



# Southwest Area Transmission Subregional Planning Group Overview

March 27, 2015

Western Regional Partnership Energy Committee

# Agenda

- What is SWAT? (mission and history)
- SWAT Planning footprint
- Maps of existing transmission projects
- Transmission projects under development
- Current SWAT study work
- How to get involved in SWAT



# What is SWAT?

- Southwest Area Transmission (SWAT) is a voluntary and open study group comprised of regulators, governmental entities, transmission users, transmission owners, transmission operators, environmental entities, and other stakeholders.
- The goal of SWAT is to promote collaborative regional transmission planning in the Desert Southwest.
- [http://www.westconnect.com/planning\\_swat.php](http://www.westconnect.com/planning_swat.php)

# History of SWAT

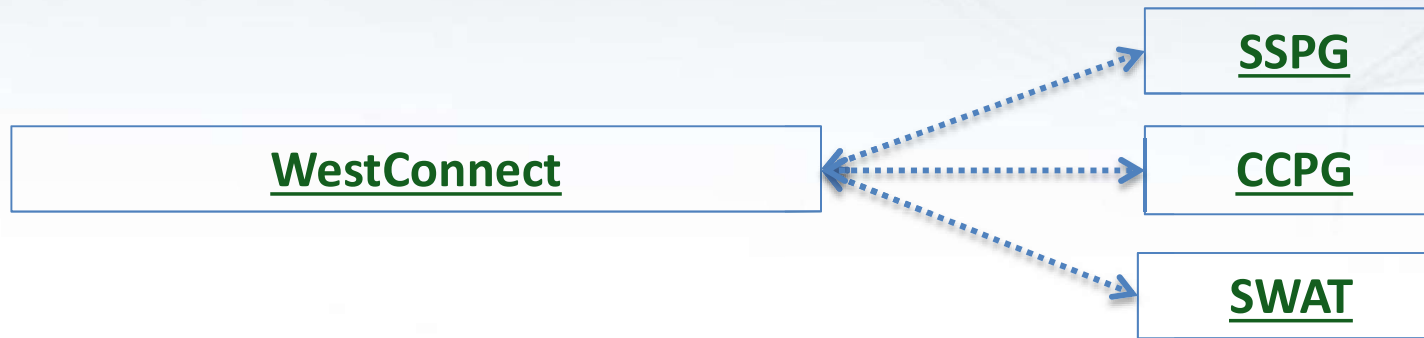
- Utilities have always been engaged in regional cooperation to ensure the reliability of the grid (Western Systems Coordinating Council formed 1967).
- In the mid-1990's FERC pushed Open Access to the transmission grid and encouraged formation of regional transmission groups (Southwest Regional Transmission Association formed 1994).
- Local voluntary study groups formed in Arizona when the Arizona Corporation Commission began conducting Biennial Transmission Assessments in 2000 (e.g. Southeast Arizona Transmission Study and Central Arizona Transmission Study).
- In early 2000's, FERC began pushing formation of Regional Transmission Organizations. Many planning groups realigned, but RTOs never became mandatory. (SWRTA merged with WSCC in 2002 to form WECC, while WestConnect prepared to become an RTO in the Southwest)
- **In 2004, CATS expanded its voluntary group to form SWAT.**
- SWAT has coordinated with Sierra Subregional and Colorado Coordinated Planning Groups since 2007 to meet increased FERC regional planning requirements (WestConnect Agreement for Subregional Transmission Planning).
- SWAT will continue to define its role through the future as regional transmission planning needs change (e.g. FERC Order No. 1000).



