

2012 DOE National Electric Transmission Congestion Study Workshop

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San Diego

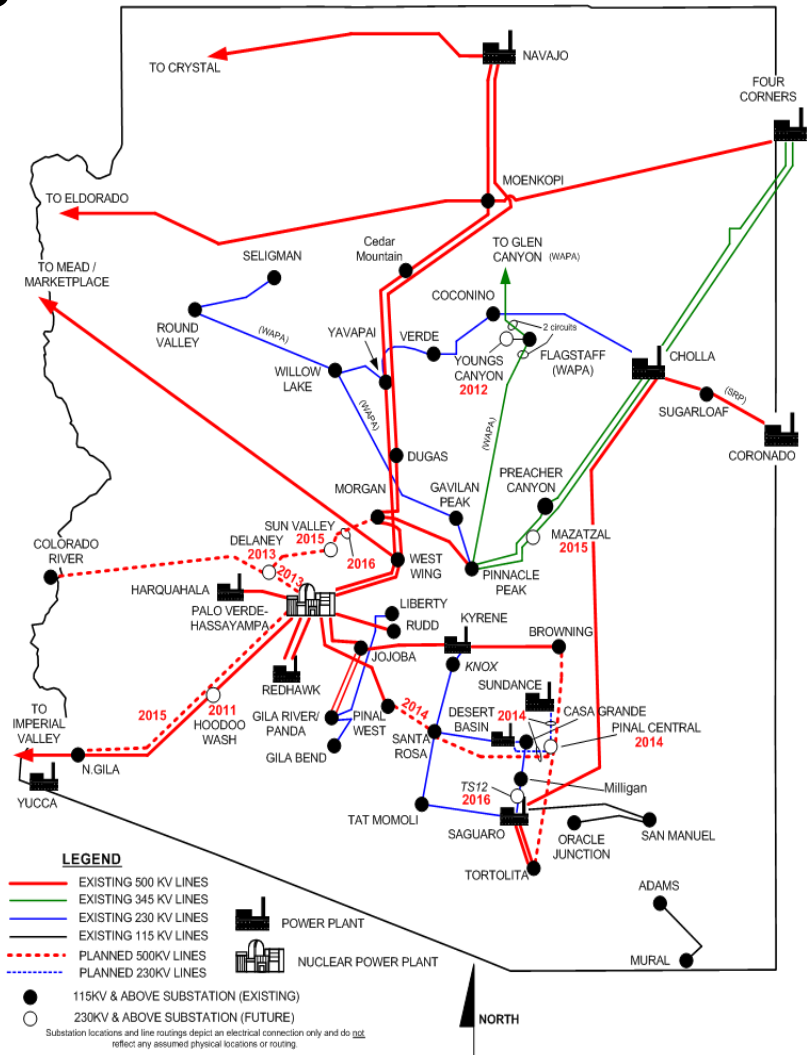


Topics

- Phoenix – Tucson Area
 - Congestion mitigated with planned transmission projects
- Southern California Area
 - No congestion identified with current CA plans to meet RES
 - Conditional congestion if CA utilizes more solar from AZ/NV or wind from NM or northern Rocky Mountain Area
 - Conditional congestion if CA relies on out of state resources for ancillary services to firm in state renewable resources
- Data Sources for Congestion Study

