

DOCKETED

Docket Number:	22-IEPR-05
Project Title:	Emerging Topics
TN #:	247870
Document Title:	Presentation - Western Region Transmission and Integration - Transmission the Enabler
Description:	3.A Neil Millar, California ISO
Filer:	Raquel Kravitz
Organization:	California ISO
Submitter Role:	Public Agency
Submission Date:	12/1/2022 3:06:47 PM
Docketed Date:	12/1/2022



California ISO

Western Region Transmission and Integration: Transmission the Enabler

California Energy Commission
Western Electricity System Integration Workshop

Neil Millar, VP, Infrastructure and Operations Planning
December 2, 2022

Topics

- The Western Interconnection
- CAISO context
- Planning processes – opportunities and challenges

The Western Interconnection is unique, with a single reliability-focused Regional Entity – the Western Electricity Coordinating Council (WECC)

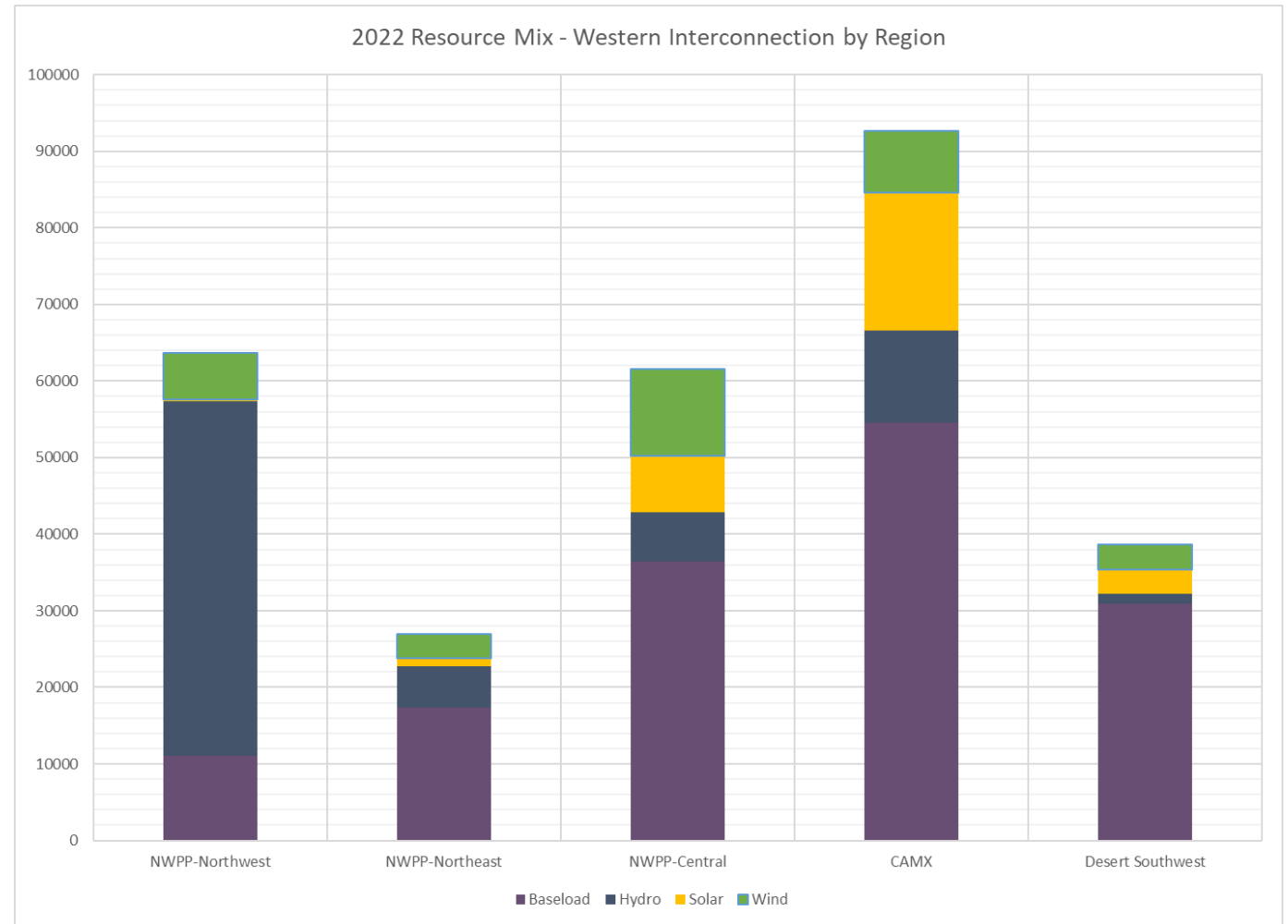
WECC oversees reliability planning and assessments, and monitors and enforces compliance for the Western Interconnection, which extends from Canada to Mexico, and part of 14 western states.

NERC-delegated responsibilities include:

- Certification and Registration of Bulk Power System Entities
 - Enforcement of Reliability Standards
 - Development of regional variances
- Reliability Assessment and Performance Analysis
- Event Analysis and Reliability Improvement, Situation Awareness
- Training and Education
- Promote Critical Infrastructure Security



