

## DOCKETED

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# Renewable Energy Transmission Initiative v2.0

## Update on Existing Transmission Capability for Renewable Resources

Neil Millar, CAISO  
Transmission Technical Input Group

Joint Agency Workshop  
2 May, 2016



California Public  
Utilities Commission



California Energy  
Commission



# Background

Goal is to characterize existing transmission system capacity and planned improvement/changes and the implications for accessing additional renewable resources

TTIG participants include all California Transmission Planning Entities

|                                       |  |
|---------------------------------------|--|
| Sacramento Municipal Utility District | California Independent System Operator     |
| Imperial Irrigation District          | Los Angeles Department of Water and Power  |
| Silicon Valley Power                  | Turlock Irrigation District                |
| Modesto Irrigation District           | Western Area Power Administration - SNR    |
| San Francisco PUC                     | Transmission Agency of Northern California |
| City of Santa Clara                   | Pacific Gas & Electric                     |
| Southern California Edison            | San Diego Gas & Electric                   |

# Data Sources and Input

TTIG assembled current transmission capabilities and proposed transmission. Contributors include:

- Information on existing capacity from previous studies performed by planning entities
- Western region information from Western Interstate Energy Board
- Developer-provided information on proposed transmission facilities

# Methodology

- California Transmission Capability estimates provided by planning entities
  - California ISO footprint
    - Transmission capacity estimates developed in prior studies for transmission areas with commercial interest (not by RETI-defined CREZ)
    - “Energy-only” transmission estimates developed for transmission areas with commercial interest - Areas with limited commercial interest not studied.
  - Other California transmission planning entity input provided directly
- Out-of-State capability limited by import paths as well as by the capability of lines from the injection point in CA to the load centers
- Transmission expansion capacity from planning entity / utility / developer-provided input

# California ISO Transmission Capability

Several new transmission lines have been constructed and several more under development. These are included in the current transfer capability values

