

POWER TO THE PEOPLE

How Transmission Reform Can Improve
Renewable Capacity and Affordability

November 13th 2PM ET

Introduction

Kristen Soares



State Climate Policy
Network Manager

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State Climate Policy Network



Network of **15,000+**

- State and local elected officials
- NGO advocates
- Researchers
- State agency staffers
- Organizers and activists
- Business leaders

... working on state climate policy

www.climate-xchange.org/network

Pro Bono Policy Assistance

We specialize in state climate policy design and analysis.
Reach out to kristen@climate-xchange.org with your requests on:

- **Example states** and **model rules** for a given policy
- **Gap analysis** of your state's climate policy landscape
- **Connections** to other actors working on similar issues

Or, check out our **State Climate Policy Dashboard**, which tracks 65+ state-level climate policies and relevant resources across all 50 states.

Our Annual Fundraiser

The future of federal climate policy may be uncertain, but the **critical role of state governments** is more clear than ever.

Help fund our programs:

- SCPN National Calls and Webinars
- State Climate Policy Dashboard
- Pro Bono Policy Assistance

Help us at carbonraffle.org



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Power to the People: How Transmission Reform Can Improve Renewable Capacity and Energy Affordability



Alice Madden
*Senior Director of
Climate Strategy*
National Audubon Society



Beverly Bendix
Manager,
Carbon-Free Electricity
RMI



Anjali Patel
VP for Clean Energy,
David Gardner and Associates
*Consultant, Americans for a
Clean Energy Grid*

Agenda

1. Transmission and Climate Progress
2. Transmission and Grid Reliability
3. Transmission and Energy Affordability
4. Q&A

Speaker

Alice Madden



**Senior Director of
Climate Strategy**

National Audubon Society

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Audubon

Building the Grid Birds Need

Alice Madden
Senior Director of Climate Strategies

November 13, 2024

Double-crested Cormorant.
Photo: Jill Clardy/Flickr
(CC BY-NC-SA 2.0)

Why is Audubon engaging on Renewables & Transmission?

- ❖ Audubon's science shows that 2/3s of all N. American bird species are at risk of extinction from climate change.
- ❖ If we act on climate change now, we can improve the chances for 76% of the at-risk species.

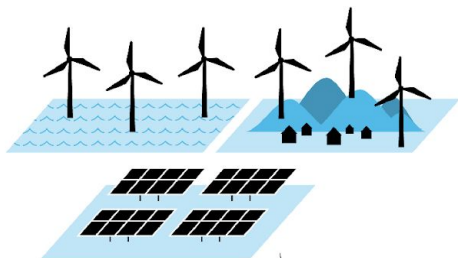


Climate Action = Conservation

We need to add 2 - 3 X more capacity to the grid to onboard the utility scale renewables & storage needed to achieve the decarbonization levels that will stabilize the climate.

AUDUBON'S COMMITMENT

100 gigawatts
of responsibly sited renewable energy generation
and transmission for rapid deployment

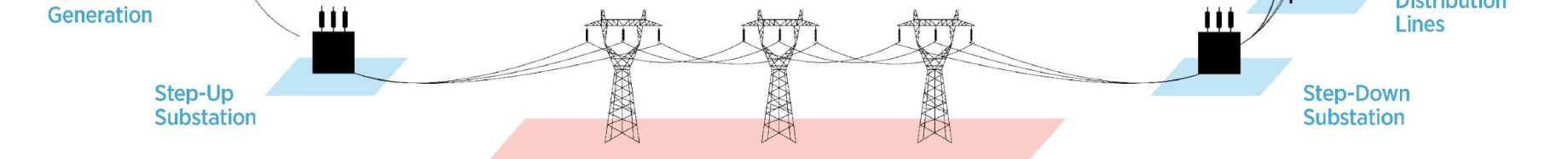


Power Generation

Step-Up Substation

THE ELECTRIC GRID ECOSYSTEM

Today, the U.S. grid cannot support enough renewable energy or contend with ever-increasing climate risks. Designed and constructed the right way, a new grid will decrease greenhouse gas emissions, provide cheaper, more reliable energy, withstand climate threats like increasingly severe storms and wildfires, minimize bird impacts from transmission lines—and secure a better climate future for us all. Here's how the grid works:



GENERATION

Large power plants are electricity “factories,” converting wind, sun, and other fuels into electricity. Unlike traditional power plants, renewable plants need to be located where resources are abundant.

TRANSMISSION

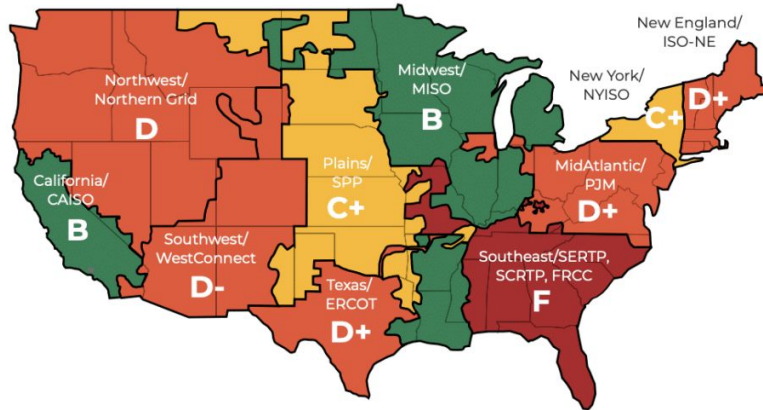
Like an Interstate highway, transmission lines move massive amounts of power across long distances from generation sites to step-down substations. **The nation urgently needs more transmission lines to carry renewable energy.**

DISTRIBUTION

Substations and transformers “step down” the electricity to a voltage level suitable for distribution to homes, businesses, schools, churches, and other places.

- **Old & Balkanized**: Average age 40 years; ¼ >50 years; three grids, 12 planning regions.
- **Obsolete**: Designed for centralized power resources e.g. coal plants near urban areas; not for more widely distributed resources e.g. utility scale wind and solar.
- **Slow**: Permitting / constructing takes ~seven yrs (mostly low voltage and intrastate).
- **Piecemeal Planning**: To date, few incentives to promote long-term interregional planning to support resources sharing, thereby improving reliability and reducing cost to rate payers.

12 Planning regions



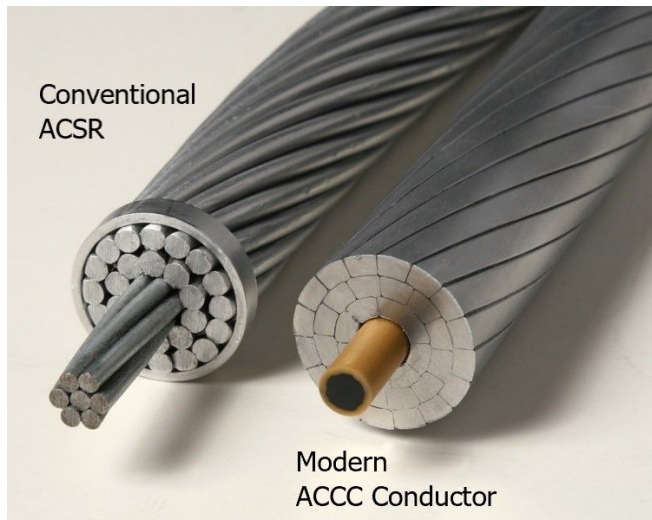
Americans for a Clean Energy Grid planning rankings

