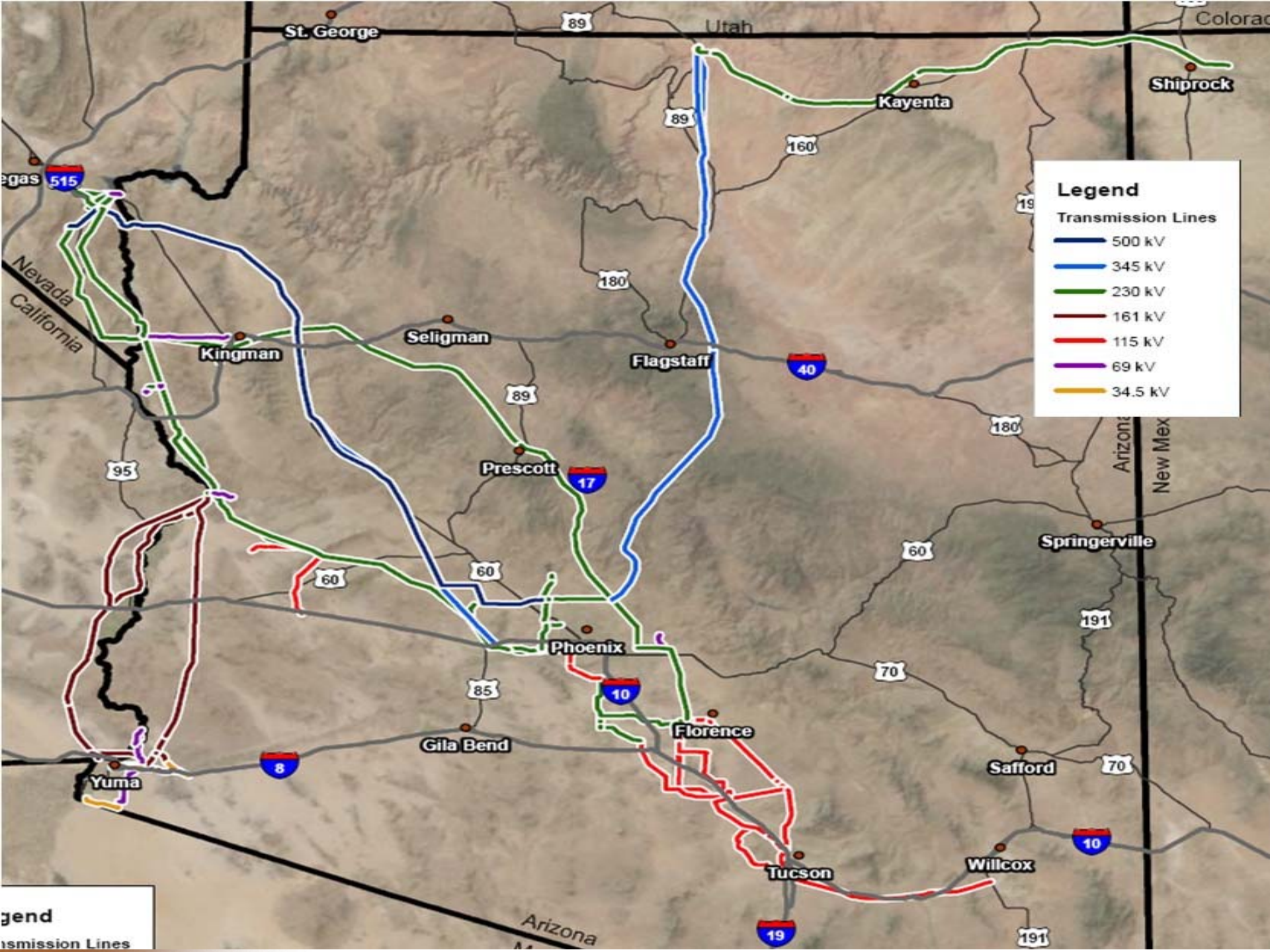
Transmission Opportunities

Western Area Power Administration

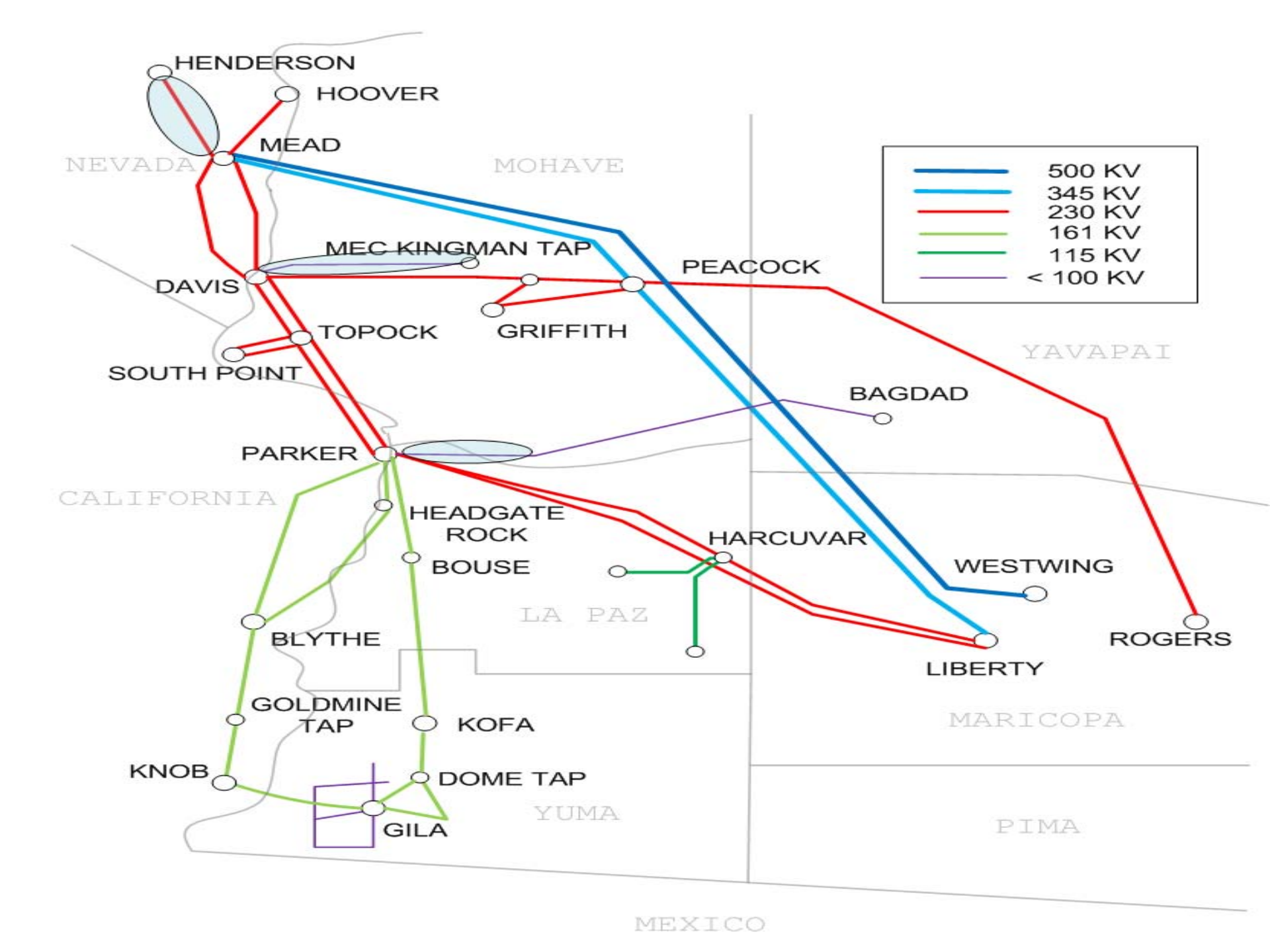
Agenda

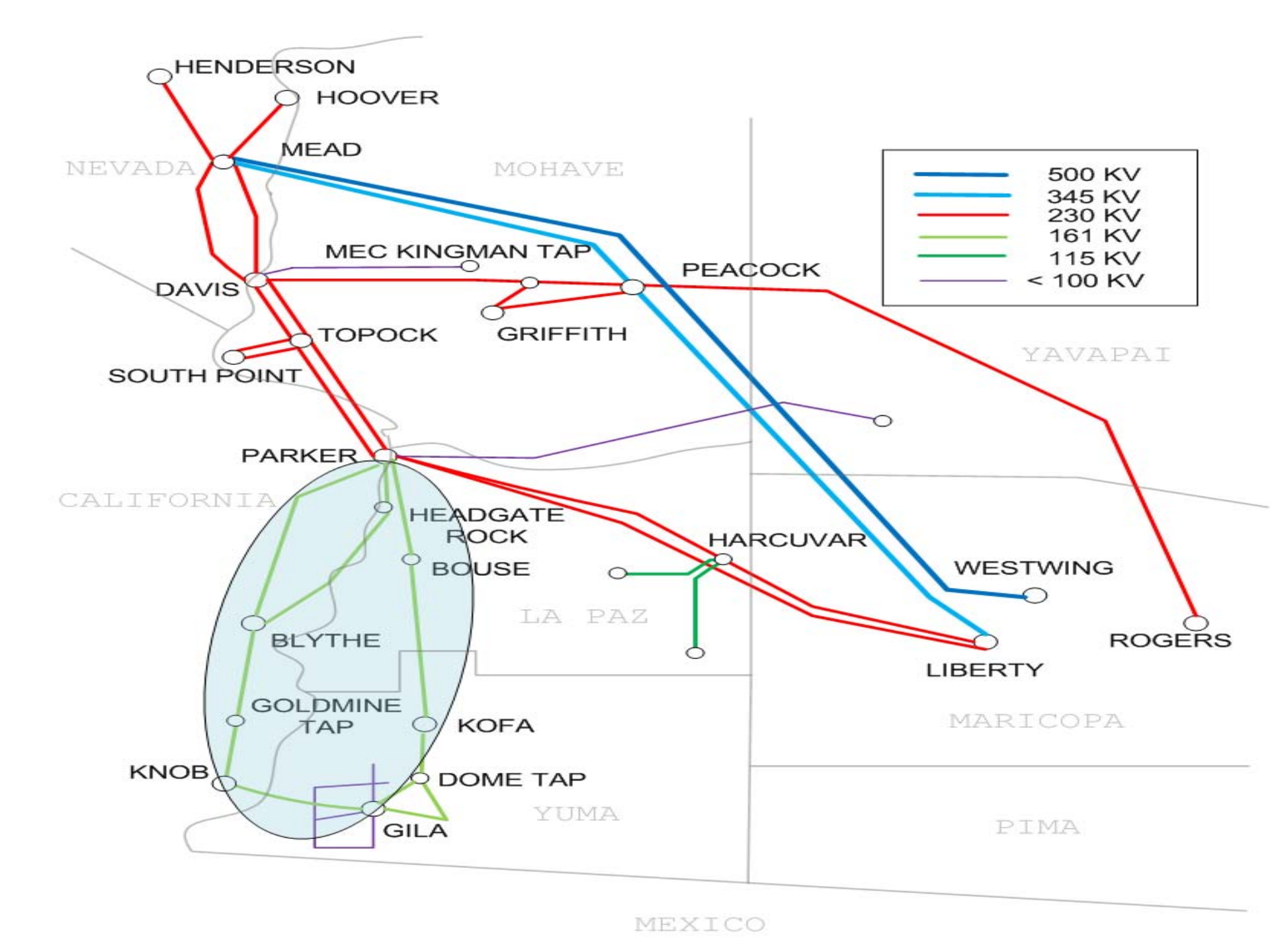
- Western Desert Southwest Region System
- Western's ten year capital improvements plan
- South of Phoenix Projects
- SMRT Project
- Other Projects in the southwest