# SWAT in Relation to other Planning Regions



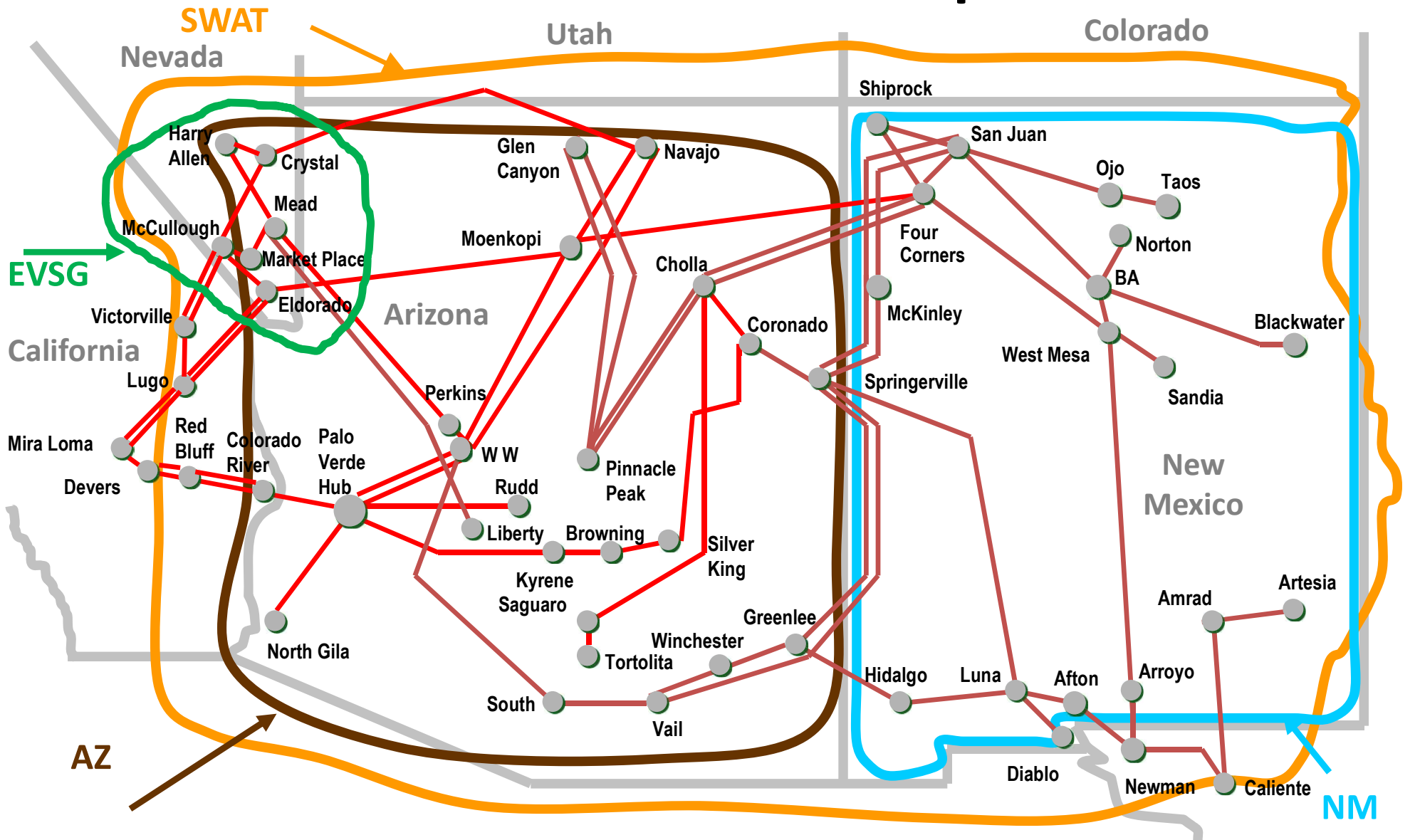
# SWAT in Relation to WestConnect



- Contractual entity funded by Transmission Owners and other stakeholders
- Performs simulations to identify regional needs and projects that address those needs
- Creates a ten year transmission plan for the region
- Selects specific transmission projects for development and cost-allocation

- Quasi-subcommittees of WestConnect. Some administrative support from WestConnect (e.g. website)
- Charter groups with no funding mechanism.
- No authority or role in selecting specific projects for development
- Address sub-regional coordination needs and report to WestConnect

# SWAT Subcommittee Footprints



**SWAT** Southwest Area Transmission  
**AZ** Arizona Transmission System  
**NM** New Mexico Transmission  
**EVSG** Eldorado Valley Study Group

**500kV**   
**345kV** 

## Web Sites

WestConnect: <http://www.westconnect.com/>

SWAT: [http://www.westconnect.com/planning\\_swat.php](http://www.westconnect.com/planning_swat.php)

Footprint wide work groups: Short Circuit, Transmission Corridor, California Interface, Coal Reduction Assessment Task Force



# Difference between “Transmission” and “Distribution”

- Generally, “transmission” means 100 kV or greater. It is the power system used for wholesale transactions, and it is regulated by the Federal Energy Regulatory Commission.
- “Distribution” is generally less than 100 kV and rules are often defined by state, local utility, or Tribe.
- SWAT focuses on the transmission level