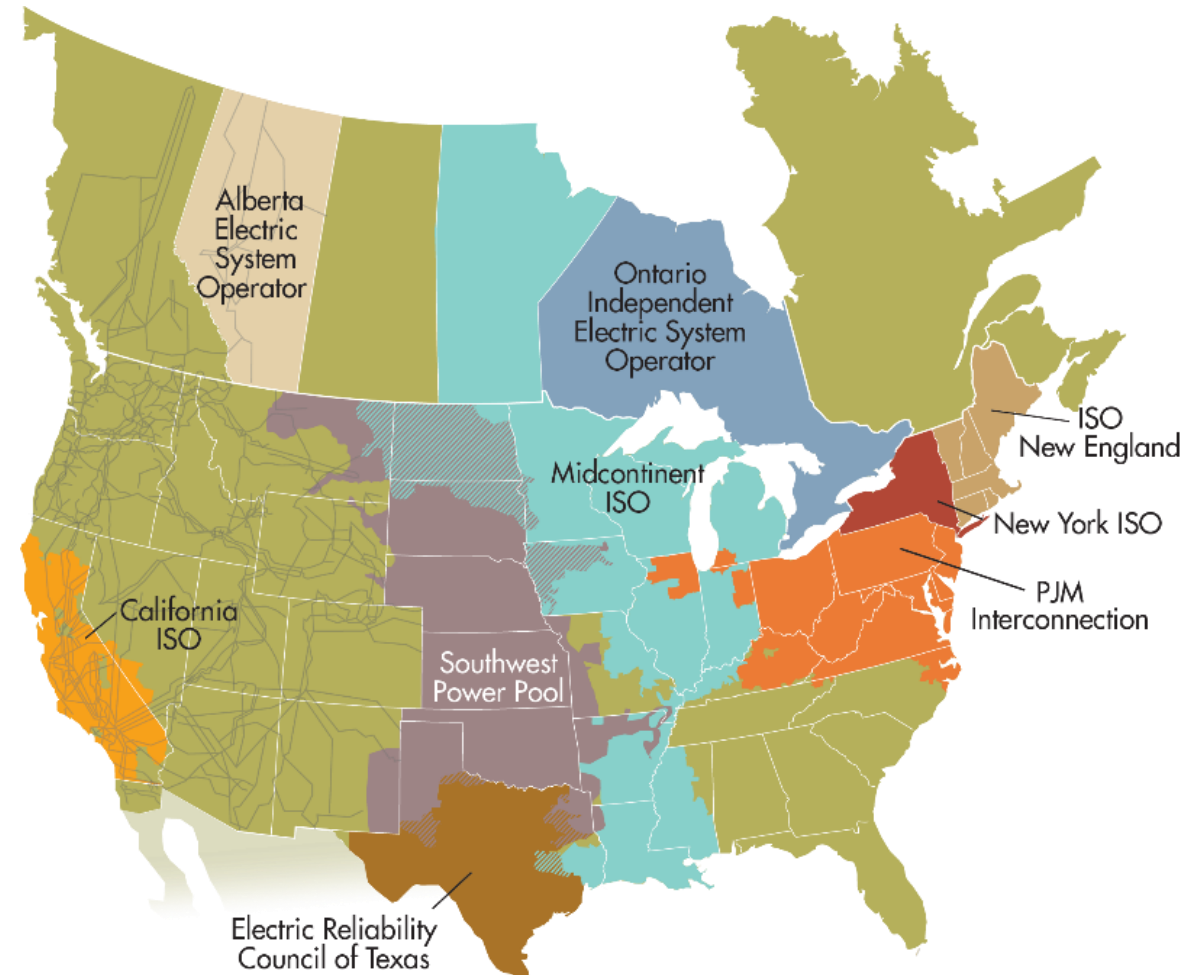
Resource Mix by Region - Western Interconnection



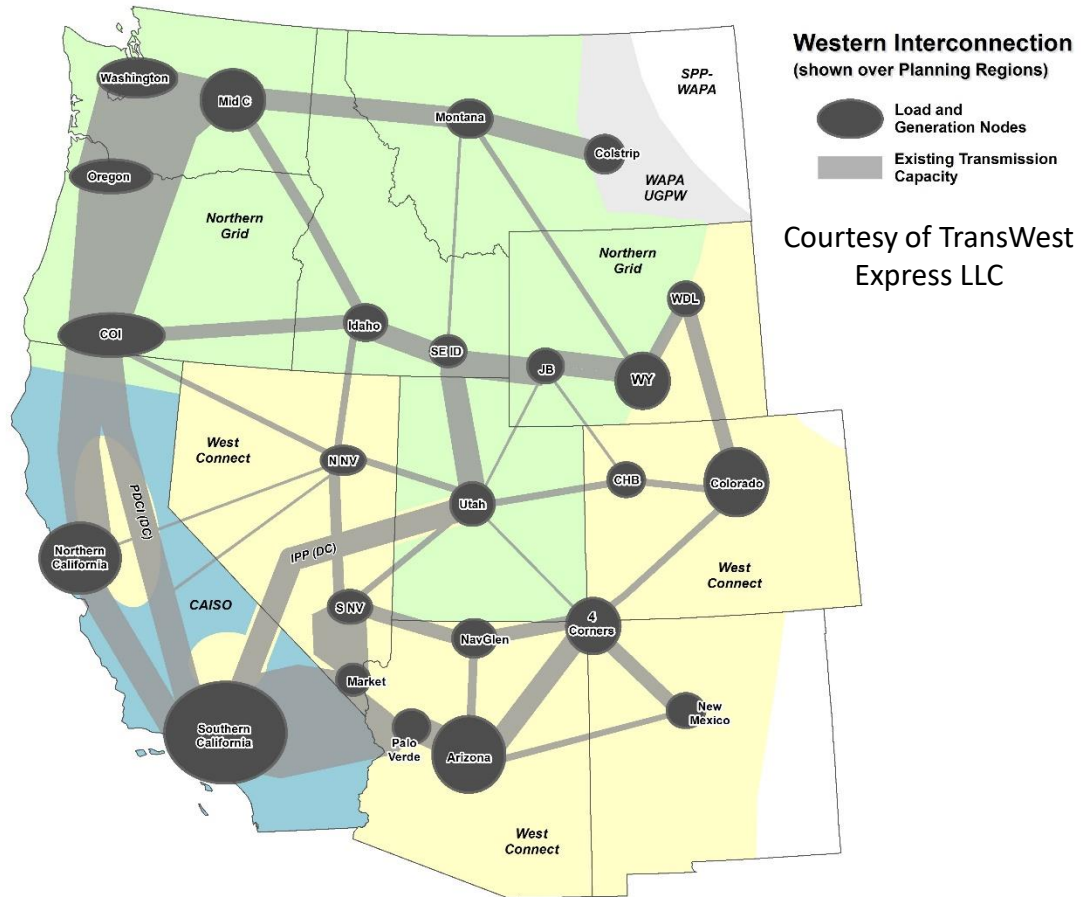
WECC – 2021 Western Assessment of Resource Adequacy
<https://www.wecc.org/Administrative/WARA%202021.pdf>