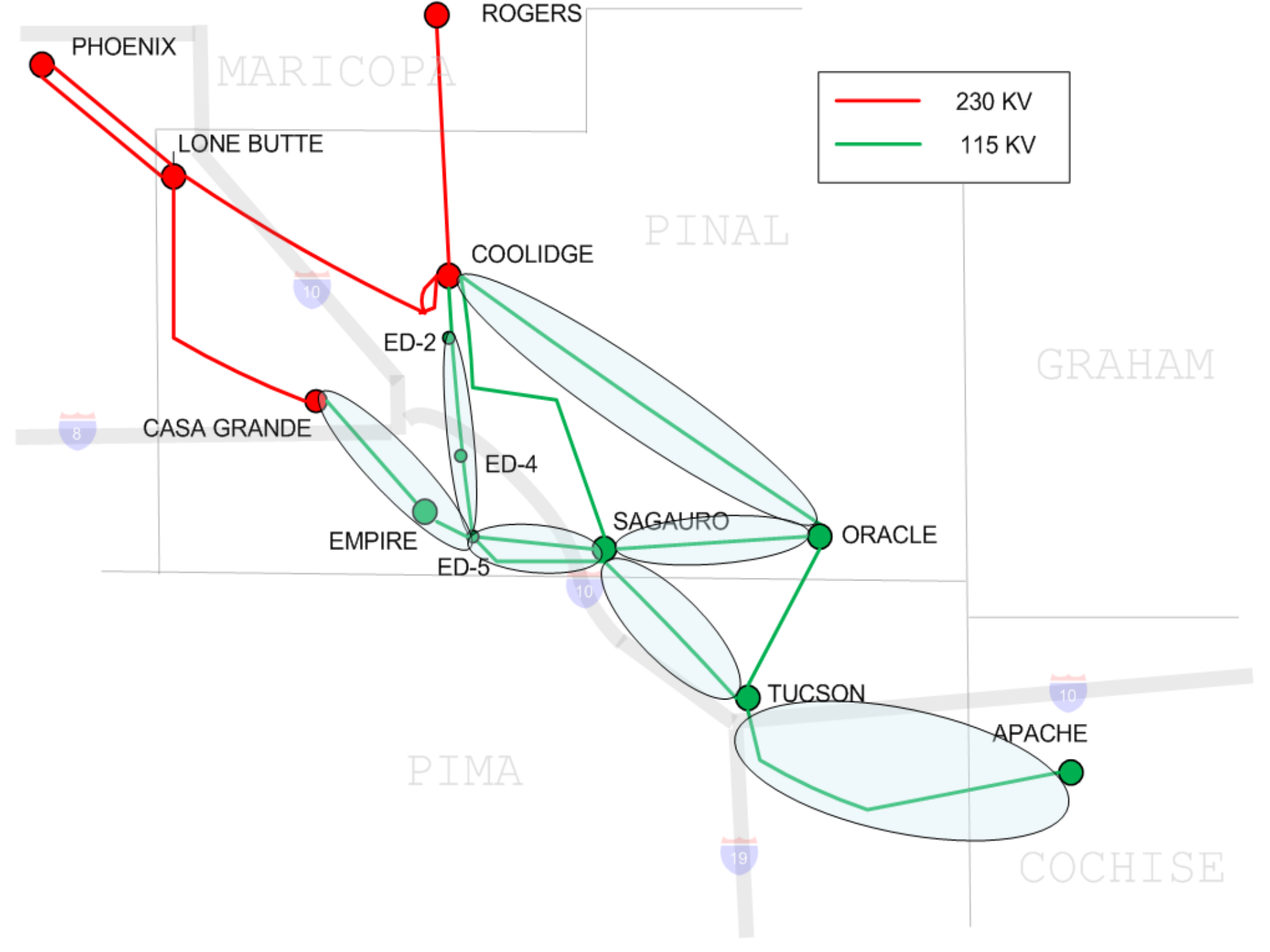
Western's Area


St. George
Utah
Colorado
Shiprock
Kayenta
Legend
Transmission Lines
500 kV
345 kV
230 kV
161 kV
115 kV
69 kV
34.5 kV
Nevada
California
Kingman
Seligman
Flagstaff
Prescott
Springerville
Phoenix
Florence
Gila Bend
Yuma
Safford
Tucson
Willcox
Arizona
New Mexico
515
89
160
180
40
17
95
60
85
10
8
70
191
19