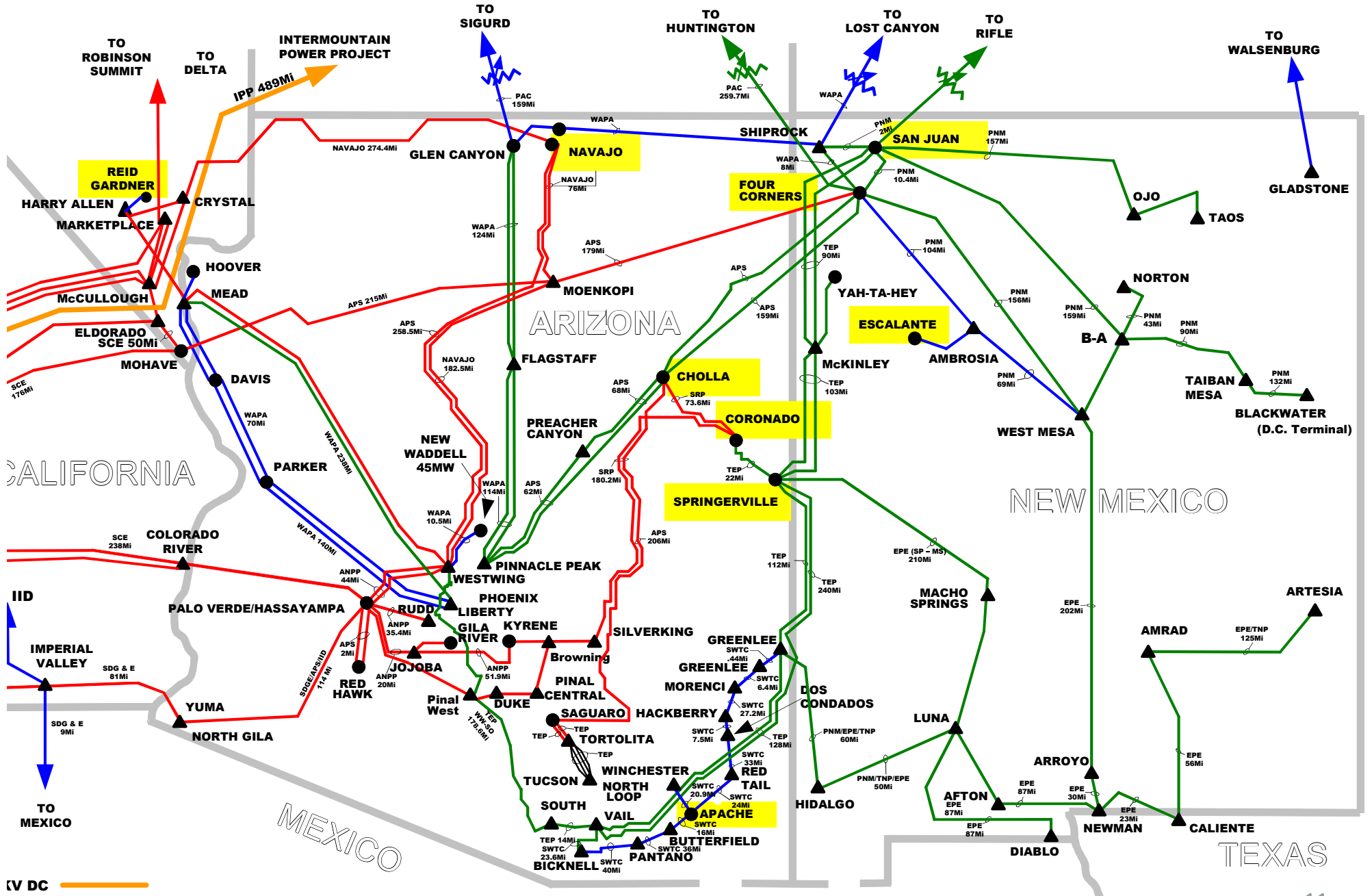


# Major Transmission Utilities in SWAT

- Arizona Public Service
- El Paso Electric
- Imperial Irrigation District
- NV Energy
- Los Angeles Department of Water and Power
- Public Service Company of New Mexico
- Salt River Project
- Southwest Transmission Cooperative
- Tucson Electric Power Company
- Western Area Power Administration – Desert Southwest Region



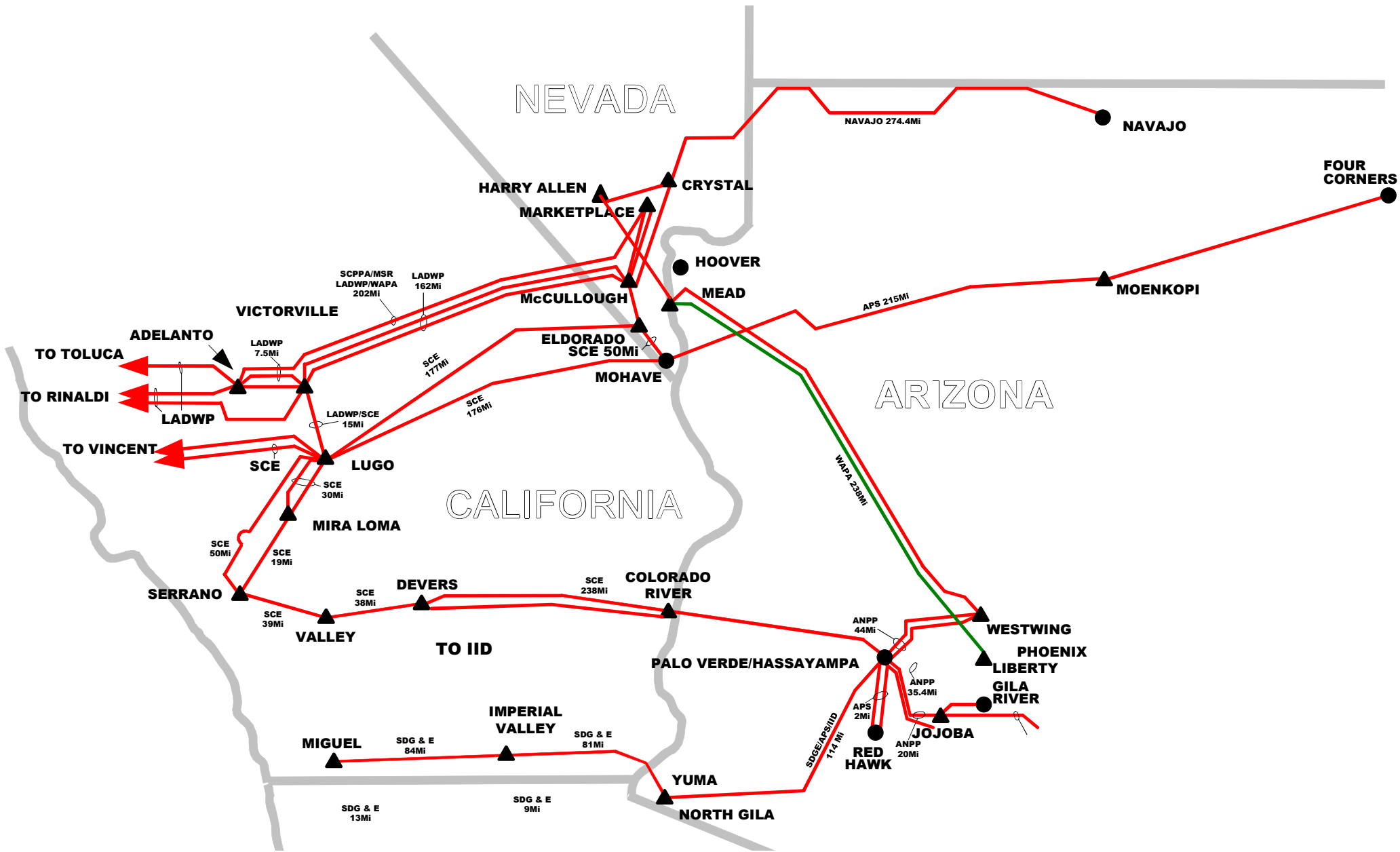
# Connecting Coal Plants to Load Centers



