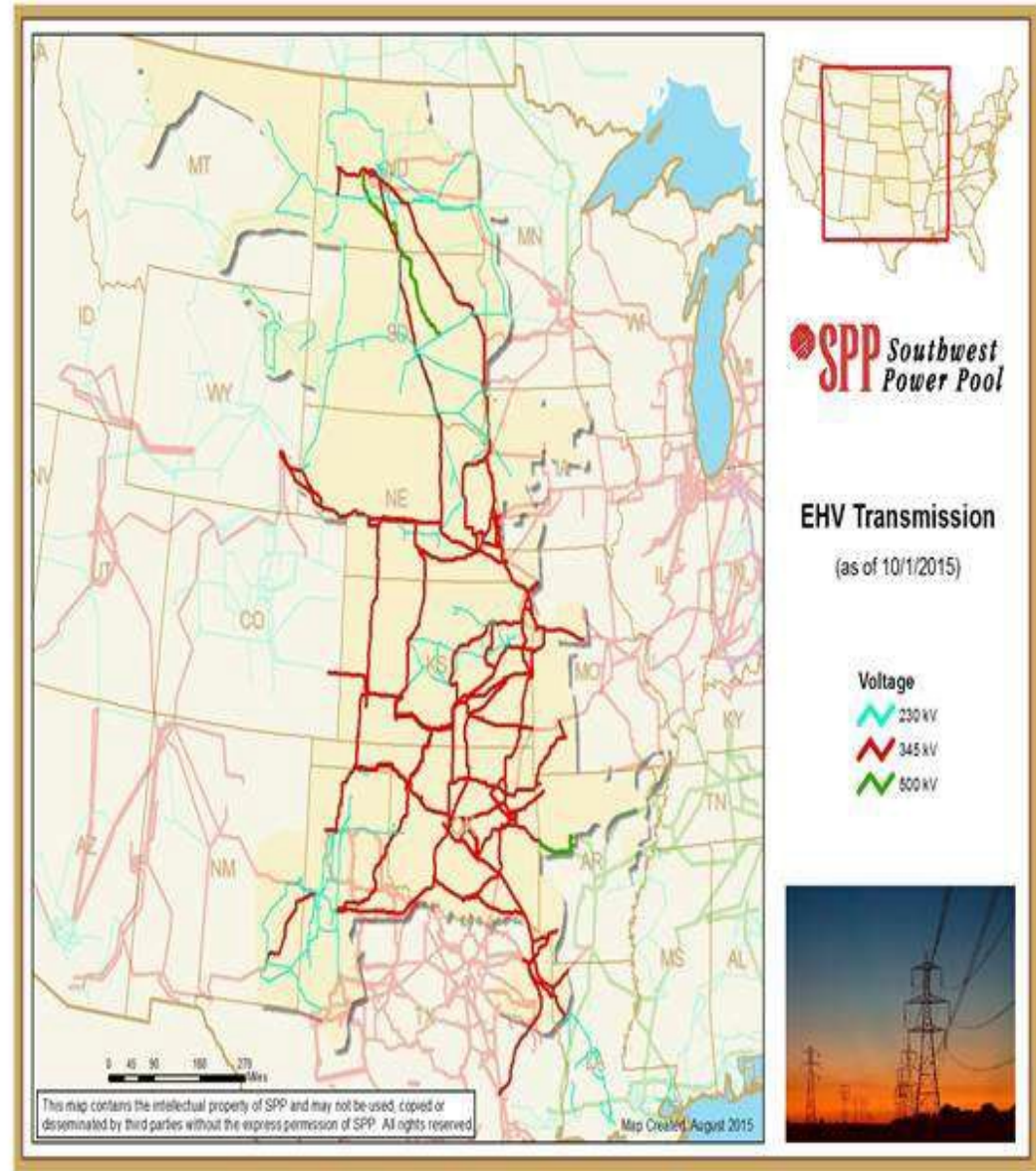
Our Membership Profile

Category	Number
Cooperatives	18
Investor Owned Utilities	18
Independent Power Producers/ Wholesale Generation	13
Municipal Systems	13
Marketers	12
Independent Transmission Companies	11
State Agencies	8
Federal Agencies	1
TOTAL	94

As of August 27, 2015

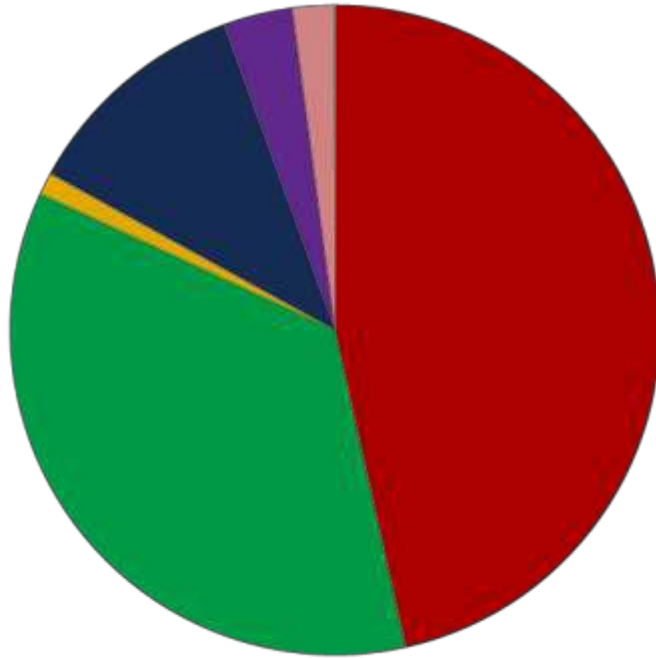
Operating Region

- 575,000 miles of service territory
- Nearly 18 million people
- 825 generating plants
- 4,782 substations
- Approximately 56,000 miles transmission:
 - The 56,000 miles of transmission lines in SPP's footprint would more than twice circle the earth!



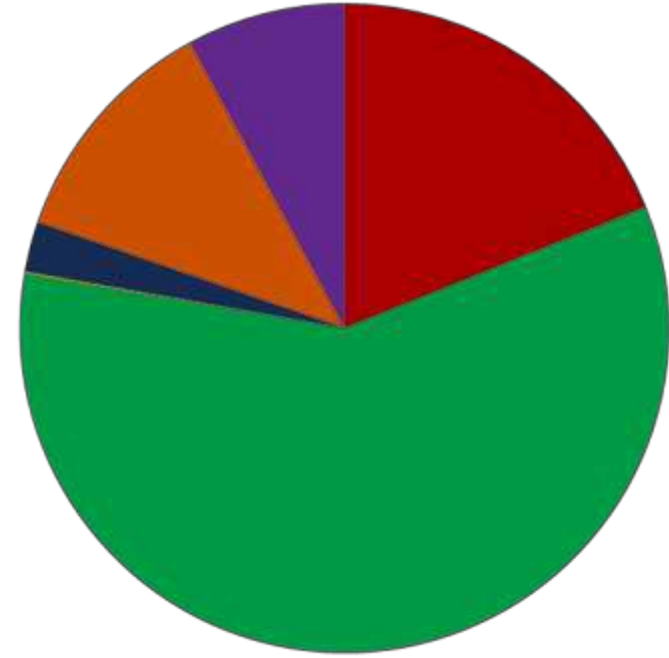
2014 Energy Capacity and Consumption (MWh)