North American Electric Power Grids



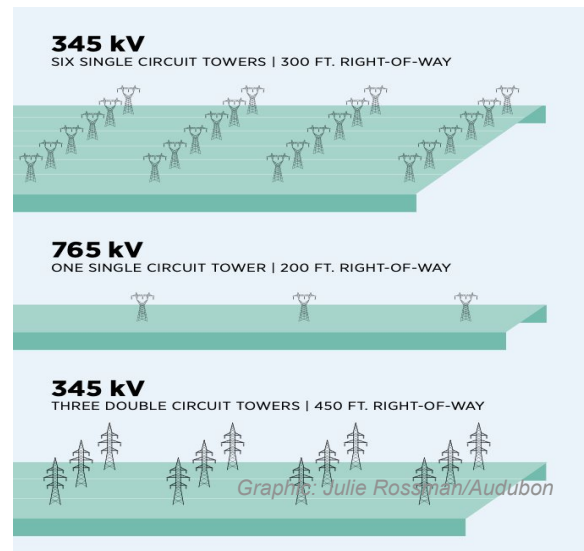
Modernize & Maximize Grid Efficiency via GETs

e.g. dynamic line ratings, power flow controllers, storage, reconductoring

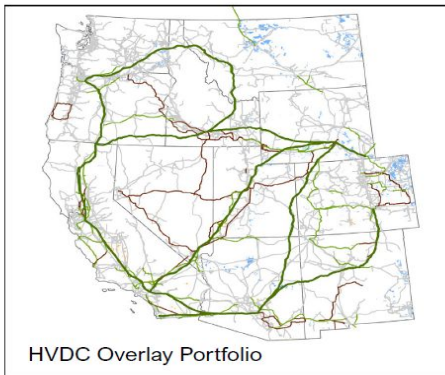
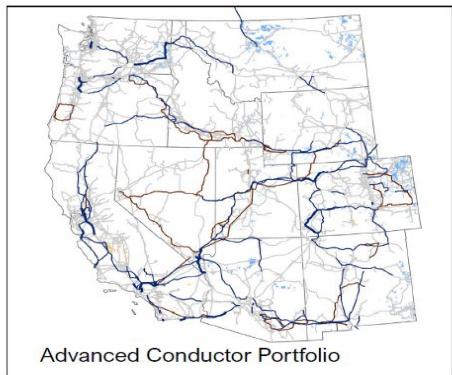
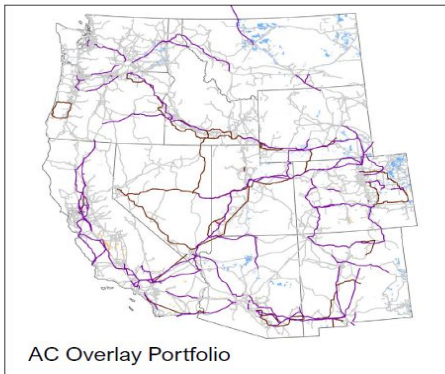
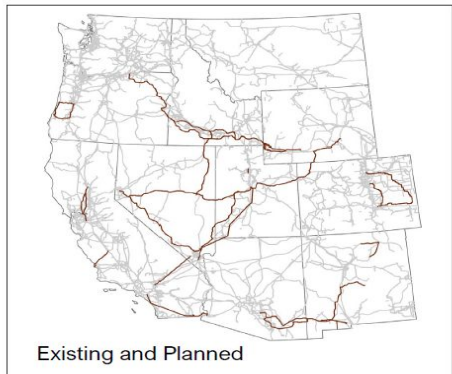


Maximize Co-Location & the Use of Existing RoW

e.g. NextGen Highways



Support Interregional Planning & Resource Sharing e.g. Intermountain



Defend Against Federal Rollbacks
e.g. monitor permitting reform & submit comments on all relevant proposed rules

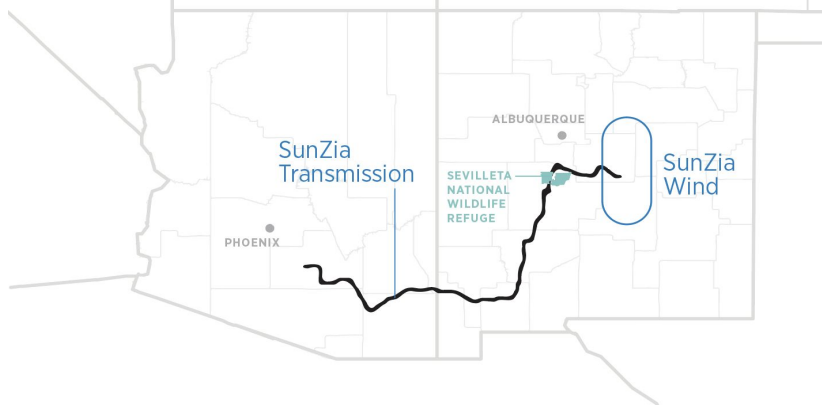
Support a Strong FERC
e.g. implementation Rule 1920



Engage with Developers & Decision-makers to Ensure Best Siting & Operation Practices

e.g. encourage broad outreach to affected communities & early Tribal consultation, utilize data-informed mapping to avoid, minimize & mitigate impacts

A 550-mile high-voltage line will deliver 4,500 MWs of wind energy to AZ & CA



Prepare States for More Strategic Planning & Rapid Deployment

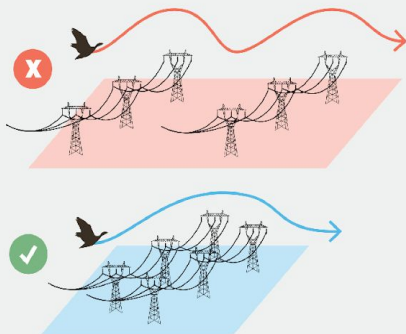


BIRD-FRIENDLY SOLUTIONS

Here are just a few examples of how we can make transmission lines safer for birds.

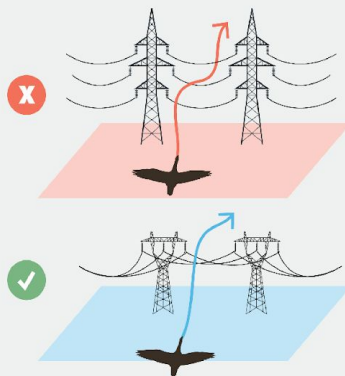
PROACTIVE: BEFORE YOU BUILD

ROUTE PLANNING



Building new transmission lines on the same rights-of-way as existing lines minimizes the overall transmission footprint—leaving more habitat intact and reducing the chances of transmission line collisions.

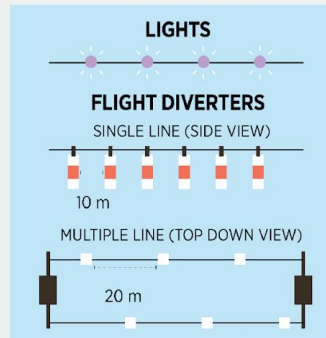
LINE CONFIGURATION



Orienting multiple transmission lines horizontally rather than vertically decreases the amount of space the lines take up—minimizing the potential for bird collisions.

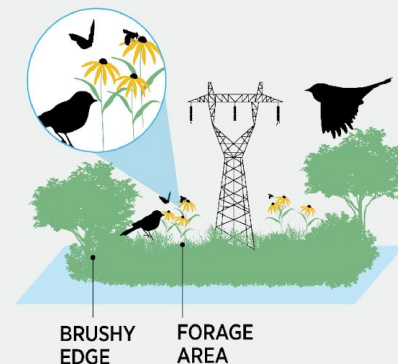
REACTIVE: AFTER YOU BUILD

LINE MARKING



Birds can avoid only what they see. By adding markings or using infrared, ultraviolet, or LED lighting that make transmission lines more visible, collision risk can be lowered by as much as 90 percent.