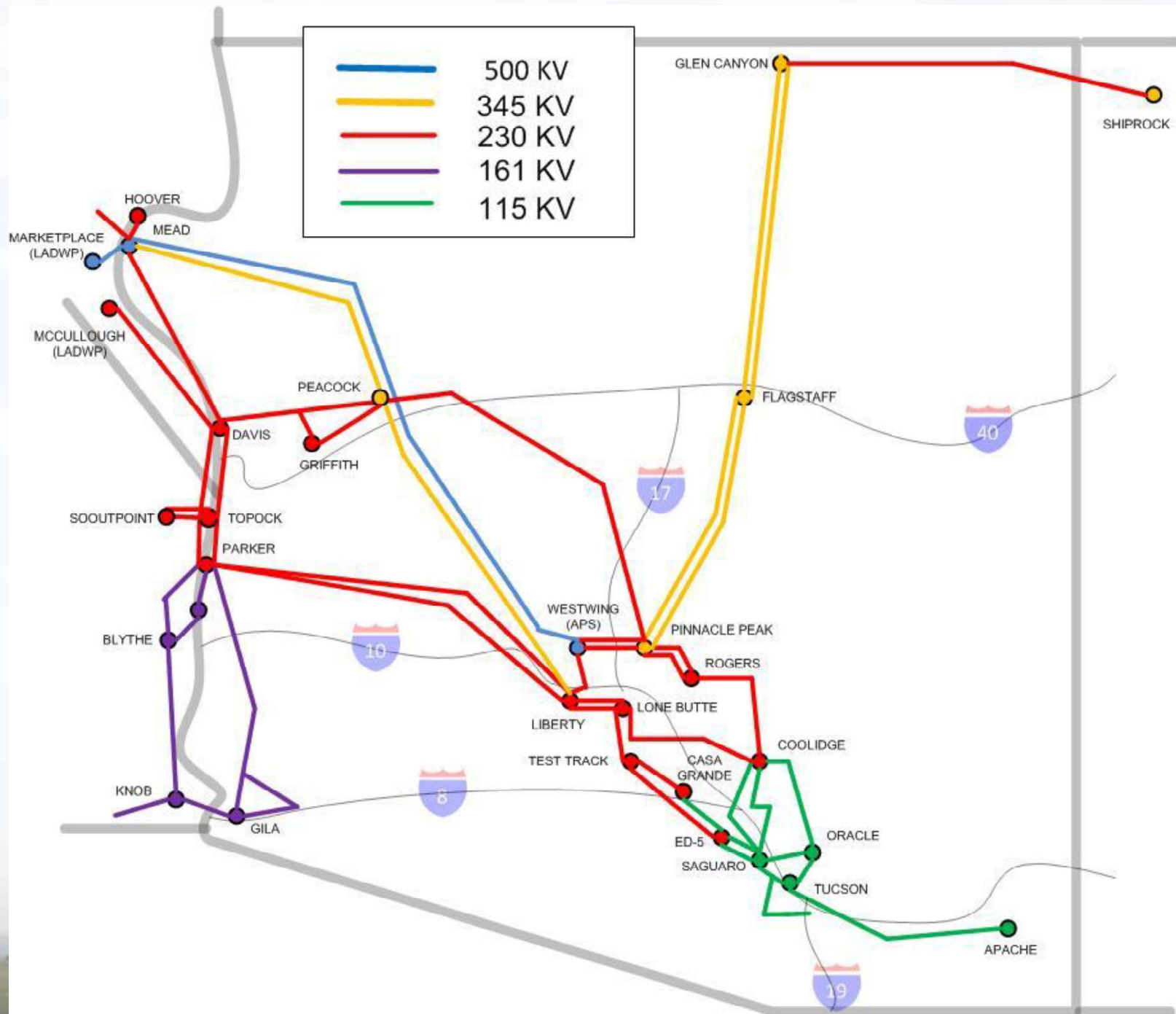
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# Exporting Power to California

