

<b>DOCKETED</b>	
<b>Docket Number:</b>	21-SIT-01
<b>Project Title:</b>	21-SIT-01, SB100 Implementation Planning for SB100 Resource Build
<b>TN #:</b>	238999
<b>Document Title:</b>	Presentations - July 22 SB100 Transmission Workshop - Session 1
<b>Description:</b>	Presentations from Session 1 of the July 22 SB100 Transmission Workshop.
<b>Filer:</b>	Mary Dyas
<b>Organization:</b>	California Energy Commission
<b>Submitter Role:</b>	Commission Staff
<b>Submission Date:</b>	7/26/2021 1:55:20 PM
<b>Docketed Date:</b>	7/26/2021



# **Joint Agency Workshop: Next Steps to Plan for Senate Bill 100 Resource Build – Transmission**

**Session 1**  
July 22, 2021



# Planning Background and Updates on Potential Transmission to Support SB 100

- Recap of Key Takeaways from June 2, 2021, SB 100 Resource Build Workshop
  - ✓ **Jim Bartridge, CEC**
- How 10-year Resource Planning and Near to Medium-Term Procurement Decisions
- Relate to Longer Term SB 100 Goals
  - ✓ **Karolina Maslanka, CPUC**
- Approach to Using SB 100 Resource Portfolios and the CAISO Conceptual Transmission Plan
  - ✓ **Jeff Billinton, CAISO**
  - ✓ **Scott Flint, CEC**



# In and Out of State Transmission Projects

- Pacific Transmission Expansion Project – Jim Avery
- North Gila Imperial Valley #2 Transmission Project– Randy Schroeder
- TransWest Express Transmission Project – David Smith
- Southwest Intertie Project (SWIP) North – Sandeep Arora
- Cross Tie Project – Jason Smith and Bob Smith
- Sunzia Southwest Transmission Project – David Getts
- Starwood Energy – Ali Amirali and Jason Crew
- Southline Transmission Project – Doug Patterson
- Lucky Corridor Transmission Project – Sean Black
- GridLiance West -- Michael Landgraf



# Public Comment Instructions

## Rules

- 3 minutes per person
- 1 person per organization

## Zoom

- Click “raise hand”

## Telephone

- Press \*9 to raise hand
- Press \*6 to (un)mute

## When called upon

- Unmute, spell name, state affiliation, if any

## Written Comments:

- Due: 8/11/2021 by 5:00 p.m.
- Docket: 21-SIT-01
- Submit at:  
<https://efiling.energy.ca.gov/EComment/Ecomment.aspx?docketnumber=21-SIT-01>

3-MINUTE TIMER

**3:00**



# Agency Leadership Remarks

---

- **Karen Douglas**, CEC Commissioner
- **Siva Gunda**, CEC Commissioner
- **Marybel Batjer**, CPUC President
- **Cliff Rechtshaffen**, CPUC Commissioner
- **Darcie Houck**, CPUC Commissioner
- **Elliot Mainzer**, President and CEO, CAISO
- **Neil Millar**, Vice President, Transmission Planning & Infrastructure Development, CAISO

---

# California Public Utilities Commission

## Karolina Maslanka



# California's Integrated Resource Planning + Transmission Planning

July 22, 2021



California Public  
Utilities Commission

# Outline

- What is Integrated Resource Planning (IRP)?
- How does IRP inform transmission planning?

# What is Integrated Resource Planning?

# Integrated Resource Planning (IRP) in California Today

- The objective of integrated resource planning is to reduce the cost of achieving GHG reductions and other policy goals by looking across individual LSE boundaries and resource types to identify solutions to reliability, cost, or other concerns that might not otherwise be found.
- Goal of current IRP cycle is to ensure that the electric sector is on track to help California reduce economy-wide GHG emissions 40% from 1990 levels by 2030, per SB 32, and to explore how achievement of SB 100 2045 goals could inform IRP resource planning in the 2020 to 2030 timeframe.
- The IRP process has two parts:
  - First, it identifies an optimal portfolio for meeting state policy objectives and encourages the LSEs to procure towards that future.
  - Second, it collects and aggregates the LSEs collective efforts for planned and contracted resources to compare the expected system to the identified optimal system. The CPUC considers a variety of interventions to ensure LSEs are progressing towards an optimal future.

# Two Models Used in IRP Analysis

- Objective of IRP modeling: To develop an optimal portfolio of new resources to add to the existing fleet in the CAISO area to plan for:
  - Achievement of long-term GHG reduction targets and other policy goals
  - Maintaining reliability
  - Keeping costs reasonable
  - Accounting for uncertainty and expected energy market conditions (i.e., “real world” conditions)
- The role of the capacity expansion model (RESOLVE) in IRP is to select portfolios of new resources that are expected to meet our policy goals at least cost while ensuring reliability
- The role of the production cost model (SERVM) in IRP is to validate the reliability, operability, and emissions of resource portfolios generated by RESOLVE

# How does IRP inform transmission planning?

# Information Flow Between the Two Planning Process

## CPUC IRP produces resource portfolios

- In accordance with a May [2010 MOU](#) between the CAISO and the CPUC, and in coordination with the CEC, the CPUC develops resource portfolios used by the CAISO in its annual Transmission Planning Process (TPP)
- The CPUC typically transmits multiple distinct portfolios developed in the IRP process:
  - Reliability and Policy-Driven Base Case portfolio
  - Policy-Driven Sensitivity portfolio(s)



Annual



## CAISO conducts TPP assessments

- Reliability and Policy-Driven Base Case portfolio
  - Identified transmission solutions go to the CAISO Board of Governors for approval
- Policy-Driven Sensitivity portfolio(s)
  - Identified transmission solutions are considered Category 2 and typically do not go to the CAISO Board of Governors for approval
  - Results often provide useful information for future IRP work

## CAISO updates Transmission inputs for IRP

- CAISO produces transmission capability limits and upgrade cost estimates
  - These serve as an inputs to RESOLVE and as criteria for mapping resources to specific busbars.

- CAISO TPP is informed by IRP resource planning assumptions and LSE procurement decisions that drive generator interconnection transmission upgrades

# Process Begins with the Incorporation of Transmission Inputs into RESOLVE

## CPUC IRP produces resource portfolios

- In accordance with a May 2010 MOU between the CAISO and the CPUC, and in coordination with the CEC, the CPUC develops resource portfolios used by the CAISO in its annual Transmission Planning Process (TPP)
- The CPUC typically transmits multiple distinct portfolios developed in the IRP process:
  - Reliability and Policy-Driven Base Case portfolio
  - Policy-Driven Sensitivity portfolio(s)

## CAISO conducts TPP assessments

- Reliability and Policy-Driven Base Case portfolio
  - Identified transmission solutions go to the CAISO Board of Governors for approval
- Policy-Driven Sensitivity portfolio(s)
  - Identified transmission solutions are considered Category 2 and typically do not go to the CAISO Board of Governors for approval
  - Results often provide useful information for future IRP work



## CAISO updates Transmission inputs for IRP

- CAISO produces transmission capability limits and upgrade cost estimates
  - These serve as an inputs to RESOLVE and as criteria for mapping resources to specific busbars.

# RESOLVE Transmission Inputs and Assumptions

- RESOLVE accounts for the cost of new transmission when optimizing for a least-cost portfolio. Typically, if candidate resources can fit on the existing transmission system, RESOLVE will select to do so because it will be the least-cost option.
- CAISO produced for use in IRP modeling:
  - transmission capability estimates of the existing transmission system, and
  - cost and capacity estimates of potential upgrades.
    - CAISO's May 2019 Whitepaper available here: <https://www.caiso.com/Documents/WhitePaper-TransmissionCapabilityEstimates-InputtoCPUCLntegratedResourcePlanPortfolioDevelopment.pdf>

# RESOLVE Transmission Inputs and Assumptions

- CPUC and CAISO staff are collaborating to improve transmission capability estimates and their incorporation into RESOLVE for future modeling
  - The May 2019 estimates were expressed based on installed capacity (solar-based) and did not differentiate transmission capacity headroom available by different types of resource.
  - The transmission zones defined by CAISO did not cover all areas of the state that have high quality renewable resources.
  - No information available about the cost of transmission upgrades beyond column "B"

**Transmission capability estimates to support CPUC's IRP process**

Transmission zones and sub-zones	Estimated FCDS Capability (MW)				Incremental Upgrade Cost Estimate (\$million)				Estimated EODS Capability** (MW)
	A	B			C			D	
	Existing System	Minor Upgrades	Major Upgrade #1	Major Upgrade #2	Existing System	Minor Upgrades	Major Upgrade #1	Major Upgrade #2	Existing System
<b>Northern CA</b>	2,000		2,000				\$ 285		3,900
- Round mountain	500								2,100
- Humboldt	-								100
- Sacramento River	2,000								4,600
- Solano	600		2,000				\$ 322		1,300
<b>Southern PG&amp;E</b>	1,100		1,000				\$ 55		TBD
- Westlands	1,100		1,000				\$ 55		TBD
- Kern and Greater Carrizo	1,000		1,500				\$ 241		TBD
- Carrizo	400		700				\$ 53		400
- Central Valley North & Los Banos	1,000		1,000				\$ 274		TBD
<b>Tehachapi</b>	4,300	1,000					\$ 100		5,100
<b>Greater Kramer (North of Lugo)</b>	600		400				\$ 146		600
- North of Victor	300		400				\$ 485		300
- Inyokern and North of Kramer	100		400				\$ 485		100
- Pisgah	400		400				\$ 261		400
<b>Southern CA Desert and Southern NV</b>	3,000		2,800				\$ 2,156		9,600
- Eldorado/Mtn Pass (230 kV)	250		1,400				\$ 76		2,400
- Southern NV (GLW-VEA)	700		1,400				\$ 150		700
- Greater Imperial*	1,200		1,400				\$ 2,334		3,100
- Riverside East & Palm Springs	2,950		1,500				\$ 2,156		5,500

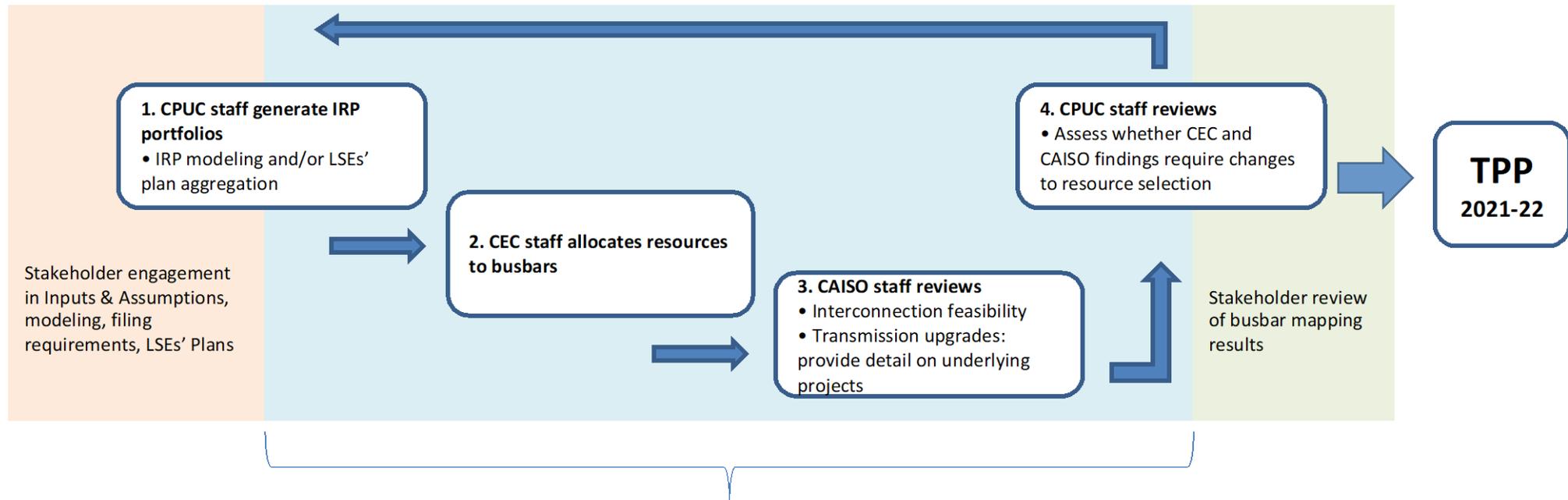
Upgrade MW information used to create levelized \$/MW-yr costs

<https://www.caiso.com/Documents/WhitePaper-TransmissionCapabilityEstimates-InputtoCPUCIntegratedResourcePlanPortfolioDevelopment.pdf>

# Role of RESOLVE in IRP and TPP Analysis

- Considering the limitations of transmission inputs, RESOLVE transmission results beyond the 10-year planning horizon have been information only and not used directly for decision-making
- RESOLVE results 10 years out serve as an indication of where transmission upgrades may be needed to accommodate resource needs
  - However, the indicative transmission upgrade information requires additional analysis to determine if the indicated transmission upgrades are necessary
  - This analysis is done via:
    - The mapping of all selected resources to specific busbars (substations)
    - The CAISO's TPP process

# Methodology for Busbar Mapping Resource Portfolios



Methodology addresses these steps

- Resource-to-busbar mapping ("busbar mapping"): process for translating geographically-coarse portfolios to plausible network locations for Transmission Planning Process (TPP) modeling
- Busbar mapping scope: utility-scale generation and storage resources that are not already in the baseline

# Geographic Granularity of RESOLVE Transmission Zones

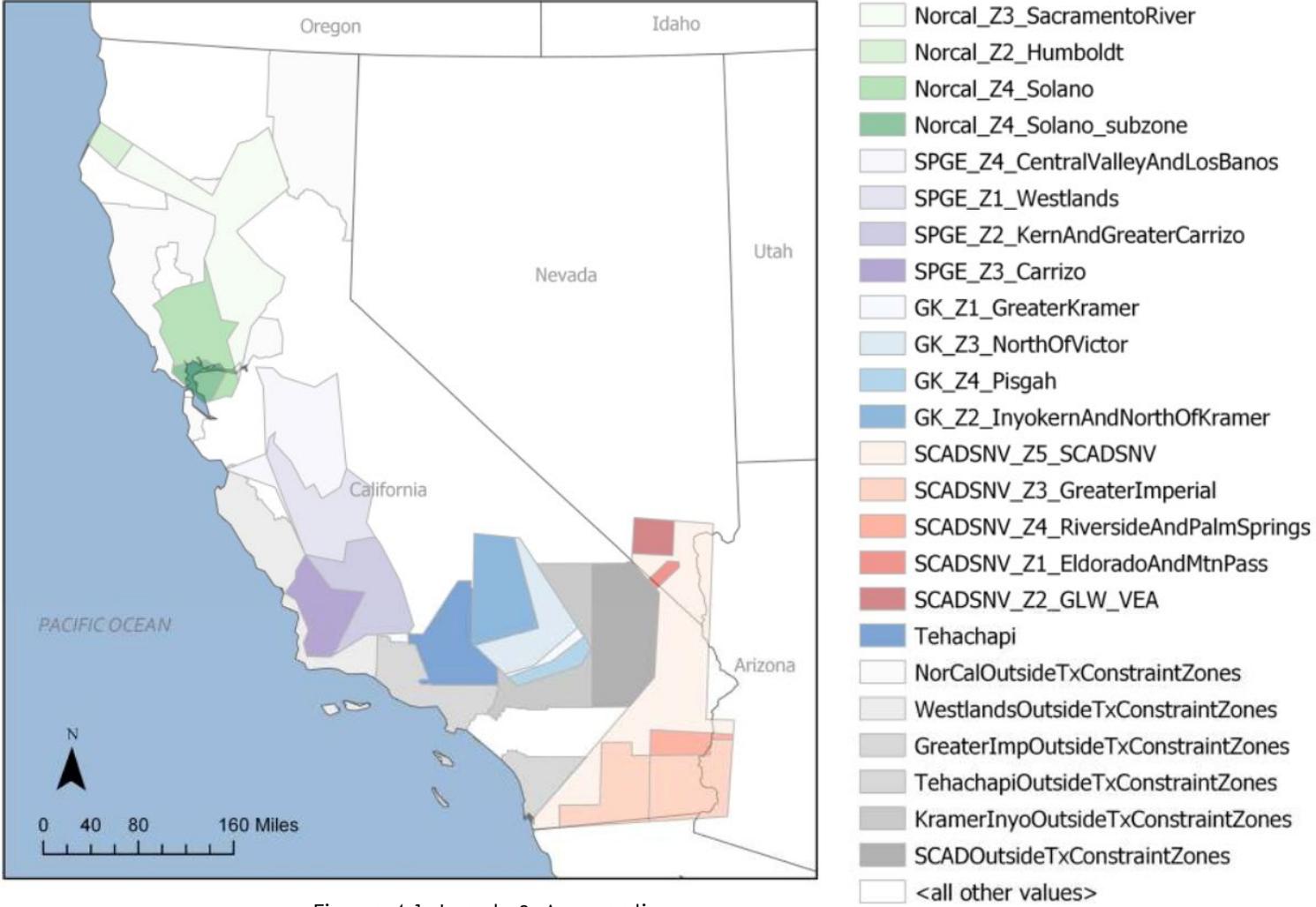
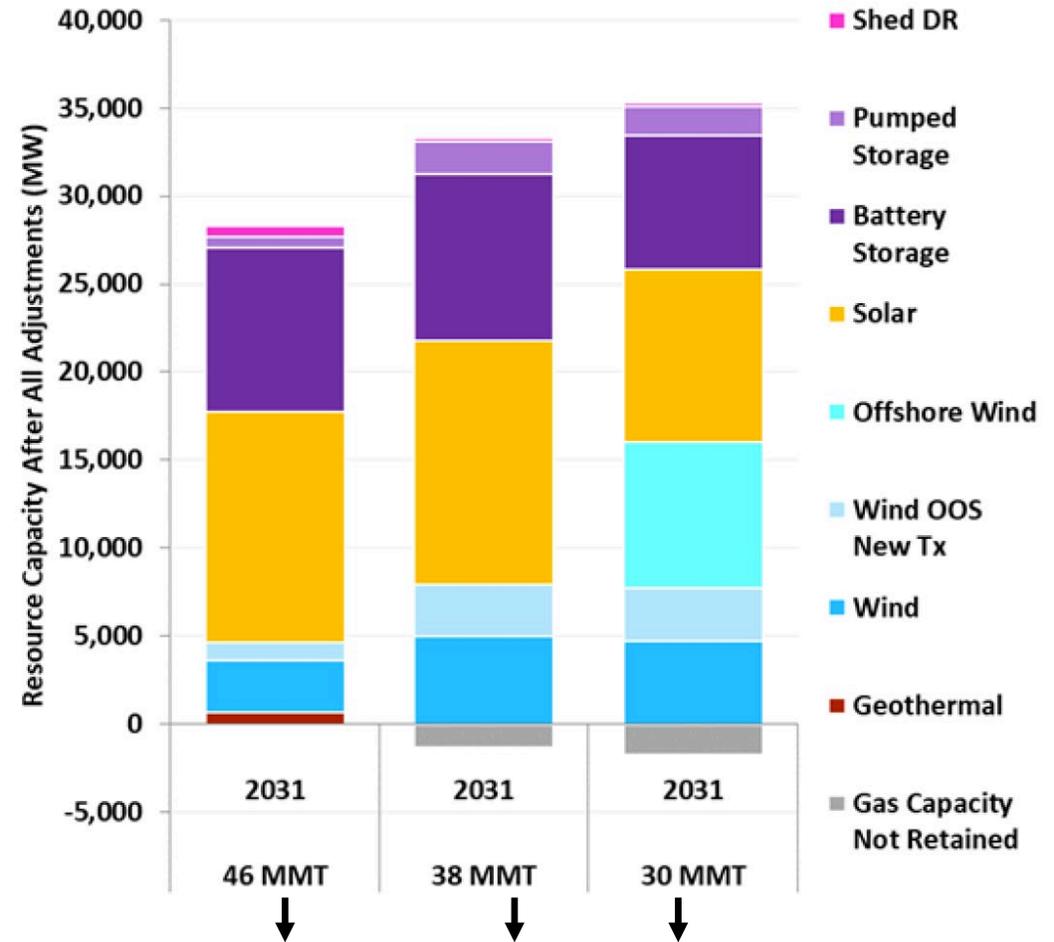