HABITAT MANAGEMENT



Transmission line cutouts are narrow, but they're long—providing a prime opportunity to manage a lot of habitat in ways that benefit birds, such as filling these presently bare areas with the native vegetation birds need.

The original developer of SunZia faced multiple stages of regulatory review, financial restructuring & litigation. When Pattern Energy took over the project however, it openly sought input from conservation organizations. And after 18 years, construction began.

- ❖ Audubon provided guidance on best practices related to routing, siting of towers, installation practices & tower design. We served as a convener & liaison for other environmental NGOs.
- ❖ We briefed leadership at Interior & the BLM on the impacts of different route alternatives that were considered, which helped advance the NEPA permitting process.
- ❖ Pattern Energy made several commitments as part of the project, including:
 - Using bird-diverting technology on portions of the line that posed collision risk
 - Working to co-locate the line along existing RoW
 - Changing some crossings along the Rio Grande River
 - Funding research related to Sandhill Cranes, Pinyon Jay, bats & other species
 - Testing ultra-violet light developed at Audubon's Rowe Sanctuary in NE on power lines that have considerably reduced collisions of Sandhill cranes

Today, Audubon is partnering with Pattern on creating Developer Best Practices using the proposed Southern Spirit line as a working model.



Long Range Transmission Planning

In 2022, MISO announced \$10B for 2,000 miles of new transmission lines in ND, MN, IO, MO, IL, WI, MI & IN. ~80% of these 18 projects are planned along existing RoW.

- ❖ We use our mapping tools to analyze routes & advise developers & decisionmakers on siting practices that effectively avoid, minimize & mitigate impacts on birds & their habitat.
- ❖ We educate & activate our members.
- ❖ We work in local coalitions & encourage broad outreach.

**All of which helps speed permitting
& avoid later conflicts.**

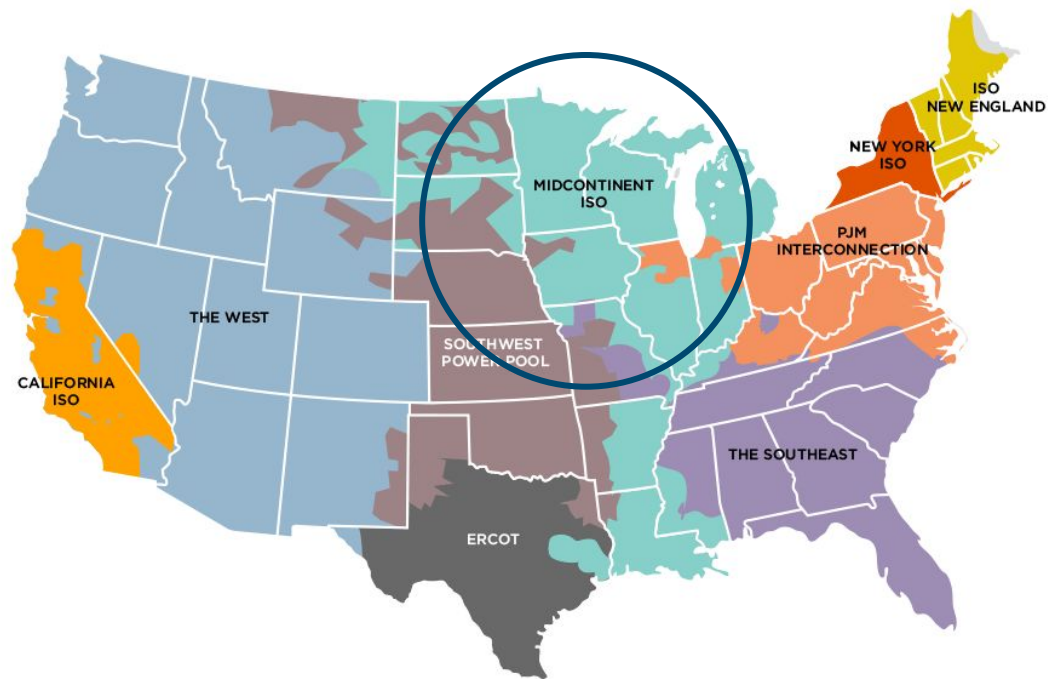


Image: Sustainable FERC Project

Alice Madden
Senior Director of Climate Strategies
alice.madden@audubon.org



Common Loons. Photo: Margaret Gompfer/Audubon Photography Awards

Thank you!



Sandhill Crane. Photo: Stan Bysshe/Audubon Photography Awards

Speaker

Beverly Bendix



Manager, Carbon-Free Electricity

RMI

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How transmission reform supports a reliable grid

Climate Xchange Presentation

Bev Bendix

Nov 13, 2024

RMI's mission is to transform the global energy system to secure a clean, prosperous, zero-carbon future for all

Sector Focus Areas



Carbon-Free Industry



Carbon-Free Mobility



Carbon-Free Buildings



Carbon-Free Electricity

Market Catalysts



Policy



Finance



Business Models



Data & Transparency



Technology



Education & Capacity

Global Geographies



Cities



China



India



U.S.



Developing Economies

Our Clean Competitive Grids team works to ensure transmission supports the energy transition.



We actively participate in Western and PJM transmission processes



We publish insights on grid solutions: regional transmission planning, grid-enhancing technologies, federal funding opportunities, and more



We collaborate with PUCs, energy offices, legislators, and utilities

REPORT | 2024

States in Sync

The Western Win-Win Transmission Opportunity

By Tyler Farrell, Charles Teplin

INSIGHT

Understanding FERC's Order 1920

May 29, 2024

REPORT | 2024

Mind the Regulatory Gap

How to enhance local transmission oversight

GETting Interconnected in PJM

There are many benefits of proactive regional transmission planning

FERC Order 1920 Benefits	Definition
Avoided infrastructure replacement	Delayed need for upgrades and replacements.
Resource adequacy savings	More efficiently meeting demand to maintain reliability without overbuilding.
Production cost savings	Lower overall costs of generating electricity by optimizing the energy dispatch across regions, utilizing cheaper power sources
Reduced transmission losses	Decreased energy waste from electricity traveling over long distances, leading to more efficient use of generated power.
Reduced congestion	Improved electricity flow and reduced cost impact associated with rerouting power.
Mitigation of extreme weather events	Enhanced grid resilience to minimize severe weather impact on electricity delivery, ensuring greater system reliability
Capacity cost benefits	Reduced need for investment in power plants to meet peak electricity demand.