Capacity



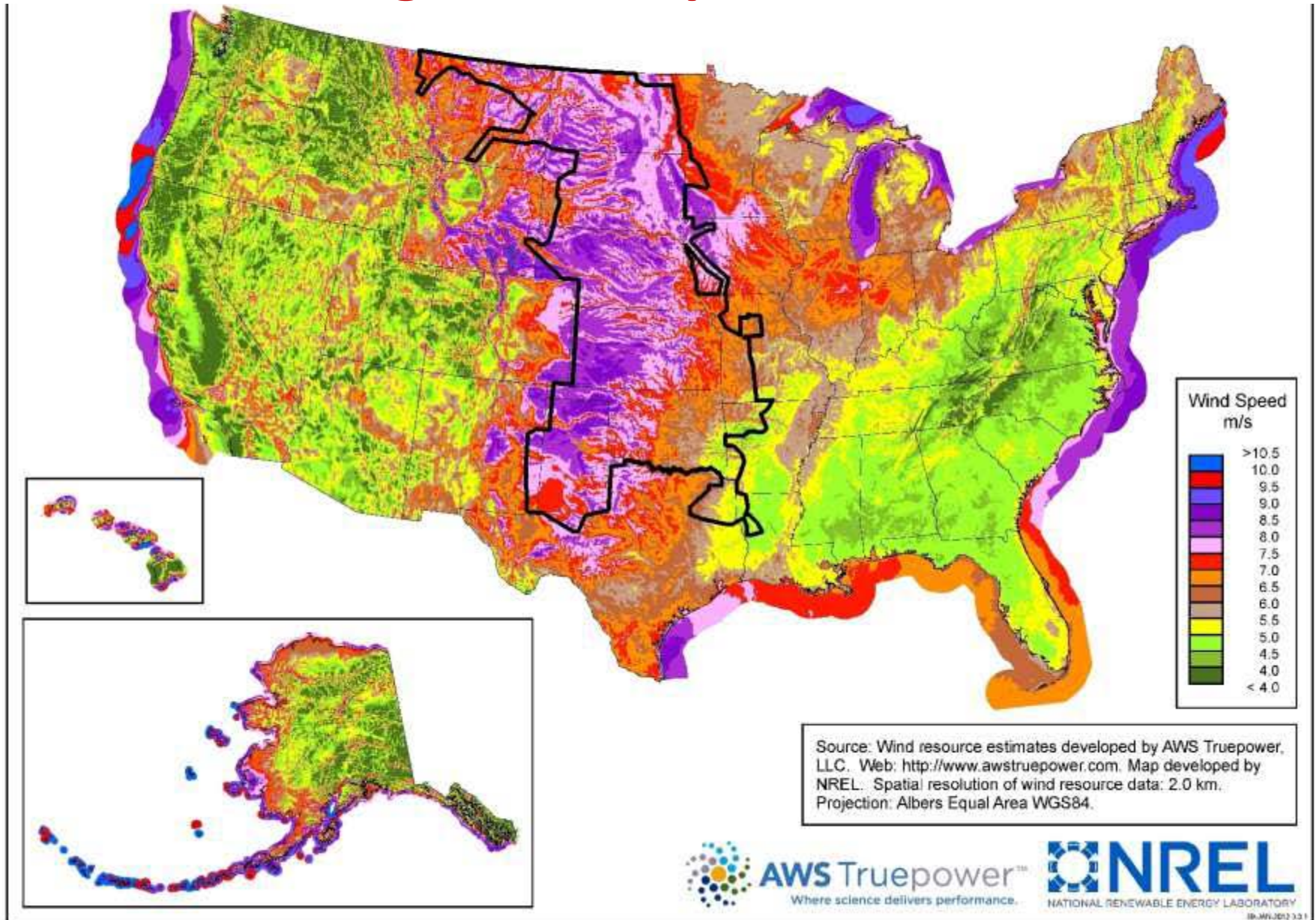
■ Gas	46.50%
■ Coal	35.40%
■ Hydro	1.10%
■ Wind	11.45%
■ Biomass	.02%
■ Nuclear	3.43%
■ Fuel Oil	2.03%
■ Solar	.07%

Consumption



■ Gas	18.9%
■ Coal	58.8%
■ Other	.1%
■ Hydro	2.5%
■ Wind	11.8%
■ Nuclear	7.9%

Annual Average Wind Speed

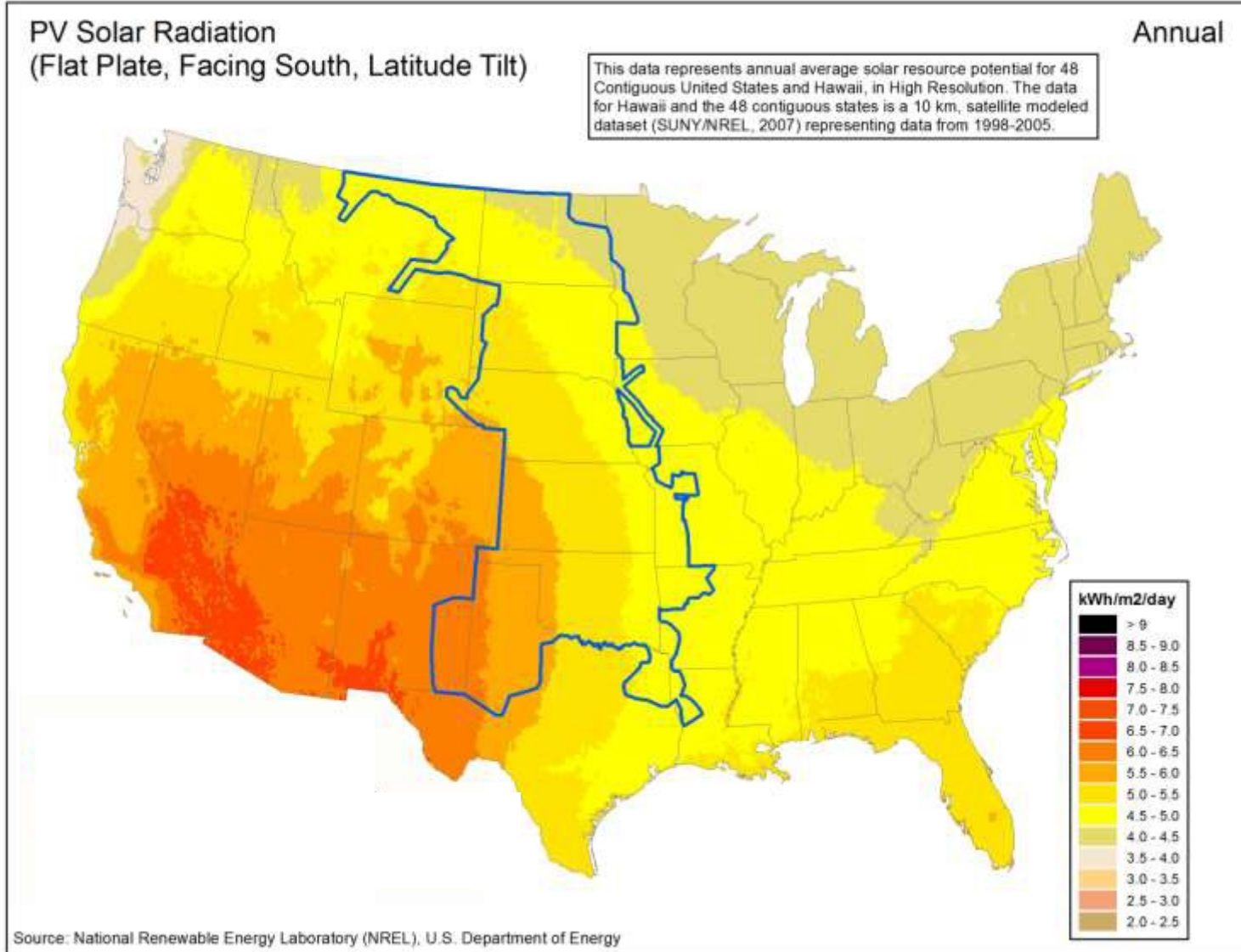


Wind Energy Development

- **Wind “Saudi Arabia”:** Kansas, Oklahoma, Nebraska, Texas Panhandle, New Mexico
 - 60,000-90,000 MW potential
 - More wind energy than SPP uses during peak demand
- **9,700 MW capacity of in-service wind**
- **16,900 MW wind under development**



Solar in the U.S.