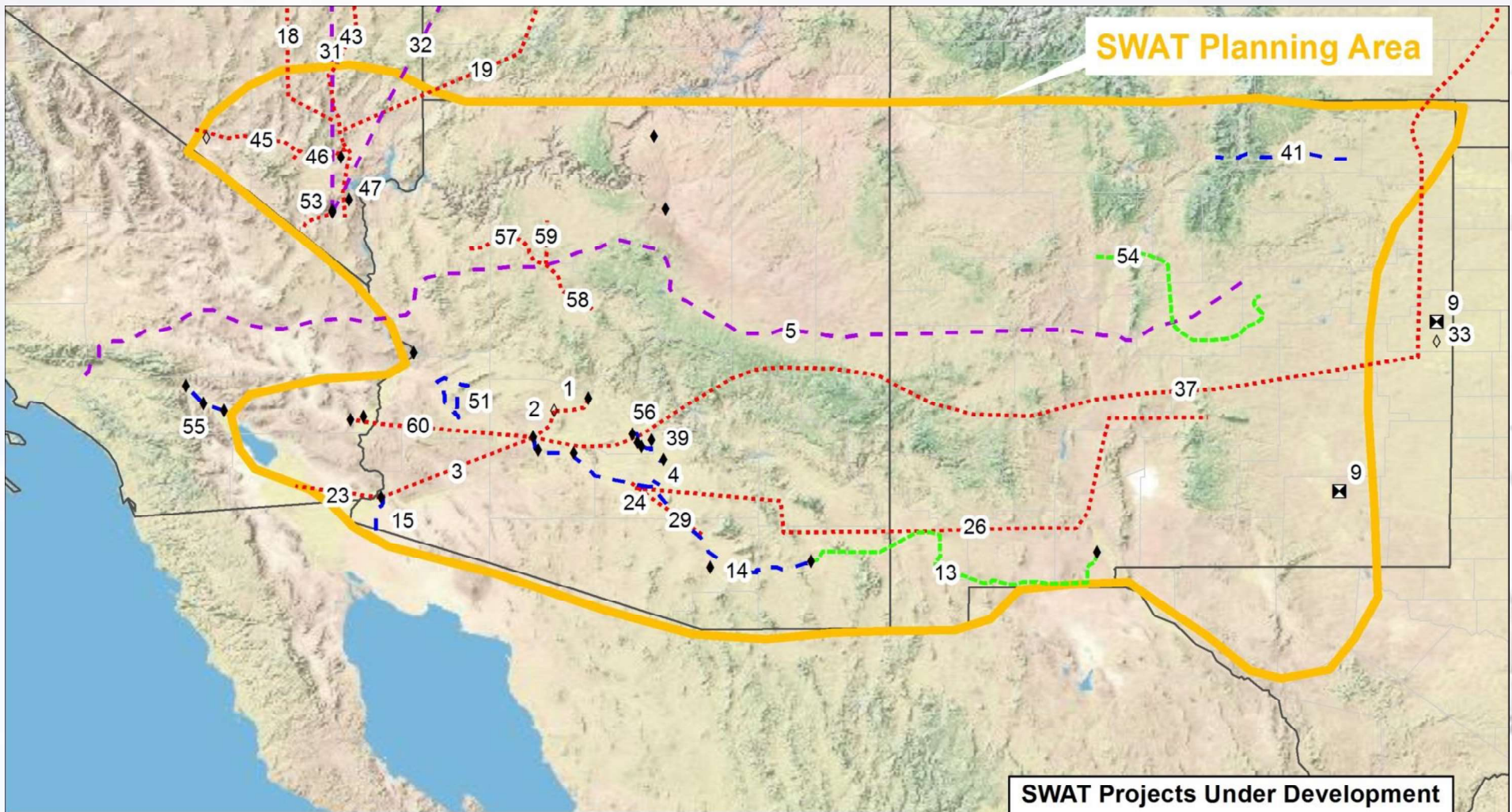


# Accessing Federal Hydropower (WAPA-DSW System)







# Integrating Renewables (Projects Under Development)



Map ID	Project	In-Service	Map ID	Project	In-Service
1	Sun Valley - Morgan	2016	33	Tres Amigas	2017
2	Palo Verde-Delany-Sun Valley	2018	37	High Plains Express	TBD
3	Palo Verde - North Gila II	2015	39	Abel - Ball (formerly Abel-Moody)	2020-2021
4	Sundance-Pinal Central	TBD	41	Lucky Corridor Transmission Project	2018
5	Centennial West	2020	43	NV Energy Self Build Robinson - Harry Allen	2024
9	WECC-Eastern Interconnection DC Tie Upgrade Project	2017	45	Centennial II (Amargosa - Northwest)	2020
13	Southline Project (Afton-Apache)	2016	46	Centennial II (Northwest - Harry Allen)	2020
14	Southline Project (Apache-Saguaro)	2016	47	Centennial II (Harry Allen-Eldorado)	2020
15	North Branch	2018	51	Harcuar Transmission Project	Suspended
18	SWIP/ON Line	2015	53	Bighorn-Eldorado	2018
19	Gateway South	2020	54	Western Spirit Clean Line	2018
23	Imperial Valley - North Gila #2	2018	55	Path 42 Upgrade	2014
24	Desert Basin-Pinal Central	2014	56	Rogers - Santan 230kV line	2016
26	SunZia Southwest Transmission Project	2020	57	Longview to Peacock Line	2021
29	Pinal Central-Tortolita	2016	58	Longview to Yavapai Line	2021
31	Zephyr	2020	59	Longview to Moenkopi-Eldorado Line	2021
32	TransWest Express	2017	60	Delaney - Colorado River	2020