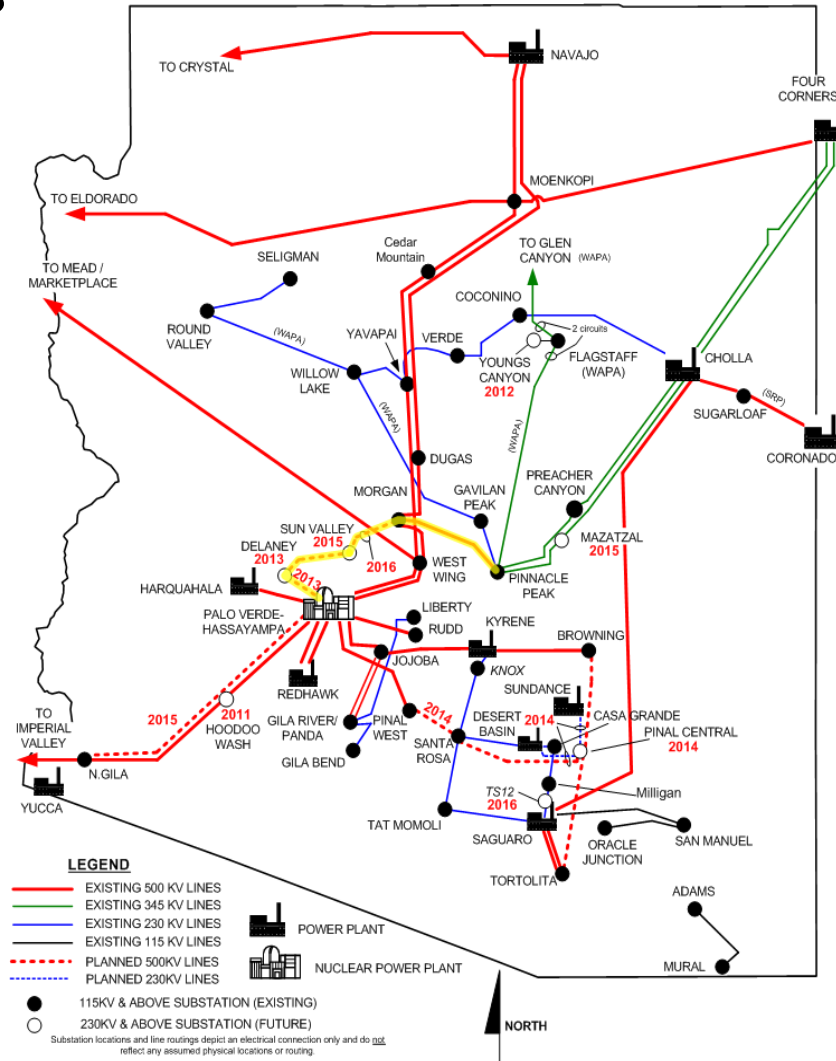
Planned Phoenix – Tucson Area Transmission Projects

- Planned EHV Projects
 - Palo Verde – Delaney – Sun Valley – Morgan – Pinnacle Peak 500kV
 - Southeast Valley 500kV
 - Pinal Central – Tortolita 500kV



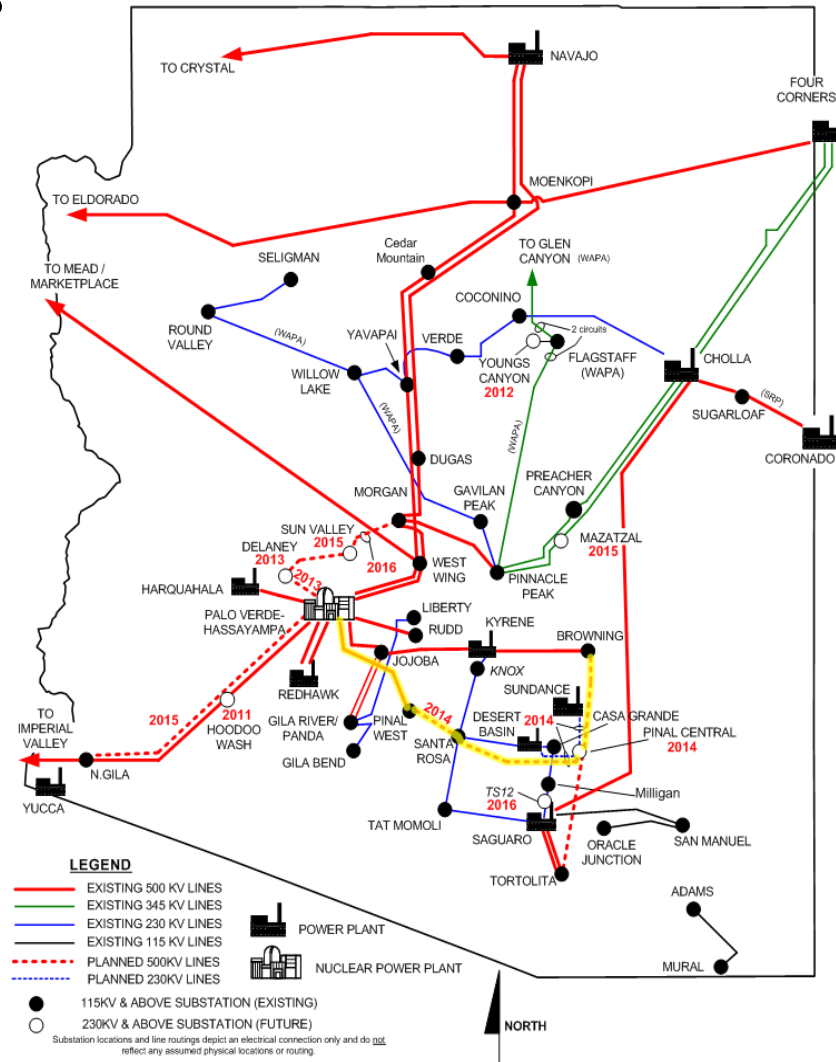
Planned Phoenix – Tucson Area Transmission Projects