Regulatory Environment

- Incorporated in Arkansas as 501(c)(6) nonprofit corporation
- FERC — Federal Energy Regulatory Commission
 - Regulated public utility
 - Regional Transmission Organization
- NERC — North American Electric Reliability Corporation
 - Founding member
 - Regional Entity



Governance

- **Independent Board of Directors**
- **Members Committee**
- **Regional State Committee**
- **Markets and Operations Policy Committee**
- **Strategic Planning Committee**
- **Working Groups**



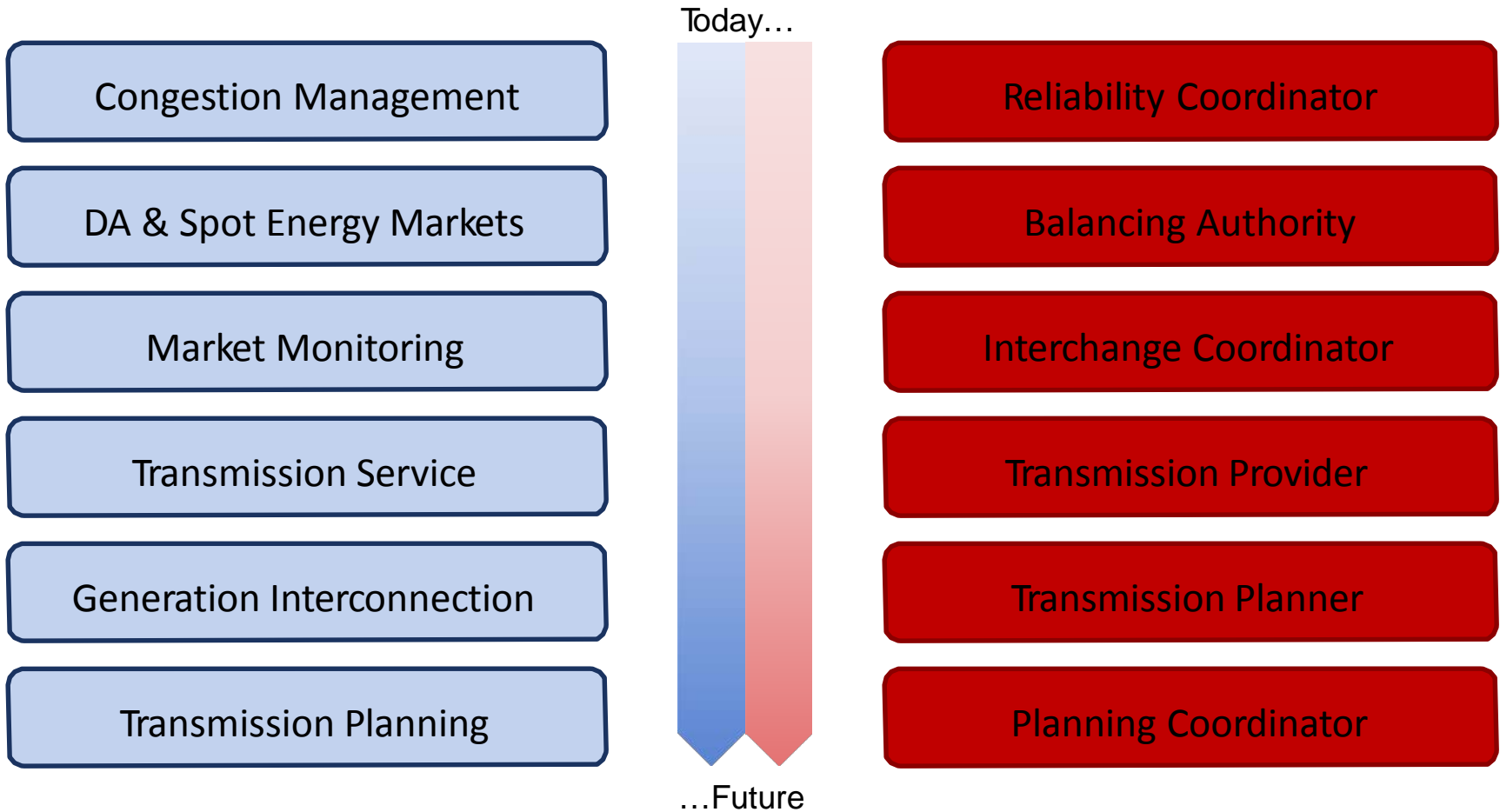
Our Major Services

- Facilitation
- **Reliability Coordination**
- Transmission Service/
Tariff Administration
- **Market Operation**
- Standards Setting
- Compliance Enforcement
- **Transmission Planning**
- Training



*Regional
Independent
Cost-effective
Focus on reliability*

SPP's Services and Reliability Functions



Pursuant to SPP's FERC-Approved Tariff

Pursuant to NERC Reliability Standards

Some Activities Outside of SPP's Responsibility

- **Transmission Siting**
- **Generation Planning/Siting**
- **Transmission/Generation Construction**
- **Transmission/Generation Permitting**
- **Credit/Allowance Trading Oversight**

OVERVIEW OF SPP OPERATIONS

Operations Characteristics

- **SPP operates regionally and power flows on the path of least resistance**
- **Power does not follow state boundaries but electrically based on metered areas**
- **SPP responds to the price signals provided by market participants in their load bids and generation offers**
- **Operations always prepares for an event to happen**
- **Response to events are based on impact and time frame to respond but always to keep the lights on**

Operations Major Services

- Reliability Coordinator
- Balancing Authority
- Market Operator



Reliability Coordinator

- **Monitor grid 24 x 365**
- **Anticipate problems by continuously doing detailed transmission system studies**
- **Take preemptive action when necessary to prevent cascading outage**
- **Coordinate regional response prior to and after events happen**
- **Independent decision making on all activities**

Balancing Coordinator

- Monitor Load/Generation 24 x 365
- Monitor tie flows for ~400 ties
- Monitor Real-Time load and generation to balance
 - Balance load and generation every 4 seconds
 - Dispatch most economical units in a reliable manner
- Respond to loss of generation or load in region

Market Concepts: What is a Market?