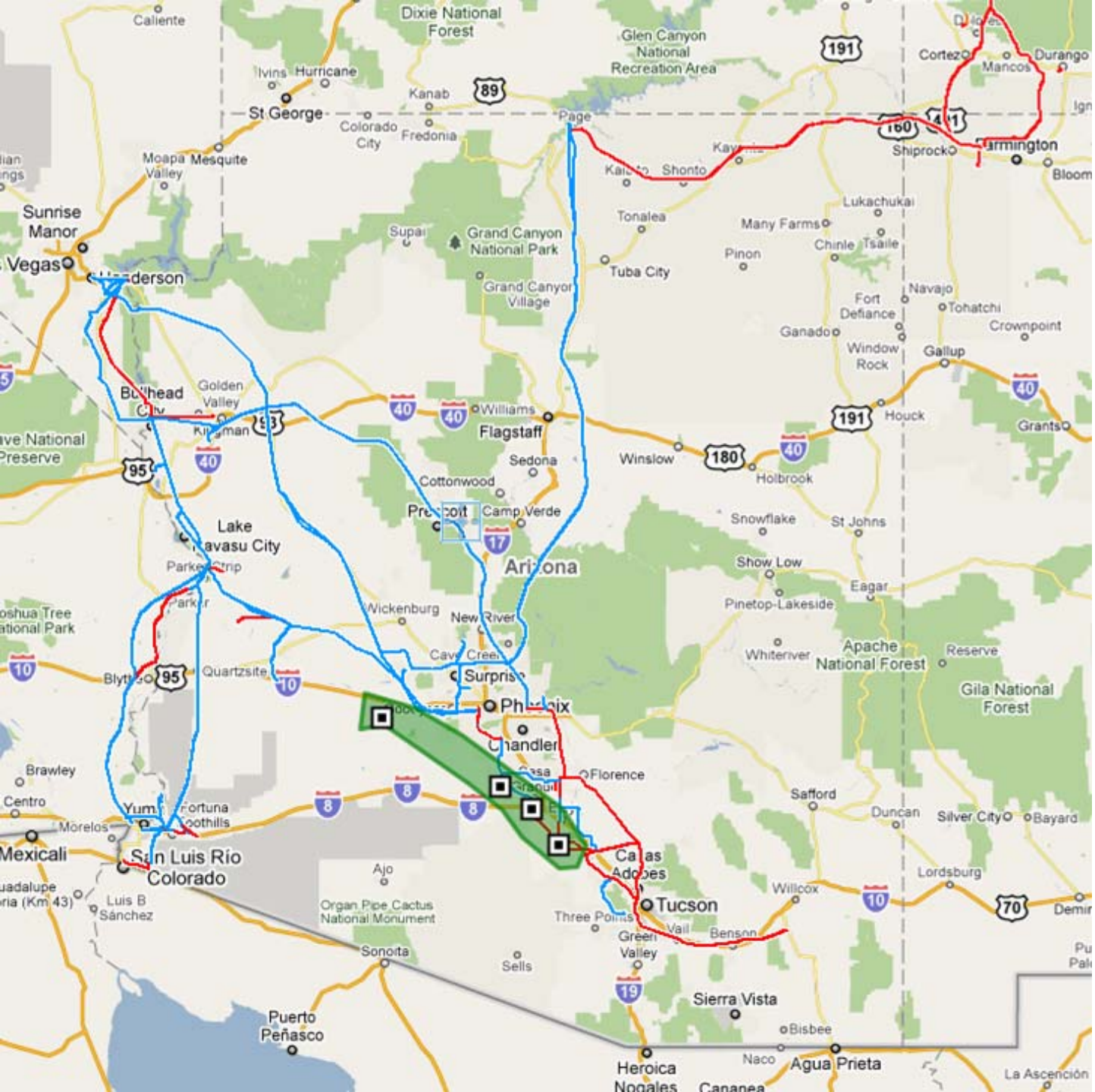
Ten Year Capital Improvements Plan


HENDERSON
HOOVER
MEAD
NEVADA
MOHAVE
MEC KINGMAN TAP
DAVIS
PEACOCK
GRIFFITH
TOPOCK
SOUTH POINT
YAVAPAI
BAGDAD
PARKER
CALIFORNIA
HEADGATE ROCK
HARCUVAR
BOUSE
WESTWING
LA PAZ
BLYTHE
ROGERS
LIBERTY
GOLDMINE TAP
KOFA
MARICOPA
KNOB
DOME TAP
YUMA
GILA
PIMA
MEXICO
500 KV
345 KV
230 KV
161 KV
115 KV
< 100 KV