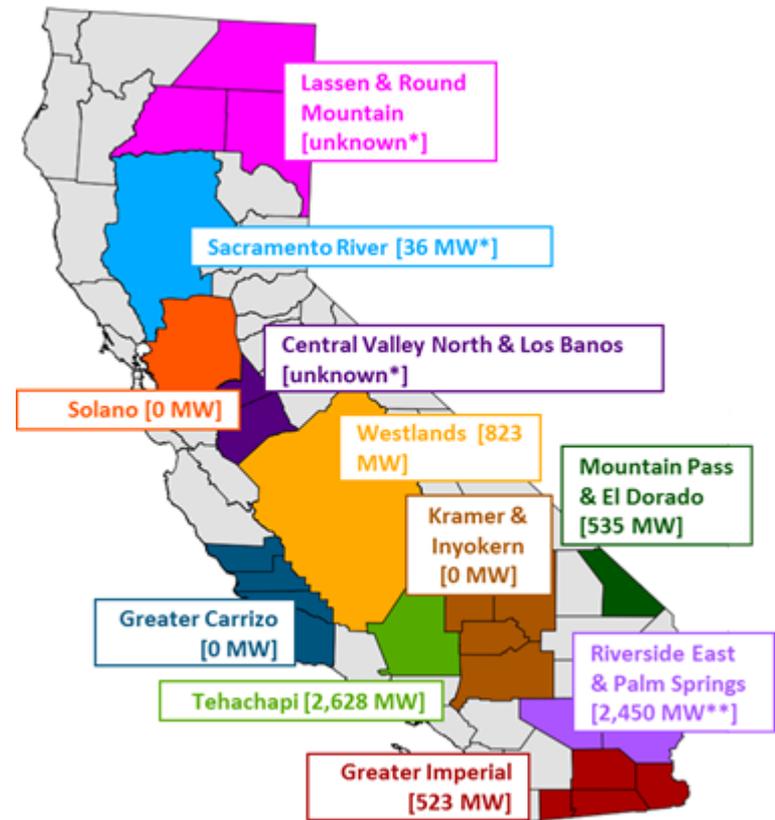


| Transmission upgrade                             | Approval status |               | Online    |
|--|-----------------|---------------|-----------|
|  | ISO             | CPUC          |           |
| 1 Carrizo-Midway                                 | LGIA            | NOC effective | energized |
| 2 Sunrise Powerlink                              | Approved        | Approved      | energized |
| Suncrest dynamic reactive                        | Approved        | Not needed    | 2017      |
| 3 Eldorado-Ivanpah                               | LGIA            | Approved      | energized |
| 4 Valley-Colorado River                          | Approved        | Approved      | energized |
| 5 West of Devers                                 | LGIA            | Pending       | 2021      |
| 6 Tehachapi (segments 1, 2 & 3a of 11 completed) | Approved        | Approved      | 2016      |
| 7 Cancelled                                      |                 |               |           |
| 8 South Contra Costa                             | LGIA            | In process    | 2016      |
| 9 Borden-Gregg                                   | LGIA            | Not yet filed | 2018      |
| 10 Path 42 reconductoring                        | Approved        | Not needed    | 2016      |
| 11 Sycamore-Penasquitos                          | Approved        | Not yet filed | 2017      |
| 12 Lugo-Eldorado line reroute                    | Approved        | Not yet filed | 2017      |
| 13 Lugo-Eldorado and Lugo-Mohave series caps     | Approved        | Not needed    | 2019      |
| 14 Wamerville-Bellota reconduct.                 | Approved        | Not yet filed | 2017      |
| 15 Wilson-Le Grand reconduct                     | Approved        | Not yet filed | 2020      |

# California ISO Fully Deliverable Capability by Transmission Area

- Sufficient capacity to meet 33% RPS but not 50% RPS
- Additional capacity would be required to meet 50% RPS with all firm delivery resources

*\*Note: Not enough information available for transmission areas with little or no commercial interest*

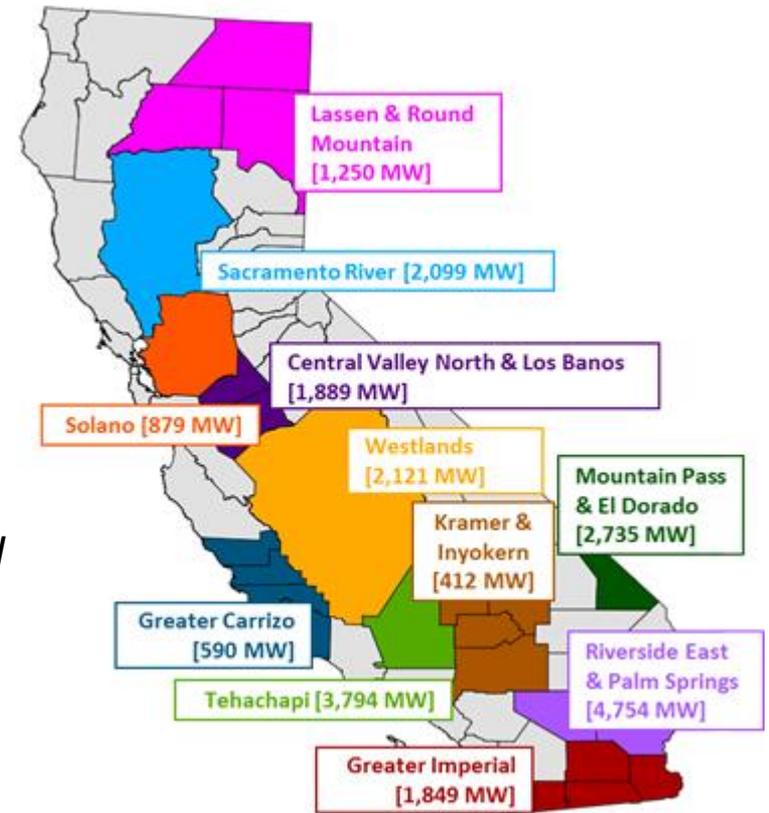


# California ISO Energy-only Capability by Transmission Area

- There is sufficient transmission to accommodate resources beyond 33% on an “energy only” basis
- Will allow faster and less expensive resource interconnection
- EO capacity areas generally comport with commercial interests

*“Energy-only resources in Sacramento Valley could interconnect to the COTP” - TANC*