Figure 4.1, Inputs & Assumptions  
<ftp://ftp.cpuc.ca.gov/energy/modeling/Inputs%20%20Assumptions%202019-2020%20CPUC%20IRP%202020-02-27.pdf>

# Resource Composition of IRP Portfolios Transmitted to CAISO for the 2021-2022 TPP

Resource Category	Unit	2031		
		46 MMT	36 MMT	30 MMT
Gas	MW	-	-	-
Biomass	MW	-	-	-
Geothermal	MW	651	-	-
Hydro (Small)	MW	-	-	-
Wind	MW	2,943	4,955	4,689
Wind OOS New Tx	MW	1,062	3,000	3,000
Offshore Wind	MW	-	-	8,351
Solar	MW	13,043	13,816	9,807
Customer Solar	MW	-	-	-
Battery Storage	MW	9,368	9,447	7,604
Pumped Storage	MW	627	1,843	1,613
Shed DR	MW	608	222	222
Gas Capacity Not Retained	MW	-	(1,319)	(1,718)
In-State Renewables	MW	16,638	18,876	22,847
Out-Of-State Renewables	MW	1,062	3,000	3,000

Source: Modeling Assumptions for the 2021-2022 Transmission Planning Process (February 2021)

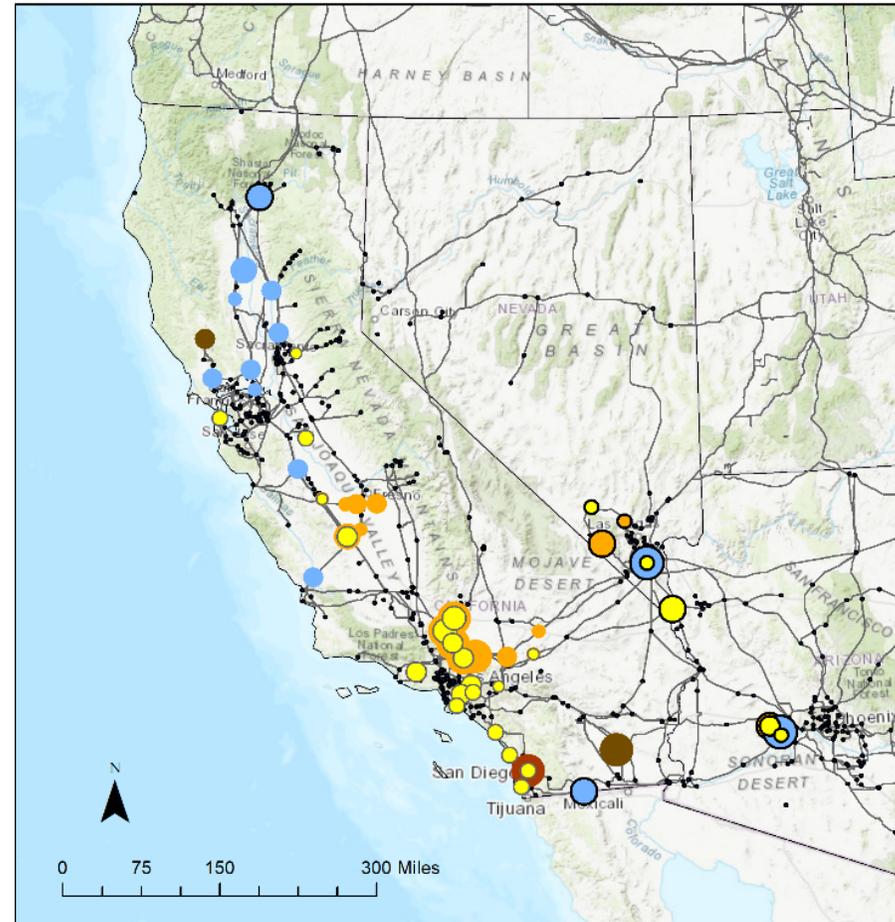


Base Case Portfolio (CAISO Board of Governors approves transmission based on TPP assessments that use this portfolio)

Policy-Driven Sensitivity Portfolios (Do not inform transmission approval)

# Map of Final Busbar Mapping Results for 46 MMT Base Case Portfolio for 21-22 TPP

Source: Modeling Assumptions for the 2021-2022 Transmission Planning Process (February 2021)



## 46 MMT Round 3 adj

### Geothermal MW FD (Fully Deliverable)

0

- 1 - 51
- 52 - 600

### Battery MW

0 - 51

- 52 - 126
- 127 - 300
- 301 - 809
- 810 - 1645

### Wind MW (Fully Deliverable)

0 - 30

- 31 - 83
- 84 - 275
- 276 - 530
- 531 - 1062

### Solar MW FD (Fully Deliverable)

0 - 57

- 57 - 176
- 176 - 299
- 299 - 530
- 530 - 1059

### Pumped Hydro MW

0

- 1 - 314

● Substations 161kV Plus

— Electric transmission lines

# The Resource Portfolios are then Transmitted to CAISO

## CPUC IRP produces resource portfolios

- In accordance with a May 2010 MOU between the CAISO and the CPUC, and in coordination with the CEC, the CPUC develops resource portfolios used by the CAISO in its annual Transmission Planning Process (TPP)
- The CPUC typically transmits multiple distinct portfolios developed in the IRP process:
  - Reliability and Policy-Driven Base Case portfolio
  - Policy-Driven Sensitivity portfolio(s)



Annual



## CAISO conducts TPP assessments

- Reliability and Policy-Driven Base Case portfolio
  - Identified transmission solutions go to the CAISO Board of Governors for approval
- Policy-Driven Sensitivity portfolio(s)
  - Identified transmission solutions are considered Category 2 and typically do not go to the CAISO Board of Governors for approval
  - Results often provide useful information for future IRP work

## CAISO updates Transmission inputs for IRP

- CAISO produces transmission capability limits and upgrade cost estimates
  - These serve as an inputs to RESOLVE and as criteria for mapping resources to specific busbars.



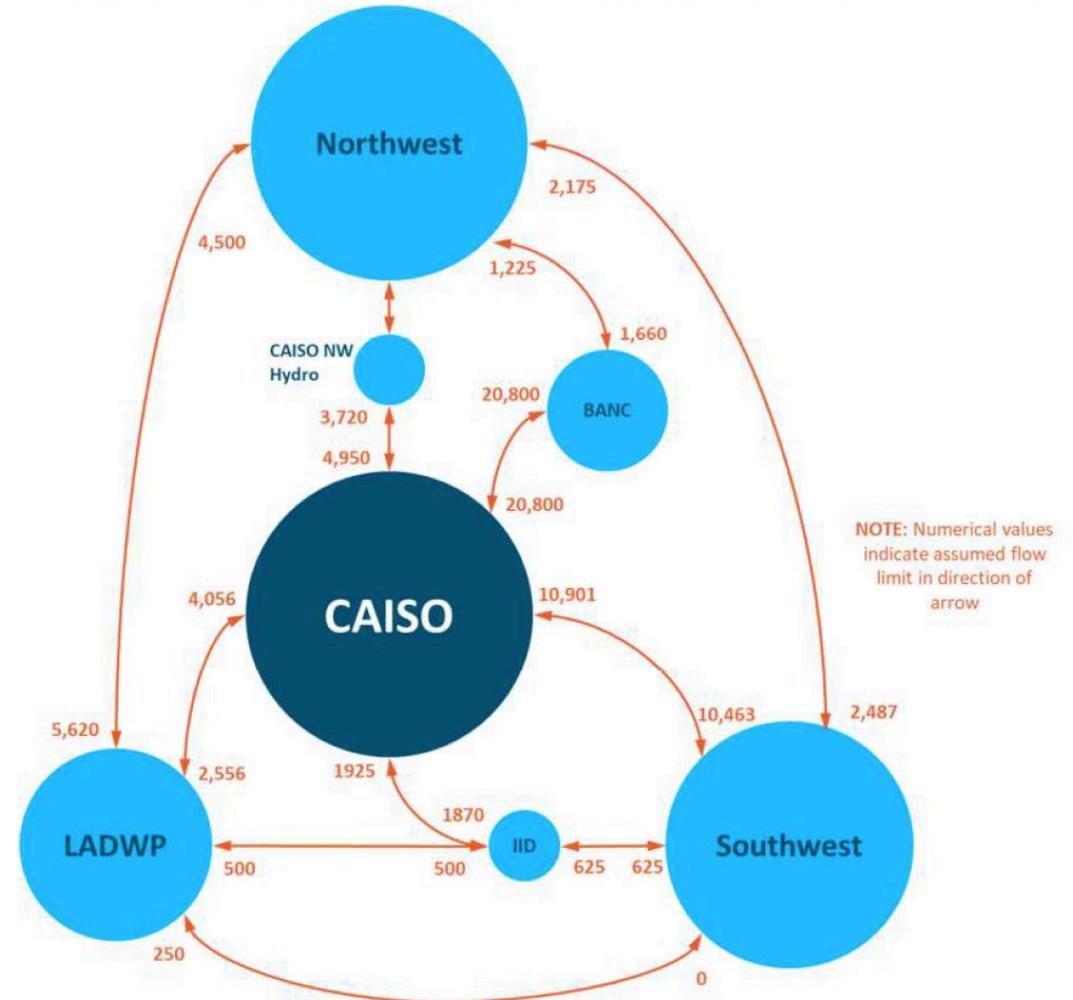
# Identified Transmission Limit Exceedances – 46 MMT Portfolio for the 21-22 TPP

- The 46 MMT portfolio, when mapped, exceeded estimates of the existing transmission limits (provided by CAISO in May 2019) in three zones. CAISO's TPP will more rigorously assess whether any transmission upgrades are required to accommodate the resources in this portfolio.
  - Southern PG&E: The transmission limit exceedance in this area could be resolved by a transmission upgrade with a CAISO estimated cost of \$55 million, which would increase the estimated transmission capability by 1,000 MW.
  - Tehachapi: The transmission limit exceedance in this area could be resolved by a transmission upgrade with a CAISO estimated cost of \$100 million, which would increase the estimated transmission capability by 1,000 MW.
  - GLW-VEA transmission zone (Southern Nevada): The energy only transmission limit exceedance in this area could be resolved by a combination of two transmission upgrades with a CAISO-estimated cost of \$138-145 million, which would increase estimated EO transmission capability by at least 1,500 MW.

# Transmission Expansion to Access Out-of-State Resources

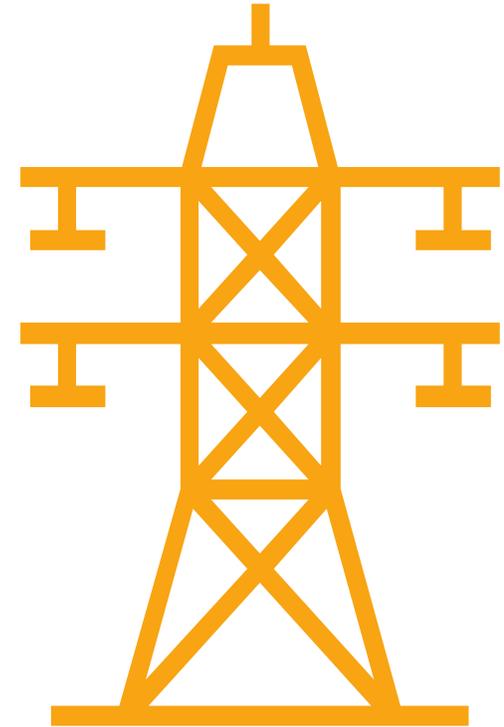
- The figure to the right depicts CAISO import/export transfer capabilities assumed in RESOLVE
  - Source: *Inputs & Assumptions: 2019-2020 Integrated Resource Planning*
- The 46 MMT base case portfolio included over 1000 MW of out-of-state resources (NM, WY, or ID) that would require transmission expansion to bring the power to the current CAISO system border.

Figure 6.2. Transmission topology used in RESOLVE (transfer limits shown in MW)



# Key Takeaways

- Developers can always pursue transmission upgrades through the TPP or the GIDAP process
- IRP long-term resource planning and procurement decisions inform CAISO's TPP and can result in policy-driven transmission approval – a proactive approach to ensure large amounts of renewable and zero-emitting resources can come online in a timely manner
- Beginning to see a shift from an era of available transmission headroom to one where transmission development will be necessary to accommodate the large amounts of resources expected to come online in the next 10-20 years to meet state goals



**For more information**

**Karolina.maslanka@cpuc.ca.gov**



California Public  
Utilities Commission

---

# California Independent System Operator

## Jeff Billinton



# Joint Agency Workshop on Next Steps to Plan for Senate Bill 100 Resource Build – Transmission

Scott Flint, Manager

Energy Infrastructure Planning and Policy Office  
Siting, Transmission and Environmental Protection Division





# SB 100 Implementation – Next Steps

- Agencies are examining the potential renewable energy builds needed to achieve SB 100 Energy Goals
- Assembling/updating statewide environmental and land use datasets for high level screen potential resource footprints:
  - Exclusion areas
  - Biodiversity
  - Essential landscape blocks and connectivity
  - Terrestrial Intactness
  - Agricultural Value
- Reviewing Landscape Planning results:
  - RETI
  - DRECP – Development Focus Areas
  - San Joaquin Least Conflict Solar



# SB 100 Implementation Environmental and Land Use

---

- Estimating potential renewable energy development footprint by technology
- Identifying coarse geographic locations of resources within transmission zones used in the RESOLVE modeling
- Screening with identified statewide environmental and land use land use datasets
- Calculating available acreage of potential renewable energy resource by transmission zone
- Creating a “Starting Point” Resource Map to:
  - inform CAISO 20 Year Transmission Look
  - iterate in ongoing SB 100 implementation work



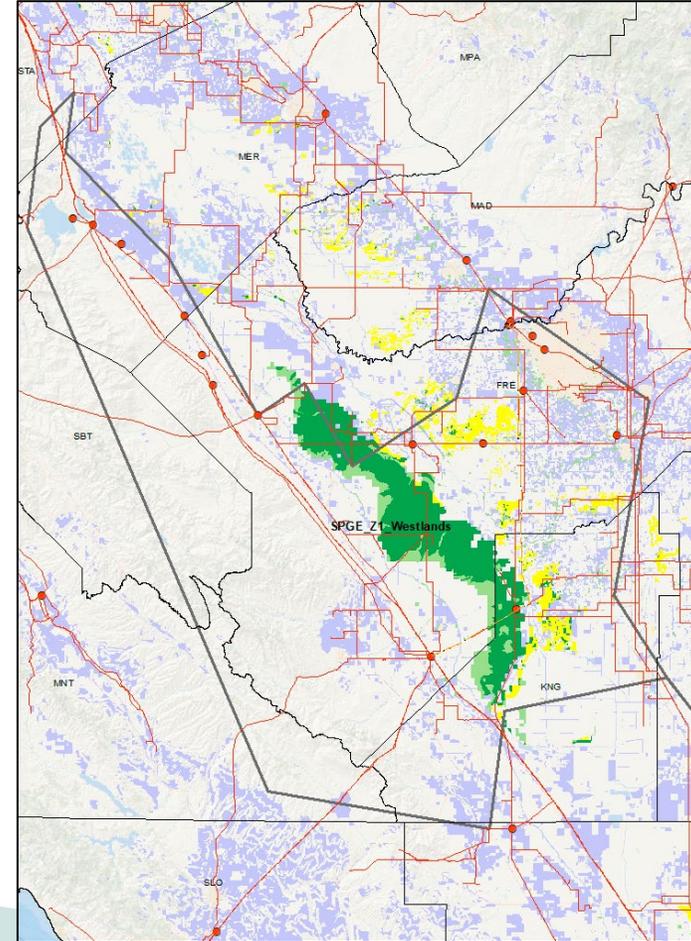
# Example Map Wetlands Tx Zone Solar Resource

Least Conflict Solar Areas (green and yellow)

Suitable Areas for Solar (light purple)

Next Steps:

- Iterate Environmental and Land Use Screens
- Calculate Range of Available Resource Acres
- Assign RESOLVE MW by Transmission Zone
- Adjust MW if Necessary
- Share w/Stakeholders
- Inform CAISO Tx Work





California ISO

*Transmission Planning  
20 Year Transmission Outlook - Update*

Jeff Billinton

*Director, Transmission Infrastructure Planning*

*June 22, 2021*

Joint Agency Workshop on Next Steps to Plan for Senate Bill 100  
Resource Build - Transmission

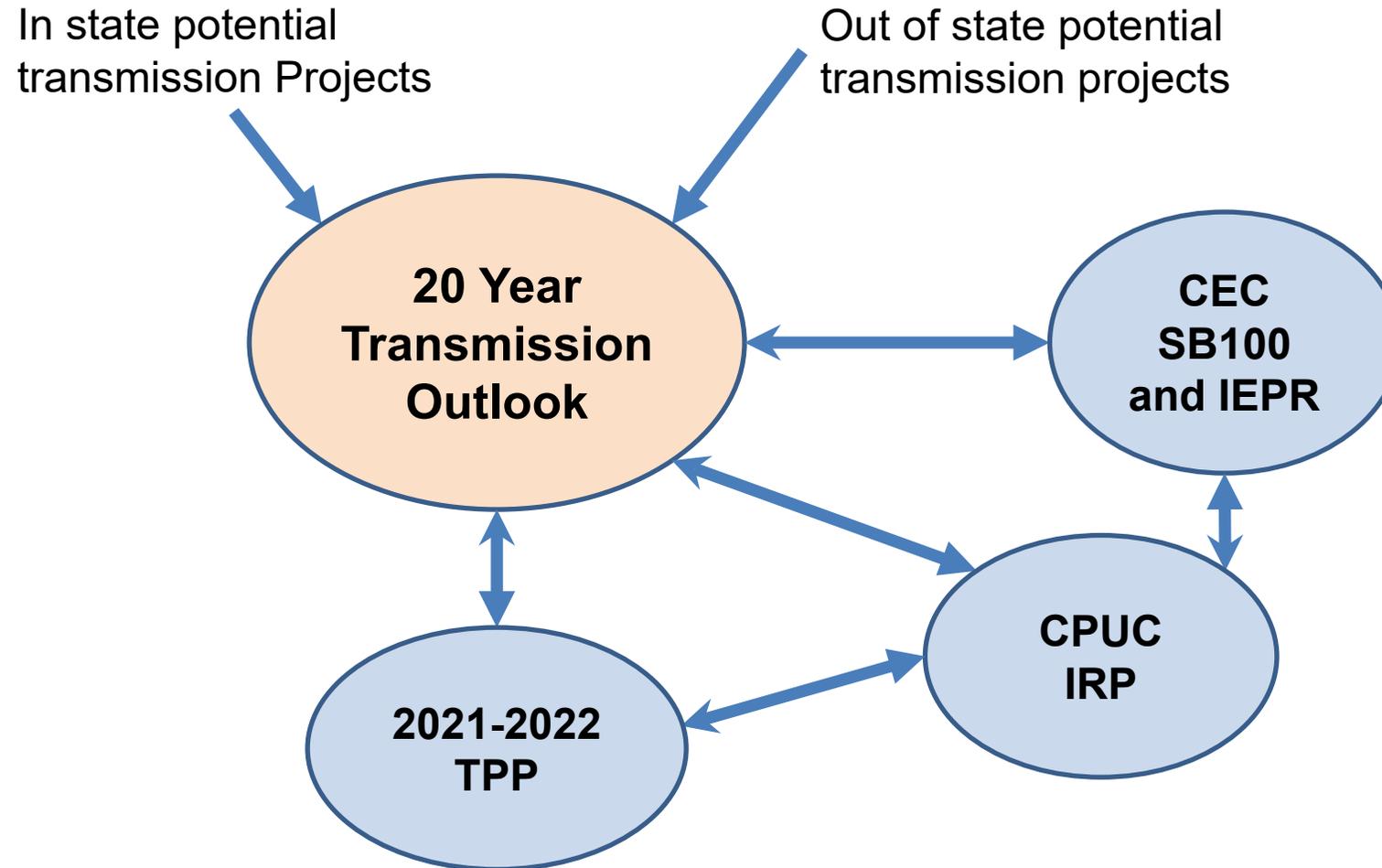
## The 20-year transmission outlook initiative will be coordinated with 2021-2022 transmission planning process

- The Outlook will include higher level technical studies to test feasibility of alternatives, and not the detailed level of comprehensive analysis that underpins the 10-Year Transmission Plan
- Accordingly the Outlook will coordinate with currently scheduled 10-Year Transmission Plan stakeholder sessions to the extent possible, and hold separate stakeholder sessions as appropriate.
- The process welcomes and will incorporate stakeholder input and consultation.