- Palo Verde -Delaney-Sun Valley-
Morgan-Pinnacle Peak 500kV
 - 83 miles of new 500kV transmission lines west and north of Phoenix
 - 26 Miles of already in-service: Morgan-Pinnacle Peak 500kV
 - APS, CAWCD, SRP
 - Increases system reliability and import into Phoenix



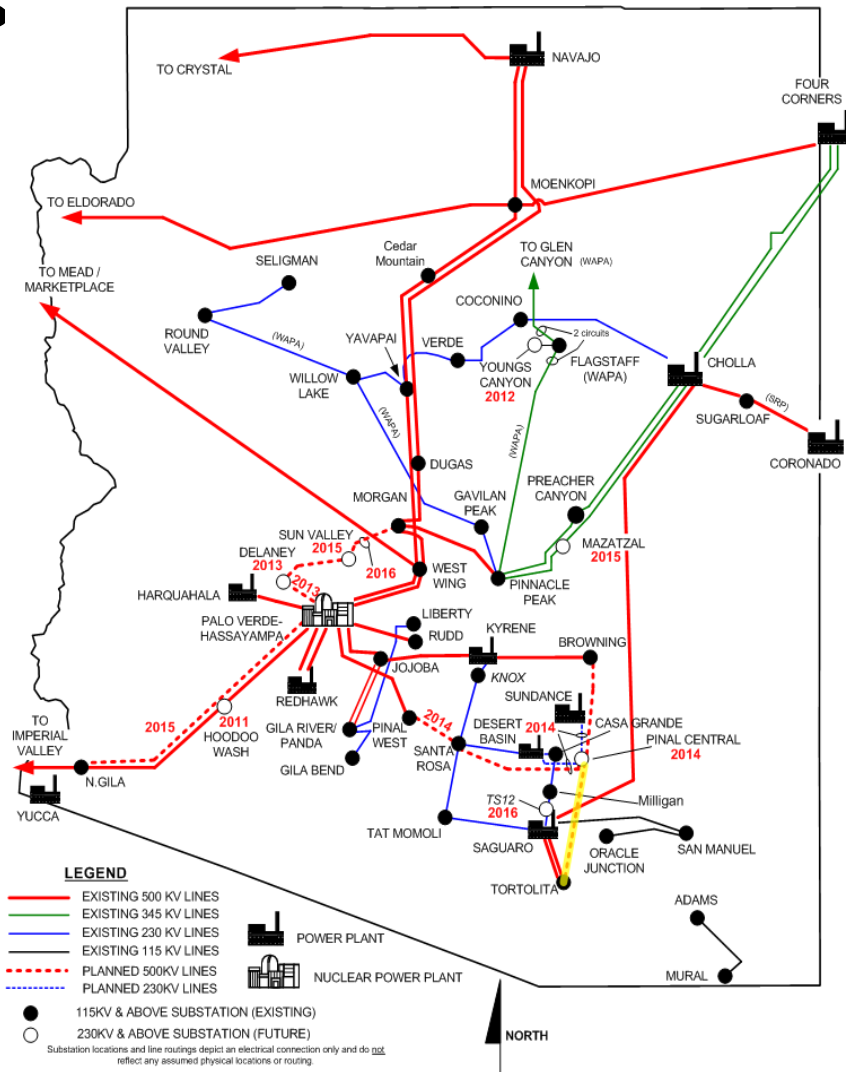
Planned Phoenix – Tucson Area Transmission Projects