Most of the western interconnection is outside of an ISO/RTO structure and there are other coordination frameworks in place:

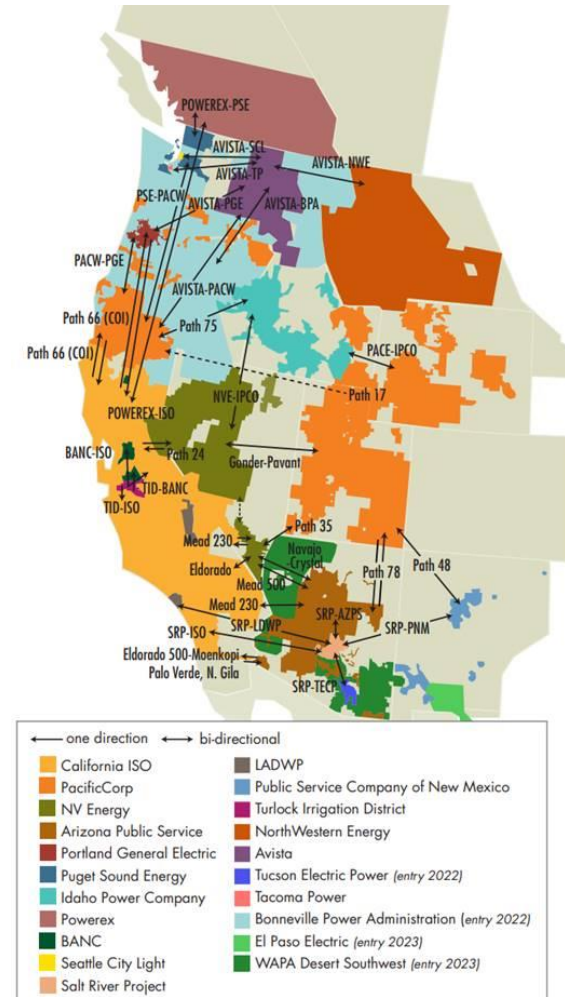
CAISO Coordination Statistics	
52,061	MW recorded peak demand (September 6, 2022)
~80	% of California load in CAISO, plus a corner of Nevada
9	ISOs and RTOs in North America
39	Balancing Authorities in the Western Interconnection (CAISO is one)
~30	% of WECC load in CAISO
10	States in which Western Energy Imbalance Market operates
~80	% of WECC load in WEIM in 2023
42	BAs and TOPs receiving reliability coordinator services from CAISO's RC West



The connectivity in the West is critical both to long term planning and to real time energy imbalance market opportunities