HENDERSON
HOOVER
MEAD
NEVADA
MOHAVE
MEC KINGMAN TAP
PEACOCK
DAVIS
GRIFFITH
TOPOCK
SOUTH POINT
YAVAPAI
PARKER
CALIFORNIA
HEADGATE ROCK
HARCUVAR
BOUSE
WESTWING
LA PAZ
BLYTHE
ROGERS
LIBERTY
GOLDMINE TAP
KOFA
MARICOPA
KNOB
DOME TAP
YUMA
PIMA
GILA
MEXICO
500 KV
345 KV
230 KV
161 KV
115 KV
< 100 KV

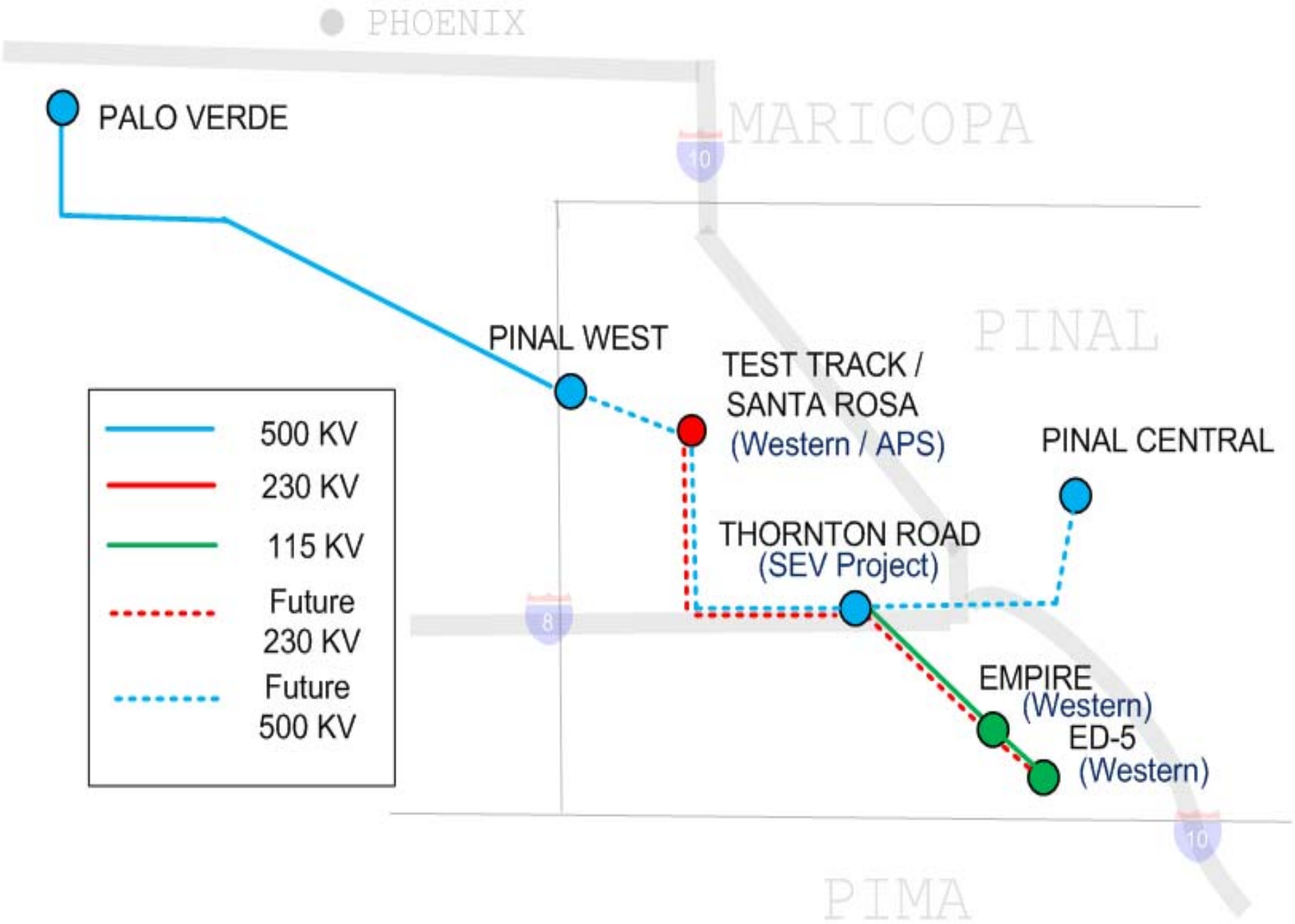

ROGERS
PHOENIX
MARICOPA
LONE BUTTE
230 KV
115 KV
PINAL
COOLIDGE
ED-2
GRAHAM
CASA GRANDE
ED-4
EMPIRE
SAGAURO
ORACLE
ED-5
TUCSON
APACHE
PIMA
COCHISE