- Southeast Valley
 - 100 miles of new 500kV transmission lines south and east of Phoenix
 - 50 miles already in-service: Hass.-Pinal West 500kV
 - SRP, TEP, SWTC, ED2, ED3, ED4
 - Increases system reliability and import into Phoenix

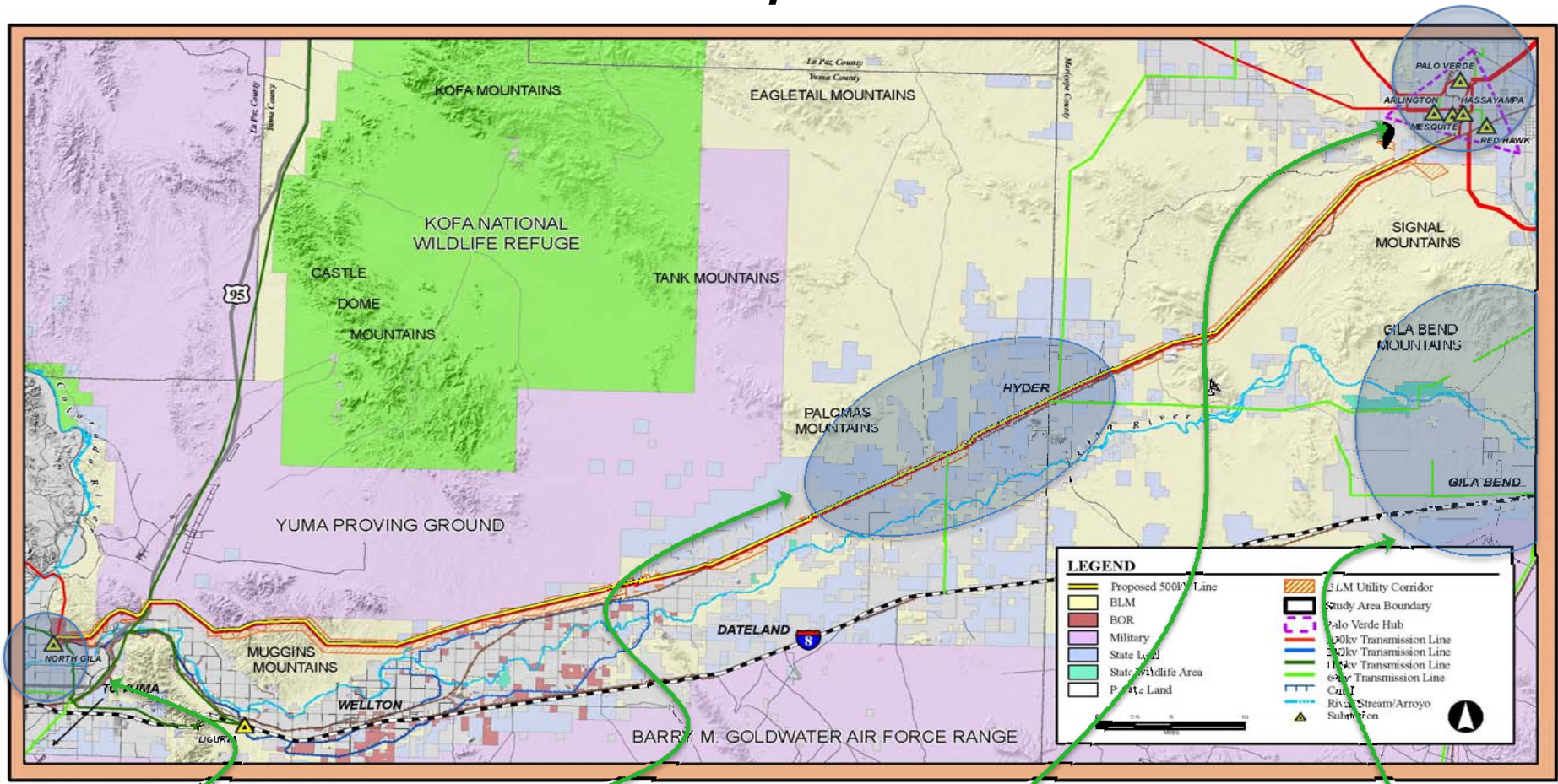


Planned Phoenix – Tucson Area Transmission Projects

- Pinal Central-Tortolita 500kV
 - 38 miles of new 500kV transmission line
 - TEP, SRP, SunZia
 - Provides additional EHV source increasing import capability into and reliability for the Tucson Area