Wholesale Energy Market:

Sellers/ Producers	Buyers/ Consumers	Locational Prices	Products
<ul style="list-style-type: none">• Utilities• Municipals• Independent Power Producers• Generators• Power Marketers	<ul style="list-style-type: none">• Utilities• Municipals• Load Serving Entities (LSEs)• Power Marketers	<ul style="list-style-type: none">• Driven by Supply and Demand at defined locations	<ul style="list-style-type: none">• Energy• Operating Reserves• Congestion Rights

Integrated Marketplace Overview

Key Components

Day-Ahead (DA)
Market

Real-Time Balancing
Market (RTBM)

Transmission
Congestion Rights
(TCR) Market

Products

Energy

Operating Reserve
(Regulation Up,
Regulation Down,
Spinning,
Supplemental)

Congestion Rights

Day-Ahead Market

- **Determines least-cost solution to meet energy bids and reserve requirements**
- **Participants submit offers and bids to purchase and/or sell energy and operating reserves the day prior to operating day:**
 - **Energy**
 - **Regulation-Up**
 - **Regulation-Down**
 - **Spinning Reserve**
 - **Supplemental Reserve**

Real-Time Balancing Market

- Balances real-time load and generation committed by the Day-Ahead Market and Reliability Commitment processes
- Operates on continuous 5-minute basis
 - Calculates Dispatch Instructions for Energy and clears Operating Reserve by Resource
- Energy and Operating Reserve are co-optimized
- Settlements based on difference between results of RTBM process and Day-Ahead Market clearing
- Charges imposed on Market Participants for failure to deploy Energy and Operating Reserve as instructed



OVERVIEW OF SPP TRANSMISSION PLANNING

SPP's Planning Role

- **Perform near and long-term reliability assessments of the transmission system in accordance with NERC TPL Standards**
- **Develop annual transmission expansion plans in accordance with Attachment O of the SPP Tariff**
- **Recommend transmission expansion plans and projects to the Board for approval**
- **Direct construction of Board approved projects (Notification to Construct)**



SPP's Transmission Planning

SPP Transmission Expansion Plan (STEP)

Integrated Transmission Planning

Transmission Service

High Priority

Generation Interconnection

Balanced Portfolio

Sponsored

Upgrade Type

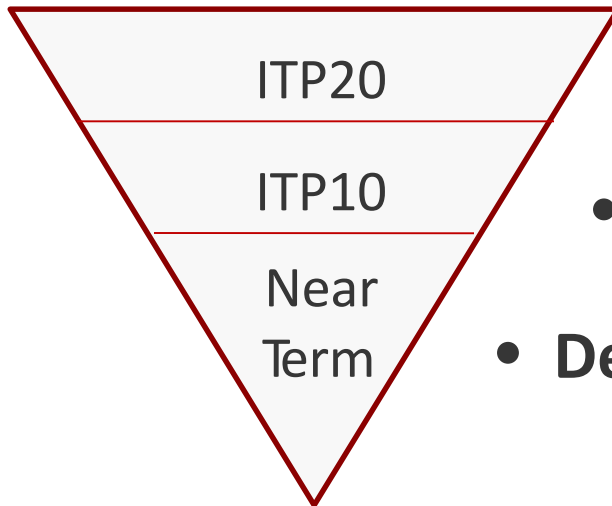
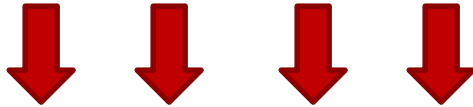
Board Approval Required

Board Endorsement Required

SPP Integrated Transmission Planning (ITP)



Conceptual



- Develop EHV “highway” vision
- Develop “highway/byway” system
- Develop “byway” & “local” system