## Assumptions for Outlook technical studies coordinated with CEC SB100 and CPUC IRP

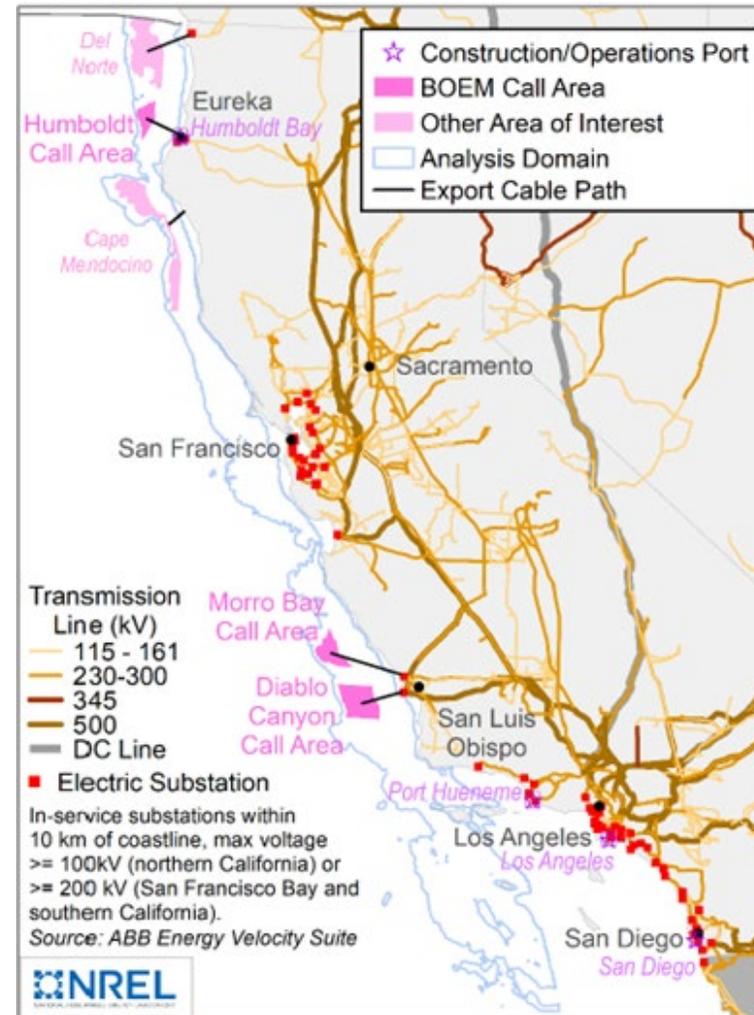
- Utilize SB100 No Combustion Scenario for Year 2040
- Continued coordination for the mapping of resources:
  - Solar mapping - *currently under way*
  - Storage mapping
  - Wind
    - On shore, Off shore and out of state
  - Gas retirement
    - Criteria being developed
      - Age, disadvantaged communities, etc.

# Primary Paths for Coordination with Other Initiatives



# Coordination with 2021-2022 TPP Policy Sensitivity 2 on Offshore Wind Portfolio

- Sensitivity 2 includes the following OSW resources:
  - Humboldt: 1.6 GW
  - Diablo Canyon: 4.3 GW
  - Morro Bay: 2.4 GW
- Detailed studies will be performed to identify the transmission needs for the above 8.3 GW
- In addition, an outlook assessment will be performed to accommodate an additional 12.8 GW of offshore wind (totaling 21.1 GW)
  - Del Norte: 6.6 GW
  - Cape Mendocino: 6.2 GW



Source: [The Cost of Floating Offshore Wind Energy in California Between 2019 and 2032 \(nrel.gov\)](#)  
(Page 39)

# 20 Year Transmission Outlook Milestones

- Stakeholder call initiating Outlook on May 14
  - Comments to be submitted by May 28
- Coordination with CEC workshops on SB100
  - SB 100 Workshop on June 2
  - SB100 Workshop – Transmission Projects on July 22
  - SB100 Workshop – Land use / Resource Mapping in August
- Stakeholder call – Transmission Planning Update on July 27
  - Comments to be submitted by August 1
- Update at 2021-2022 TPP Stakeholder call on September 27 and 28
  - Comments to be submitted by October 12
- Update at 2021-2022 TPP Stakeholder call on November 18
  - Comments to be submitted by December 6
- Draft 20 Year Transmission Outlook as standalone document together with draft 2021-2022 Transmission Plan to be posted on January 31, 2022
- Stakeholder meeting in February

---

# In and Out of State Transmission Projects



---

# Pacific Transmission Expansion Project

## Jim Avery





---

# North Gila Imperial Valley #2 Transmission Project

## Randy Schroeder





# NORTH GILA IMPERIAL VALLEY #2

500 kV TRANSMISSION PROJECT  
(NGIV2 Project)



**North Gila** Imperial Valley **#2**  
TRANSMISSION LINE

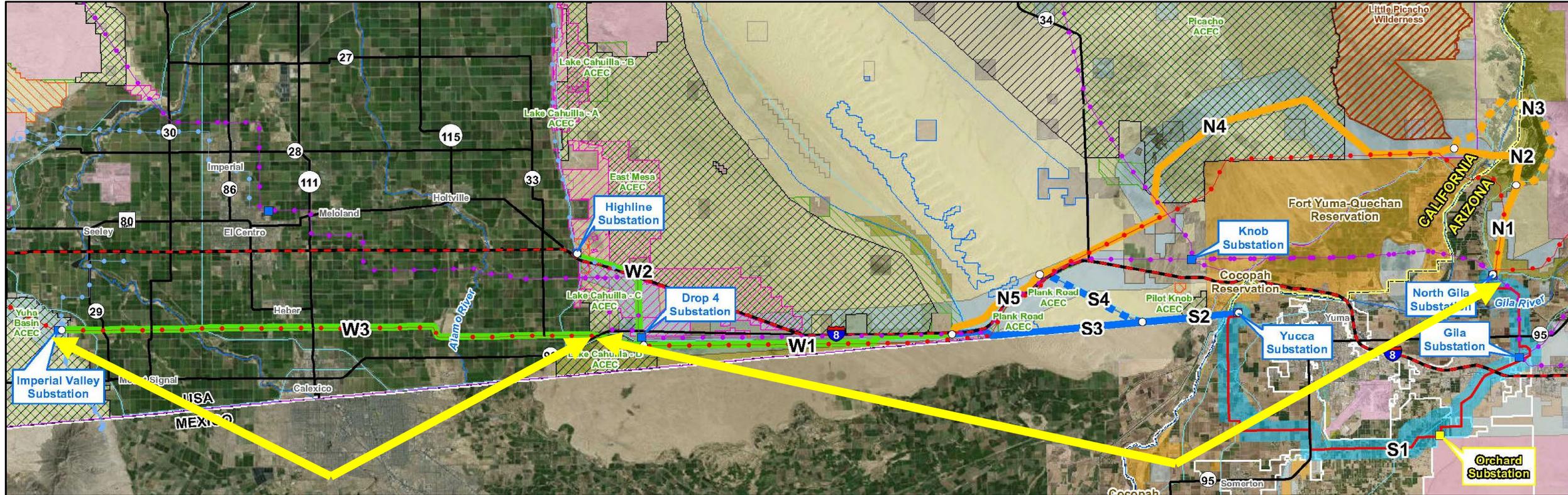
Joint Agency Transmission Workshop

July 22, 2021

# PROJECT OVERVIEW

- Proposed as a single circuit 500kV line from the North Gila 500kV substation (near Yuma, Arizona) to the existing Imperial Valley 500kV substation (near El Centro, California), approximately 90 miles in length.
- Proposed to loop into the existing IID Highline 230kV substation and establish a new 500/230kV (Dunes substation) and a reliable outlet for IID to export up to 1250MW of renewables as a new regional delivery point.
- Permitting is still anticipated to include up to a double circuit (e.g. 500/230kV same structure) depending on regional need for added capacity
- Will be submitted as a Interregional Transmission Project to WestConnect and CAISO, March 2022
- Open Houses were held Late March 2018 in Yuma and El Centro (Project Sponsored)
- Initial permitting review by the BLM and potential Cooperating Agencies provided input on route alternatives
  - Completed routing study, Plan of Development, and environmental field surveys
- Anticipated In-Service Date – Q4 2025

# NGIV2 PROJECT ROUTING OVERVIEW



## Imperial County

- ~35 miles
- Private / Agricultural lands

## BLM Land

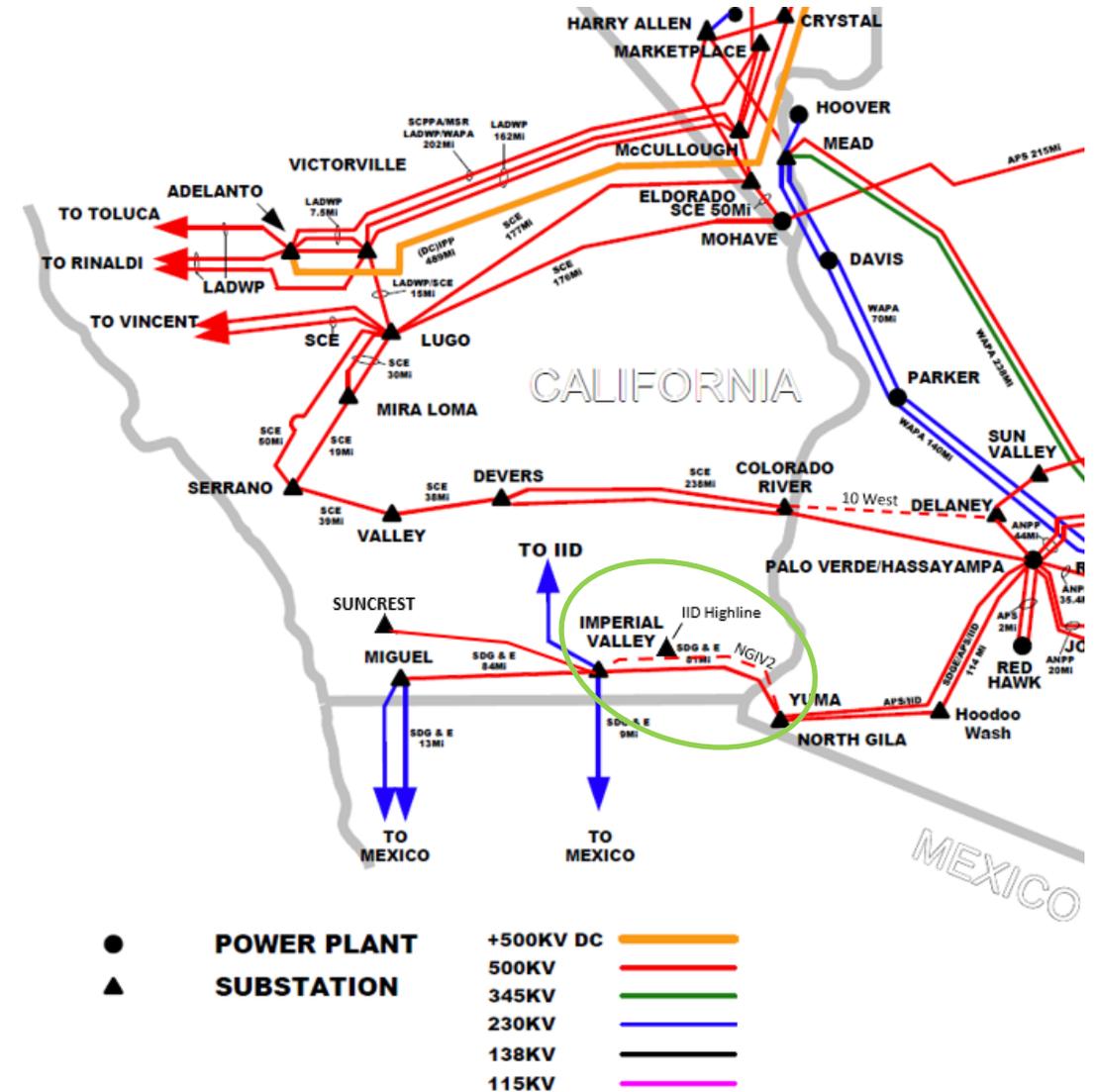
- ~55 miles, all within designated corridor (Proposed Route)
- Also at IV Sub

# NG-IV#2 PROJECT NEED & BENEFIT

Population growth and increasing energy demands in the Southwest require additional transmission grid capacity.

## NG-IV#2 Transmission Line will:

- Provide additional import/export access from generation resource zones where transmission access currently is limited (two lines east of North Gila towards Palo Verde and two lines west of Imperial Valley towards San Diego)
- Reliable outlet for export up to 1,250 MW of renewables
- Increase diversity, reliability and efficiency of the regional grid
- Enable more energy developers to tap into the regional grid
- Provide support to greenhouse gas (GHG) reduction targets



## WECC Three-Phase Rating Process

- Accepted WECC Path Rating September 2019 for 1250MW increase to Path 46

## Participative with Regional Planning Organizations

- WestConnect/Southwest Area Transmission (SWAT) and CAISO planning efforts
  - Will be Submitted into 2022-2023 Western Interconnection Interregional Transmission Coordination process
  - Submitted into CAISO Transmission Planning Process, noted LCR reductions but overall below 1.0 Benefit/Cost ratio
- Contact information on [www.ngiv2.com](http://www.ngiv2.com)

---

# TransWest Express Transmission Project

## David Smith

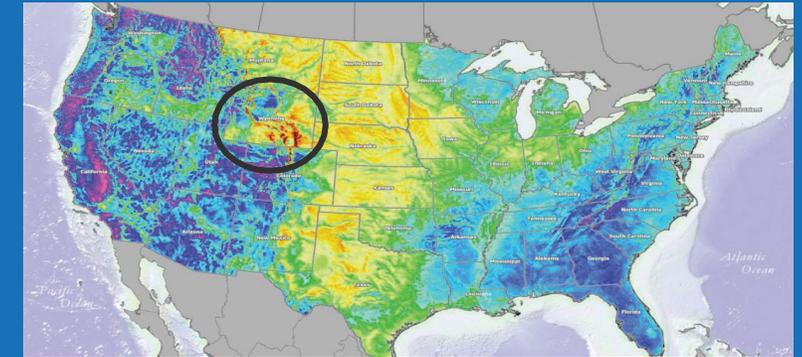
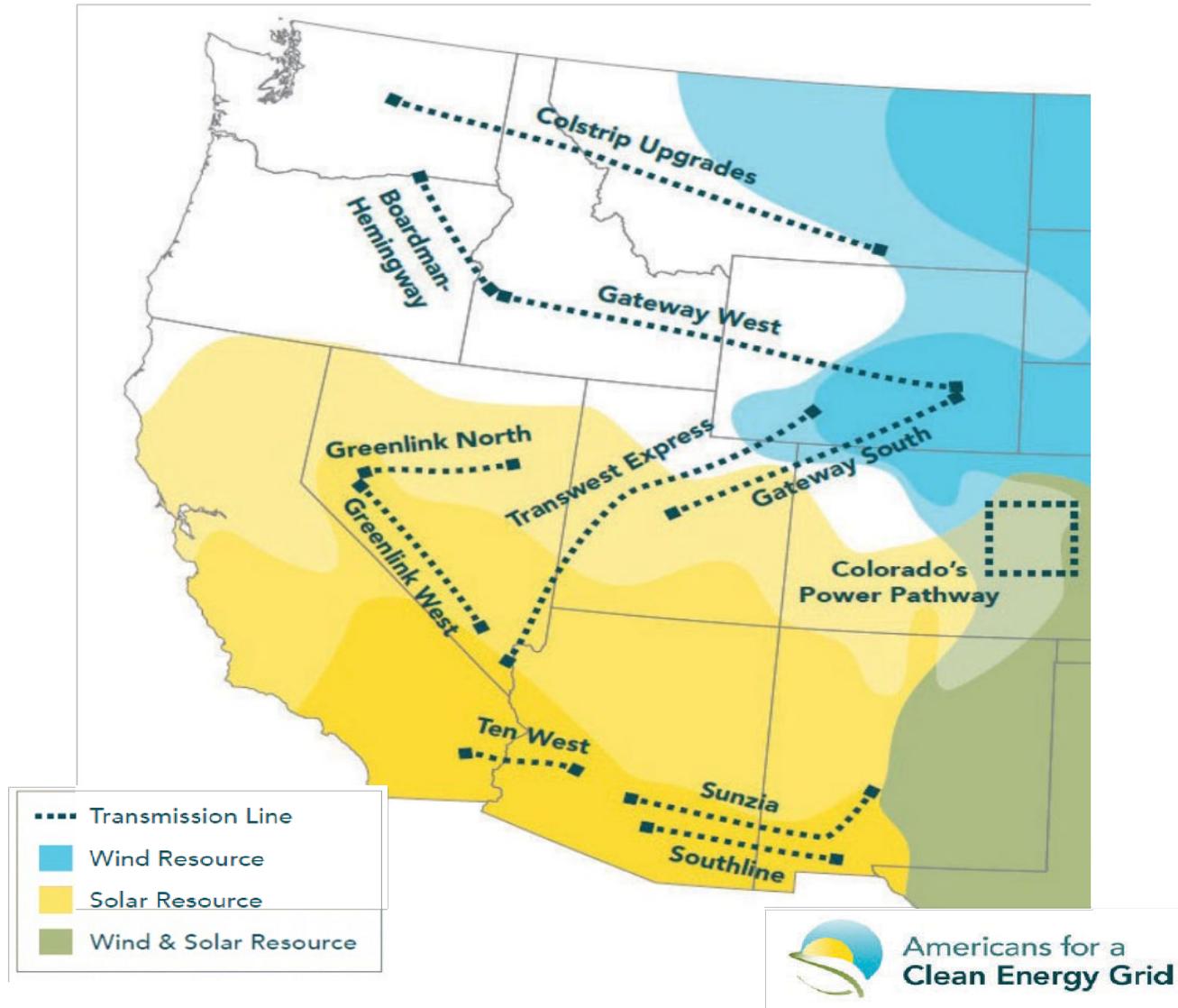




# TransWest Express Transmission Project New Interregional Transmission To Connect the West

Joint Agency Workshop on Next Steps To Plan For  
Senate Bill 100 Resource Build: Transmission  
July 22, 2021

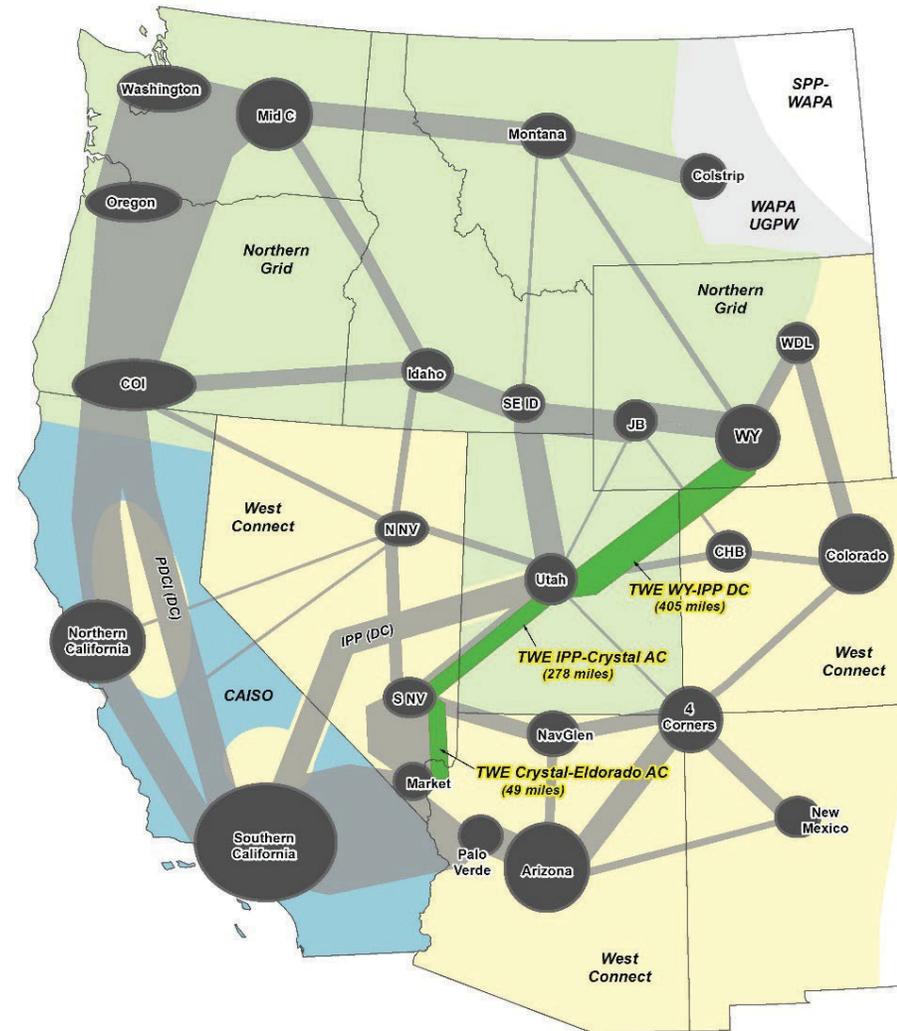
# Near Term Transmission Projects to Access Resource Areas