**SWAT Projects Under Development**

- - - 500kV
- - - 345kV
- - - 230kV
- - - 500 / 600kV DC
- - - Below 230kV
- ⊠ AC-DC-AC Converter Station
- ⊠ Substations
- ◆ Existing
- ◇ Future

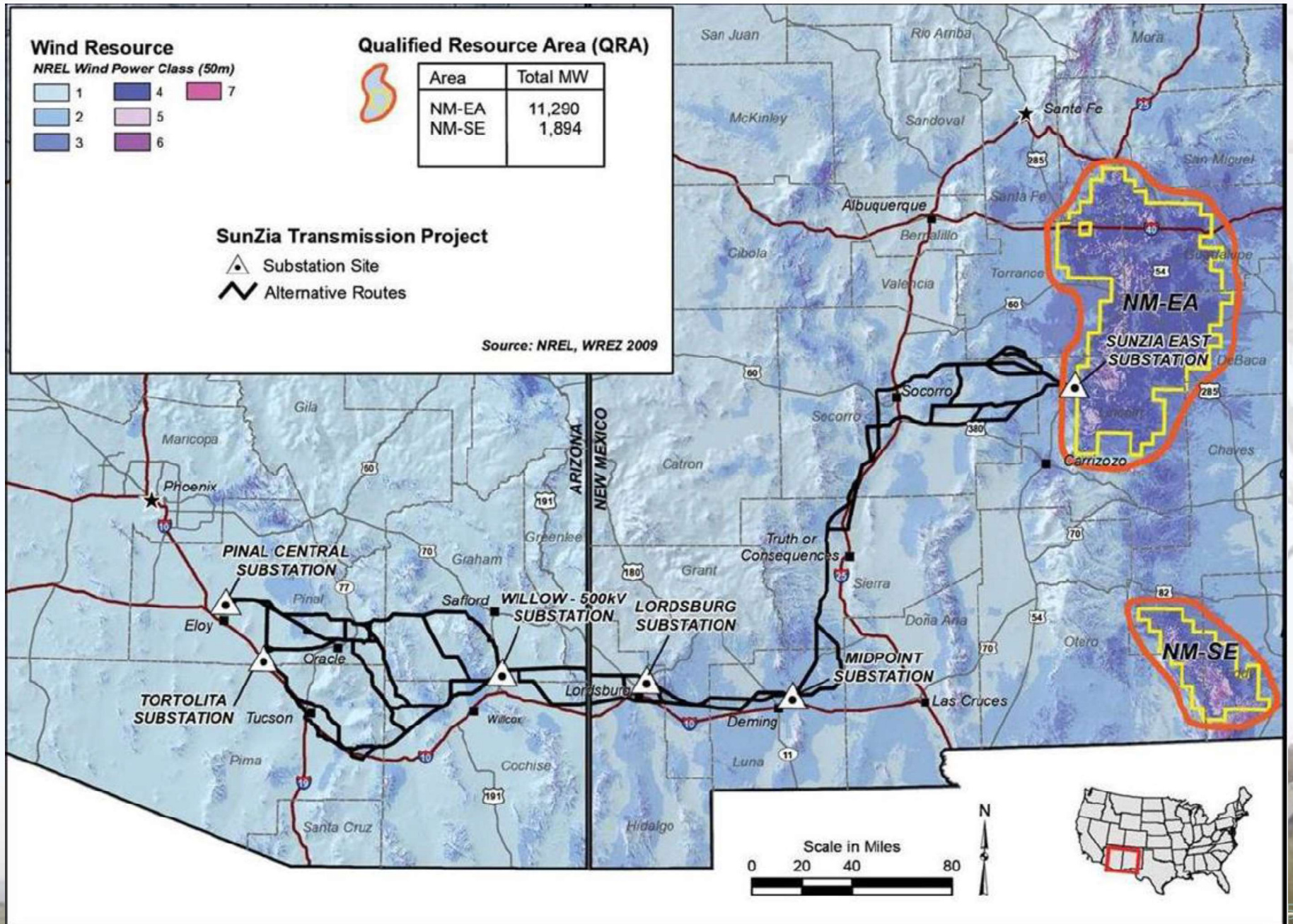



Last Updated: 2/10/2015

Not all projects have received permits to construct and routes are subject to change  
 Not all SWAT projects are shown due to the scale of the map