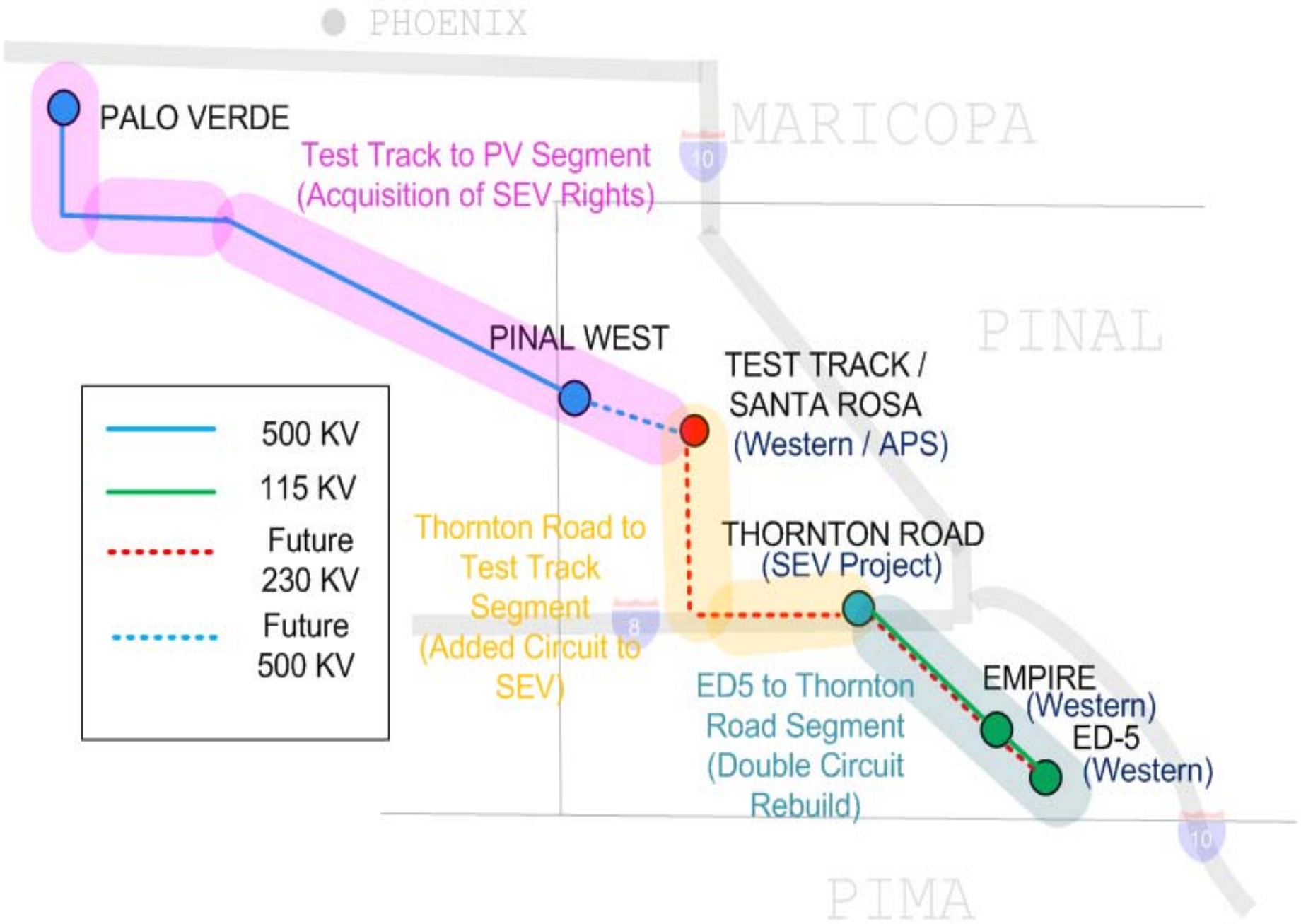
South of Phoenix Projects


Caliente
Dixie National Forest
Glen Canyon National Recreation Area
191
Cortez
Durango
Mancos
Ivins
Hurricane
St George
89
Kanab
Page
Colorado City
Fredonia
160
Shiprock
Farmington
Moapa Valley
Mesquite
Kayenta
Kaibeto
Shonto
Bloom
Sunrise Manor
Vegas
Supai
Grand Canyon National Park
Tonalea
Many Farms
Lukachukai
Chinle
Tsaile
Pinon
Tuba City
Grand Canyon Village
Navajo
Fort Defiance
Tohatchi
Ganado
Crownpoint
Window Rock
Gallup
Bullhead City
Golden Valley
Kingman
93
Williams
Flagstaff
40
191
Houck
Grants
Winslow
180
Holbrook
95
Sedona
Cottonwood
Prescott
Camp Verde
17
Lake Havasu City
Parker Strip
Parker
Arizona
Snowflake
St Johns
Show Low
Eagar
Pinetop-Lakeside
Wickenburg
New River
Cave Creek
Whiteriver
Apache National Forest
Reserve
Gila National Forest
Blythe
Quartzsite
10
Surprise
Phoenix
Chandler
Florence
Casa Grande
Brawley
Centro
Yuma
Fortuna Foothills
Morelos
8
Safford
Duncan
Silver City
Bayard
Mexicali
San Luis Río Colorado
Ajo
Casas Adobes
Tucson
Willcox
Lordsburg
70
Luis B Sánchez
Organ Pipe Cactus National Monument
Three Points
Vail
Benson
Green Valley
Sonoita
Sells
19
Sierra Vista
Bisbee
Puerto Peñasco
Naco
Agua Prieta
Heroica Nogales
La Ascención