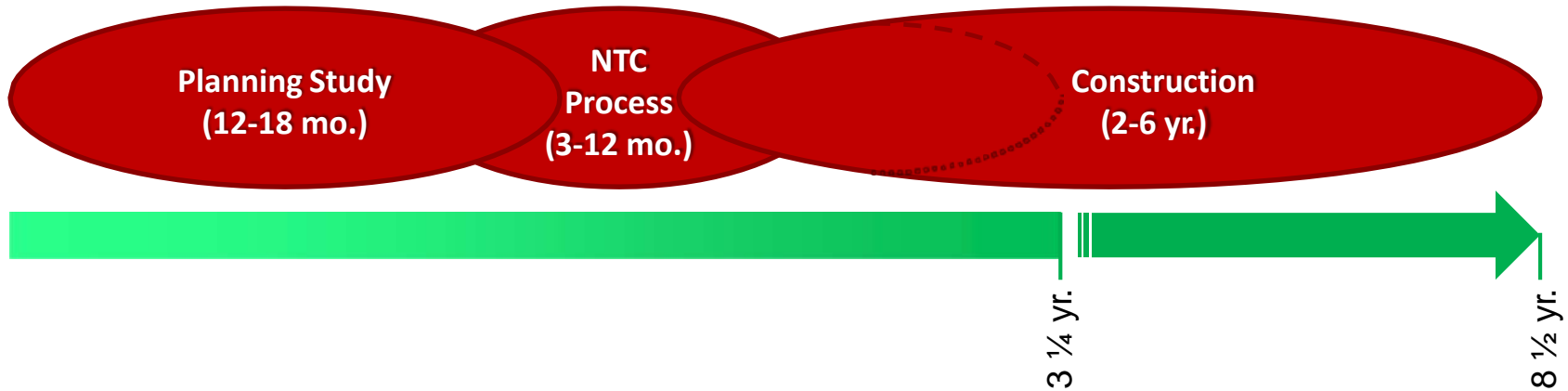


Implementation

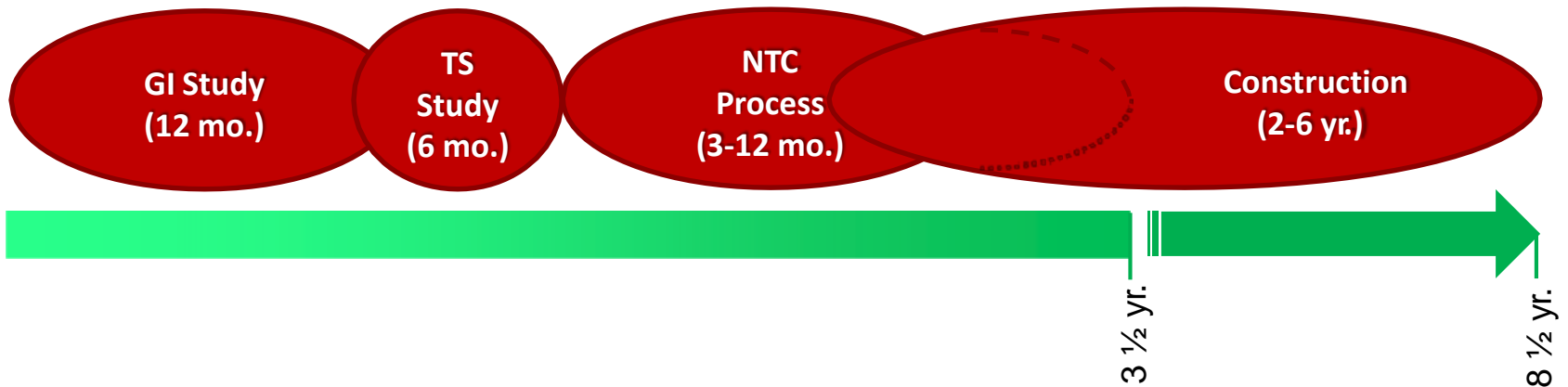


Transmission Build Cycle

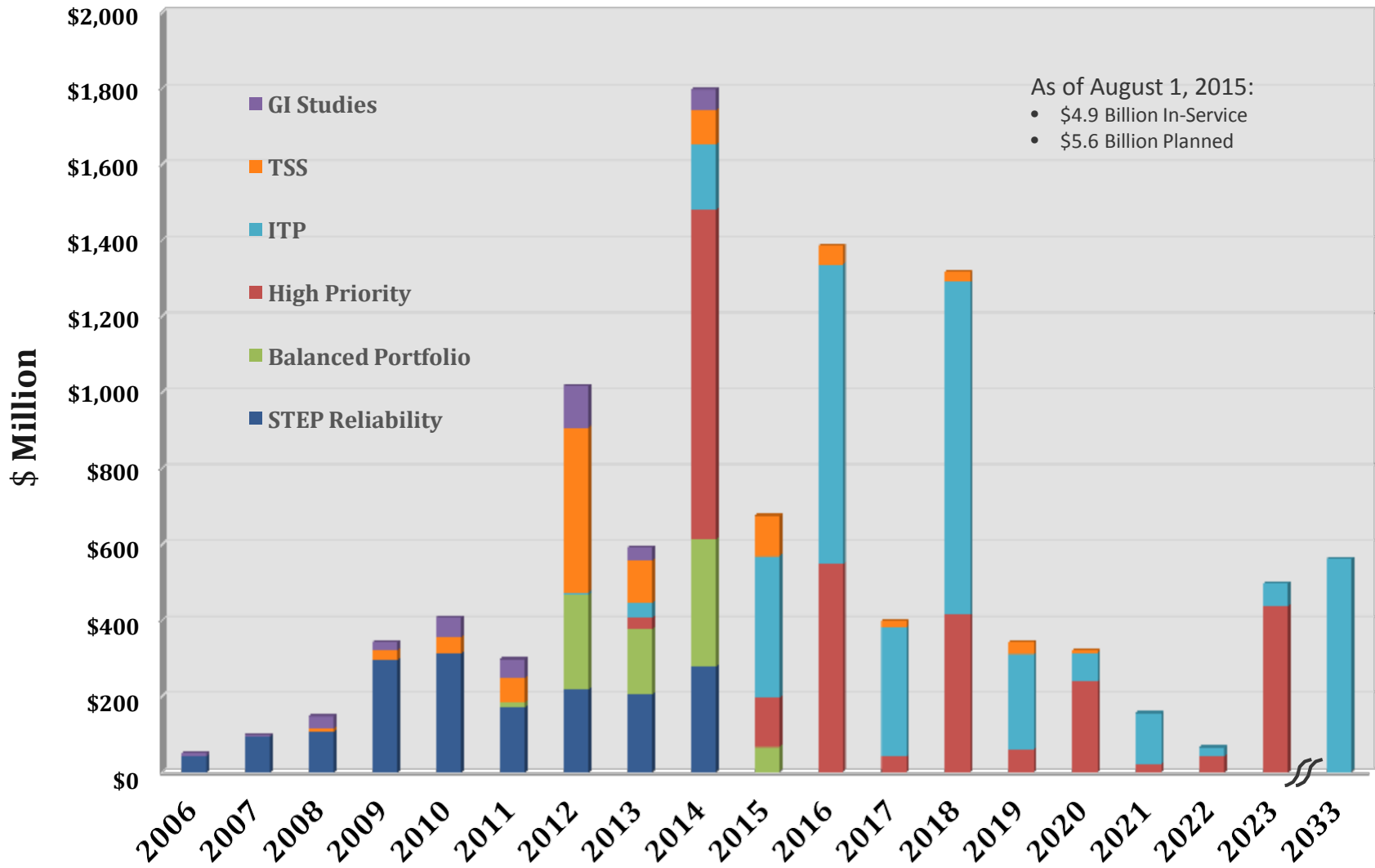
Transmission Planning Process



GI and Transmission Service Process



Total Investment Per In-Service Year



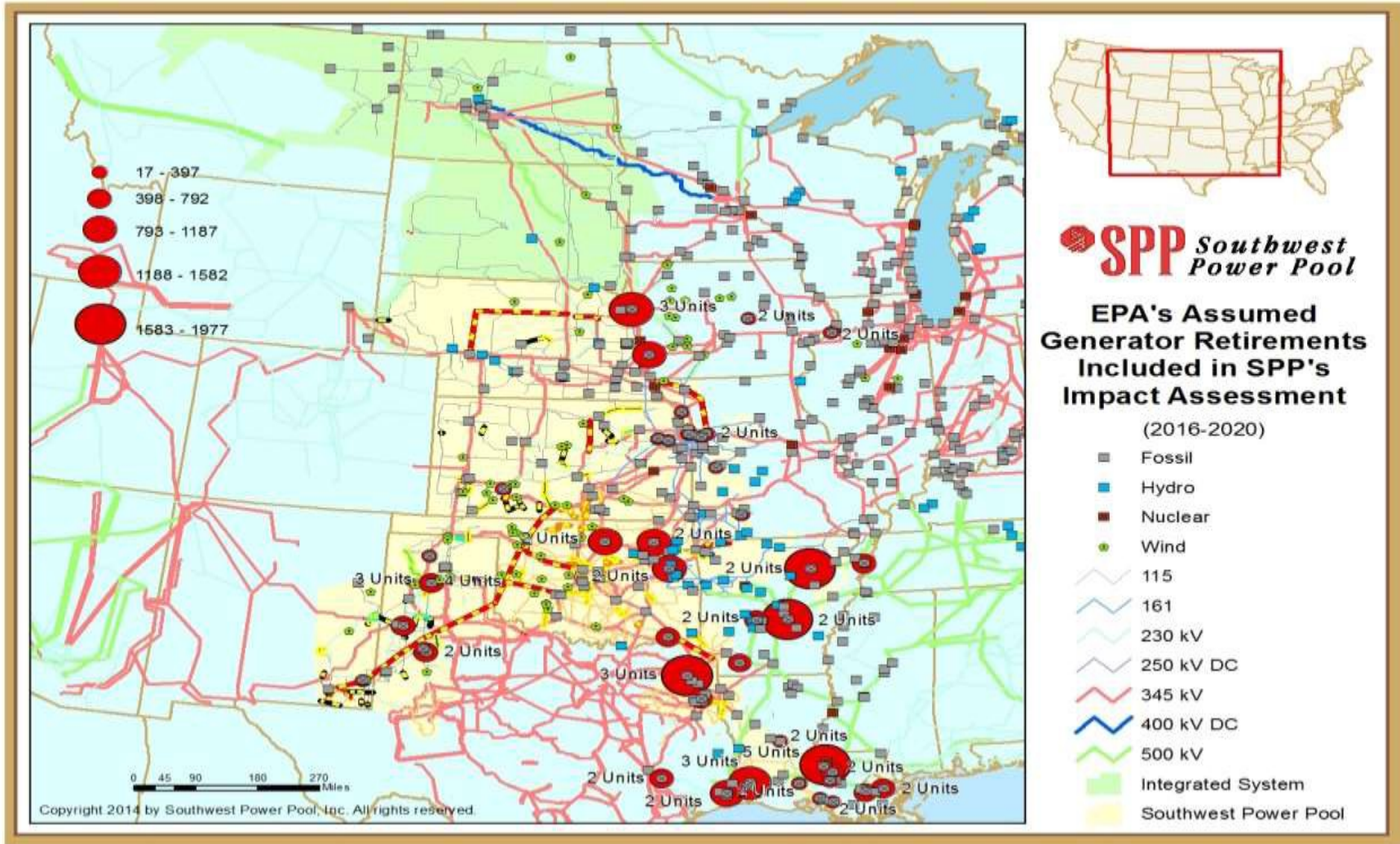
SPP's CPP ANALYSES

SPP's CPP Impact Assessments

- SPP performed three assessments
 - Reliability Impact Assessment: Assessed impact of EPA's projected generator retirements on transmission system and resource adequacy (Oct 2014)
 - Regional Compliance Assessment: Evaluate changes to existing resources and resource plans needed to comply with CPP under a regional compliance approach (Apr 2015)
 - State-by-State Compliance Assessment: Evaluate changes to existing resources and resource plans needed to comply with CPP under a regional compliance approach (Jul 2015)
- All assessments performed on draft rule