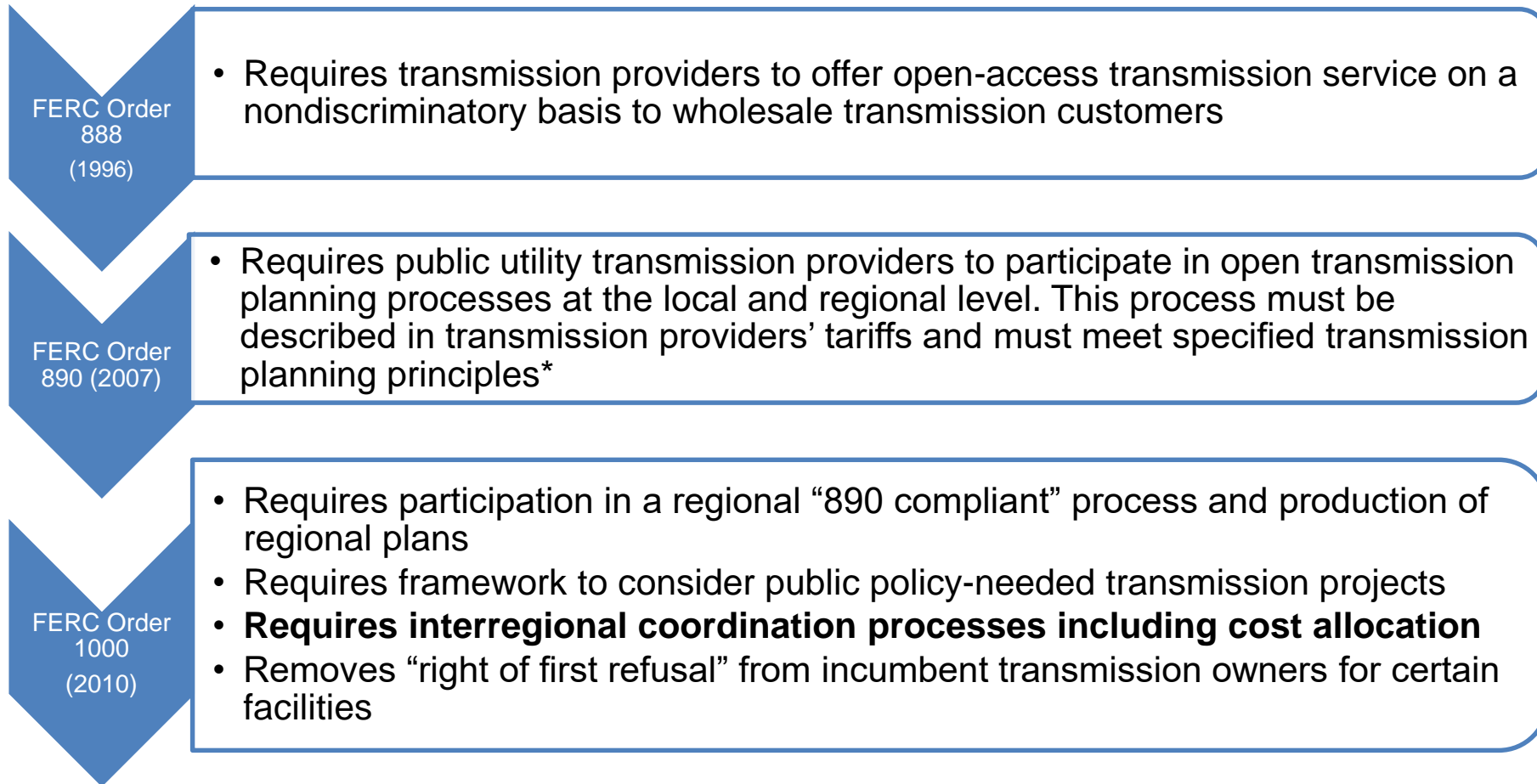


Estimated WEIM maximum transfer capacity



Path	Estimated Max Capacity (MW)
Path 24 (west to east)	100
Path 24 (east to west)	35-90
Eldorado	797
Path 35 (west to east)	580
Path 35 (east to west)	538
Gonder-Pavant	130
PACW to PGE	320
Path 66 (ISO to PGE)	627
Path 66 (PGE to ISO)	296
Path 66 (ISO to PACW)	331
Path 66 (PACW to ISO)	432
Path 17	0-400 ^{1, 2}
PSE to PACW	300
Eldorado 500-Moenkopi	732
Palo Verde, N. Gila	3,151
Path 78 (PACE to APS)	625
Path 78 (APS to PACE)	660
Navajo-Crystal	522
Mead 500	349
Mead 230 (APS <-> ISO)	236
Mead 230 (ISO to NVE)	3,443
Mead 230 (NVE to ISO)	3,476
IPCO to PACW (Path 75)	1,500
PACW to IPCO (Path 75)	400-510
PACE to IPCO	2,557
IPCO to PACE	1,550
NVE to IPCO	262
IPCO to NVE	390-478
Powerex <-> PSE	150
Powerex <-> ISO	150
BANC <-> ISO	2,000-4,000
TID to ISO	1,400
TID to BANC	650
Path 48	2,100
SRP <-> TEPC	9,988
SRP <-> PNM	400
SRP <-> AZPS	10,021
SRP <-> ISO	14,488
SRP <-> LDWP	349
Avista <-> BPA	3,600
Avista <-> NorthWestern	764
Avista <-> PACW	500
Avista <-> SCL	500
Avista <-> TP	500
Avista <-> PGE	500

Transmission access and expansion planning evolved to ensure open access and competitive markets



* Principles include: 1) Coordination, 2) Openness, 3) Transparency, 4) Information Exchange, 5) Comparability, 6) Dispute Resolution, 7) Regional Participation, 8) Congestion Studies, 9) Cost Allocation

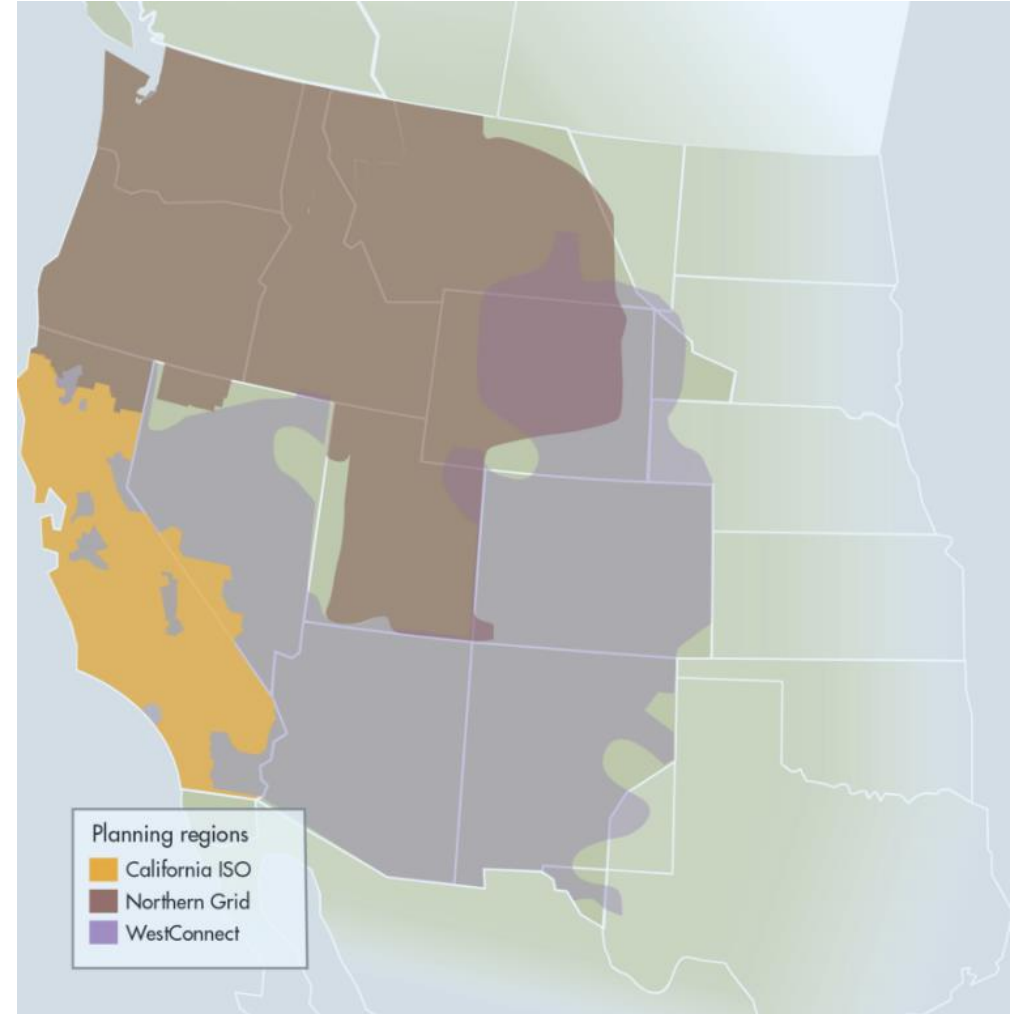
The CAISO and our neighbors have an interregional coordination framework approved by FERC