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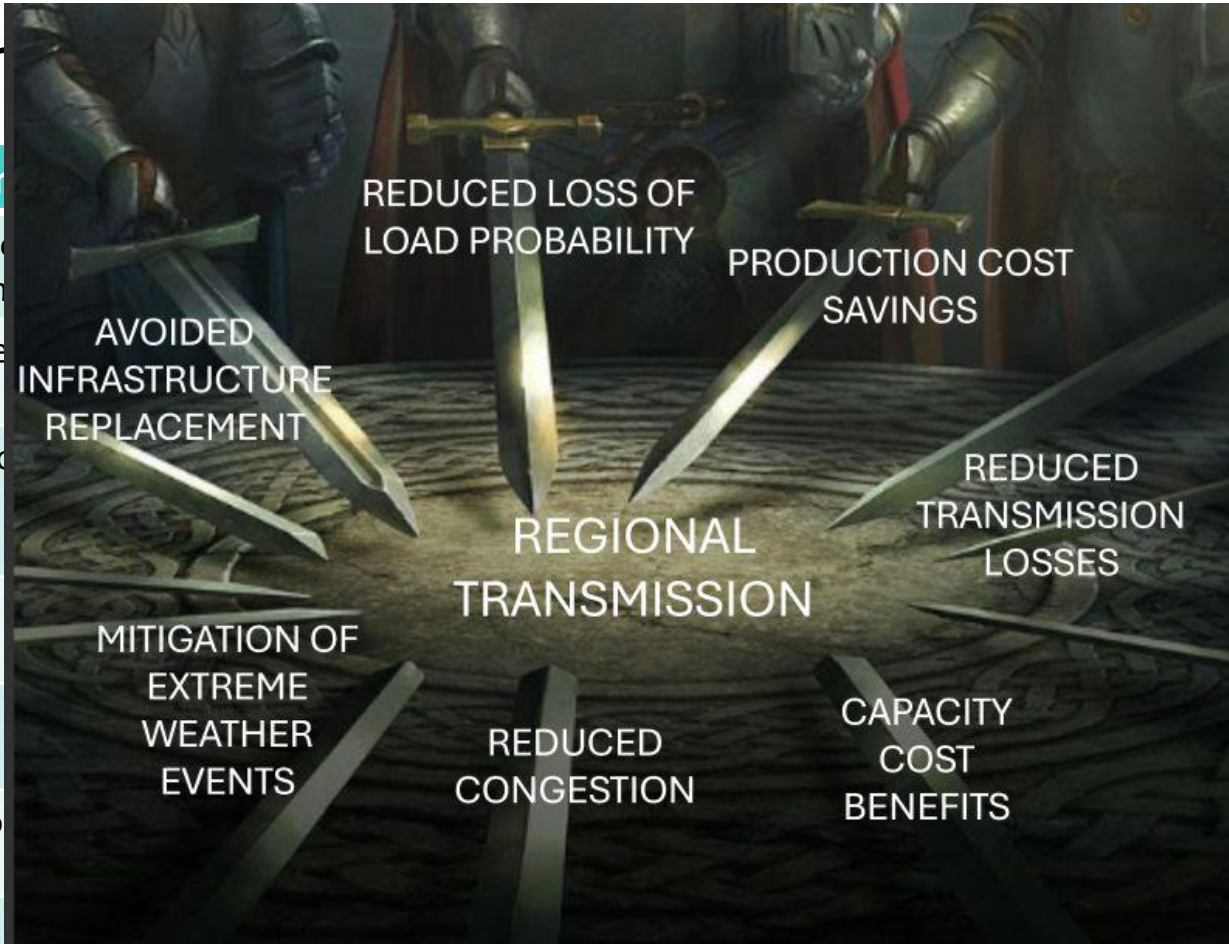
Reduced

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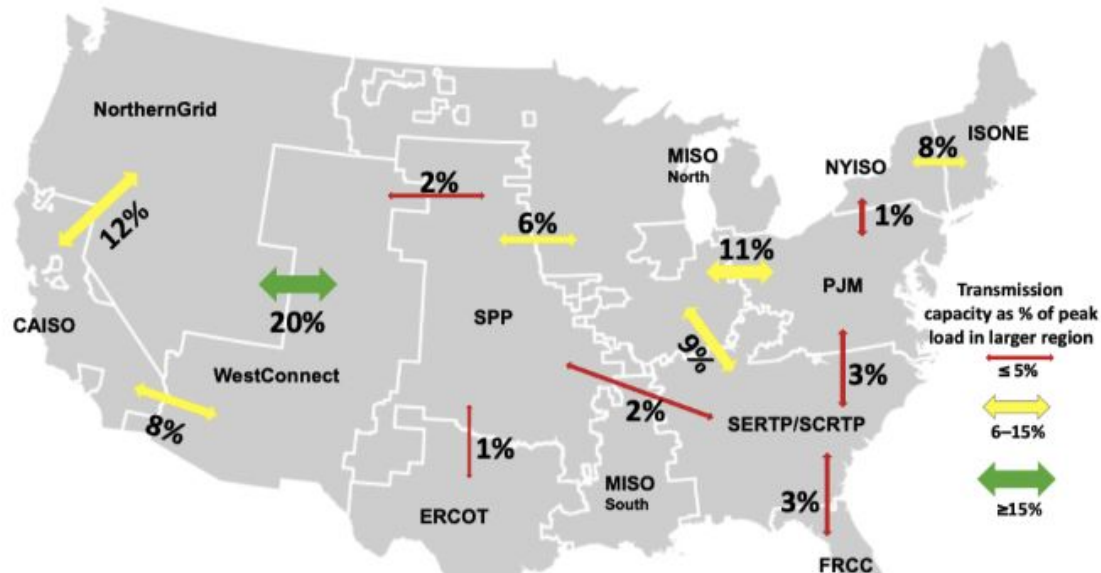
the weather impact
stem reliability

nts to meet peak

The US transmission system is generally balkanized

Limited connectivity between transmission planning regions

Minimal venues for interregional planning



Estimates based on matching firm transfer capacity between EPM Integrated Planning Model regions to FERC Order 1000 regions. Some regions are combined due to lack of available data. BANC and LAWP excluded. Analysis by Carbon Impact Consulting.

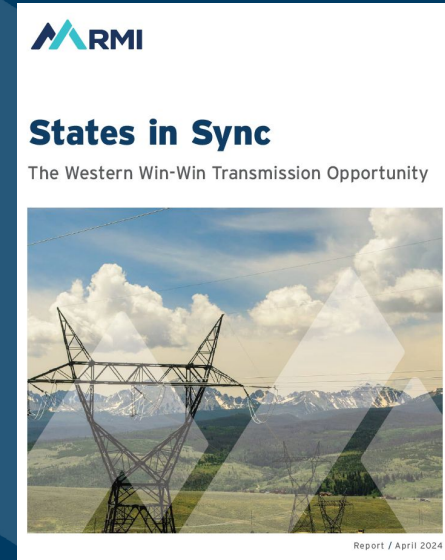
NISKANEN
CENTER

Illustrating the value of regional diversity for reliability

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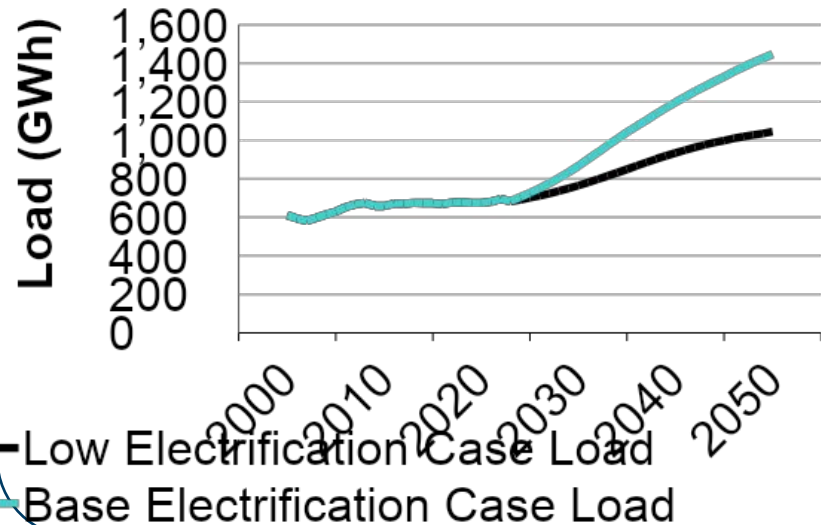
Non-RTO Western US example