ED5-Palo Verde Project

- **Palo Verde to Test Track – 500-kV**
  - Transmission Rights on the SEV Project
  - 500/230 Transformer at Santa Rosa/Test Track
- **Test Track to ED5 – New 230-kV Line**
  - Test Track to Thornton Rd – Double circuit with Southeast Valley Project (SEV) Santa Rosa-Pinal Central 500-kV line
  - Thornton Rd to ED5 – Double circuit with Western's Casa Grande-ED5 115-kV line
  - New 230 Yard and 230/115 Transformer at ED5


PHOENIX
MARICOPA
PINAL
PIMA
10
8
PALO VERDE
PINAL WEST
TEST TRACK /
SANTA ROSA
(Western / APS)
PINAL CENTRAL
THORNTON ROAD
(SEV Project)
EMPIRE
(Western)
ED-5
(Western)
500 KV
230 KV
115 KV
Future
230 KV
Future
500 KV

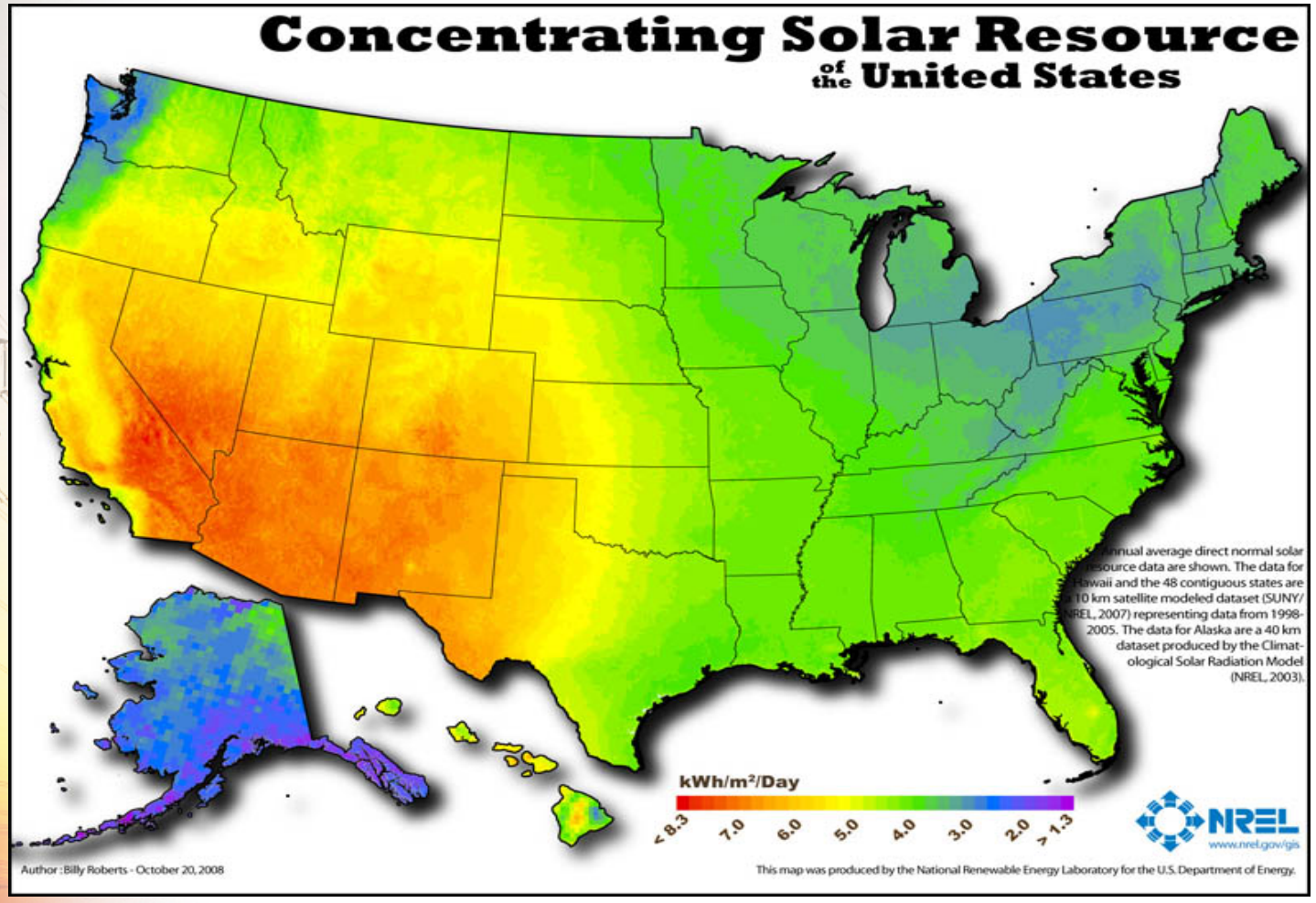

PHOENIX
MARICOPA
PINAL
PIMA
10
8
PALO VERDE
Test Track to PV Segment
(Acquisition of SEV Rights)
PINAL WEST
TEST TRACK /
SANTA ROSA
(Western / APS)
THORNTON ROAD
(SEV Project)
Thornton Road to
Test Track
Segment
(Added Circuit to
SEV)
ED5 to Thornton
Road Segment
(Double Circuit
Rebuild)
EMPIRE
(Western)
ED-5
(Western)
500 KV
115 KV
Future
230 KV
Future
500 KV