Interconnection Requests in APS Queue total > 10,000 MW



5 projects
516 MW

8 projects
2148MW

5 projects
2570 MW

> 10,000 MW of
existing generation

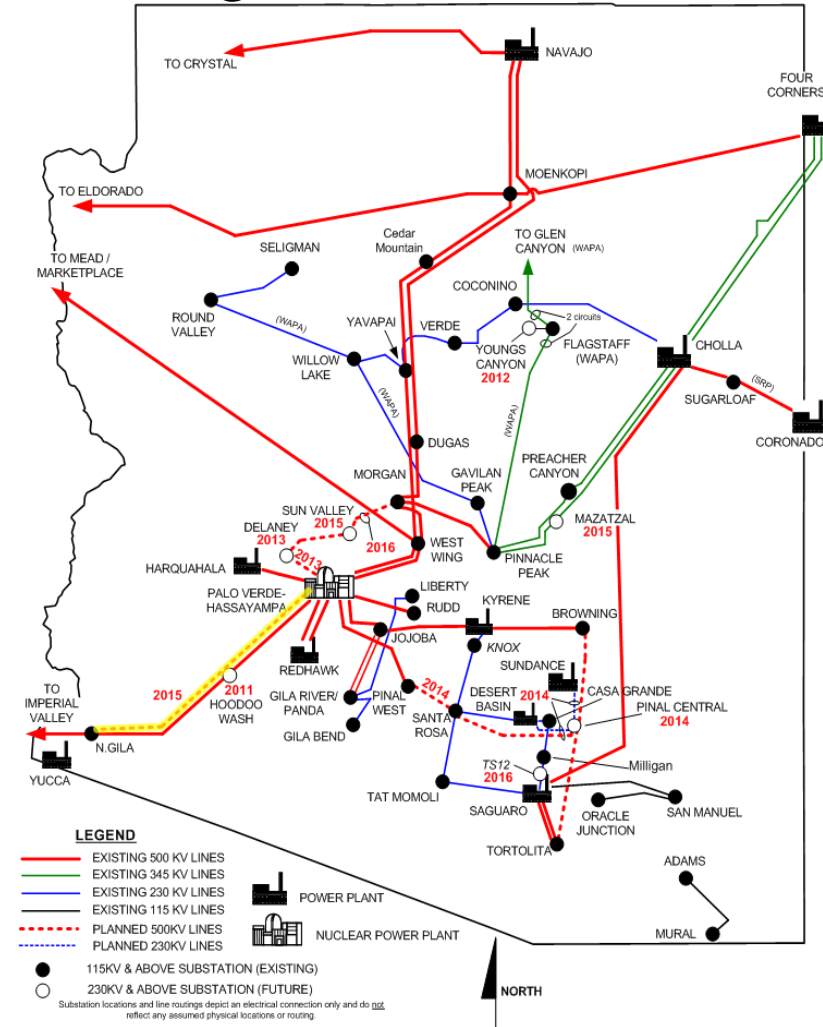
43 projects
1413 MW

Ancillary Services to Firm CA Renewable Resources

- 6000 MW of gas combined cycle generating units at or near the Palo Verde Hub
- CAISO transmission from Palo Verde Hub limited to 2965 MW
 - Palo Verde – Devers 1802
 - SDG&E share of Hassayampa – North Gila 1163 MW
- Resources from Palo Verde Hub into CAISO total 2633 (After Agua Caliente)