Analysis & Report Credit:
Tyler Farrell



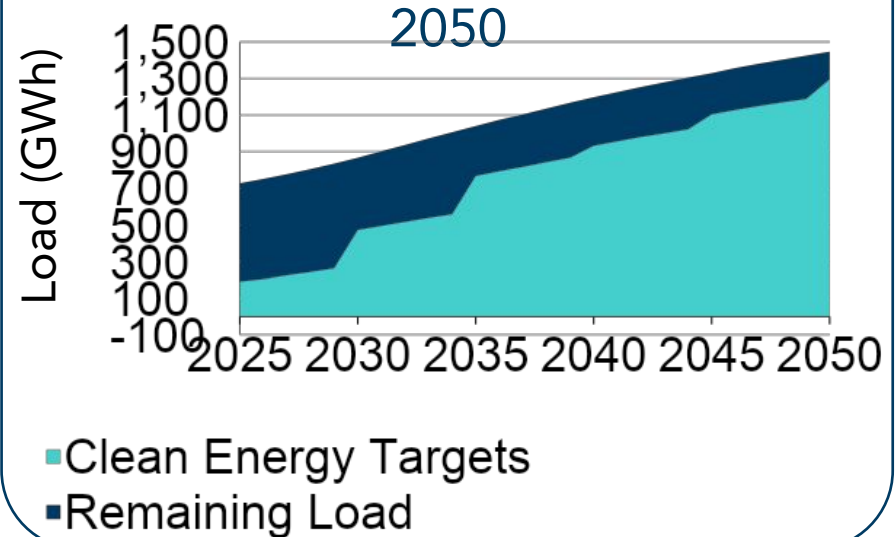
Load growth and public policy goals are driving a renewed need for planning

The West is on the cusp of supercharged electricity demand



RMI Graphic. Source: RMI analysis, Energy Innovations, and the US EIA.

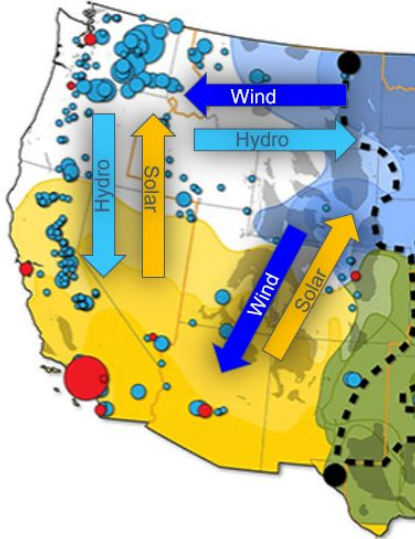
Clean energy targets will make up over 90% of Western demand by 2050



RMI Graphic. Source: RMI analysis and the Lawrence Berkley National Laboratory.

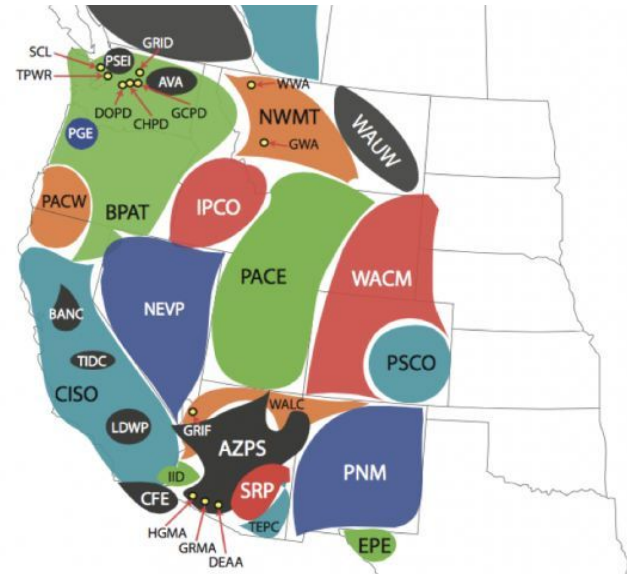
Approach: What is the value of regional planning compared to isolated planning to meet 100% clean energy goals?

How much can each state benefit from doing this...



Source: National Renewable Energy Laboratory.

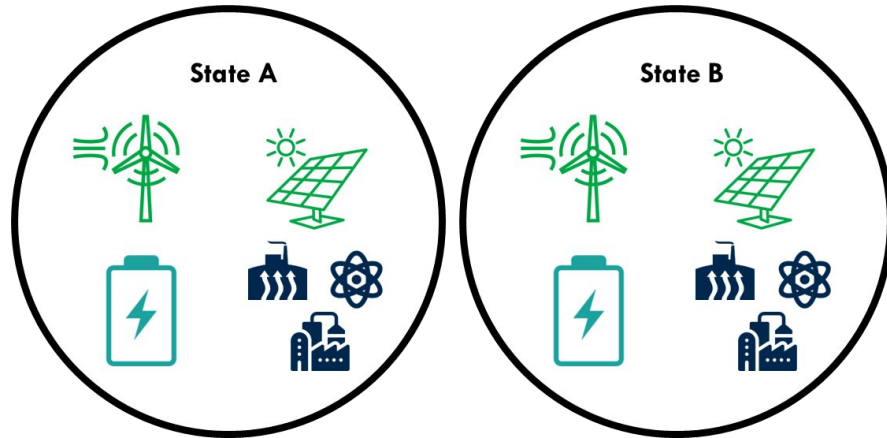
Instead of planning in isolation like this...



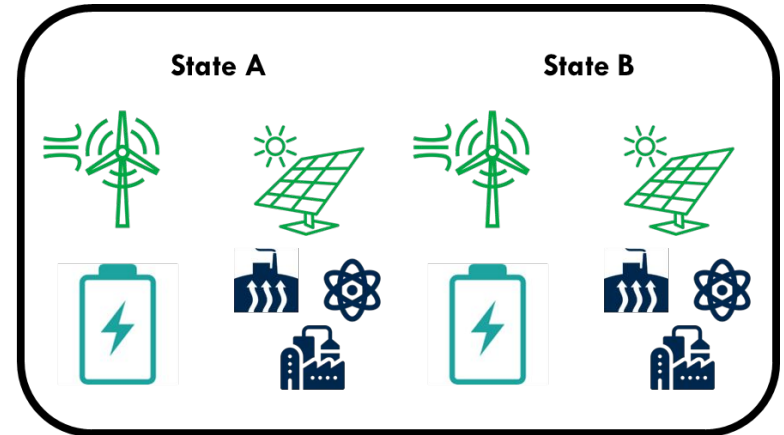
Source: Western Electricity Coordinating Council.

We quantify regional diversity by running an energy model with states **in isolation** and **as a pair**

Cost for state A and B to meet load
load
in isolation



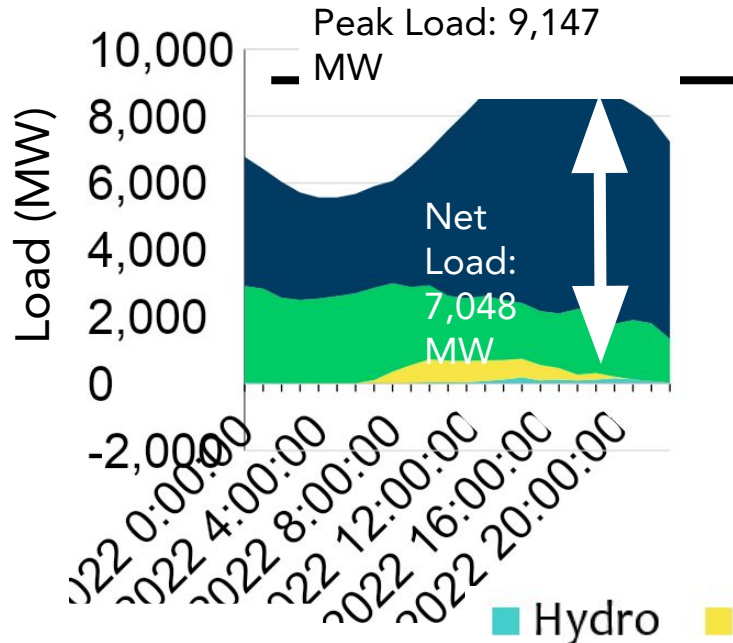
Cost for state A and B to meet load
load
as a pair