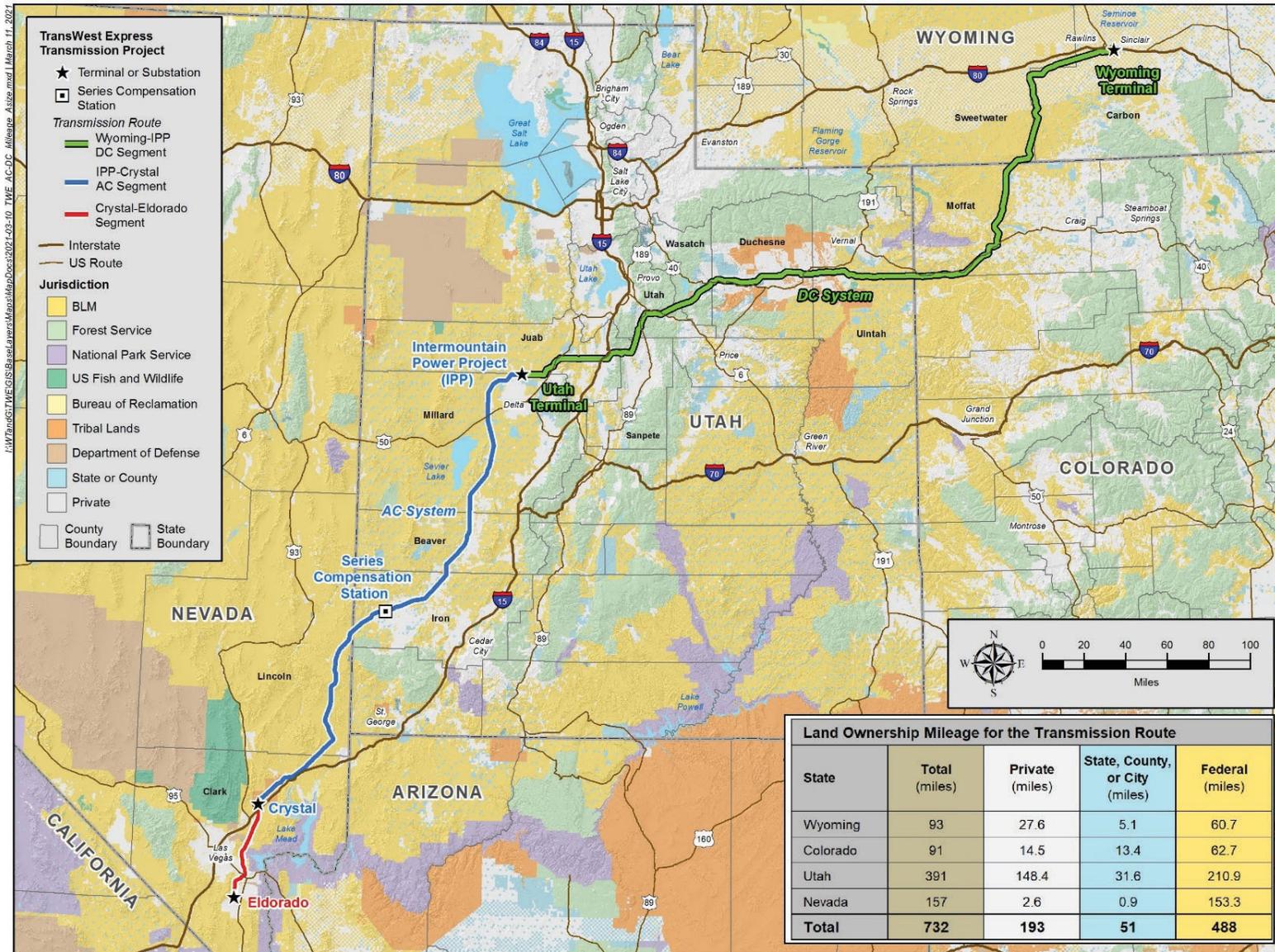
- **Highest-quality wind resources** in the U.S. are located in the Rocky Mountain Region in **Wyoming**
- Transmission studies have identified a **lack of transmission** to connect Nevada/ Arizona/ California to this resource
- Economic studies have shown wind resources plus the cost of transmission **provides diversity and cost benefits** when added to regional RPS portfolios

# TransWest Express Transmission Project Overview

- 732-Mile Transmission System
- Direct interconnection between CAISO, WestConnect (LADWP, NVE, others) and Northern Grid (PAC East)
- Wyoming to Utah HVDC Segment
  - 3,000 MW capacity
  - Connects to existing Intermountain Power Project (IPP) 2,400 HVDC Transmission operated by LADWP
  - Connects to 1,500 MW AC Segment
- Utah to Nevada 500 kV AC Segments
  - 1,500 MW capacity
  - Connects to CAISO, Nevada and Arizona utilities at Crystal/Harry Allen and Eldorado
- 2025 In-Service Date



# TransWest Express Project Route



# TWE Project is essentially shovel-ready

- Secured all key federal and state permits
- Secured all 14 county authorizations
- Secured 95+% of total land rights, including all private land easements in Wyoming
- Engineering design substantially complete
- Environmental conditions substantially satisfied
- Open Solicitation for initial transmission capacity commences June 2021



## Steps remaining:

- Complete ROW acquisition
- Interconnection agreements
- Construction and commercial contracts
- BLM Notice to Proceed, anticipated late 2021
- Construction start in 2022

# Transmission Planning and Capacity Allocation

## ■ TransWest participates in California and regional transmission planning processes

- WECC - Ensure TWE Project meets NERC Transmission Planning Reliability Standards
- RETI 2.0, IRP, TPP, FERC Order 1000 Interregional Transmission Project submittals
- Northern Grid, WestConnect > single Local Transmission Owner needs

## ■ TransWest's Open Solicitation

- Public Notice provided on June 7, 2021
- Statements of Interest due August 6, 2021
- Offering long-term point-to-point service
  - Up to 1,500 MW from Wyoming to Utah
  - Up to 1,500 MW from Wyoming to Nevada
- [www.transwestexpress-os.com](http://www.transwestexpress-os.com)



174 FERC ¶ 61,160  
UNITED STATES OF AMERICA  
FEDERAL ENERGY REGULATORY COMMISSION

Before Commissioners: Richard Glick, Chairman;  
Neil Chatterjee, James P. Danly,  
Allison Clements, and Mark C. Christie.

TransWest Express LLC Docket No. ER21-645-000

ORDER GRANTING APPLICATION FOR AUTHORIZATION TO CHARGE  
NEGOTIATED RATES, SUBJECT TO CONDITION, AND GRANTING WAIVERS

(Issued February 26, 2021)



For More  
Information

[www.transwestexpress.net](http://www.transwestexpress.net)



---

# Southwest Intertie Project (SWIP) North

## Sandeep Arora



Southwest Int

# LS POWER

---

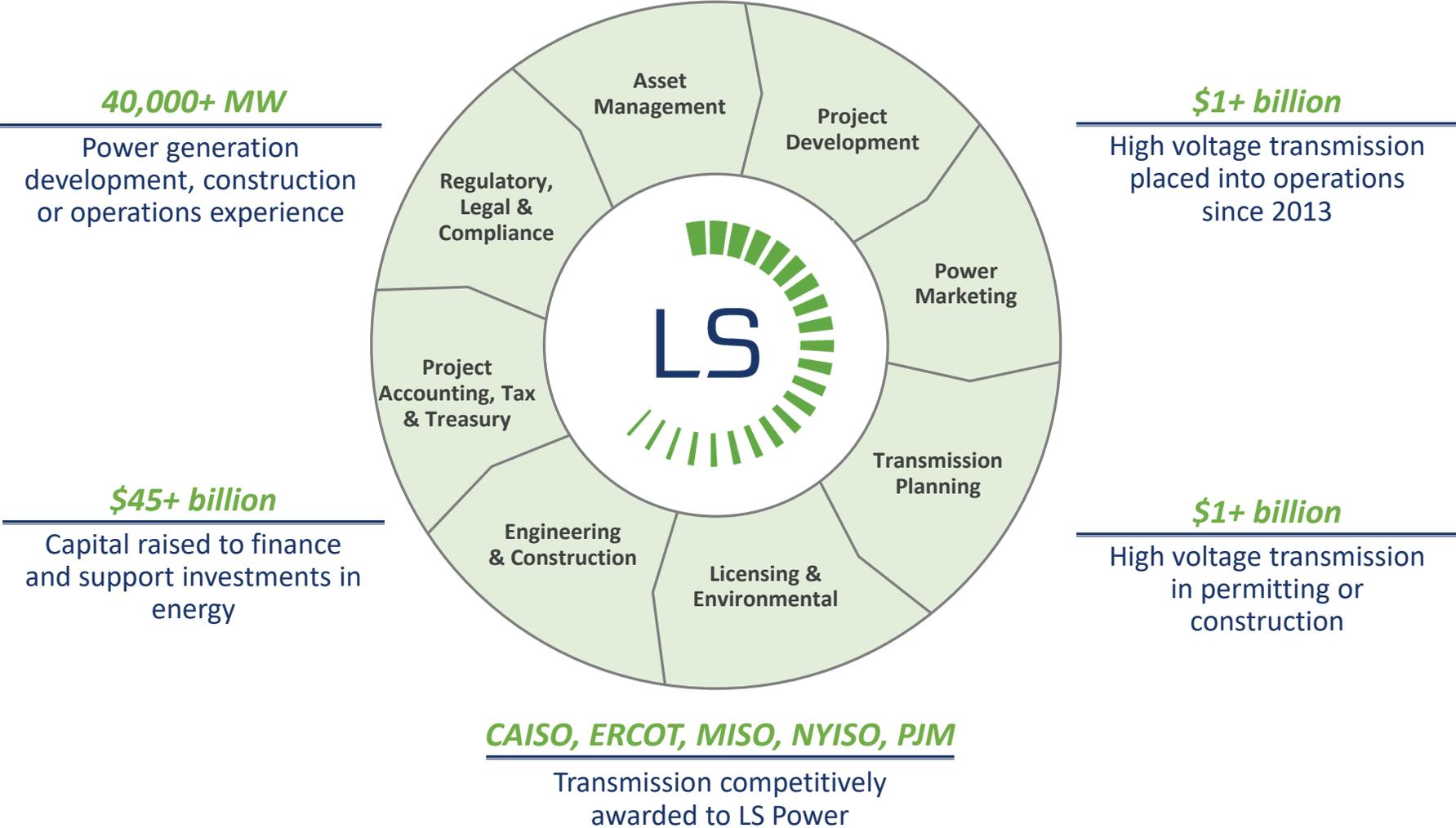
Joint Agency Workshop  
On SB 100 Resource Build: Transmis



July 22, 2021

# LS Power

## Power generation and transmission company formed in 1990

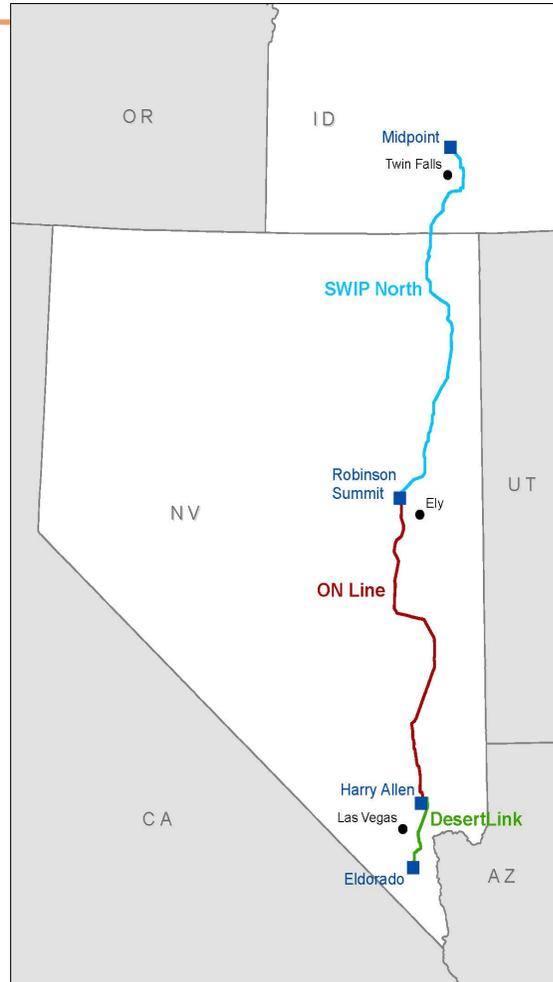


# Project Portfolio



*Extensive development and operating experience across multiple regions, markets, and technologies*

# Southwest Intertie Project (SWIP)



**SWIP North is the final link of a transmission project that would create ~1,050 MW of firm transmission rights from Idaho to California for CAISO, with a planned in service date of 2024**

## **Phase I - ON Line (Robinson to Harry Allen) – Operating**

- 231-mile, ~1000 MW, 500 kV transmission line in Nevada
- Paid for by Nevada. Began commercial operations in January 2014
- First connection between Nevada Power Company and Sierra Pacific Power Company

## **Phase II - DesertLink (Harry Allen to Eldorado) – Operating**

- 60-mile 500 kV transmission line near Las Vegas (~3400 MW transfer capability for CAISO use).
- Extends CAISO footprint up to Harry Allen.
- LS Power selected by CAISO via competitive solicitation pursuant to FERC Order 1000
- Robust cost containment package including caps on construction costs, capital structure and ROE
- Operating since August 2020

# Phase III – SWIP North (Midpoint to Robinson)

---

- 275-mile, ~2050 MW, 500 kV bidirectional transmission line between Midpoint (ID) and Robinson Summit (NV)
- Project scope also entails upgrading ON Line from ~1000 MW to ~2300 MW
- Unique capacity exchange with NVE entitles LS Power to ~1050 MW hurdle free from Midpoint to Harry Allen once SWIP North completed; all of which is being offered to CAISO
- Links PacifiCorp (East and West) and Idaho Power to CAISO
- Construction ready 2022, In service 2024
- Interregional cost allocation is already complete
  - Nevada paid 100% of the ON Line portion, which is nearly half of the entire SWIP path. California would get free access across ON Line (no wheeling charges) if it pays for SWIP North, and benefits from integration with broader transmission system.
- WECC Path Rating study underway, expected to be complete in 2022
- Federal NEPA process complete
  - BLM Rights-of-Way secured
  - Construction/O&M Plan approved
  - Conditional Notice to Proceed with Construction issued
- Transmission Interconnection studies with NVE and Idaho Power underway

# SWIP-N – a “no regrets” transmission project

## Reliability Benefits

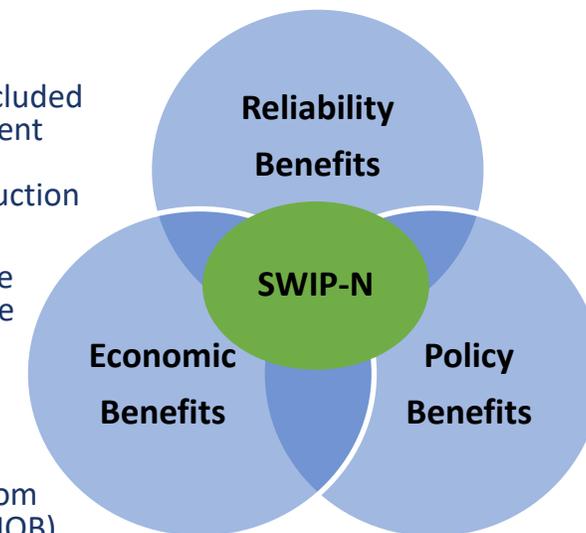
- Access to ~1050 MW increased firm capacity to improve reliability and RA in time for retirement of Diablo Canyon Power Plant and OTC plants in 2024.
- Integrated new line for AC transmission system that directly resolves certain constraints on the parallel import paths (e.g., COI, PG&E-Sierra, SDG&E Double Tap-Friars).
- Creates alternate path for Pacific NW resources during wildfire or extreme weather events, such as when COI and PDCI paths were de-rated by ~650 MW during the August 2020 heat wave and 5500 MW during the 2021 Bootleg fire.
- Load diversity benefits between CAISO and Pacific NW (e.g. ID Power and PacifiCorp East).

## Policy Benefits

- Provides access to significant amount of Idaho wind. The CPUC Base Case Portfolio included 1062MW and Sensitivity included 3GW of out-of-state (OOS) wind. According to a recent [Brattle Group study](#), net public policy-related costs of ID wind to CA customers are \$20/MWh lower than CA solar due to higher energy and capacity value, and GHG reduction benefits.
- Enables access to other OOS diverse renewables (e.g. NV geothermal) that can provide supply at net peak demand of evening peak hours and during multi-day low renewable production events.

## Economic Benefits

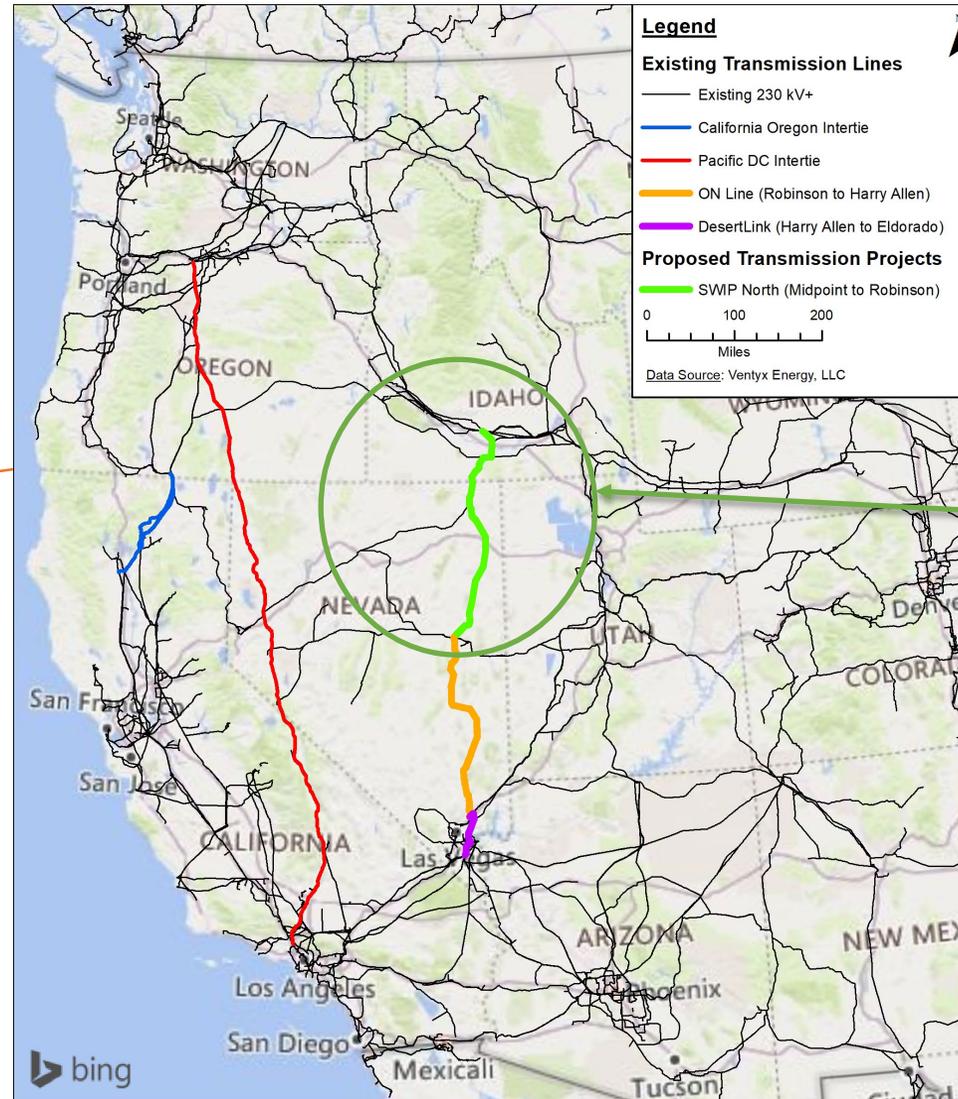
- A [Brattle Group study](#) shows up to \$105 million annually of production cost savings from increased market transfers by offering a parallel path to Northern CA interties (PACI, NOB) economic congestion. Study does not include analysis of benefits if SWIP North would have been in service during recent events such as the Bootleg fire.
- Provides pathway to deliver excess CA solar to Pacific NW and reduce renewable curtailments, which offers capital cost savings.
- Provides Capacity savings and enhances EIM and future EDAM benefits.