Interregional coordination

- Annual exchange of information
- Annual public interregional coordination meeting
- WestConnect's and Northern Grid's biennial processes have been coordinated with two cycles of the ISO's annual process

Interregional cost allocation

- Interregional projects only considered if comparing favorably to a regional solution to a regional need
- Costs shared in proportion to each region's share of total benefits (not capacity)



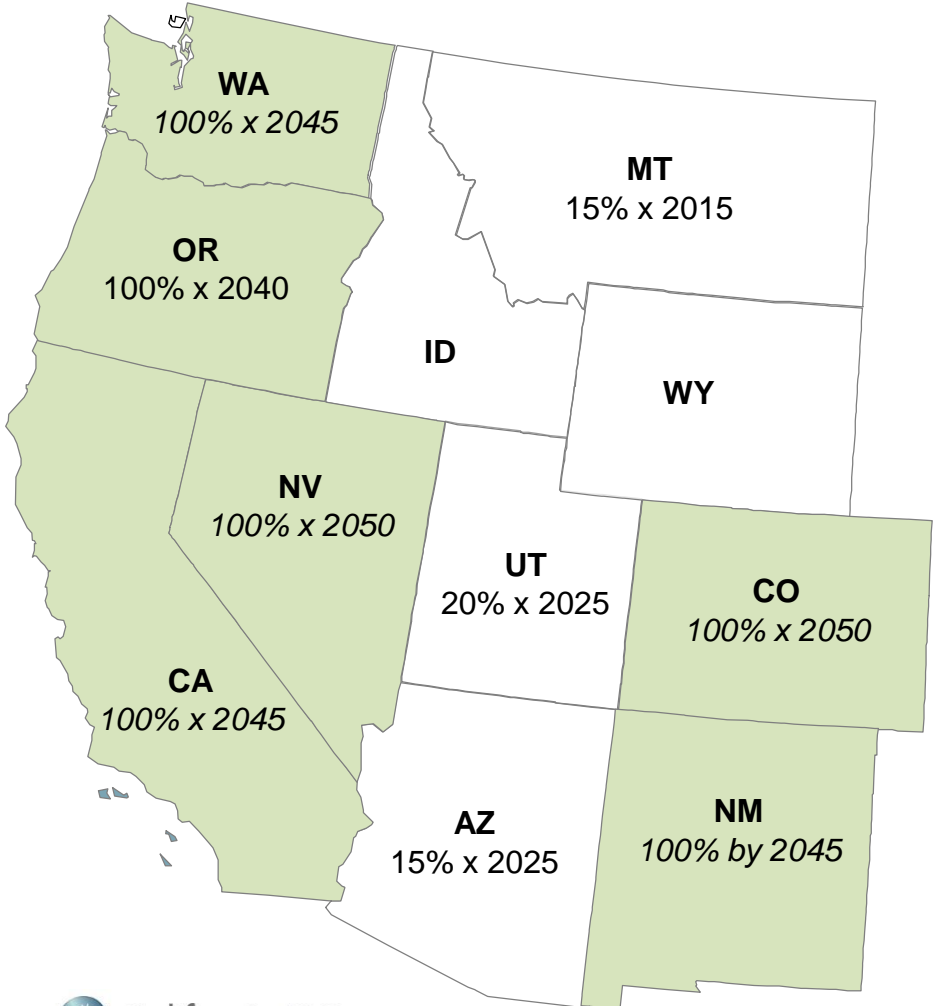
The federal landscape is also evolving; FERC has Notices of Proposed Rulemakings pending orders

- Three NOPRs on transmission planning:
 - Regional Transmission Planning and Cost Allocation and Generation Interconnection (RM21-17)
 - Transmission System Planning Performance Requirements for Extreme Weather (RM22-10)
 - One-Time Reports on Extreme Weather Vulnerability Assessments (RM22-16)
- Improvements to Generator Interconnection Procedures and Agreements (RM22-14)
- Expected (?) Interregional Planning NOPR