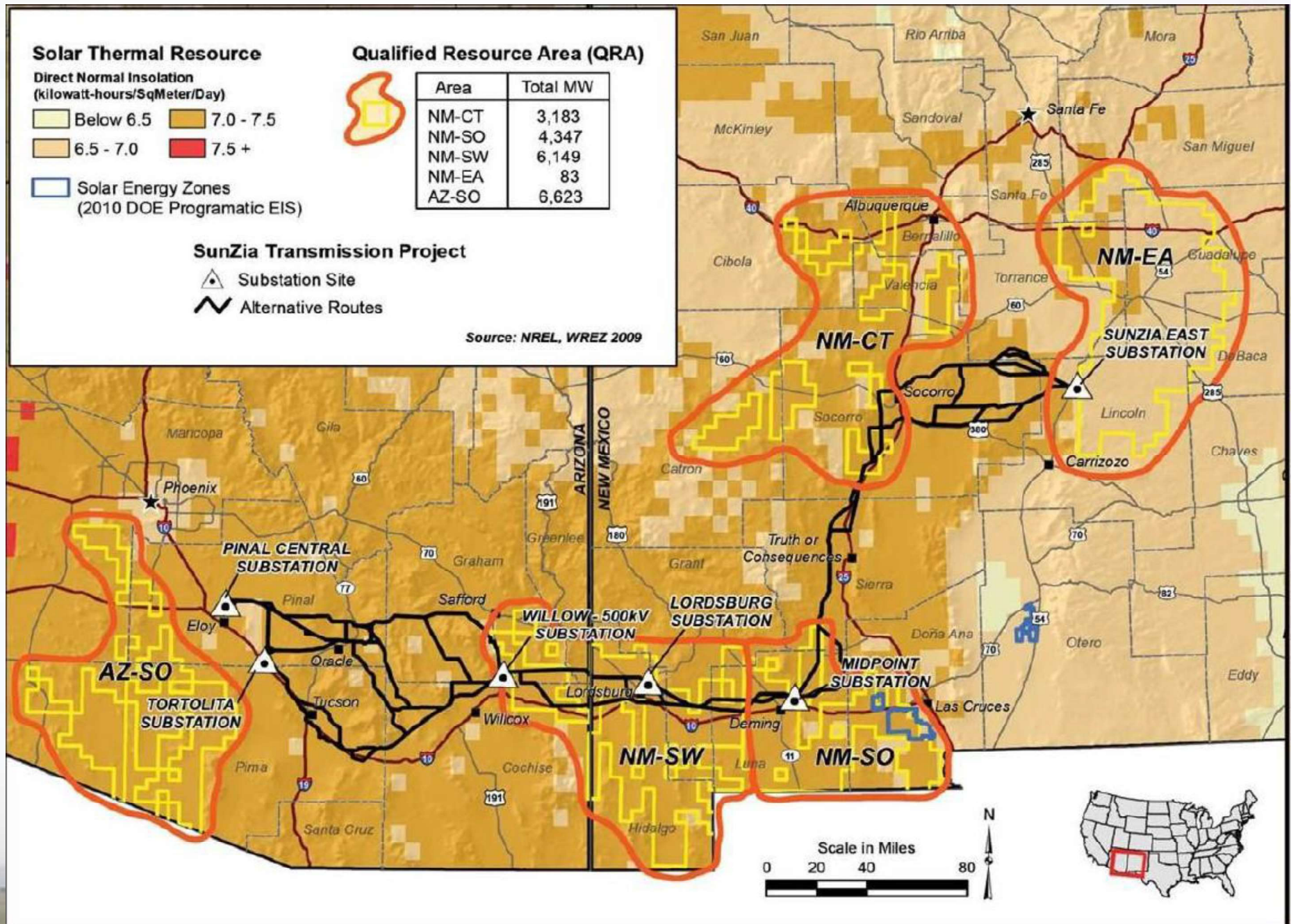


# SunZia – Wind Resources



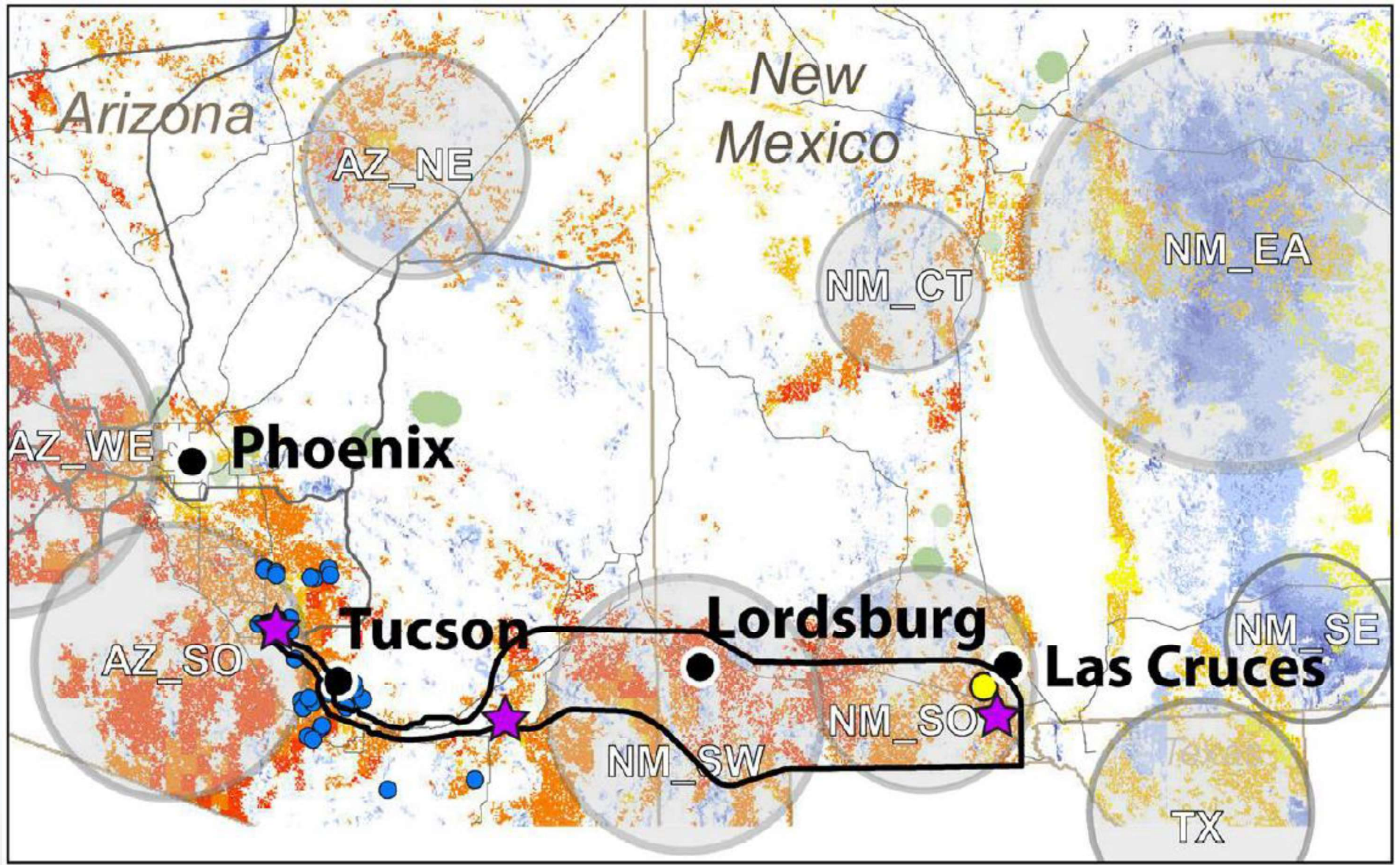


# SunZia – Solar Resources





# Southline - Renewables





# Current SWAT Study Work

- Arizona Corporation Commission 9th Biennial Transmission Assessment coordination
  - Some contingency analysis on ten year plan filings
  - Reliability Must Run studies in local pockets
- Assisting WestConnect in FERC Order No. 1000 Planning Process
  - Used SWAT forum to develop a draft power flow simulation case for WestConnect planning study
  - Will use the SWAT forum as needed to review WestConnect study results
- Coal reduction study
  - First phase completed in 2014
  - Second phase will be completed by January 2016. (Focuses on EPA 111(d) scenarios and identifying conceptual transmission needs to address reliability concerns)

# “Phase 1” Coal Study Scenarios

- Baseline
  - Reference case without coal plant shutdowns
  - Simulated a Heavy Summer 2019 condition
- Two Scenarios (about 20% coal retirement)
  - Expected Coal Reduction with Planned new Gas
  - Expected Coal Reduction replaced by Renewables
- Two Sensitivities (about 50% coal retirement)
  - High Coal Reduction with High Renewables
  - High Coal Reduction with Renewables and Planned new Gas
- Specific generating units and locations identified to replace retired units to the extent information was available

# “Phase 1” Coal Study Results and Conclusions

- The High Coal Reduction with High Renewables scenario demonstrated widespread cascading after single contingencies. Other scenarios demonstrated fairly acceptable system performance.
- There is a limit to the amount of coal plants that may be shut down while maintaining reliable system operation
  - Unsure of exactly where the limit falls, especially as dispatch scenarios change in different times of the day or year.
  - The limit seems to be influenced the amount of gas fired replacement capacity, which could be due to its reactive power capability.