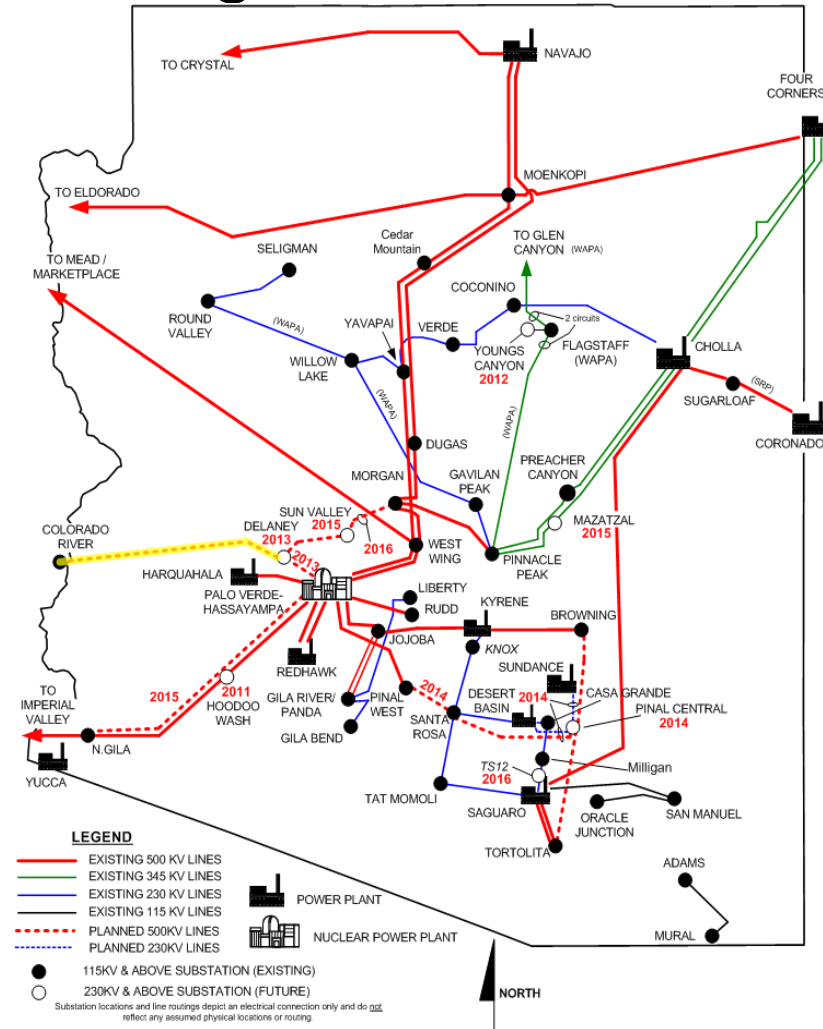
Planned and Proposed Arizona to California Transmission Projects

- Palo Verde-North Gila #2 500kV
 - 110 miles of new 500kV transmission line
 - Provide 2nd EHV source into Yuma Area increasing import capability into and reliability to the Yuma Area
 - Facilitate interconnection of solar resources



Planned and Proposed Arizona to California Transmission Projects

- Delaney-Colorado River 500kV
 - 114 miles of new 500kV transmission line
 - APS/ETA propose to develop and place facility in the CAISO grid
 - Provides additional CAISO transmission for renewable resources from AZ/NM and firming resources for CA in state renewable resources
 - Facilitate interconnection of solar resources



Data Sources for Congestion Study

- Interconnection Queues
 - APS, PNM, EPE, NVE
 - CAISO
- WECC
 - Production cost studies
 - WECC ten year plan
- WestConnect ten year plan
- NTTG and Columbia Grid planning studies