

The Transmission Challenge for Renewable Energy in California the Western States

CGEC 2011 California Geothermal Forum
Mammoth Lakes, CA

Redesigning the Western Interconnection to Access Renewable Energy Resources

- Transmission infrastructure limits identified as a major barrier for meeting 2020-2050 renewable energy mandates (33% RPS and beyond in CA)
 - Response: DOE, State and Utility-Sector Funding for Transmission Planning and Construction to Access Renewables
- Since 2008, geothermal industry very involved in Western States transmission planning efforts
 - Western Governors' Association; RETI and CTPG in CA; RETACC NV; WECC's Regional Transmission Expansion Planning (RTEP)

Accomplishments to Date: Preparing the “Short List” of 2010-2020 Transmission Priorities for Renewables

- ✓ Zone-Specific Assessments for Renewable Energy Resources across the Western States
- ✓ Statewide Renewable Energy Transmission Plans in CA and NV
- ✓ Economic Analysis of “Least Cost” Alternatives for Renewable Technologies (Supply Curve Analysis)
- ✓ “Net Short” Calculations of Energy Demand/Need for Renewable Energy
- ✓ Approving and constructing projects: Sunrise Powerlink, NV On Line; what next?

FOUNDATIONAL PROJECTS BY 2020



CAISO

- CAISO02 Sunrise
- CAISO03 Blythe-Doyers
- CAISO04 Tehachapi Upgrade

SSPG

- SSPG02 SWIP South
- SSPG05 TCP Harry Allen - Northwest
- SSPG06 TCP Northwest - Amargosa

SWAT

- SWAT01 PV-NG#2
- SWAT06 Pinal Central - Tortolita
- SWAT07 Southeast Valley (SEV)
- SWAT08 PV - Morgan

CCPG

- CCPG02 Pawnee - Smoky Hill
- CCPG03 Waterton - Midway
- CCPG04 San Luis Valley

NTIG

- NTTG01 Gateway South Phase 1
- NTTG02 Gateway Central Phase 1
- NTTG03 Gateway West Phase 1
- NTTG05 Hemingway - Boardman
- NTTG06 Cascade Crossing

CG

- CG01 I-5 Corridor
- CG02 West McNary
- CG03 Big Eddy - Knight
- CG04 Little Goose Area Reinforcement

BCII

- BCH01 Nicola - Meridian
- BCH03 BC-US Interlie

Alberta AESO

- AESO03 1202L Conversion
- AESO04 Heartland
- AESO05 West HVDC
- AESO06 East HVDC
- AESO07 Fort McMurray - East Line
- AESO08 Fort McMurray - West Line



Final - Ver 7.0, July 22, 2010

(1) Map does not reflect 230 or 345 kV lines that are included in the Foundational Transmission Project List
 (2) Internal reinforcements projects not shown for clarity
 (3) Lines shown are for illustrative purposes only and may not reflect final line routing.

California's Transmission Strategy to get to 33% RPS and beyond ...

CAISO 2011 Statewide Transmission Plan:

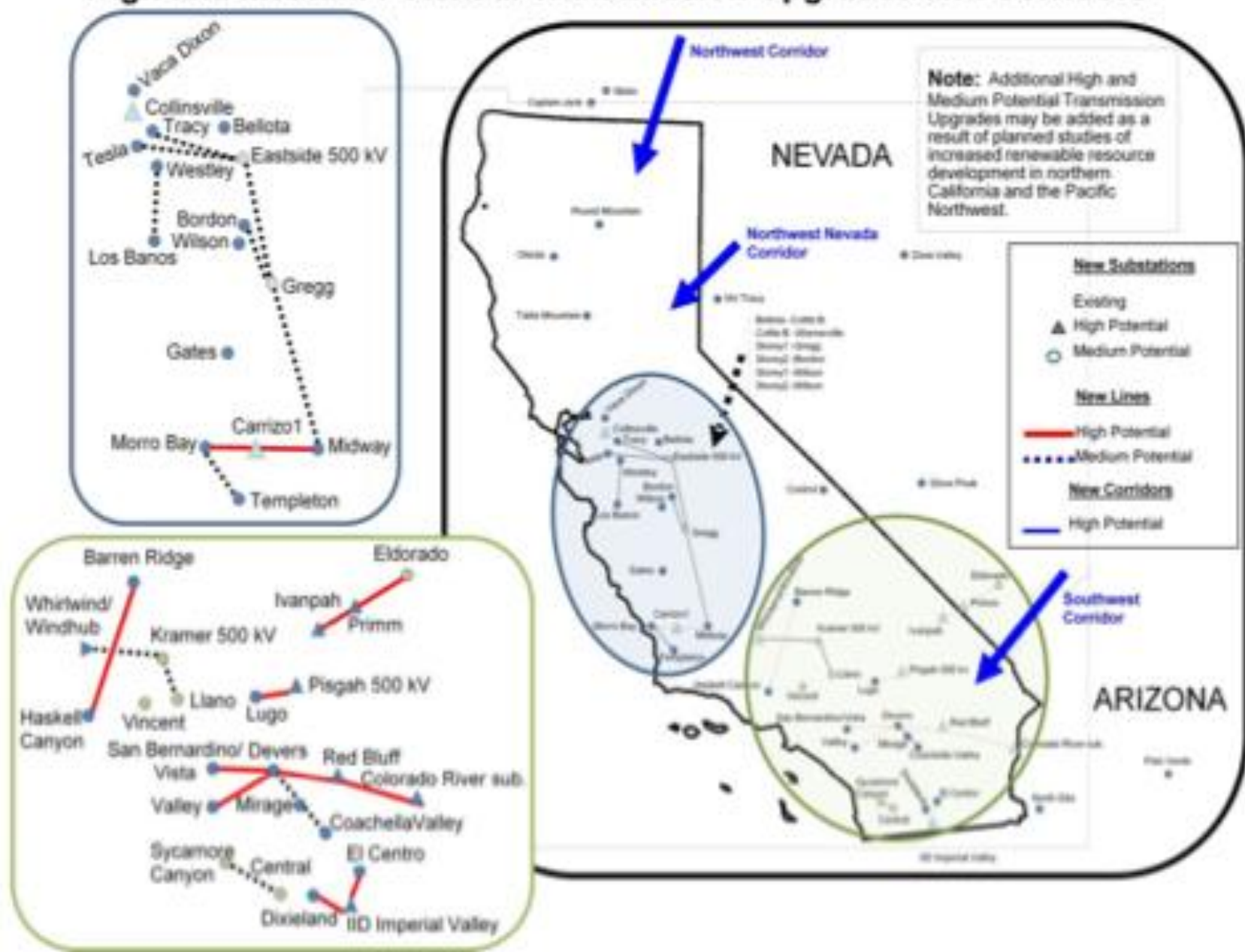
- “No new major transmission projects are required to be approved by the ISO at this time to support achievement of California's 33% renewable energy goal given the transmission projects already approved or progressing through the California Public Utilities Commission approval process.”

Figure 1. CTPG Renewable Generation



2010 CTPG Statewide Transmission Plan

High and Medium Potential Transmission Upgrades and Corridors



GEA 2011 Board Policy Priority

Facilitate Permitting and Construction of the Transmission Capacity Needed to Support Geothermal Energy Development.

Inadequate transmission is an increasingly common barrier to geothermal energy production. Ensuring that transmission capacity is built in a timely fashion to meet the needs of project development will require effective state, regional and federal support.

Transmission Objectives and Strategies

- Support state and regional transmission policies that will facilitate new geothermal development,
- Work collaboratively with other groups to support regional policies and initiatives to promote needed transmission
- **Identify priority transmission projects** needed for geothermal development
- Support DOE/FERC efforts to facilitate the permitting and construction of needed transmission capacity.

Transmission Financing and Cost Recovery

- Who will bear the initial cost and risk of transmission construction determined necessary to meet RPS/RES targets?
 - “It’s always going to be the ratepayers...”
- For the geothermal industry, the focus should be financing solutions for **Grid Access** (i.e. network upgrades and expansion of intra-state collector line systems that connect to trunk lines)
- Aggregation of costs for transmission solutions for dispersed geothermal projects (20-100 MW) across recognized renewable energy zones should assess system benefits and cost-recovery at the broadest level

Specific Transmission Needs

- **Imperial Valley and Imperial Irrigation District (IID) System (Path 42 Upgrades)**
- **Objective:** Resolve transmission cost allocation and grid access issues for a variety of interconnection, upgrade and system improvement proposals in the Imperial Valley and IID system. The major goal is to get IID the financial and planning resources it needs to implement long-awaited system improvements to provide transmission access to Imperial Valley geothermal resources in all directions (i.e. Arizona, Los Angeles area, San Diego)

Nevada-California Transmission

- Northwest Nevada “High Potential Transmission Corridor”
- Path 52 Corridor (Nevada-Owens Valley and South)