  - The amount of renewable resources that may be integrated is dependent upon addition of gas fueled generation or other resources that compensate for loss of inertia and dynamic reactive capability
  - No analysis to show what transmission system upgrades could resolve system cascading (e.g. capacitors, synchronous condensers, new transmission lines)
- Ongoing studies are needed



# How To Get Involved In SWAT

- Upcoming quarterly SWAT meetings:
  - May, webinar
  - August, Westminster, CO
  - November, Phoenix, AZ
- Various subcommittee calls/webinars throughout the year (Arizona, Eldorado Valley, New Mexico)
- Email distribution lists for each of these groups.  
Contact Patrick Harwood ([harwood@wapa.gov](mailto:harwood@wapa.gov))

# Questions or More Information About SWAT

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602-605-2883



# Maps of Existing and Future Transmission Projects

- Arizona Utility Ten Year Plans and Biennial Transmission Assessment filings
  - <http://edocket.azcc.gov/Docket/DocketDetailSearch?docketId=18827>
- TEPPC
  - <https://www.wecc.biz/TransmissionExpansionPlanning/Pages/Project-Information-Portal2.aspx>
- WestConnect Ten Year Plan
  - [http://www.westconnect.com/final\\_reports\\_2015.php](http://www.westconnect.com/final_reports_2015.php)
- SWAT Planning Map
  - [http://www.westconnect.com/documents\\_results.php?categoryid=83](http://www.westconnect.com/documents_results.php?categoryid=83)



# Land Resource Maps for Development of New Generation and Transmission

- US Bureau of Land Management, Arizona Office
  - [http://www.blm.gov/az/st/en/prog/energy/arra\\_solar.html](http://www.blm.gov/az/st/en/prog/energy/arra_solar.html)
- Open Energy Information
  - <http://en.openei.org/wiki/Gateway:Transmission>
- TEPPC Environmental Data Viewer
  - <https://www.wecc.biz/TransmissionExpansionPlanning/Pages/Environmental-and-Cultural-Considerations.aspx>