SPP's Reliability Impact Assessment

EPA's Projected 2016-2020 EGU Retirements



*Excludes committed retirements prior to 2016

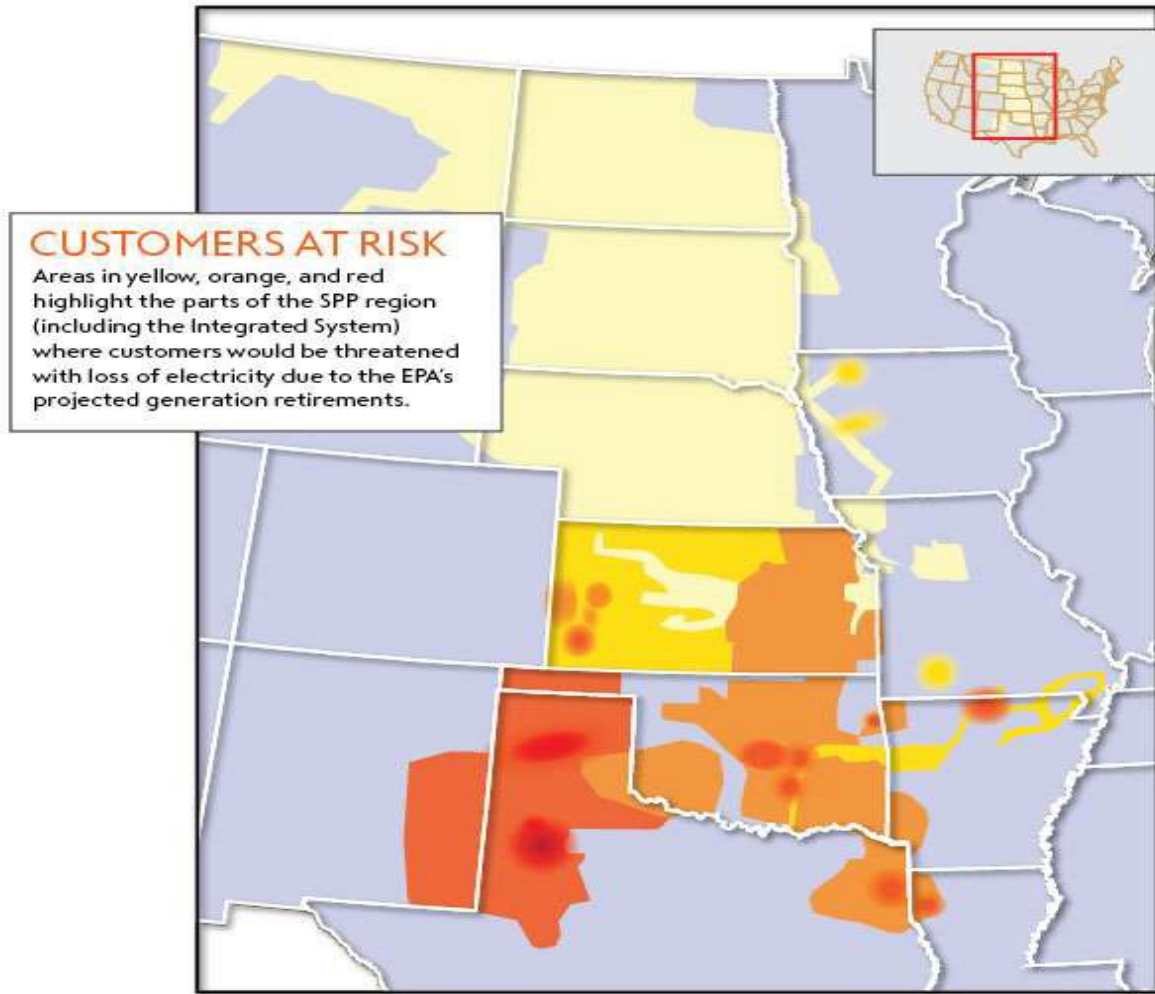
**Extracted from EPA IPM data

***THESE RETIREMENTS ARE ASSUMED BY EPA – NOT SPP!

Reliability Impact Assessment Summary

- What happens if CPP compliance begins and generator retirements occur before generation and transmission infrastructure is added?
 - Inadequate generation capacity
 - Inadequate transmission system capacity
- What happens during CPP compliance after replacement generation capacity is added but before additional transmission infrastructure is built?
 - Inadequate transmission system capacity
- Both scenarios identified a risk of electric service interruptions and potential violations of NERC standards