# Integrated nature of SWIP North provides alternate path to COI/PDCI and access to diverse renewable energy resources

Bootleg Fire July 2021

Greater imports from Pacific NW could have been achieved with SWIP North during COI/PDCI derate, providing reliability and economic benefits.



Thousands of MW of new and existing wind, solar, geothermal and hydro from northern WECC can be imported to California, and excess California solar can be exported through SWIP North.

# CAISO should conduct a robust OOS transmission study in current TPP and allow decision making by March 2022

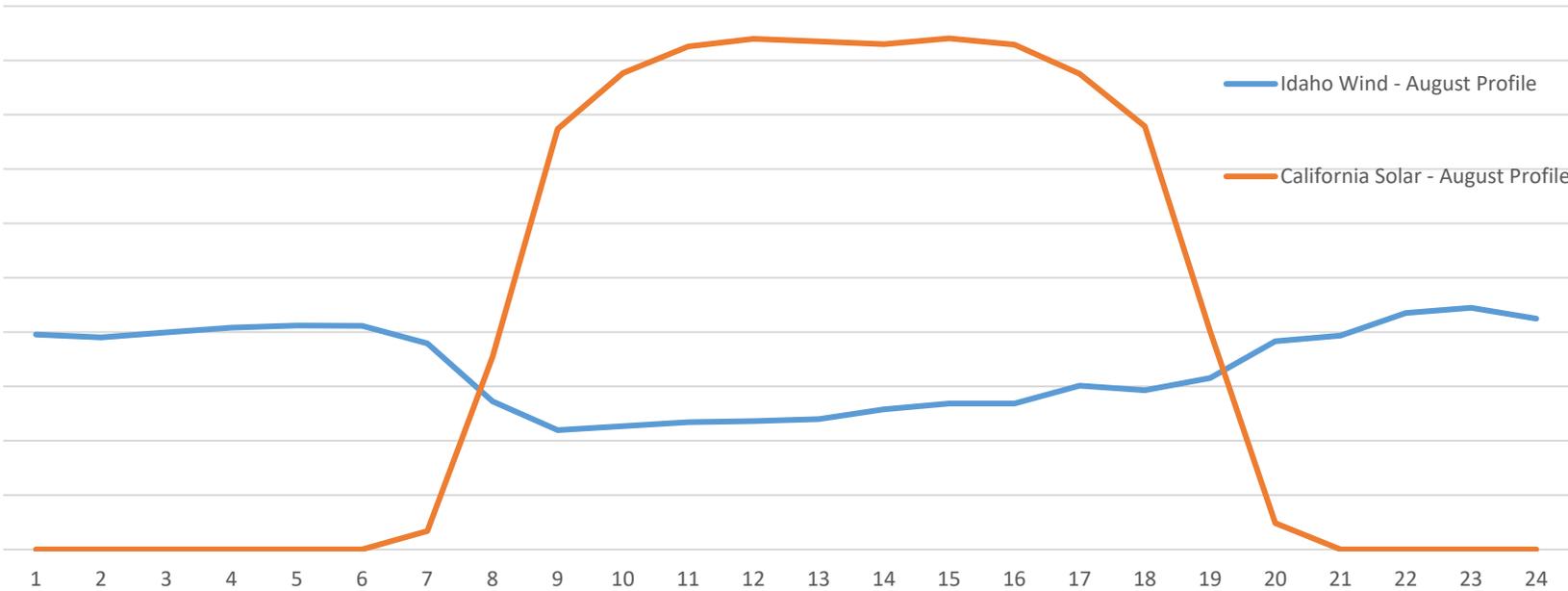
---

- **CAISO is currently launching a study in its 2021-22 Transmission Planning Process (TPP) to evaluate transmission alternatives to deliver out-of-state (OOS) wind.**
  - We applaud CAISO for taking on this study, and recommend studying all benefits (Reliability, Economic and Policy) of OOS transmission projects such as SWIP North. A robust combined benefits analysis for the CPUC IRP 46 MMT Base Case portfolio (1062 MW OOS wind) and 38 MMT Sensitivity portfolio (3 GW OOS wind) can help inform stakeholders and policy makers on the project recommendations in this 2021-22 TPP cycle.
- **LS Power recommends that the 2021-22 TPP must capture all benefits of SWIP North.**
  - According to the [Brattle Group study](#), SWIP North could provide benefits of ~\$105 million annually. This results in a BCR > 1.0, which suggest SWIP North pays for itself based on economic benefits alone. CAISO ratepayers would receive policy and reliability benefits with an economic project that pays for itself; an overall win for CAISO TPP and CPUC IRP processes.
  - Given the increased frequency of extreme weather events such as the August 2020 heatwave and 2021 Bootleg fire that can lead to grid emergencies, CAISO's study should value the benefits that transmission like SWIP North can provide in mitigating these situations.
  - No wheeling charge for transfer across SWIP path from Midpoint to Harry Allen should be assumed for study, pursuant to the TUA in place between LS Power affiliate and NV Energy.
- **California needs 11.5 GW new resources by mid-decade, and diverse renewable resources can be brought online to help meet resource needs and clean energy goals, if new OOS transmission is approved in time by CAISO.**
  - OOS renewables can help improve reliability and provide resource diversity in time for Once-Through Cooling and Diablo Canyon retirements in 2024. A robust OOS transmission analysis in this year's TPP cycle can inform policy makers and, if new transmission is approved by CAISO Board in March 2022, shovel-ready projects such as SWIP North can be built in time.

# Resource Diversity to Support Net Demand Peak

SWIP-North Access to Idaho Wind Offers Complimentary Profile to California Solar to Meet Summer Evening Peak Load, and During Multi-Day Low Renewable Energy Production Events

CA Solar vs Idaho Wind - August Daily Profile



LS Power developed Figure 1 using California solar using PVsyst based on generic Fresno County solar data, Idaho wind data based on meteorological site data from Idaho wind. Both data represent average production during the month of August and displays all hours of the day.

# Questions?

---

**Sandeep Arora**

**SVP, Transmission and Interconnection**

**[sarora@lspower.com](mailto:sarora@lspower.com)**

---

# Cross Tie Project

## Jason Smith and Bob Smith



# Cross-Tie Transmission Line

## Joint Agency Workshop on Next Steps To Plan for Senate Bill 100 Resource Build: Transmission

Jason Smith, President

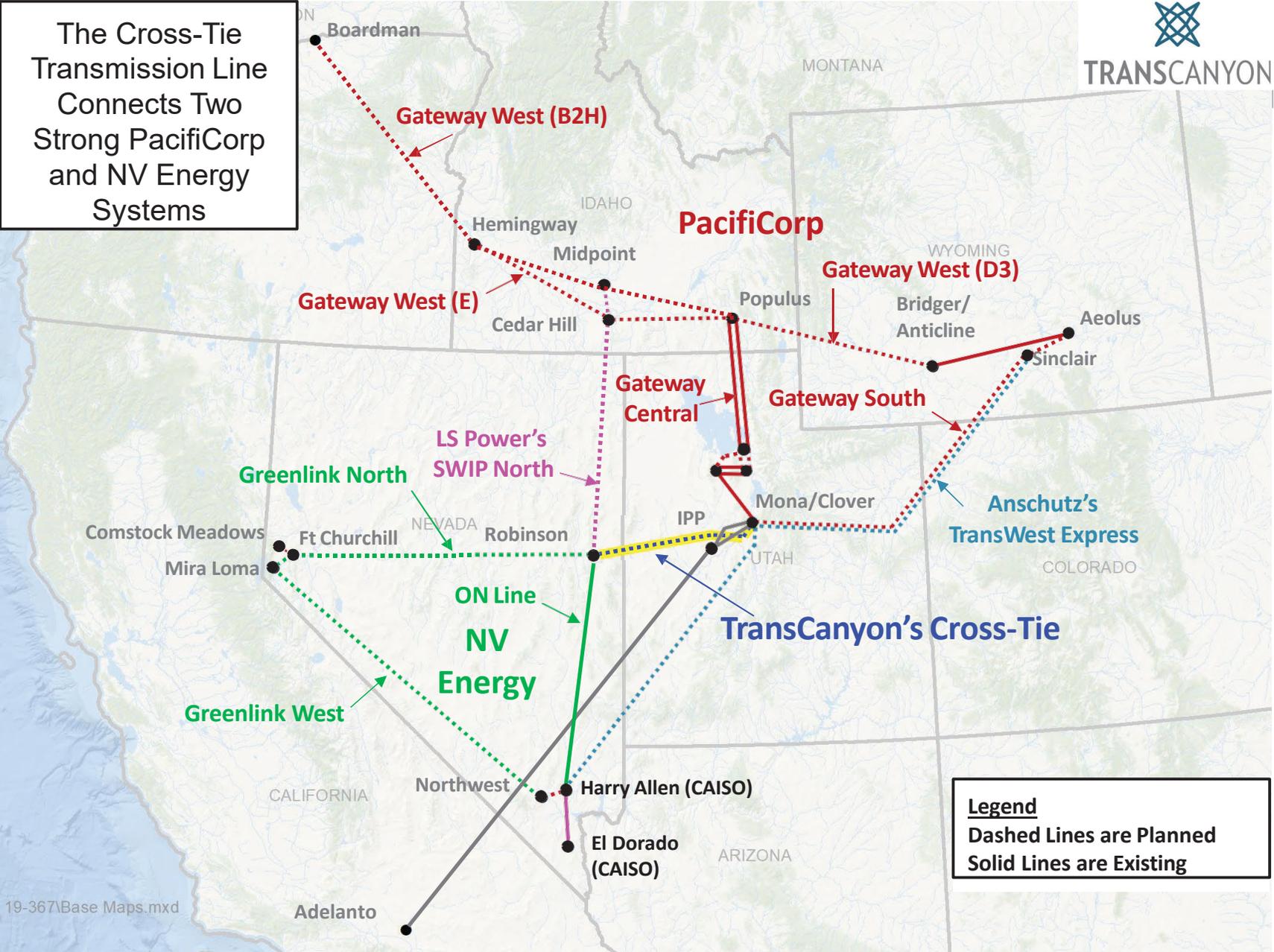
Bob Smith, Transmission Planning Consultant

July 22, 2021



TRANSCANYON

The Cross-Tie Transmission Line Connects Two Strong PacifiCorp and NV Energy Systems



# Cross-Tie Regional Benefits

---

- Macro Benefits: Cross-Tie is a 214-mile 500kV AC network element that provides a portfolio of benefits to the regional transmission system
  - Cross-Tie will increase transmission capacity between the PacifiCorp, NV Energy, CAISO and Idaho Power Balancing Areas
- Policy Benefits
  - Facilitates import of complementary renewable resources including Wyoming wind
  - Facilitates export of renewable resources from California to diverse load centers throughout the West
- Reliability Benefits
  - Low-cost investment to leverage existing system and increase regional reliability benefits
  - Improves contingency response during system disturbances (weather, fire, natural disasters)
  - Relieves congestion on the California-Oregon Intertie by providing flow relief and alternate transmission paths
- Economic Benefits
  - Regional economic benefits from more efficient resource procurement and dispatch
  - EIM participants enjoy benefits of more transmission capacity to bid resources into neighboring markets

# Cross-Tie Timeline



✓ TransCanyon filed Advisory Notice to PUCN and SF-299 to BLM

Regional Transmission Planning and Path Rating Studies

Permitting (NEPA / State Permits)

Preliminary Engineering

ROW Acquisition

Procurement & Construction

Operations

# Who We Are

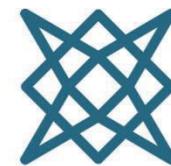
---



**TransCanyon is an independent developer of electric transmission infrastructure for the western United States**

- Independent well-positioned to drive creative solutions
- Leverage the combined energy expertise and financial strength of Berkshire Hathaway Energy and Pinnacle West
- Focused on all phases – development through ongoing operation
- Long-term stewards of the environment
- Value collaboration to achieve success





TRANSCANYON

---

# Sunzia Southwest Transmission Project

## David Getts





**SunZia™**

Delivering Clean Energy

***Joint Agency Workshop  
on Next Steps to Plan  
for SB100 Resource  
Build: Transmission***

***July 22, 2021***





# SunZia Project Participants



Southwestern Power Group (SWPG) is an independent developer of utility-scale generation and transmission assets, with a market focus in the desert Southwest. Since 2000, company has distinguished itself as a leading force in evolving energy markets, including renewable energy, storage and smart electrical grids. SWPG is comprised of a select, experienced group of individuals with decades of experience in finance, permitting, licensing, real estate, construction and operations. [www.southwesternpower.com](http://www.southwesternpower.com)



MMR is a global infrastructure firm with more than 4,000 full-time employees in the U.S. and a reputation for completing domestic and global projects within budget, on time and with unwavering consideration for safety. Across the globe, MMR has served clients in the renewable energy, chemical and petrochemical, oil and gas, industrial manufacturing, power generation and power development markets. [www.mmrgroup.com](http://www.mmrgroup.com)



Pattern Energy is one of the world's largest privately-owned developers and operators of wind, solar, transmission, and energy storage projects. Its operational portfolio includes 28 renewable energy facilities that use proven, best-in-class technology with an operating capacity of 4.4 GW in the United States, Canada and Japan. Pattern is New Mexico's largest clean power company and has a long-term commitment to protect the environment and strengthen communities. [www.patternenergy.com](http://www.patternenergy.com).



The New Mexico Renewable Transmission Authority (RETA) is a state government entity established to identify and develop transmission and to enable renewable energy in New Mexico. RETA partnered with MMR and SWPG to facilitate SunZia as a benefit to the grid, and the is now a co-developer of the project. RETA has also worked with Pattern Energy to develop and construct the Western Spirit line. [www.nmreta.com](http://www.nmreta.com)

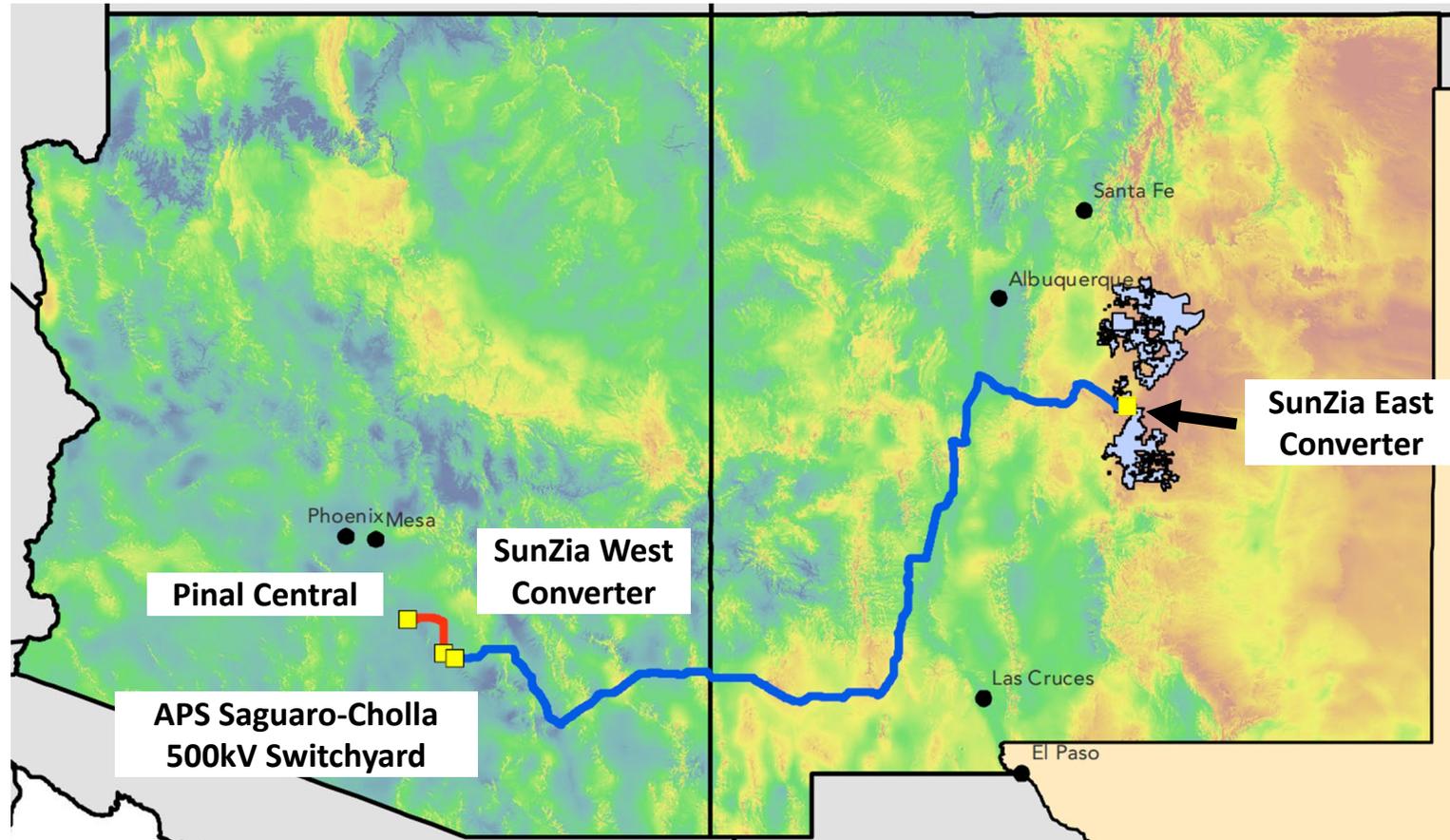
These presentation materials may neither be reproduced nor used in whole or in part for any other purpose, nor furnished to any person without SunZia's express written permission. While the information included herein is believed to be accurate and reliable, by delivery of this presentation, SunZia does not make any representations or warranties, express or implied, as to the accuracy or completeness of such information. By accepting this presentation, the recipient agrees that SunZia shall not have any liability for any representation (express or implied) contained in, or for any omissions from, this presentation or any other written or oral communications transmitted to the recipient. The delivery of this presentation shall not, under any circumstances, create the implication that there has been no change in the affairs of SunZia or any of its project participants affairs after such date. Certain provisions of various agreements may be summarized in this presentation, but it should not be assumed that the summaries are complete. Such summaries are qualified in their entirety by reference to the texts of the original documents.