***Estimated Energy-only capacity is over 22,000 MW subject to curtailment***



# Non- California ISO California Transmission Capability

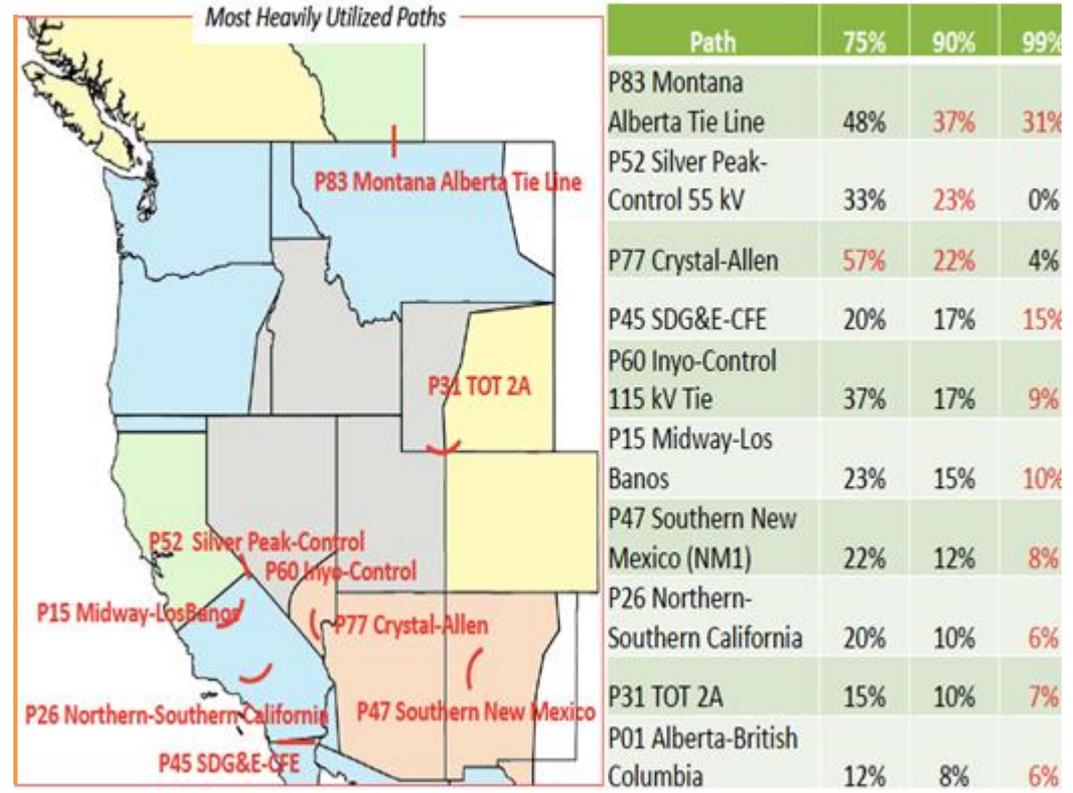
- Current California projects under development and proposed
- Projects that have not been approved are not included in current transmission capacity estimates

| Proponent    | Name                     |
|--------------|--------------------------|
| LADWP        | Barren Ridge             |
| LADWP        | South of Haskell         |
| LADWP        | Victorville-LA           |
| LADWP        | IPP Replacement          |
| SMUD/Western | Colusa Sutter 500 kV     |
| Western      | SLTP                     |
| IID          | STEP Midway-Devers 55 kV |
| IID          | Desert Southwest Project |

# Capacity on Out of State Transmission will limit renewable imports into California

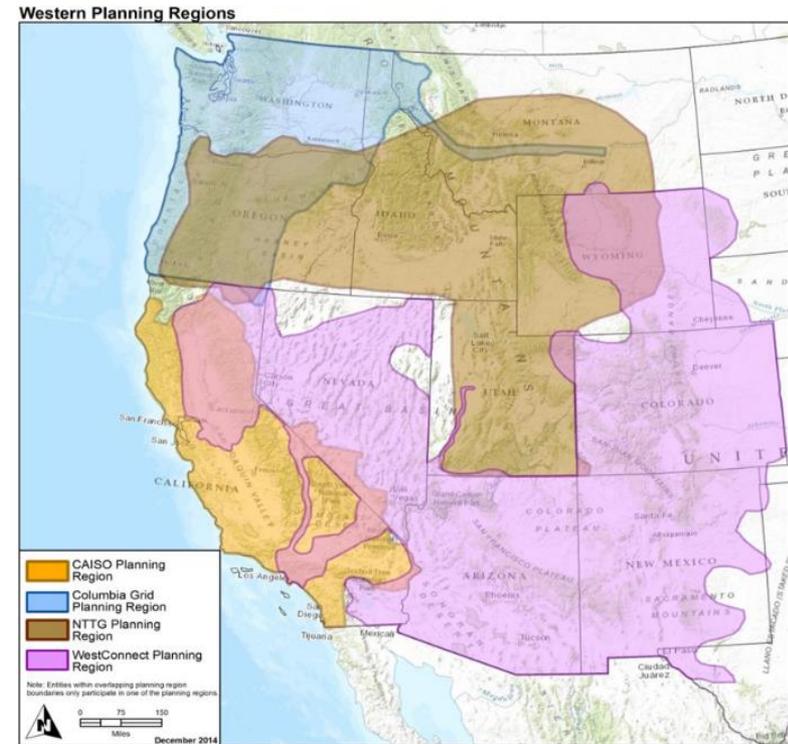
- Several of the most heavily used paths in the Western Interconnect deliver energy to California
- TTIG assumed capacity for OOS resources limited to capacity available at intertie transmission area