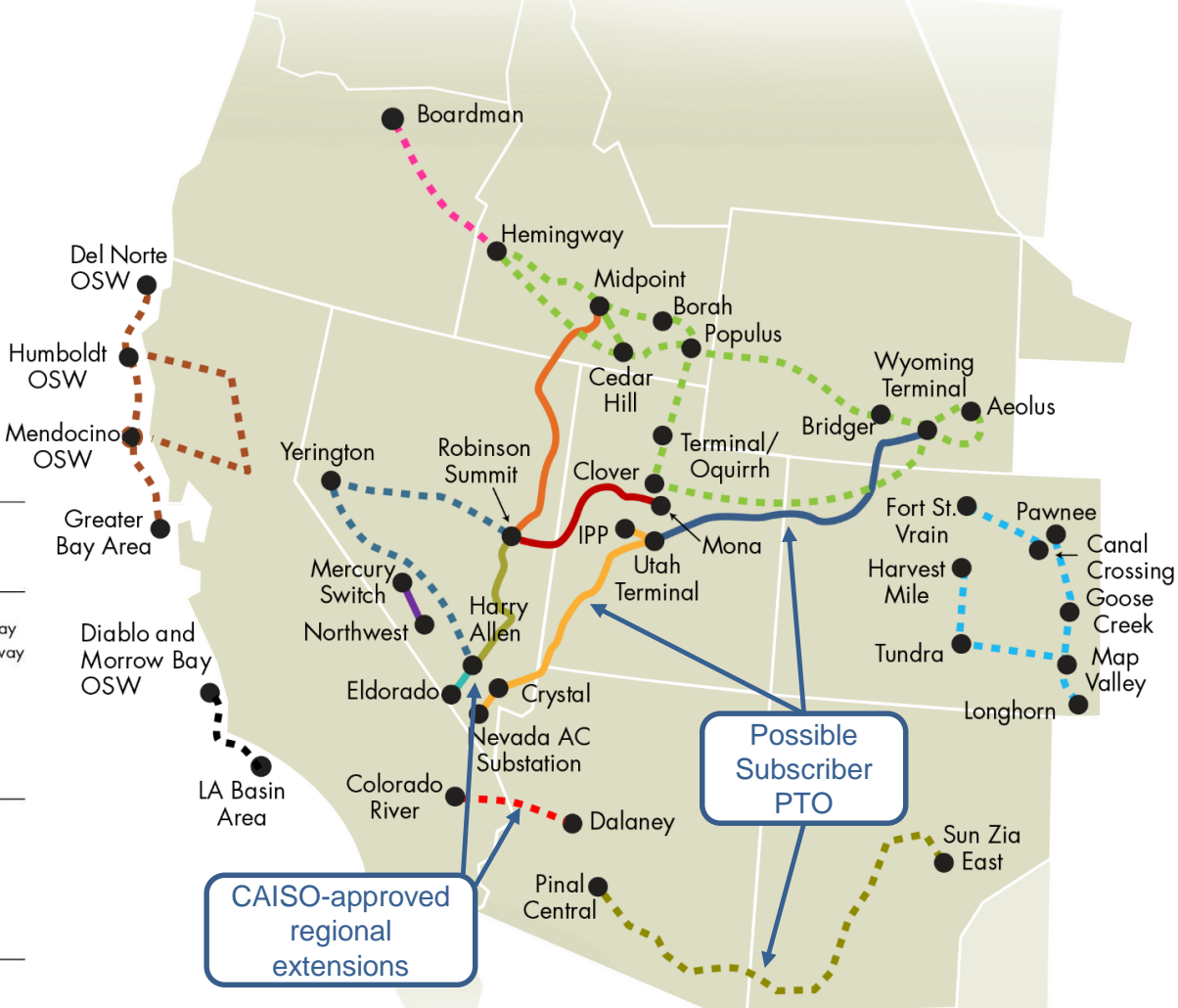
Also note:

- Joint Federal-State Task Force on Electric Transmission (AD21-15)
- Staff Workshop on Establishing Interregional Transfer Capability Transmission Planning and Cost Allocation Requirements (AD23-3-000)

Ambitious clean energy goals, load growth, and retirements are increasing interest in major transmission projects across the West

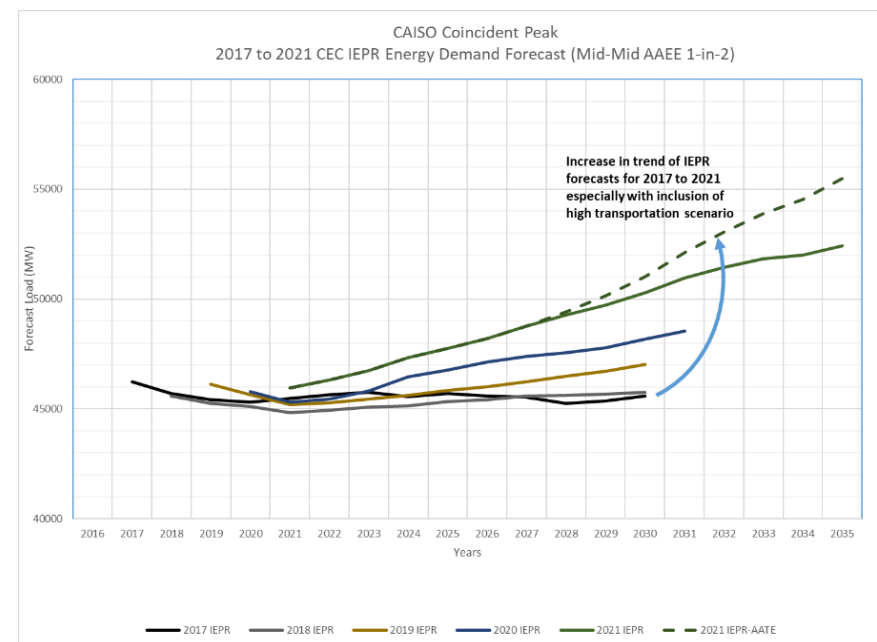
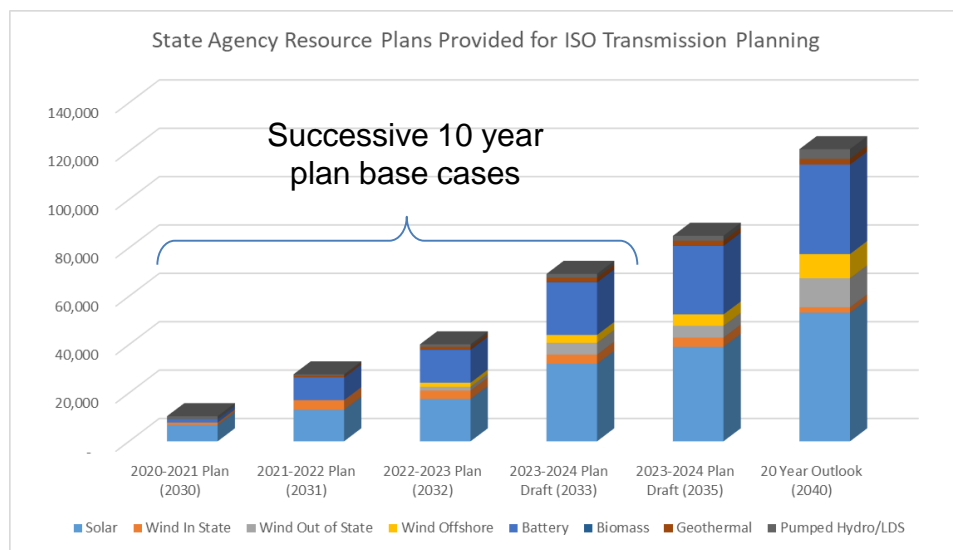