Reliability Risks Identified



RELIABILITY RISK ASSESSMENT

SIGNIFICANT



SEVERE

SPP's Compliance Assessments

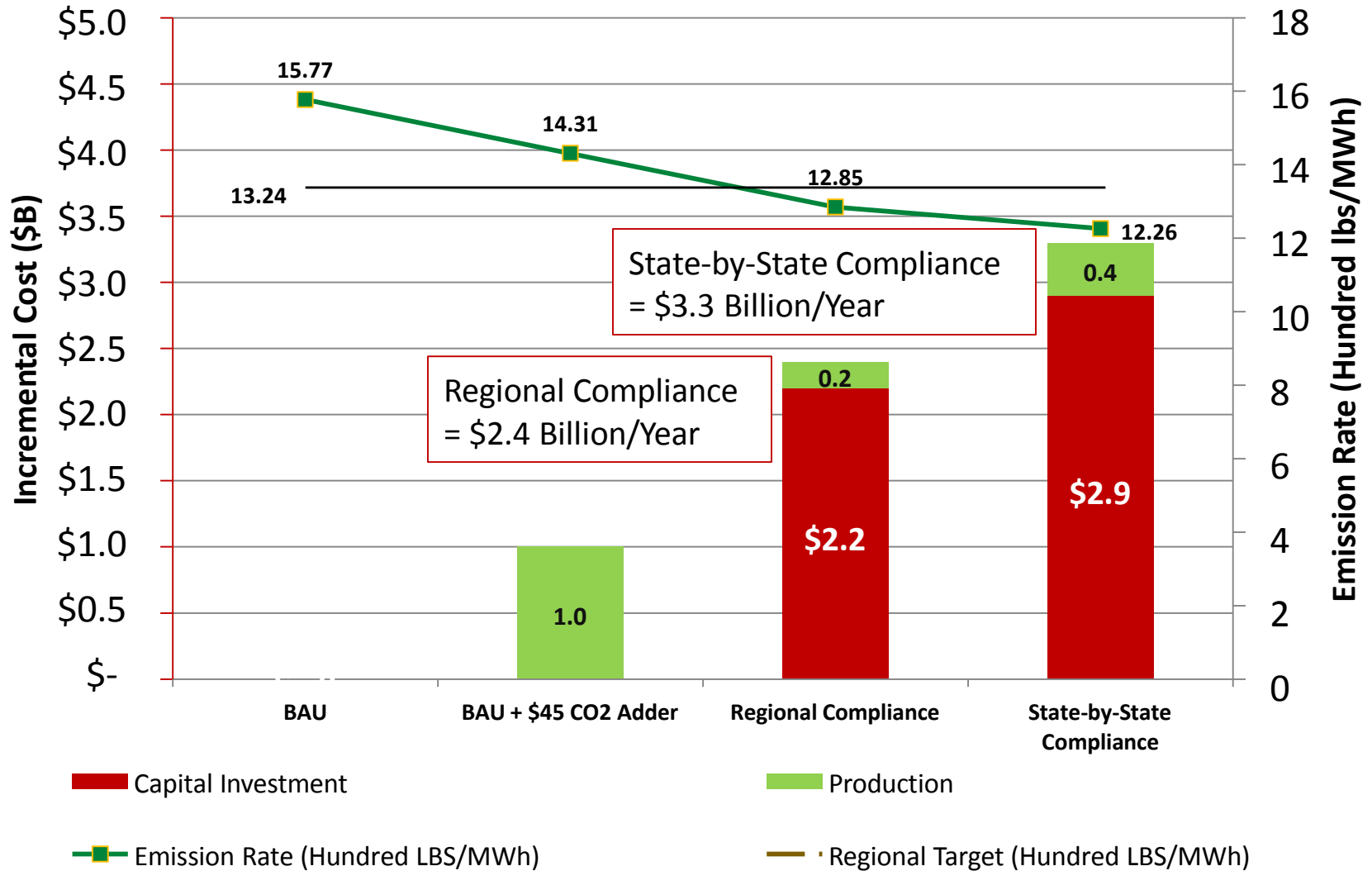
Objectives of Assessment

- Evaluate the impact of the EPA's draft Clean Power Plan on existing resources and resource expansion plans resulting from state-by-state and regional compliance
- Provide an “apples-to-apples” comparison of the state-by-state compliance impacts with regional compliance impacts
- The assessment did NOT:
 - Prescribe the best or only compliance approach
 - Include cost of transmission expansion, congestion, gas infrastructure, or market design changes
 - Take a position on the appropriateness of the EPA's proposed state goals

Assessment Steps

- **Assume continued operation of SPP's energy markets**
- **Estimate SPP's share of the EPA's carbon emissions goals for states containing assets that operate within SPP**
- **Develop a 2030 Business as Usual Reference Case utilizing Stakeholder approved datasets**
- **Evaluate carbon reduction measures for the SPP region**
 - **Apply reasonable carbon cost adders**
 - **Implement incremental resource plan changes capable of meeting the regional emission goal and each state's emission goal**

Costs of CPP Compliance Approaches Assessed



*The compliance approaches assessed were based on EPA's draft rule issued June 2014 and do not include cost of transmission expansion, congestion, market enhancements or other infrastructure.

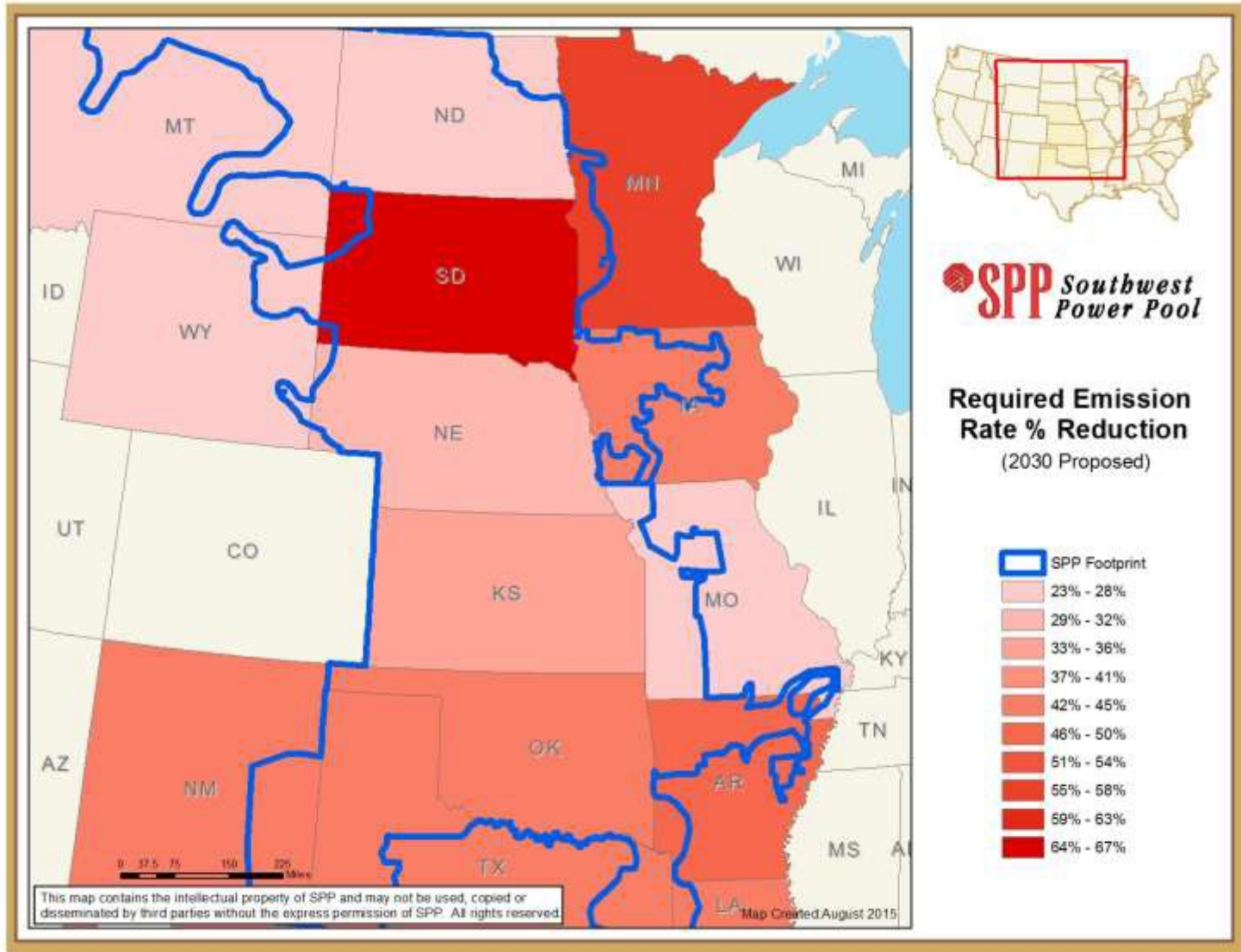
Summary of Results

- **Compared to the regional compliance approach:**
 - **State-by-state compliance increased generation investment and production costs by 40%**
 - **State-by-state compliance required 114% more generation retirements**
 - **State-by-state compliance increased generation at risk for retirement by 9%**
 - **State-by-state compliance required 185% more new natural gas generation and roughly the same amount of new renewables**