***Example: NV capacity limited to the Mountain Pass & El Dorado capacity***



# Interregional Transmission Planning

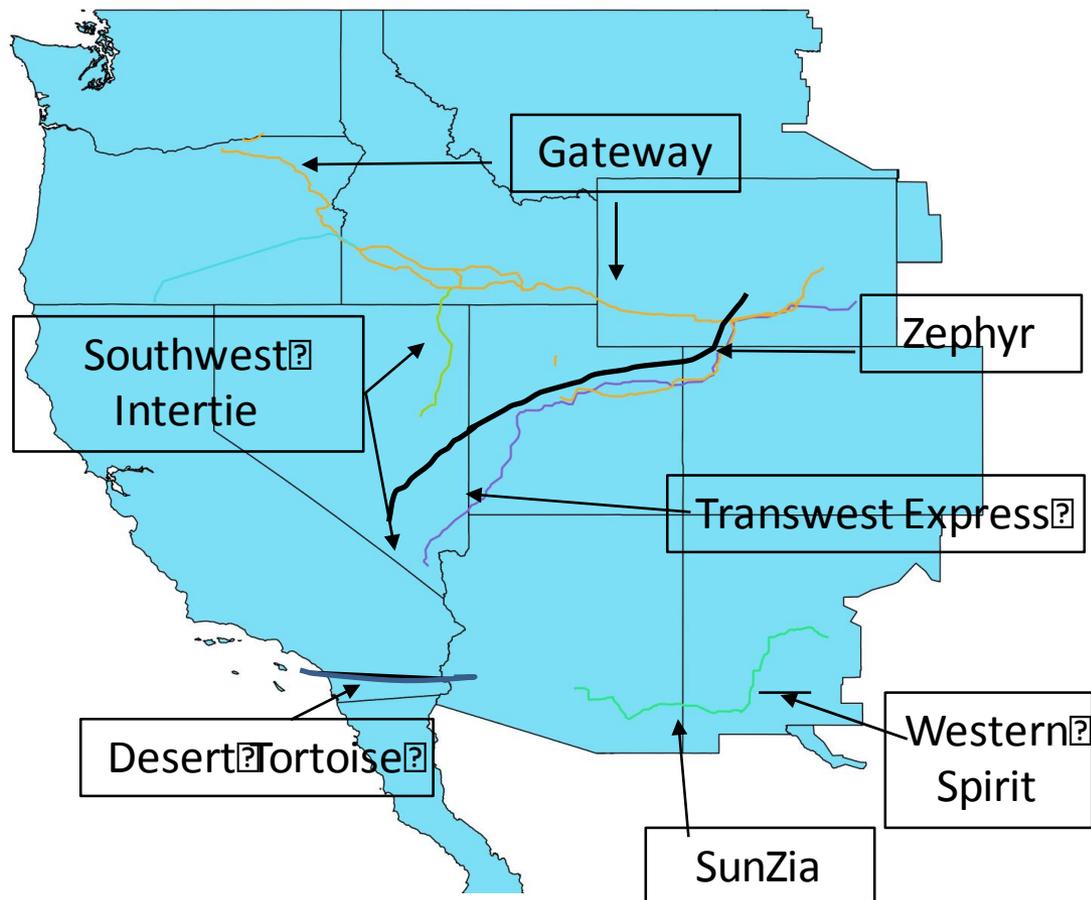
- FERC Order 1000 formed four planning regions in the western interconnection
- Planning regions are required to coordinate planning data, information, and interregional transmission proposals submitted into their regional processes
- Through interregional coordination the planning regions are well positioned to support RETI 2's goal to explore combinations of renewable generation resources in Wyoming, New Mexico and other areas
- The ISO is currently working with NTTG and WestConnect to consider the best approach to consider RETI's goals within their regional planning processes



# Proposed Interregional Transmission

Several large transmission projects under development could deliver substantial capacity to the California grid in the future

- Gateway Projects
- SunZia
- Transwest Express
- Zepher
- Southwest Intertie Project
- Western Spirit
- Desert Tortoise



# Summary conclusions

- Considerable transmission capacity is available for energy-only resources, but . . .
- Deliverability considerations are critical in considering actual transmission needs to achieve 50% RPS
- Out of state resources are technically viable to achieve – based on input received
- Out-of-State capability can be constrained by the transfer capability into California at the interconnection point – both in state and out of state capabilities need to be taken into account