- Northern California OSW**
 - Sea Cable and overhead lines
- Other Proposed Projects**
 - Ten West Project
 - Boardman - Hemingway
 - Colorado Power Pathway
 - Sun Zia
 - Greenlink Nevada
 - Gateway Project
 - PTE
- 2020-2021 ITP Submittals**
 - TransWest Express DC
 - TransWest Express AC
 - Cross-tie
 - NW Tie Upgrade
 - SWIP North
- Existing Lines**
 - ON Line
 - Desert Link



California is admittedly accelerating the pace of resource development and related transmission needs most quickly

The pace of resource additions is set by escalating load growth, electrification of other industries including transportation, and de-carbonization of electricity production



Resource Additions – Grid Installed Capacity:

2020-2021 Plan – 10.4 GW in 10 years

2021-2022 Plan - 27.7 GW in 10 years

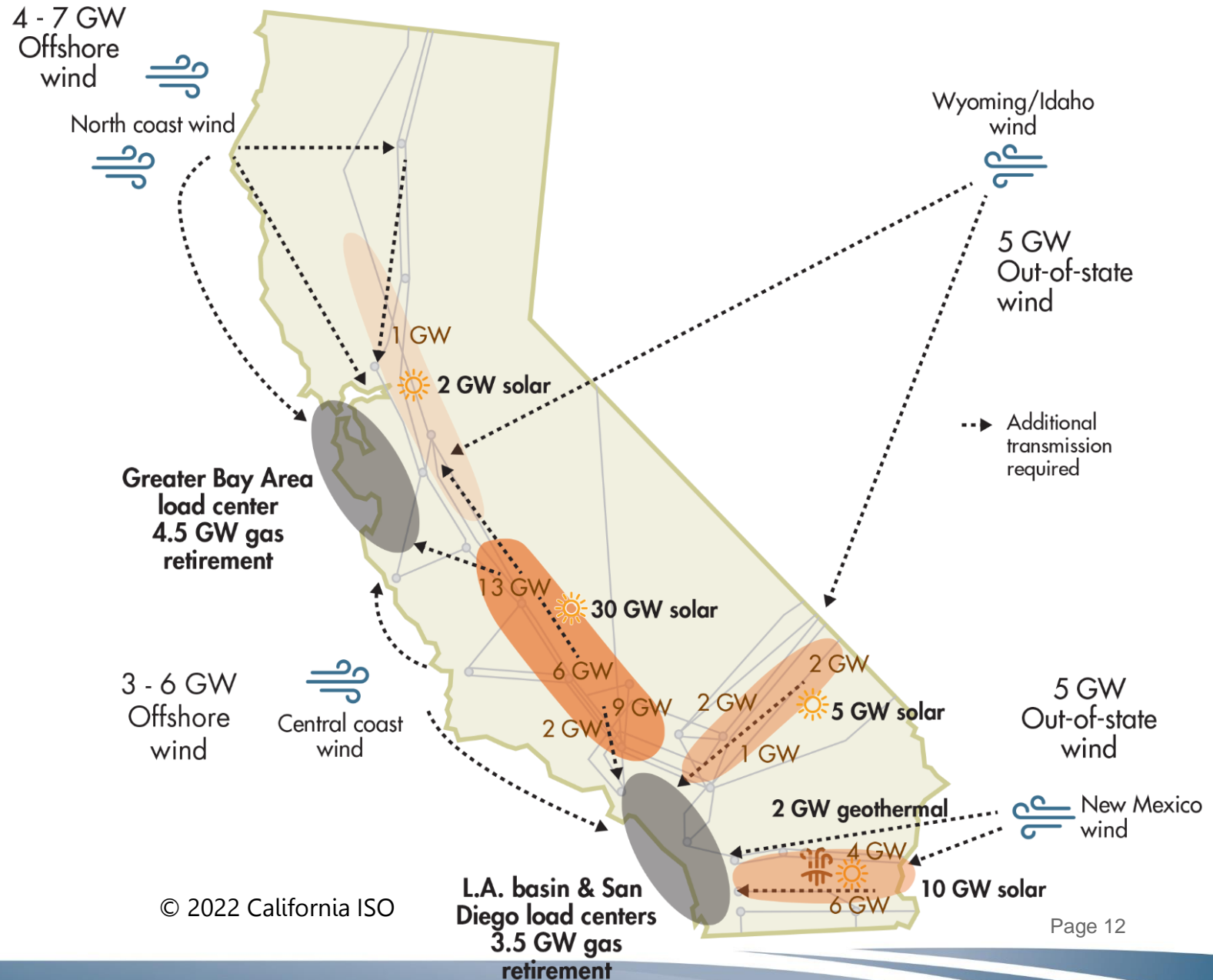
2022-2023 Plan - 40.1 GW in 10 years

2023-2024 Plan (draft) – 70.3 GW in 10 years

20 year outlook - 120 GW in 20 years

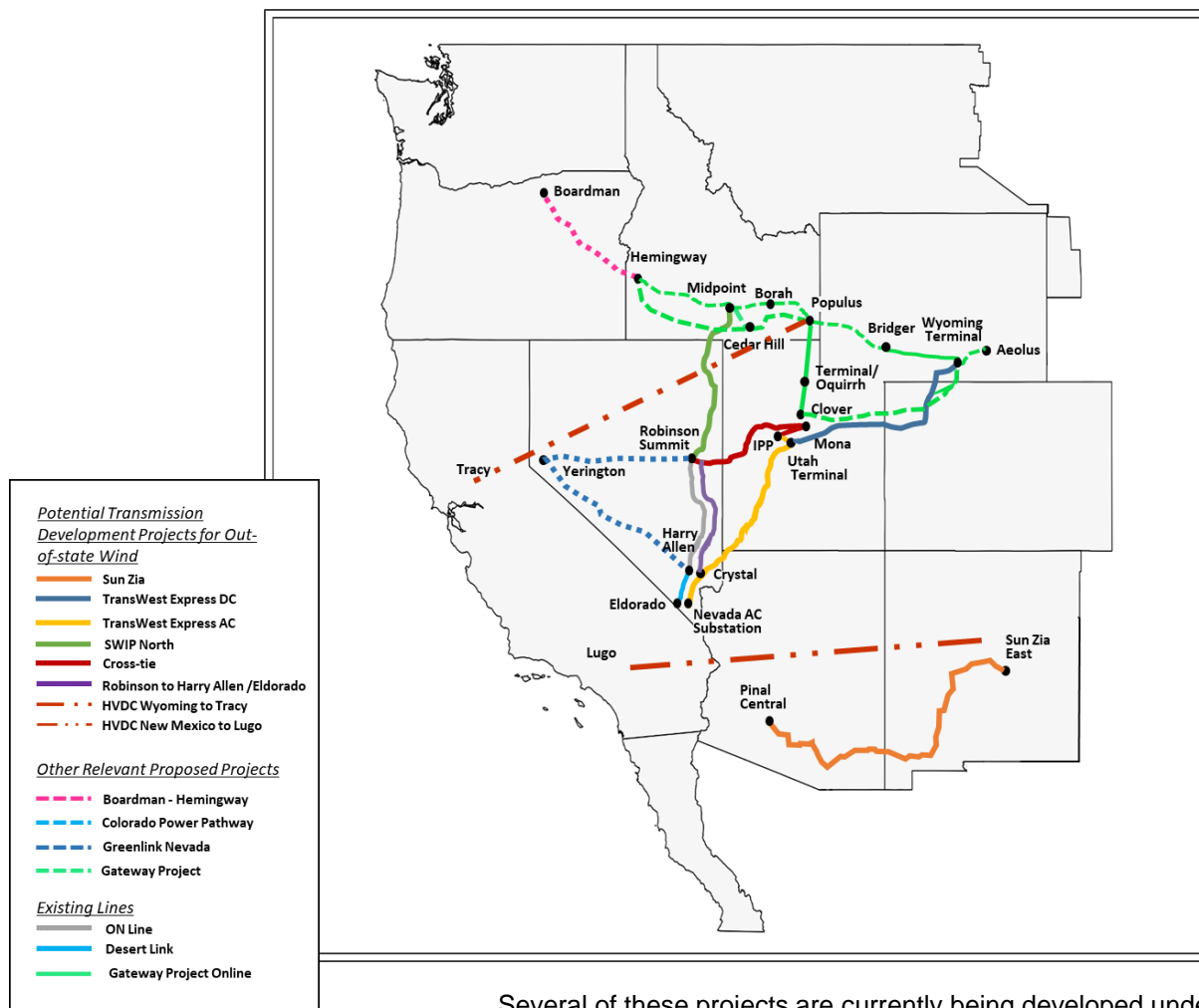
The ISO's 20 Year Outlook provides a useful foundation for interregional transmission discussions

53 GW	Solar
22 GW	Wind
2.3 GW	Geothermal
37 GW	Battery
4 GW	Long-duration Storage
~120 GW	Total
\$30.5B	Estimated cost of transmission



© 2022 California ISO

Significant transmission development needed to access out-of-state wind



The 20 Year Outlook found that to achieve the targeted volumes of out of state wind required the aggregate capacity of:

- TransWest Express
- Sunzia
- SWIP North
- Cross Tie
- Robinson-Eldorado
- Additional (HVDC) transmission to Northern California
- Additional (HVDC) transmission to Southern California

Several of these projects are currently being developed under a subscriber model – with the transmission costs incorporated into the energy costs – and not rate-base projects receiving cost-of-service cost recovery that would be added to CAISO transmission access charges.