# SunZia Transmission Project Overview

	TRANSMISSION	WIND
<b>SunZia I</b>	500+ mi DC 3 GW Transfer Capacity	3,200 MW In Service by 2025
<b>SunZia II</b>	500+ mi AC 1.5 GW Transfer Capacity	1,850 MW In Service after 2025

- 3,000 MW SunZia I line rating
- ~530 miles 525kV DC line
- ~35 miles 500kV AC line
- Two AC/DC Converter Stations
- Physical delivery:
  - Pinal Central substation
  - Saguaro-Cholla 500kV line
- Transmission service to Palo Verde CAISO scheduling point
- Schedule:
  - Final Notice to Proceed end-2022
  - In-Service date 2025

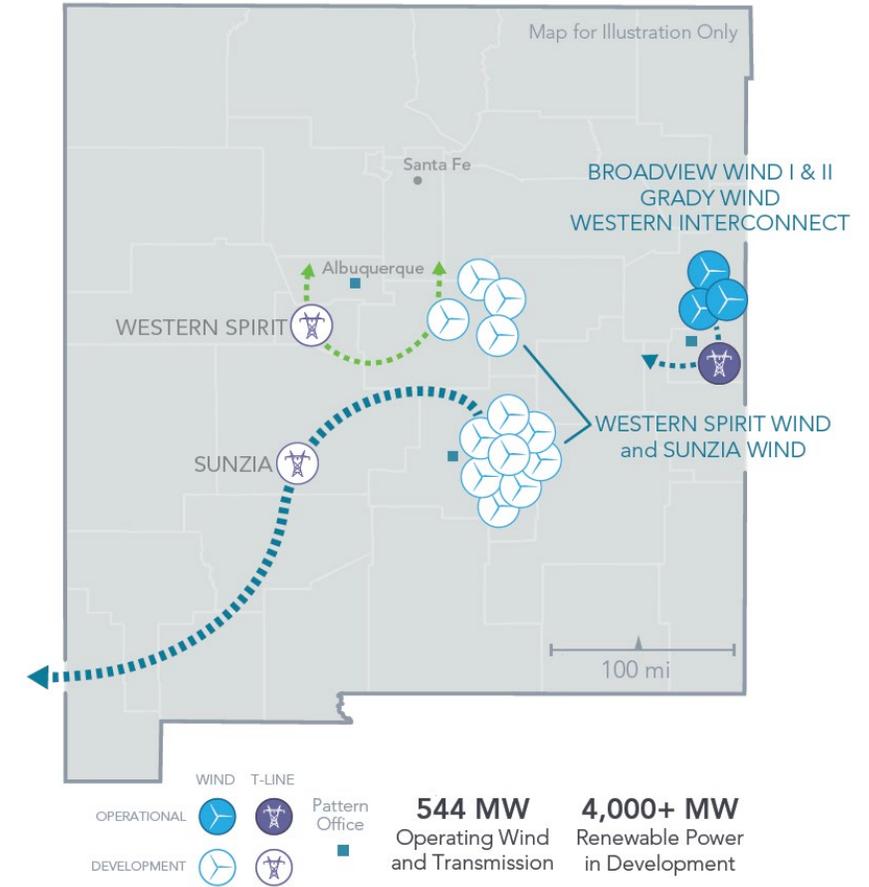




# Pattern Energy NM Wind Portfolio

Pattern Energy has successfully developed and financed ~1,600MW of New Mexico wind + transmission projects

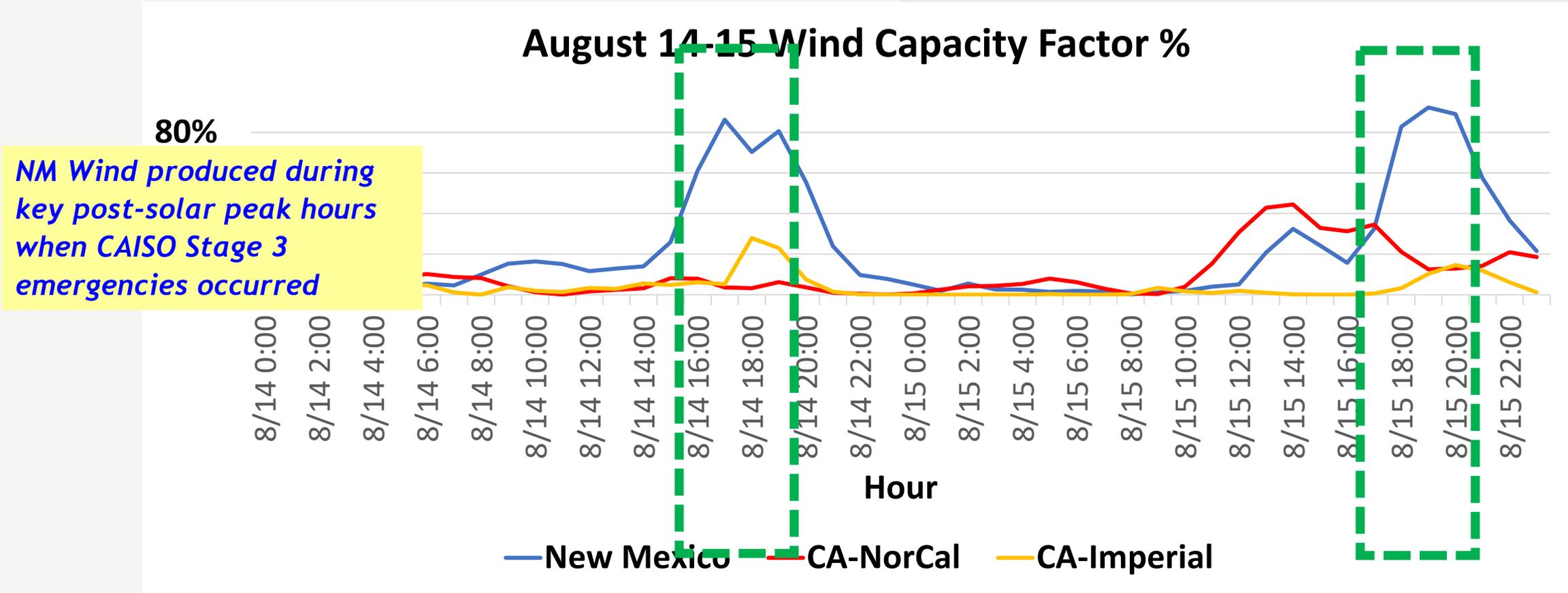
	OPERATING		CONSTRUCTION	DEVELOPMENT
	Broadview Wind	Grady Wind	Western Spirit Wind	SunZia Wind
Size	324 MW	220 MW	1,050 MW	~3,200 MW
County	Curry, NM Deaf Smith, TX	Curry, NM	Guadalupe, Lincoln, and Torrance, NM	Guadalupe, Lincoln, and Torrance, NM
Status	COD 2017	COD 2019	Expected COD 2021	Expected construction 2022, COD 2025
POI	Western Interconnect; Developed & constructed by Pattern, owned & operated by Pattern	Western Interconnect; Developed & constructed by Pattern, owned & operated by Pattern	Western Spirit Transmission; Developed & constructed by Pattern, to be sold to PNM	SunZia Transmission Project; Developed by SWPG
POD	CAISO Willow Beach	CAISO Willow Beach	CAISO Palo Verde / Willow Beach / Four Corners LADWP Navajo	CAISO Various PODs
Offtaker	SCE	SMUD	LADWP, SJCE	TBD



\* Pattern became the anchor tenant for 1,500 MW of SunZia transmission capacity in August 2016 pursuant to SunZia's FERC order. SunZia expects to hold an additional capacity allocation process in 2021 for the remaining 1,500 MWs of transmission capacity.



# August 2020 Wind Output (1 of 2)



Source: Pattern Energy operational wind data from Pattern-owned wind farms.  
New Mexico data from Curry County, NM. CA-NorCal data from Shasta County,  
CA, and CA-Imperial data from Imperial County, CA.

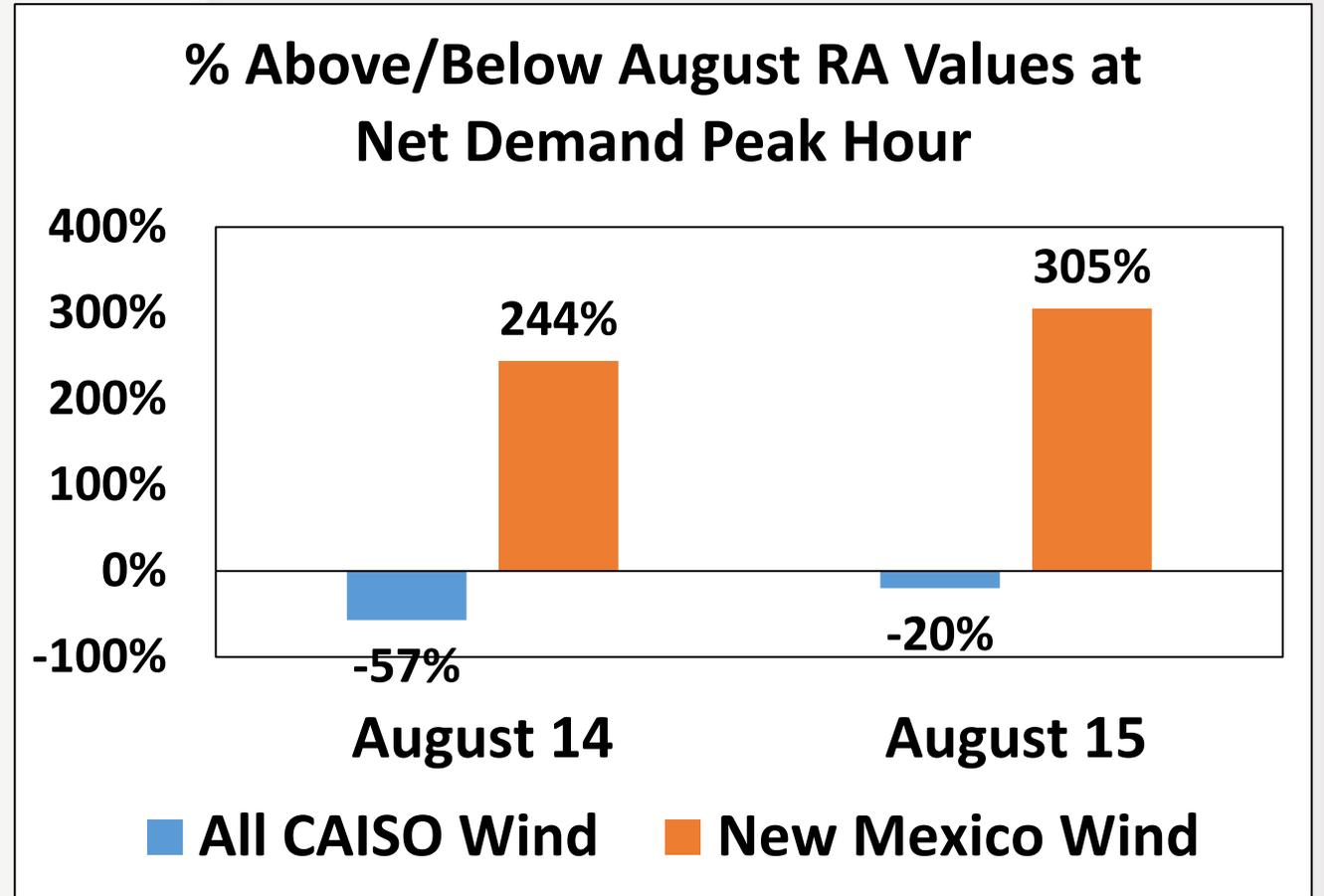


# August 2020 Wind Output (2 of 2)

Final Root Cause Analysis of Mid-August 2020 Extreme Heat Wave, January 13, 2021, pp. 49-50:

“The total wind fleet within the CAISO collectively bid into the day-ahead market about 230 MW (20%) less than the RA obligation at the net peak demand on August 14 but 120 MW (10%) more on August 15. In contrast, actual energy production during the net demand peak was 640 MW (57%) less and 230 MW (20%) less [than the RA obligation] on August 14 and 15, respectively.”

*NM Wind produced 244% and 305% above August RA value during net demand peak hour on August 14 and 15, respectively, compared to total CAISO wind fleet at -57% and -20%.*



Source: NM Wind data from Pattern operational wind sites in Curry County, NM. Graph shows % above August RA value based on energy dynamically scheduled to CAISO Scheduling Point at net demand peak hour August 14 and 15.



# Key SunZia Takeaways

- **Permits are in hand and being amended for final route modifications**
- **Federal ROW is signed, State ROW is in-process, Private ROW is 98% done**
- **Engineering for HVDC Converter Stations is underway by Hitachi-ABB with procurement starting in late 2021. This is the long-lead item.**
- **Anchor tenant Pattern Energy is marketing SunZia Wind energy, based on success of Western Spirit project**
- **After 15 years of development and \$150 million, we have line-of-sight to Line 1 construction start by end-2022, operational in 2025**



# Out-of-State Development Challenges

- Long-term, capital-intensive development period
- Need for sufficient commercial interest prior to construction start
- Lack of inclusion in CAISO Transmission Planning Process (TPP) base portfolios
- Need for sufficient import capability and deliverability at CAISO interties, known in advance
- Resource Adequacy (RA) counting rules need to recognize increased RA value of out-of-state wind resource

---

# Starwood Energy

## Ali Amirali





# California Energy Commission

July 21, 2021



# Introduction of Ten West Link / DCRT



## Ten West Link Project

- 500 kV transmission line from Delaney Substation (west of Phoenix) to Colorado River Substation in Riverside County, CA.
- Strong project economic Benefit/Cost based on identified need. Will also enhance grid flexibility and robustness, and renewable development and integration.
- Advanced state of development after extensive 3+ year BLM/CPUC environmental review. Construction pending CPCN.
- Agencies involved in the permitting process include:
  - Bureau of Land Management (BLM)
  - California Public Utilities Commission (CPUC), and
  - Arizona Corporation Commission (ACC)

## Project Sponsor: DCR Transmission, LLC (DCRT)

- Selected by CAISO in 2015 following an extensive competitive solicitation process to develop Ten West Link.
- Starwood Energy specializes in energy infrastructure investments, with a focus on power generation, transmission, storage, CCUS, RNG and related projects. Significant development, construction, financing and operations expertise.



# Ten West Link Will Expand Access to New Renewable Resources in California While Minimizing Resource Impacts



- 500 kV line, **125 miles in length**
- Interconnects SCE and APS 500 kV substations
- **Parallels existing infrastructure**, including 60+ miles of existing SCE 500 kV DPV line
- *Creates critical transmission infrastructure though region with highly desirable solar resource*
- **Significant renewables interconnection** interest; especially solar + storage project
- **Extensive consultation** in BLM/CPUC NEPA/CEQA process. **Broad stakeholder support** including local communities, CRIT, and NRDC.
- Wide **variety of route alternatives considered** balancing impacts, including no-wires alternative.
- Route selected **reduces visual, biological and cultural impacts** ... KofA Refuge + Mule Mountains
- Structure placement/types generally **matched to existing infrastructure**, reducing visual impacts



# Project Benefits

- Ten West Link offers a wide array of economic, reliability, operational flexibility, and public policy related benefits to Arizona and California. These benefits include:
  - Providing a second parallel line to the existing DPV line
    - ❖ Enhance reliability of California's and Arizona's interconnected transmission network Increases the transfer capability between critical transmission hubs in Central Arizona and Southern California
    - ❖ Reduce transmission system losses
    - ❖ Enhance the efficiency and operational flexibility of the bulk transmission network
  - Allowing for a cost-effective transfer of energy in the Southwestern United States, expanding regional access to low-cost and diverse renewable resources
  - Facilitating the interconnection of and energy delivery from new renewable energy resources
    - ❖ 3,200 MW of Solar plus storage project already executed an LGIA
    - ❖ 500 MW of solar plus storage project negotiating LGIA
    - ❖ Approximately 9,000 MW of new renewable generation proposing to use the transmission line
  - Reducing transmission system congestion and enhancing the economic supply of electric power to Arizona
  - Increasing competition at the Palo Verde trading hub
  - Enhancing participation in EIM and EDAM



# Project Status

---

- Received Certificate of Environmental Compatibility (CEC) from ACC in March 2020
  - Filed the application with ACC in October 2019
  - Line Siting Committee recommended approving the project on February 7, 2020
  - ACC unanimously approved granting CEC on March 25, 2020
- Record of Decision (ROD) received from BLM November 2019
  - National Environmental Policy Act (NEPA) process started in October 2015
  - Draft Environmental Impact Statement (EIS) issued August 30, 2018 and Final EIS issued September 13, 2019
  - ROD received November 22, 2019 and Right-of-Way Grant received August 4, 2020
- Certificate of Public Convenience and Necessity (CPCN) process underway at CPUC
  - CPCN application filed October 2016
  - Testimonies filed December 2019, Reply Testimonies filed in March 2020, and Briefing process completed March 2021
  - Waiting for Proposed Decision
- Finalizing leasing of land by means of ROW Agreement with Arizona State Lands Department
- Working with private land owners along the Project route
- Engineering, Procurement, and Construction company on board
- 90% engineering completed, structure testing completed, and vendors on board
- Construction to begin following the receipt of CPCN

---

# Southline Transmission Project

## Doug Patterson



Joint Agency Workshop on Next Steps  
to Plan for Senate Bill 100 Resource Build:  
Transmission Panel

Doug Patterson

July 22, 2021

---

## Fully Permitted Path Connecting NM & AZ For Up to 1,000 MW Phased Construction Starting 2021

Two segments, approximately 370 miles

- New Build — 345kV double-circuit Afton-Apache, 259 miles
- Upgrade — 230kV double-circuit Apache-Saguaro/Tortolita, 121 miles



TEP Acquiring  
Vail-Tortolita Segment  
Construction Starting  
2021

Address multiple needs

- Improve Reliability
- Relieve Congestion
- Support Growth
- Facilitate Access to Renewable Resources

Minimize Environmental Impacts:

- Upgrade existing lines
- Follow existing corridors
- More than 85% of Agency Preferred Route parallels or upgrades existing corridors

### Regional Planning

- WestConnect (2009)
- WECC Path Rating



### Permitting

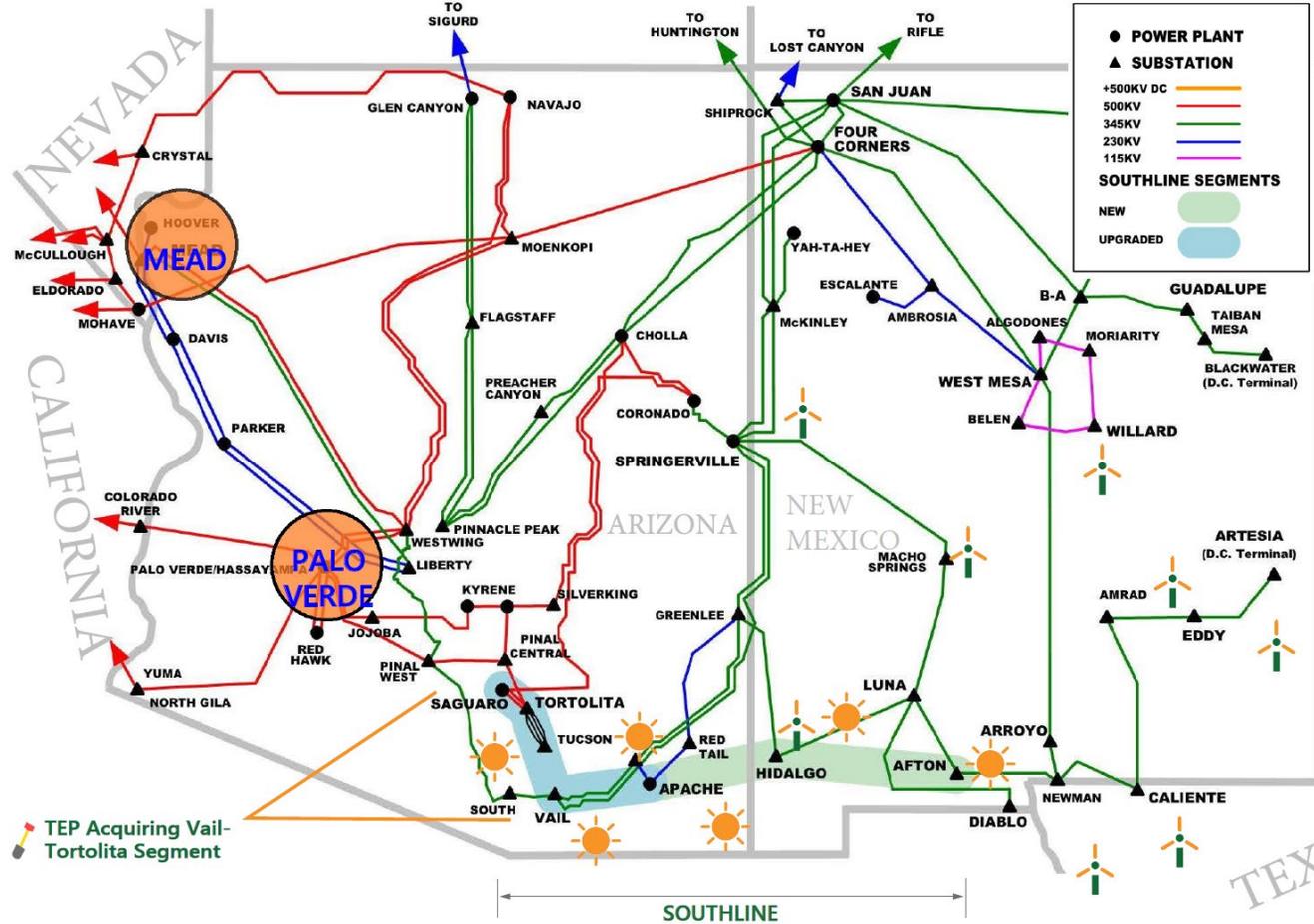
- Pre-NEPA (2009-2011)
- DEIS (2014) FEIS (2015)
- Federal ROD's (2016)
- ACC CEC (2017), NMPRC (2017)
- ACC CEC Modification (2021)