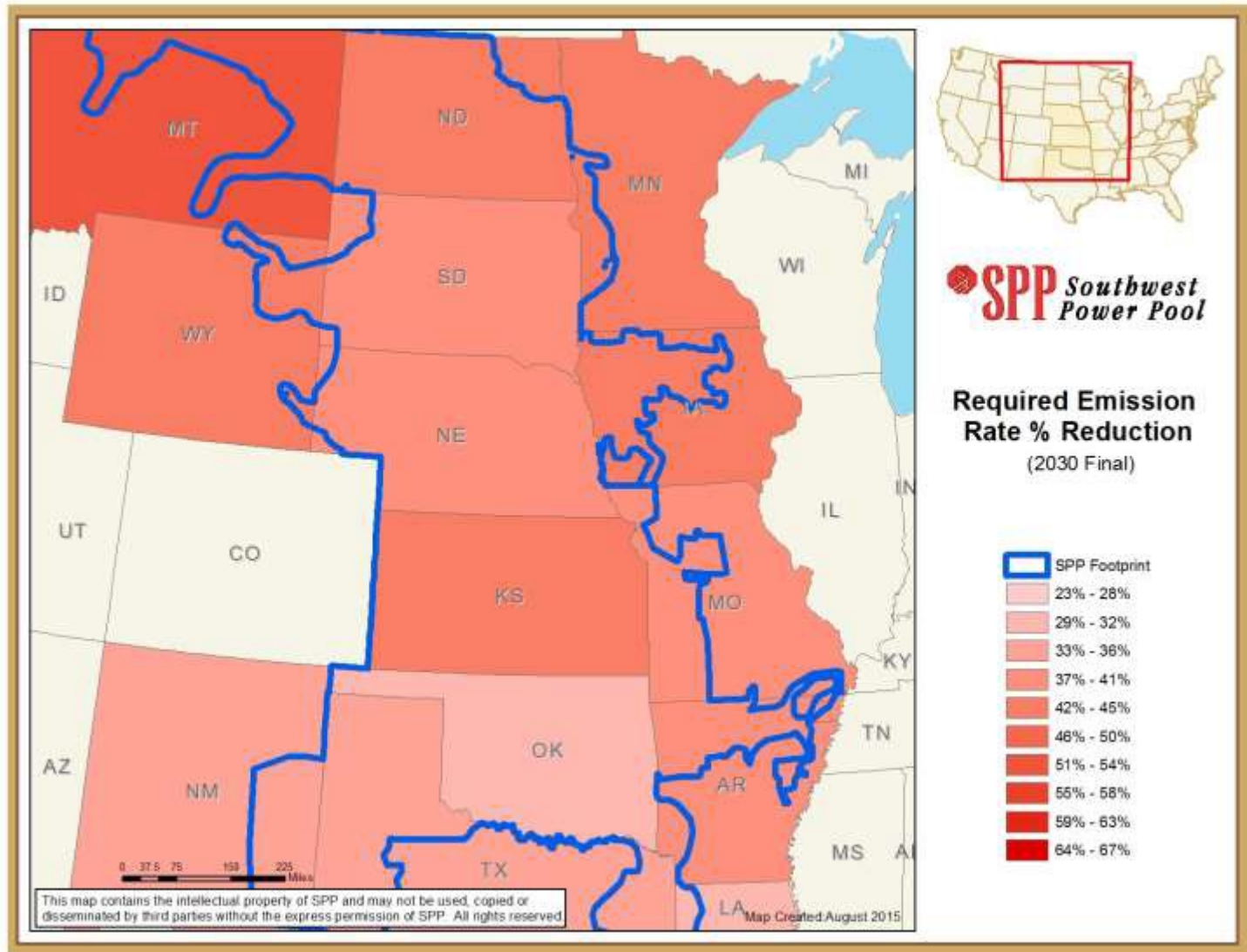
Summary of General Conclusions

- **State-by-state compliance is more costly than regional compliance**
- **State-by-state compliance is more disruptive than a regional approach to the reliability and economic benefit provided by SPP's markets**
- **More new generation and transmission infrastructure likely needed for state-by-state than for regional compliance**

State Emission Rate Goals (Draft)



State Emission Rate Goals (Final)



CPP RELIABILITY PROVISIONS

Reliability Provisions Included in CPP

- Requirement that each state demonstrate in its final plan that it has considered reliability issues, including consultation with reliability or planning agency
- Mechanism for a state to seek a revision to its plan in case unanticipated significant reliability challenges arise
- Reliability safety valve to address unanticipated events or other extraordinary circumstances causing a conflict between environmental and reliability requirements

Demonstration of Reliability Consideration

- Must be included in state plans submitted to EPA
- EPA suggests consulting with **ISOs/RTOs** or other **planning authorities (PAs)**
 - At least once during plan development
 - Continuing dialogue during development
- Documentation in state plans should include
 - The consultation process
 - Response and recommendations of **PA**
 - State's response to any recommendations

Plan Revisions due to Reliability Issues

- States may propose plan revisions to deal with reliability threats, as long as required emission performance is maintained
- EPA will review proposed revisions in accordance with 40 CFR part 60.28
- If expeditious review needed, state must document reliability risks by providing a separate analysis from applicable **ISO/RTO** or other **PA**
 - Must include a statement that there are no practicable alternative resolutions to the risks

Reliability Safety Valve

- RSV provides
 - 90-day period during which an EGU not required to meet its emission standard
 - Period after initial 90-day period during which EGU allowed to operate under alternative standard with plan revisions that offset resulting excess emissions

Reliability Safety Valve – Initial Period

- Affected state required to notify EPA within 48 hours
 - Description of emergency situation, affected EGU(s), and modified emission standard for affected EGU
- State must provide second notification within 7 days
 - Full description of emergency, need for modified standard, how the state is coordinating with **Reliability Coordinators (RCs)** and **PAs** to alleviate the problem, and maximum time the affected EGU will operate in modified manner
 - Written concurrence from **RC** and/or **PA** confirming existence of reliability threat and supporting the temporary modification
 - Any analyses performed by the **RC/PA**

Reliability Safety Valve – After Initial Period

- State must notify EPA at least 7 days prior to end of initial 90-day period whether reliability issue still exists
- If so, the state must inform the EPA it will submit a revised plan expeditiously
 - Must include a second written concurrence from **RC** and/or **PC** confirming continuing reliability issue and that the alternative standard for the affected EGU is required
- Any state that experiences a second reliability emergency that creates conflict within its plan must revise its plan so that it is flexible enough to prevent recurrences of conflicts due to reliability issues

FUTURE COORDINATION BETWEEN SPP AND STATES

General Thoughts about Compliance Approach

- SPP studies indicate a regional approach to compliance is better than state-by-state approaches
- Studies demonstrate merits to development of regional carbon trading markets
- States are encouraged to coordinate with each other and develop plans, even if litigating, rather than waiting for EPA's Federal Plan to be imposed on them
- SPP stands ready to assist any way that it can to ensure a reliable, cost effective approach to compliance

Coordination with SPP

- SPP is the Planning Authority and Reliability Coordinator for its Region and is available to assess state plans for reliability impacts to the SPP region
- We encourage states to begin coordination with SPP early and often during the development of state plans
- We encourage states to determine their expectations for SPP's role in the consultation process early so that SPP can appropriately schedule resources
- States with multiple RTOs/PAs/RCs should be aware of potential for overlapping impacts that could require broader coordination

SPP States with Multiple Planning Authorities

State	PA, in addition to SPP
Arkansas	MISO
Iowa	MISO
Louisiana	MISO
Minnesota	MISO
Missouri	MISO
	Associated Electric Cooperative
Montana	NorthWestern Corporation
	Bonneville Power
New Mexico	El Paso Electric Company
	Public Service Company of New Mexico
North Dakota	MISO
Oklahoma	Associated Electric Cooperative
South Dakota	MISO
	WAPA - Rocky Mountain Region
	Black Hills Corporation
Texas	MISO
	ERCOT
	El Paso Electric Company
Wyoming	Bonneville Power
	Black Hills Corporation
	NorthWestern Corporation
	PacifiCorp
	WAPA - Rocky Mountain Region

SPP Contact Information

- For any questions, ideas, concerns, requests, etc. related to SPP's role in the Clean Power Plan, contact:

David Avery

Director, Corporate Communications

501.482.2320

davery@spp.org



Additional Information

SPP's 2014 Reliability Assessment Report

<http://www.spp.org/publications/PPP%20Reliability%20Analysis%20Results%20Final%20Version.pdf>

SPP's 2014 Letter to EPA

http://www.spp.org/publications/2014-10-09_SPP%20Comments_EPA-HQ-OAR-2013-0602.pdf

SPP's 2015 Regional Compliance Assessment Report

<http://www.spp.org/publications/SPP%20Regional%20Compliance%20Assessment%20Report.pdf>

SPP's 2015 State-by-State Compliance Assessment Report

http://www.spp.org/publications/SPP_State_by_State_Compliance_Assessment_Report_20150727.pdf