Today the grid is most challenged during two periods

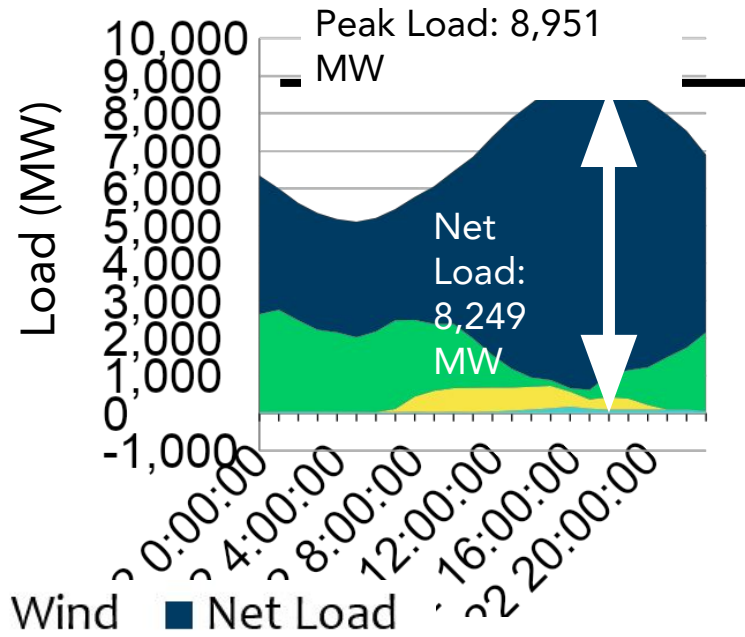
Yesterday's challenge (peak load)

Public Service Company of Colorado, July 18, 2022



Today's challenge (peak net load)

Public Service Company of Colorado, July 22, 2022

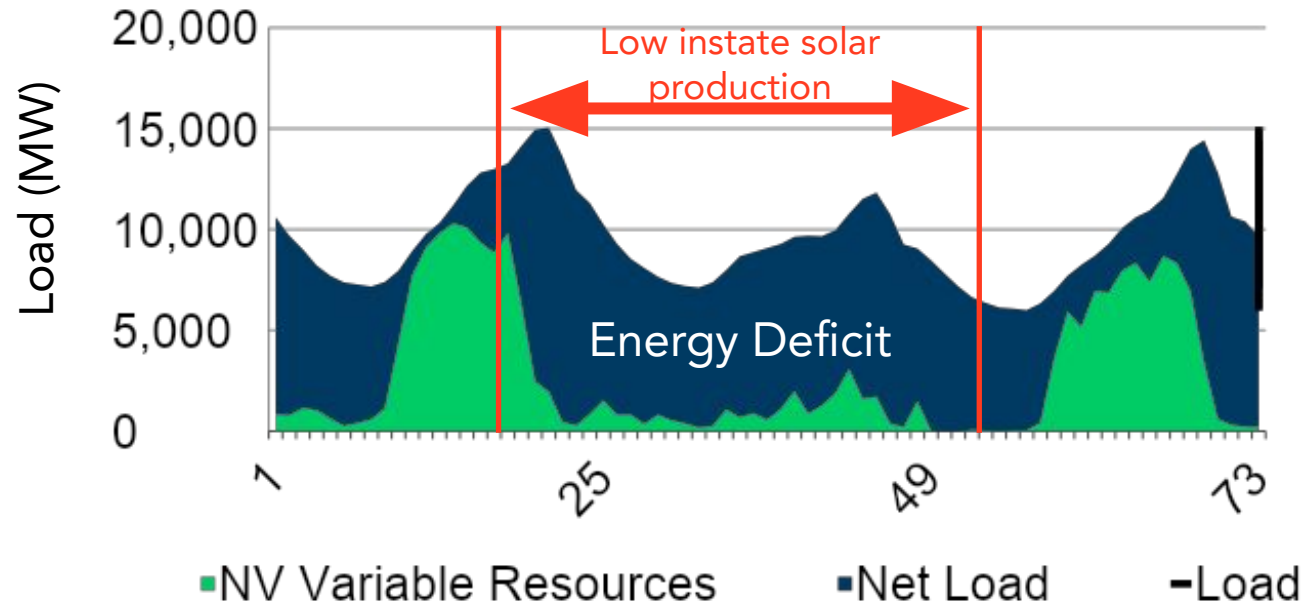


Planners will encounter new challenges in the future due to periods with low wind and solar

- Additional variable resources provide little marginal value during these periods.
- A significant energy deficit makes it difficult to charge and discharge battery storage.

Tomorrow's Challenge

Nevada isolated scenario – August 22-25

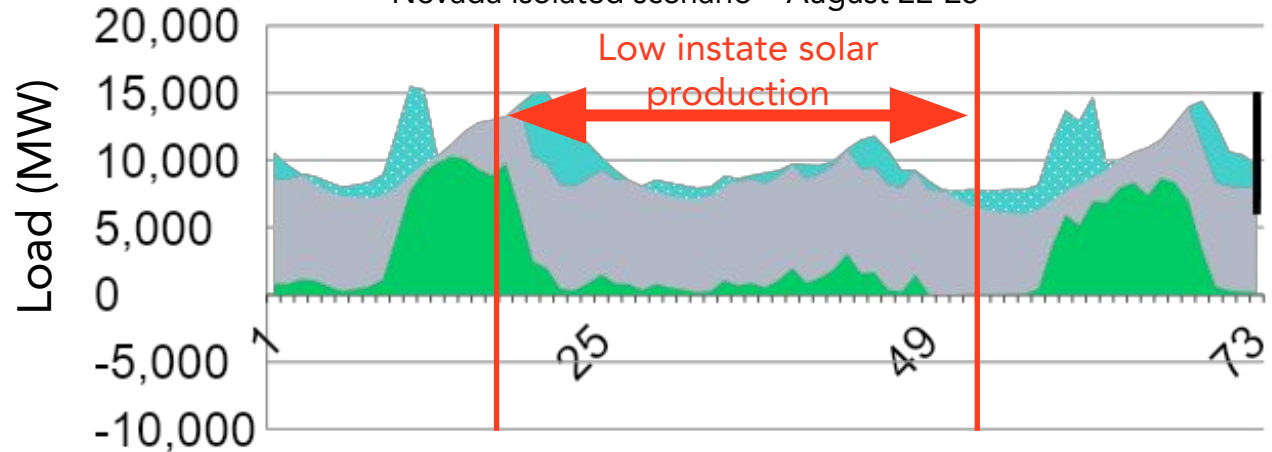


New challenges cannot be reasonably addressed by only variable resources or battery storage

- Our model finds an optimal need for 7.7 GW of relatively more expensive clean firm.