### Commercial

- FERC PDO (2015)
- Initiated Open Solicitation (2016)
- Vail – Tortolita Acquisition (2021)

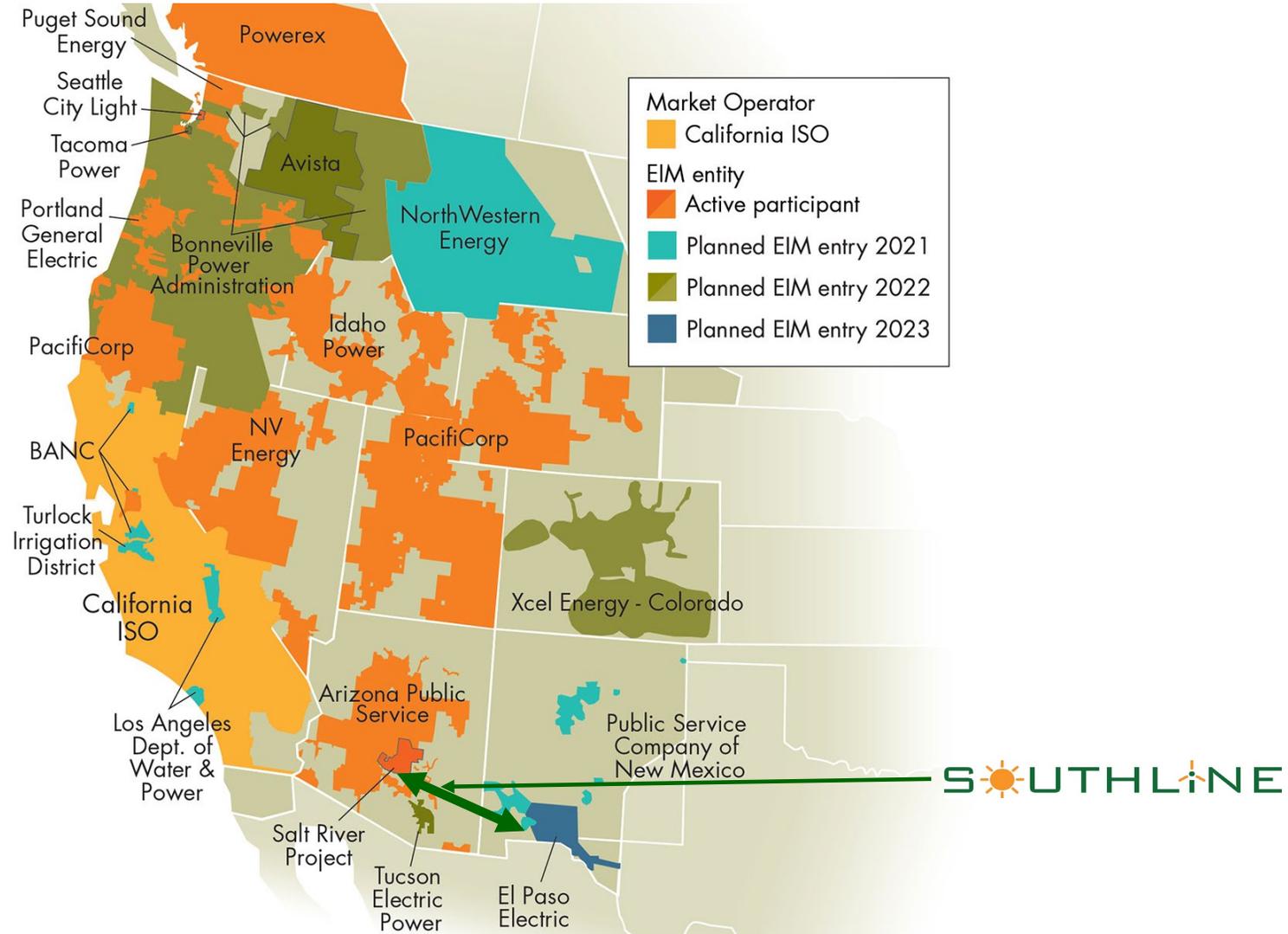
# Regional System and Resources



- Creates path to market for transmission-constrained renewable energy resources
- Bridges large gap between systems in southern New Mexico and southern Arizona
- Provides local economic development
- Follows I-10 corridor to create complementary EV and communications opportunities
- Careful routing minimizes impact, and conserves resources

Phased capacity of 600MW to 1,000MW

Utility Partners: Tucson Electric Power and Western Area Power Administration

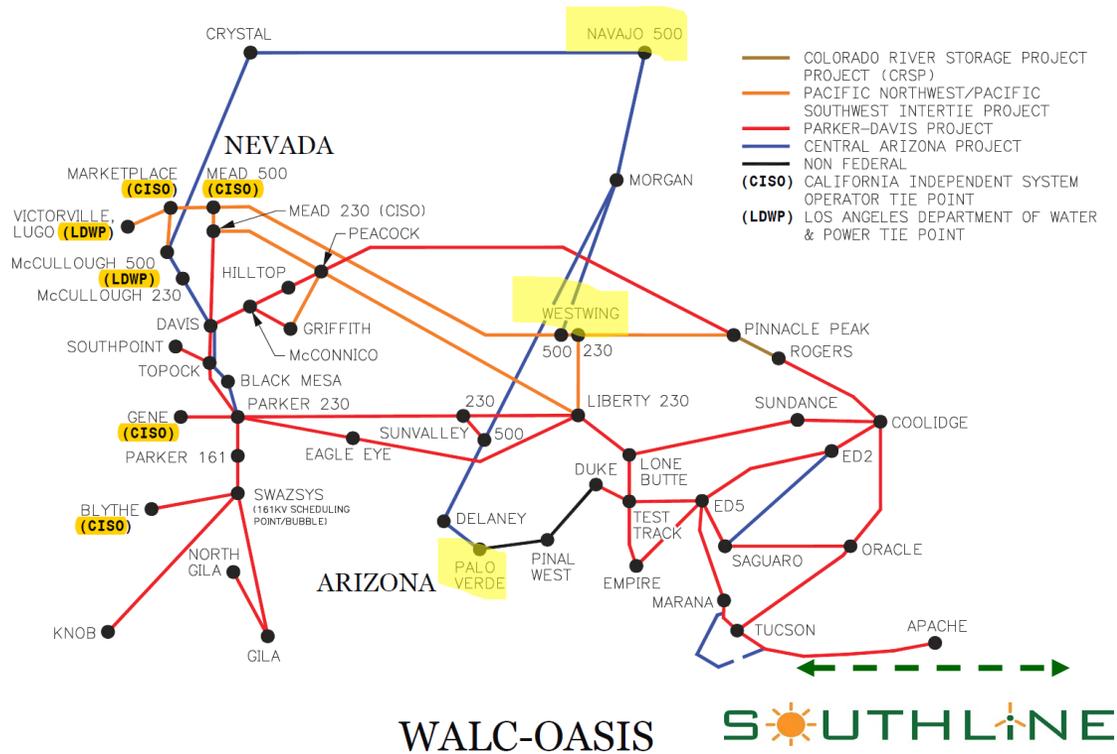


Map boundaries are approximate and for illustrative purposes only.

Copyright © 2021 California ISO

**Southline Could Enhance EIM Benefits**

WAPA DSW System with CA interfaces



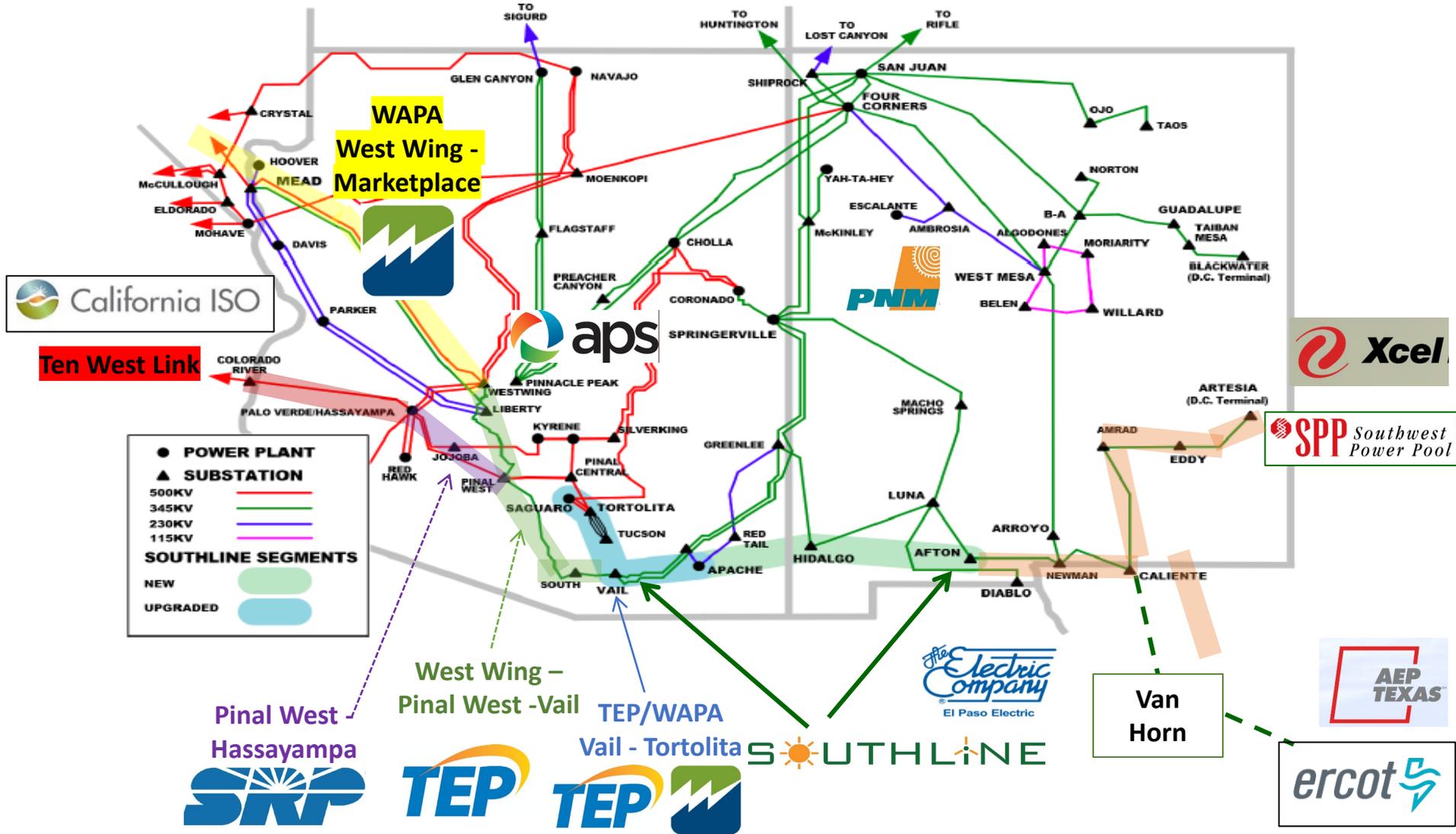
Example of upgraded and old WAPA lines



**New line = 8X capacity in same ROW**

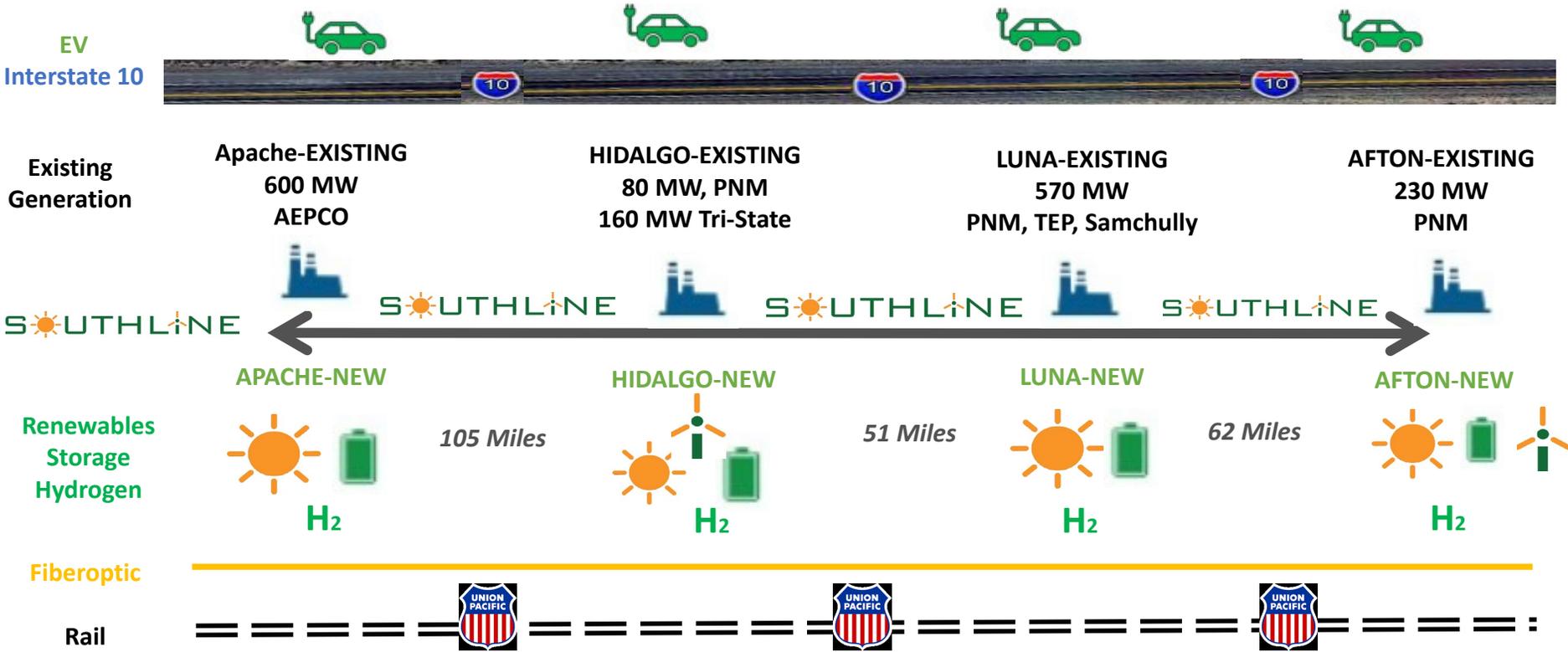
*Additional Similar Upgrade Opportunities Exist*

# Permitted Lines & Existing Corridors



# Corridor Opportunities

- Southline connects to or is adjacent to over 1,600MW of existing thermal generation
- Opportunity to add solar, battery storage, offer firm renewable wind + solar + bess combination
- Potential to convert existing units to Hydrogen
- Interstate 10 an EV opportunity
- Parallels Major Rail Corridor and Fiber Optic Corridor



*Shared Energy, Transportation and Communications Corridors Provide Long Term Synergies*

## Expansion Tx Ranking

### 1) Optimize Existing ATC with Neighbors

- Contract modifications
- Network Service, Conditional Firm

### 2) Leveraging Existing System

- Low Impact (eg Station Improvements)
- Grid Enhancing Technologies
- Storage (Network? Hubs? PVH, Mead, etc)
- Re-Conductor (new materials?)
- Re-build in existing corridor

### 3) New Transmission

- Parallel & Connect With Existing System
- New Corridor for New Transmission

## Consider an Implementation Iteration to Prioritize

- Analysis of #1 & 2 and fully permitted #3
- Back these “Most Buildable” resources out and re-run models on remaining need.

## Additional Considerations

### 4) Operating Benefits

- New / Increased BAA ties
- Resource/Load Diversity

### 5) EIM

### 6) Federal Nexus / Partnership

- WAPA, BPA, BOR etc

### 7) Corridors

- Energy
  - Transmission
  - Thermal Generation
  - Natural Gas
- Transportation
  - Interstate Highway
  - Rail
- Communication

Doug Patterson  
Black Forest Partners, L.P.  
Tiburon, CA  
415-944-0656  
[doug@blackforestpartners.com](mailto:doug@blackforestpartners.com)

[www.southlinetransmissionproject.com](http://www.southlinetransmissionproject.com)

---

# Lucky Corridor Transmission Project

## Sean Black



A photograph of a male worker in safety gear, including a yellow hard hat with the Ameren logo, safety glasses, a high-visibility yellow vest, and a brown leather tool belt. He is looking off to the side with a focused expression. The background shows a utility site with power lines and another worker in the distance.

**Presentation to the California Energy  
Commission  
Lucky Corridor Project Portfolio in New  
Mexico  
July 22, 2021**

# Lucky Corridor Transmission Project Portfolio

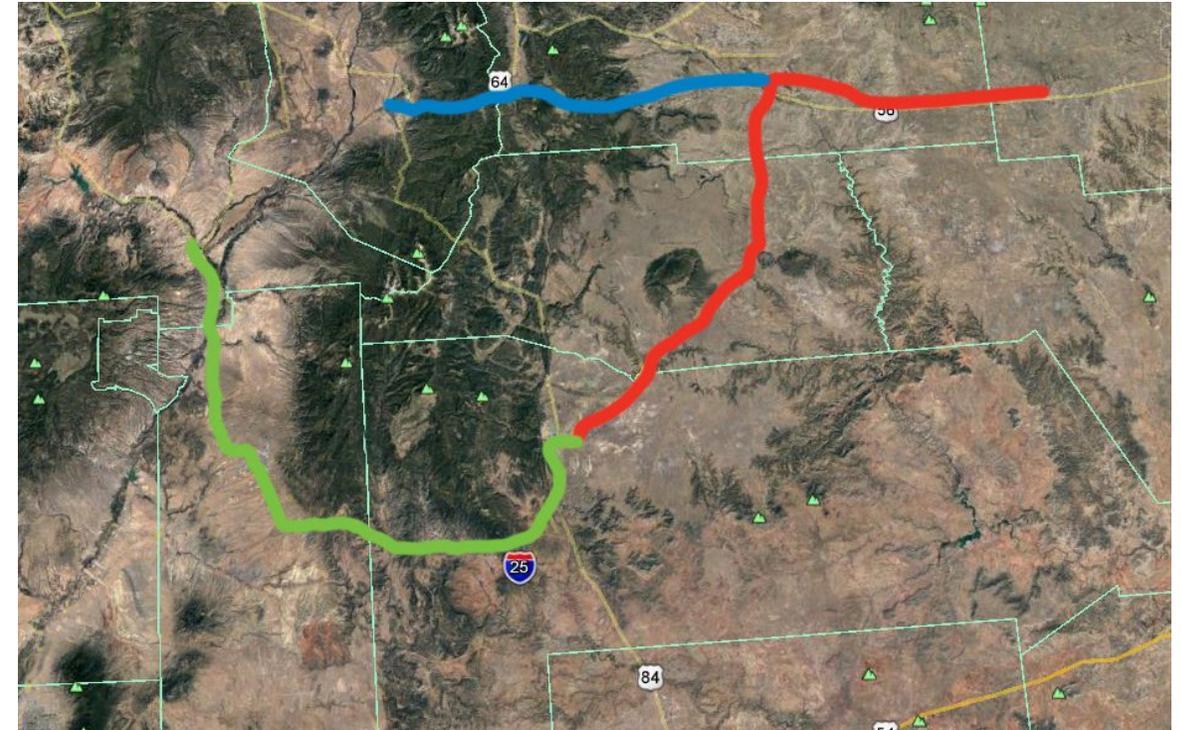
## Empowering New Mexico's Renewable Energy Future

Northeast New Mexico has some of the best wind and solar resources in the country. However, transmission infrastructure is needed to deliver these clean resources.