ISO assessment of status of current planning processes

Process	Status
Regional planning (ISO Footprint)	<ul style="list-style-type: none">• Robust with state agency coordination, policy driven transmission moving forward, competitive process for greenfield high voltage, and established coordination with interconnection process
Generation interconnection (and Load Serving Entity resource procurement)	<ul style="list-style-type: none">• Proven effective with slower cadence of resource development• Recent process changes improved efficacy of existing interconnection processes• Procurement processes need better coordination with generation interconnection and transmission planning
Interregional Planning	<ul style="list-style-type: none">• FERC Order 1000 interregional coordination process providing useful data exchange• Not effective in advancing interregional solutions

Regional and Interregional Transmission - Opportunities and Challenges

- Coordination and collaboration through effective dialogue is critical
 - Interregional transmission planning needs to be coordinated with resource planning – cannot wait until resources are developed and then look for opportunities
 - We need tighter linkages between procurement processes and interconnection and planning processes for regional and interregional transmission
 - Cost allocation discussions for ratepayer-recovered transmission facilities struggle with FERC Order 1000 one-size-fits-all cost allocation structure in place
- Funding options to lower the delivered cost of electricity to consumers need to be exploited
 - The ISO has had ample investor interest in competitively procured transmission
- We need to be creative and flexible:
 - Options like the subscriber transmission owner model being developed with TransWest Express and Sunzia also need to be supported