Tomorrow's Challenge

Nevada isolated scenario – August 22-25



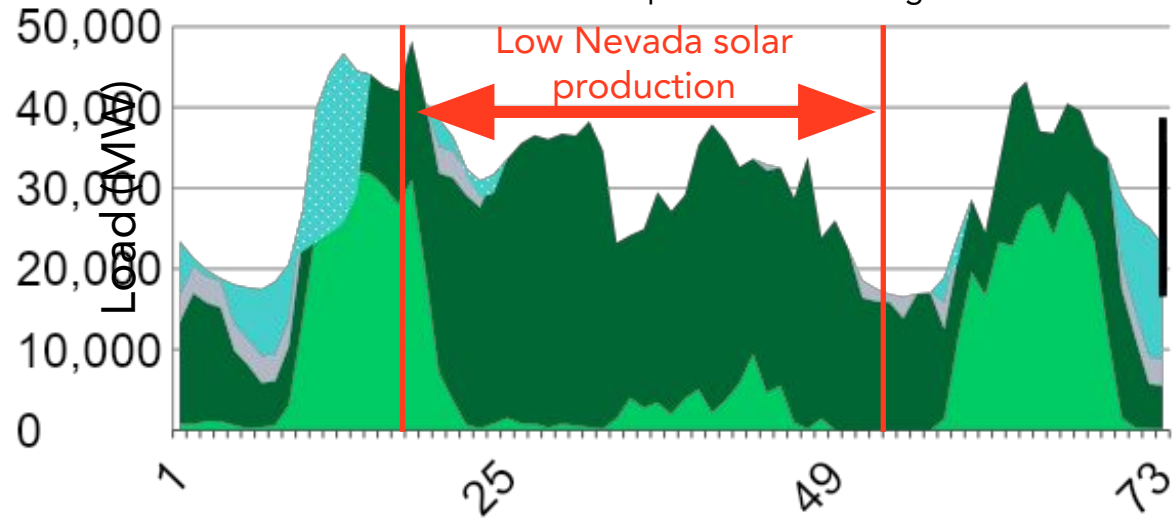
- NV Variable Resources
- Clean Firm
- Storage Discharging

Regional transmission harnesses diversity to reduce the need for clean firm

Tomorrow's Challenge

Nevada and Colorado as a pair scenario – August 22-25

- As a pair, variable resources are now curtailed during this same period.
- Overall, the system reduces its reliance on expensive clean firm.



- NV Variable Resources
- CO Variable Resources
- Clean Firm

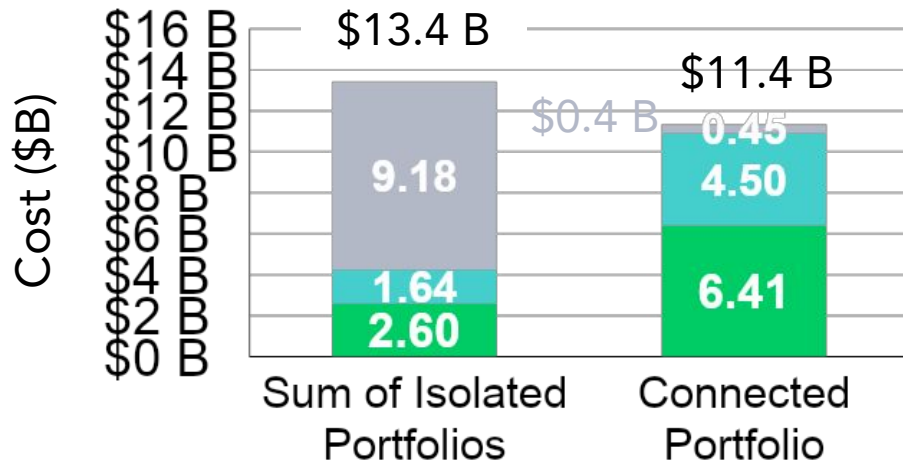
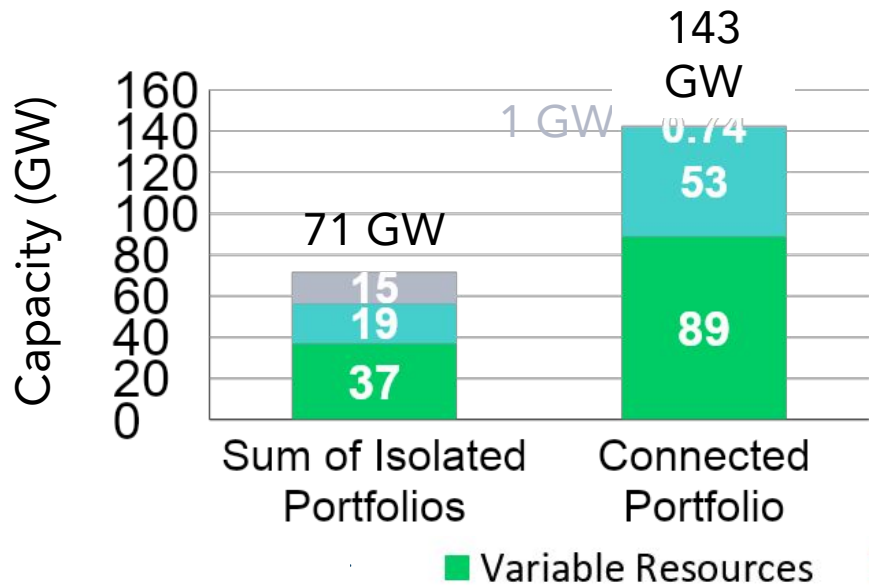
Cost savings are driven by a reduction in clean firm capacity

In isolation, Colorado and Nevada need 15 GW of "Clean Firm".

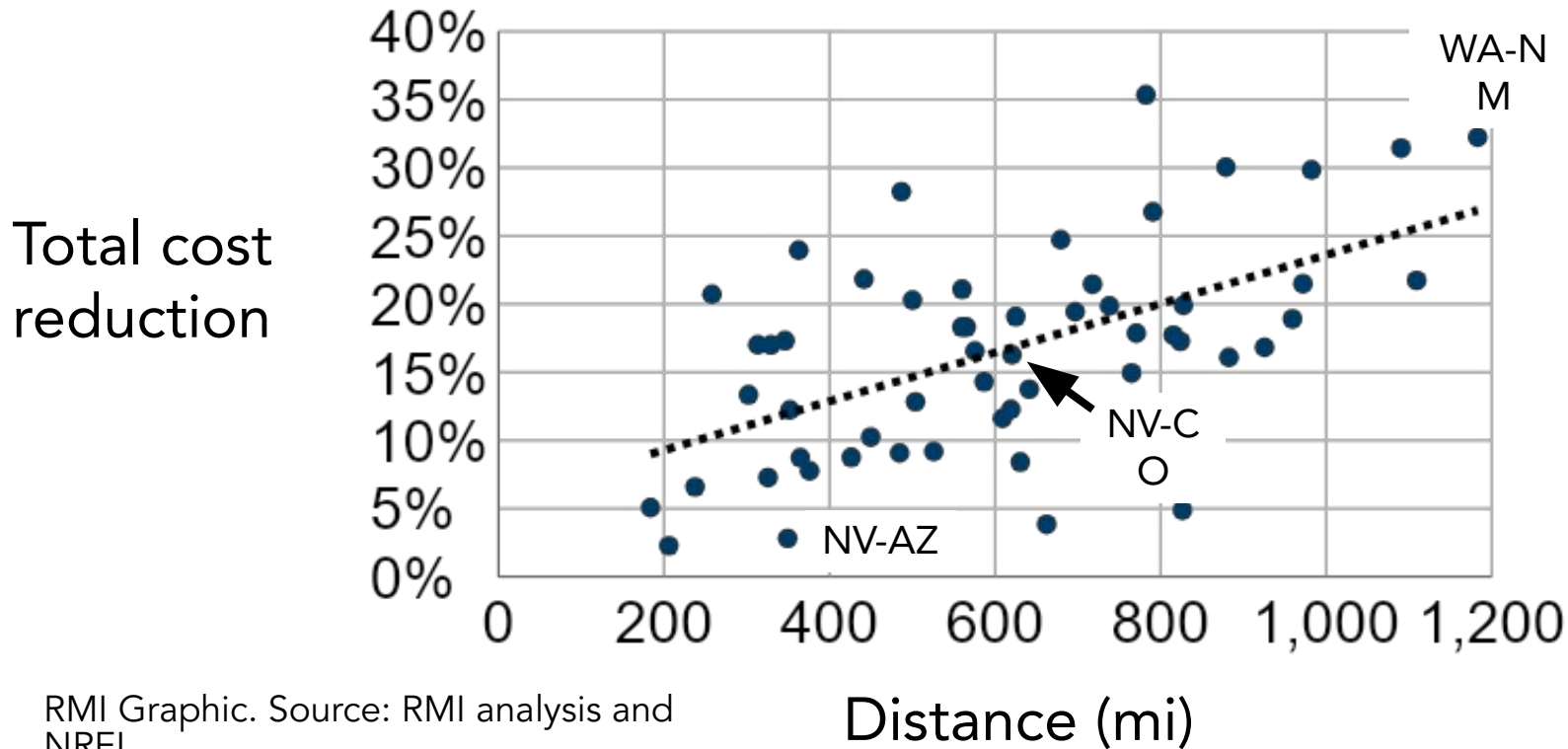
As a pair, they can leverage more wind, solar, and storage.