The portfolio will:

- Stimulate the New Mexico economy with access to low cost, renewable energy
- Help New Mexico meet new emission reduction targets, and build a clean, 21<sup>st</sup> century economy
- These projects will provide reliability benefits and increase access to renewable energy for consumers

**Ameren Transmission acquired Lucky Corridor LLC in August 2020** to actively develop the portfolio of transmission projects in Northern New Mexico



— Mora      — Vista Trail      — Santa Fe

# Ameren Transmission

**Ameren business focused on transmission development, construction and operation**

Operating subsidiary of Ameren Corporation (AEE); a Fortune 500 Electric Utility that owns and operates over 8,000 circuit miles of NERC jurisdictional electric transmission and over 10,700 MW of electric generation

**Over 100 years** planning, constructing, operating and maintaining FERC/NERC jurisdictional transmission assets

**Over 375 FTEs** focused on transmission engineering, construction, project management, operations and maintenance

**\$3.6 billion\*** in FERC-Regulated transmission rate base at the end of 2020

Executing **\$3.7 billion** of transmission projects over the next five years (2021 – 2025)

\*Excludes transmission investment in Missouri which is vertically integrated

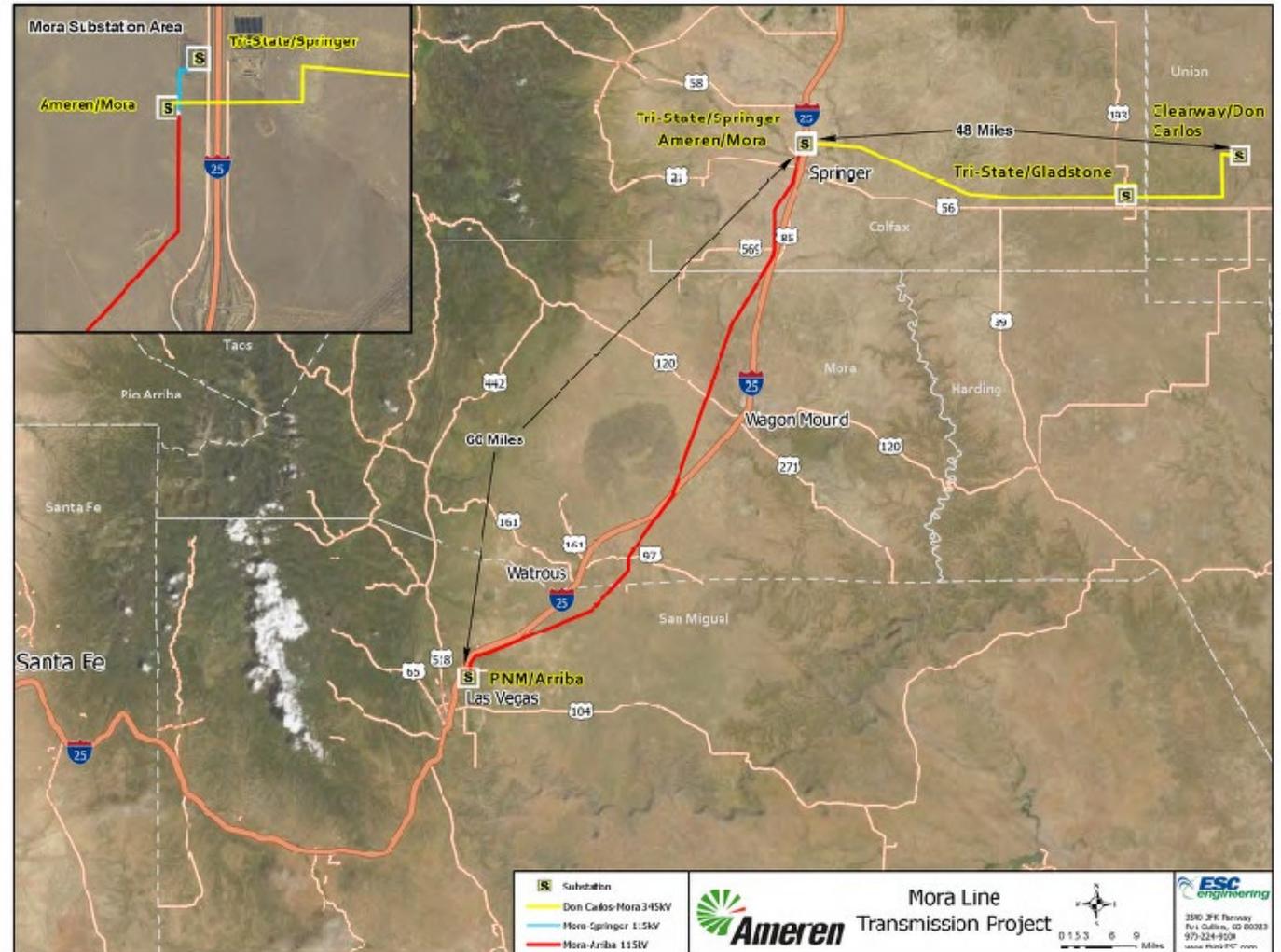


Construction of a lattice tower structure crossing the Illinois River; part of the Illinois Rivers Transmission Project

# Mora Transmission Project

## Project Overview

- 114-mile 345 kV/115 kV Transmission Project that interconnects the 180 MW Don Carlos Wind Farm Collector Station in Union County, NM to the Springer Substation located in Springer, NM (owned by Tri-State) and, finally the Arriba Substation located north of Las Vegas, NM (owned by PNM)
  - Don Carlos – Mora Segment: 48-mile, 345 kV line (yellow line)
  - Mora 345 kV/115 kV Substation
  - Mora – Arriba Segment: 66-mile, 115 kV line (red line)
- Anchor Tenant Agreement for 180 MW with Don Carlos (acquired by Clearway Energy)
- Negotiated Transmission Construction Interconnection Agreements with:
  - Public Service of New Mexico for interconnection at the Arriba substation
  - Tri-State Electric Cooperative for interconnection at the Springer substation
- Working on the OATT and *pro forma* agreements; anticipate FERC filing before end 3<sup>rd</sup> quarter 2021
- Site Acquisition - Over 760 acres of easements acquired; 95% site control of Don Carlos – Mora line segment
- Environmental Status - Completed archeological, cultural and biological pedestrian studies, supervised by State Land Office
- Targeting construction (NTP) on or before the 3<sup>rd</sup> quarter of 2022



# Vista Trail Transmission Project (formerly Lucky Corridor)

345 kV transmission project to transfer renewable energy towards Four Corners



- The 65-mile, greenfield segment will interconnect the Mora substation to the Taos substation (owned and operated by Tri-State Generation and Transmission Association, Inc.)
- Subject to interconnection requests, the project will deliver up to 1,500 MW to the Public Service Company of New Mexico's Ojo substation;
  - FERC negotiated rate authority has already been approved to offer 850 MW of capacity;
- Joint routing/development study with key stakeholders in progress;
- Public stakeholder meetings planned in the fall of 2021;
- Plan to file amended SF-299 application to the National Forest Service by end of 2021;
- Targeting commercial operation in 2025.

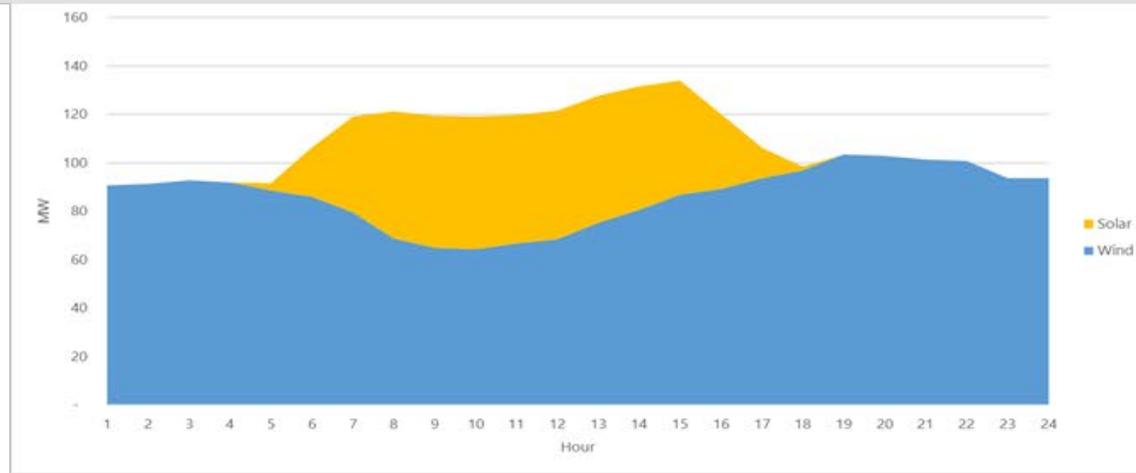
# Renewable Development in New Mexico

## Union County, New Mexico has outstanding wind and solar resources

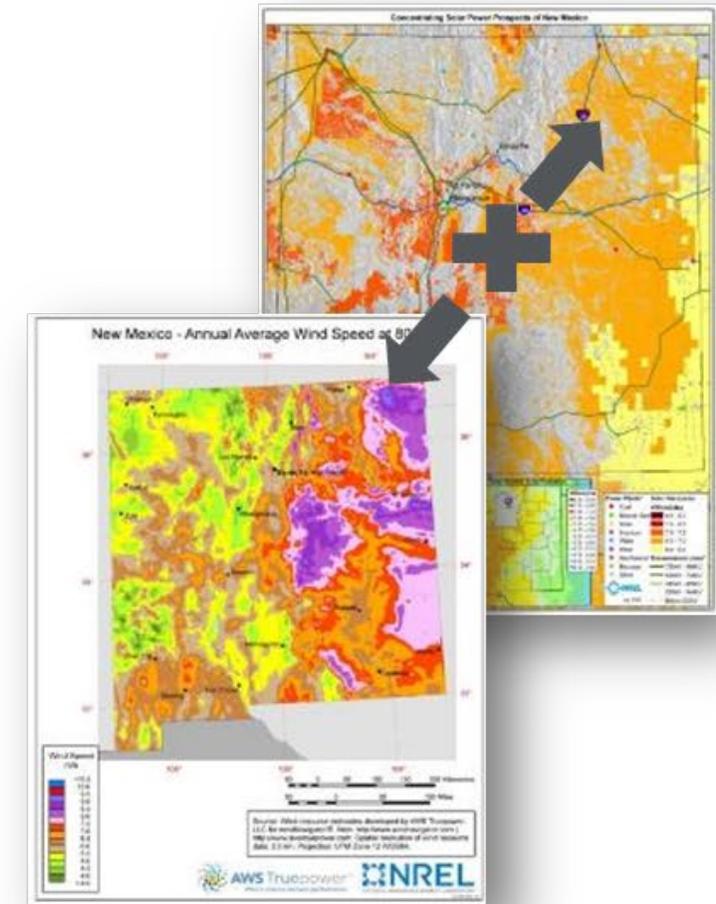
### Renewable Development in New Mexico

- Lucky's anchor tenant (Clearway Energy Group) has a recognized presence in delivering renewable energy to California, as well as a long history of working in New Mexico
- Complimentary wind and solar resources provide reliably shaped renewable energy
- The combination of robust scalable wind and solar facility resources and strong transmission and generation developers creates a unique opportunity to serve CAISO load

### Avg Daily Generation from Meteorological towers in Union County



### Wind & Solar Resources in New Mexico



A large version of the Ameren TRANSMISSION logo, centered on the page. It consists of the stylized green fan icon with a red tip, followed by the word "Ameren" in a large, bold, italicized sans-serif font, and "TRANSMISSION" in a large, bold, all-caps sans-serif font below it.

---

# GridLiance West

## Michael Landgraf





## Potential Transmission to Support SB 100

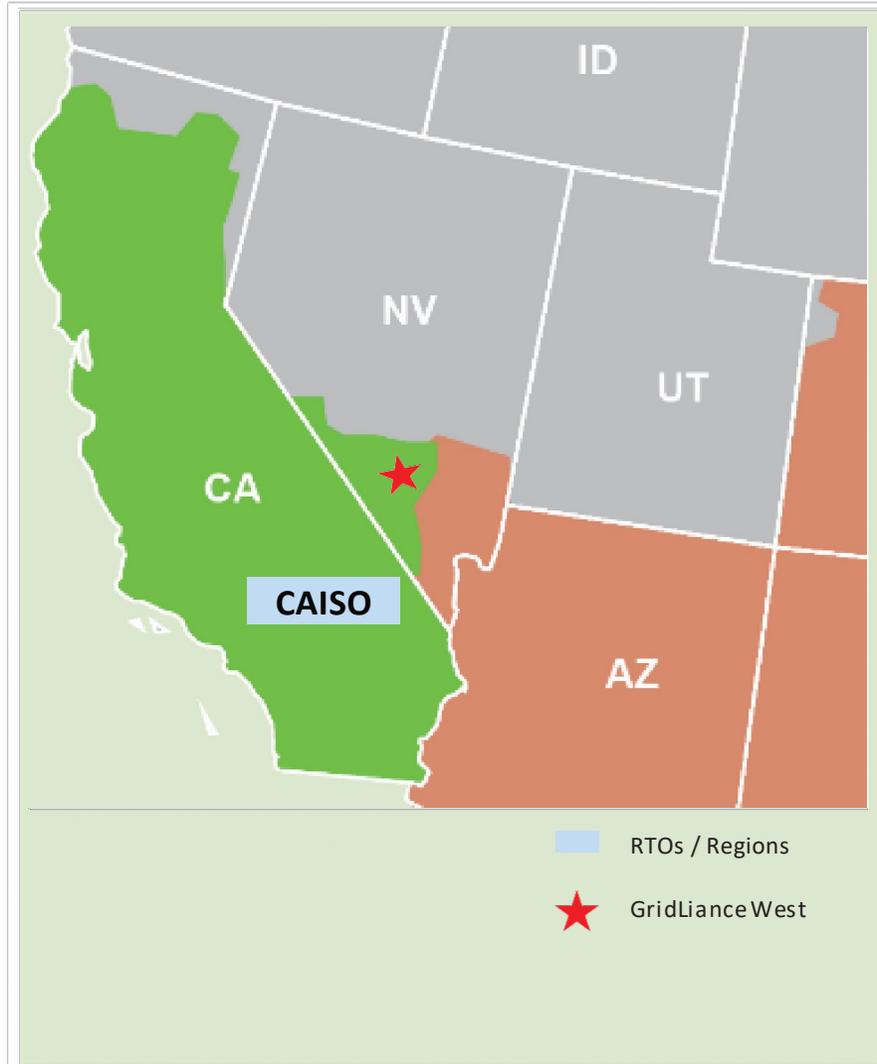
---

July 22, 2021



# GridLiance West Overview

*Providing access to renewables in southwest Nevada to support California's clean energy goals*



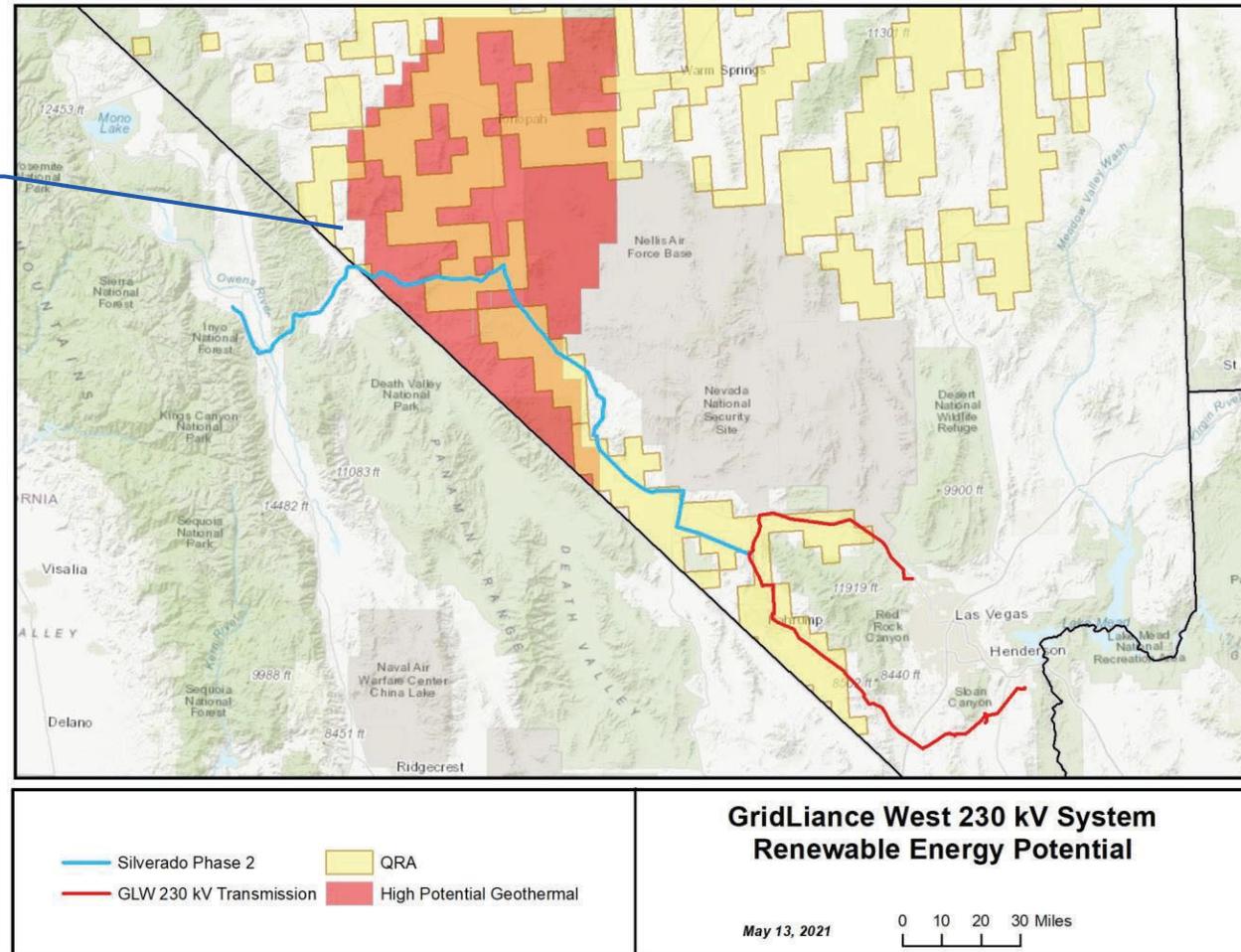
- 167 miles of 230 kV transmission network in Southwest Nevada
- Integrated into the CAISO; the only out-of-state transmission system in the CAISO and interconnecting renewables
- Located outside of high wildfire risk areas in the region
- >6 GW of renewables in the CAISO queue, including >400 MW geothermal which can provide clean capacity to serve CA and support reliability



# GridLiance West Supporting SB100

*Upgrades to GridLiance West system can enable >6 GW of renewables in support of SB100*

GridLiance West can enable development of untapped diverse renewable resources, with up to 40 GW renewable potential. CPUC has sited solar, storage, wind, and geothermal resources in Southern Nevada, and expanding GLW system to tap into these resources is a least-regrets approach to help meet CA's mid-term reliability needs and support SB 100.





# Session 1 Public Comment

## Rules

- 3 minutes per person
- 1 person per organization

## Zoom

- Click “raise hand”

## Telephone

- Press \*9 to raise hand
- Press \*6 to (un)mute

## When called upon

- Unmute, spell name, state affiliation, if any

## Written Comments:

- Due: 8/11/2021 by 5:00 p.m.
- Docket: 21-SIT-01
- Submit at:  
<https://efiling.energy.ca.gov/EComment/Ecomment.aspx?docketnumber=21-SIT-01>

3-MINUTE TIMER

**3:00**



# Session 2 Begins at 1:30 p.m.

## Stakeholder and Balancing Authorities Discussion of Transmission Issues

- <https://energy.zoom.us/j/92673190192?pwd=V3BWeXE1aIRtdDJTUWV1UENXTTRQQT09>
- ID: 926 7319 0192
- Password: 780069

## Written Comments:

- Due: 8/11/2021 by 5:00 p.m.
- Docket: 21-SIT-01
- Submit at:  
<https://efiling.energy.ca.gov/EComment/Ecomment.aspx?docketnumber=21-SIT-01>