In isolation, Colorado and Nevada need to spend \$9B on expensive "Clean Firm."

As a pair, they can use much lower cost wind, solar, and storage, saving ~\$2 B.



Finding: The most wide-reaching planning could significantly reduce the cost of meeting clean energy goals

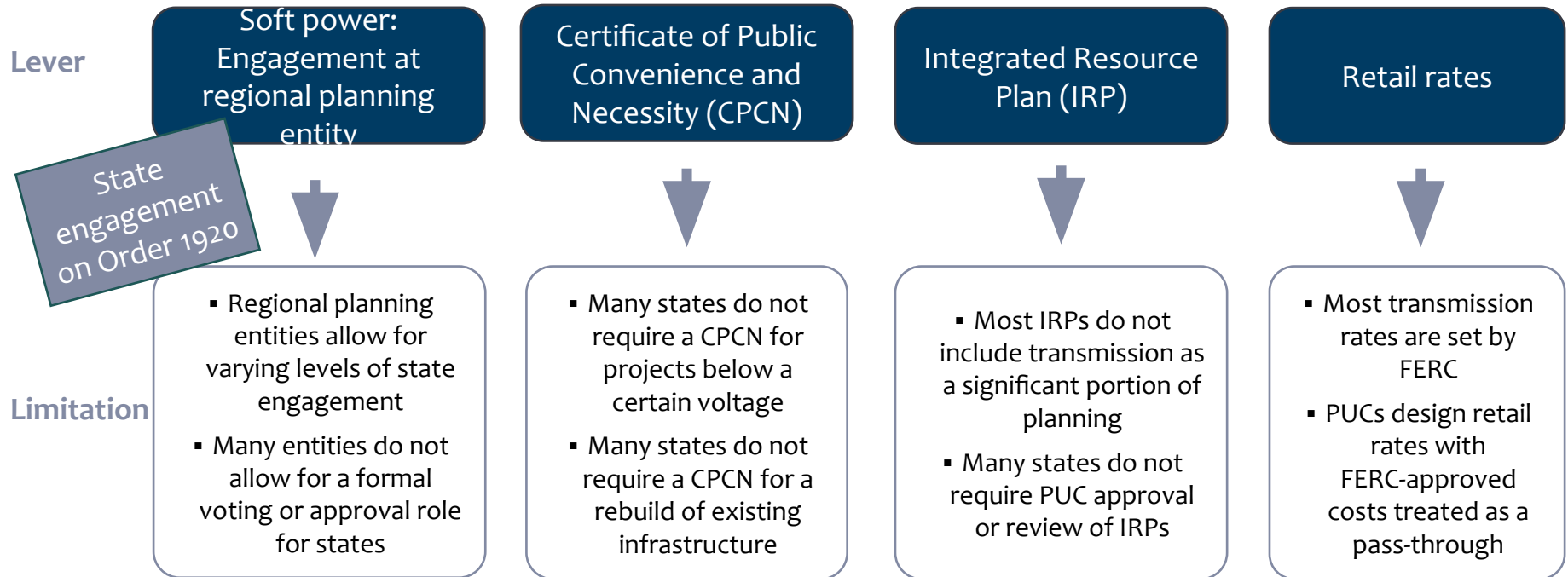


What power do PUCs have on transmission?

	IRP (with PUC approval)	No IRP / No PUC approval
RTO	<ul style="list-style-type: none"> • Approved as part of RTO planning process • Included in IRP (not usually) • CPCN issued by PUC • Cost allocation set by FERC formula rate, RTO • Cost recovery set by PUC rate case* 	<ul style="list-style-type: none"> • Approved as part of RTO planning process • CPCN issued by PUC • Cost allocation set by FERC formula rate, RTO • Cost recovery set by PUC rate case*
Non-RTO	<ul style="list-style-type: none"> • Included in IRP (not usually) • CPCN issued by PUC • Cost allocation set by FERC formula rate and PUC as part of IRP • Cost recovery set by PUC rate case* 	<ul style="list-style-type: none"> • CPCN issued by PUC • Cost allocation set by FERC formula rate • Cost recovery set by PUC rate case*

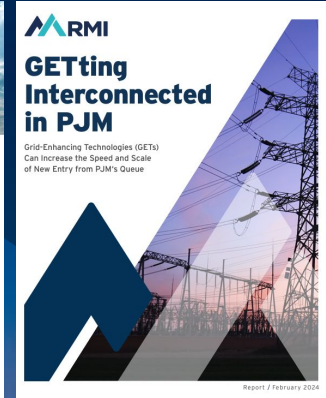
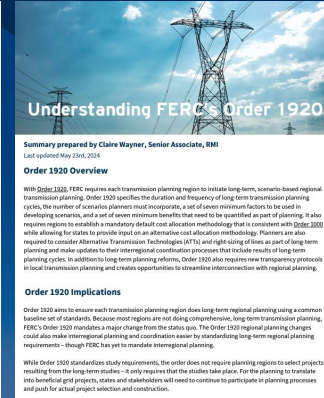
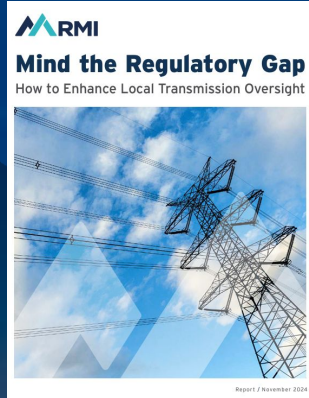
* If the state has unbundled rates, then the PUC has much less leverage

State regulators have four main “levers” they can “pull” on transmission, with key limitations



Examples of “levers” states can pull

- Exercise “Soft power”
 - Making transmission a priority in regional conversations. (Ex. In the West, commissioners have convened a “transmission collaborative” within their existing regional coordinating bodies (WIEB).)
 - A letter signed by multiple commissioners highlighting transmission as a concern. (Ex. In the West, multiple commissioners from OR, NV, AZ, and other states signed a letter around the need for a third option in regional markets).
- Update IRPs to incorporate transmission: States with IRPs could ensure that transmission is an integral component of IRPs and require PUC review and approval of IRPs.
- States can ensure PUCs have proper resources (staff, funding) to do adequate review of transmission projects
- States can consider creating electric transmission authorities, which are state government agencies that can advise on transmission planning, review, and permitting



Take-aways:

- We want proactive regional and interregional
- Proactive planning can help ensure cheapest reliability solutions
- States can support proactive, “beyond borders” planning
- It’s transmission vs. gas plants, not vs. distributed solutions

Thank you
Contact:
bbendix@rmi.org

Speaker

Anjali Patel



VP for Clean Energy,
David Gardner and Associates
Consultant,
Americans for a Clean Energy Grid

Q&A

Thank you for joining!

**Reach out to
kristen@climate-xchange.org with any
additional questions!**

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