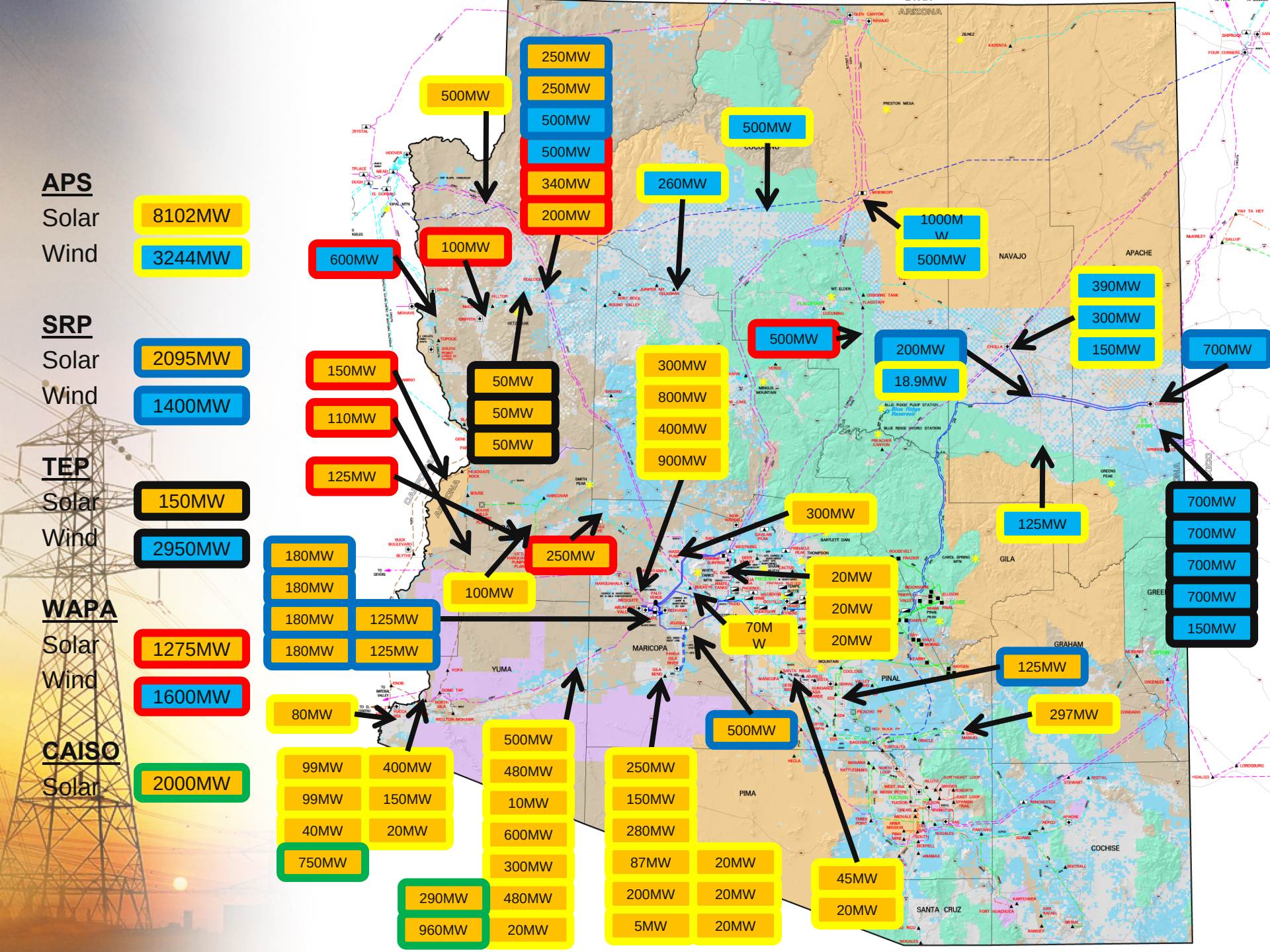
Benefit of ED5-PV Project

- Provide access to Palo Verde
- Enhance viability of renewable resources in development in southern Arizona
- Will provide 300 MW of unconstrained transfer capability from ED5 to Palo Verde

The Sonoran-Mohave Renewable Transmission (SMRT) Project

Solar Development Potential




APS
Solar 8102MW
Wind 3244MW
SRP
Solar 2095MW
Wind 1400MW
TEP
Solar 150MW
Wind 2950MW
WAPA
Solar 1275MW
Wind 1600MW
CAISO
Solar 2000MW
500MW
250MW
250MW
500MW
500MW
340MW
200MW
100MW
600MW
150MW
110MW
125MW
50MW
50MW
50MW
250MW
100MW
180MW
180MW
180MW
125MW
180MW
125MW
80MW
99MW
400MW
99MW
150MW
40MW
20MW
750MW
500MW
480MW
10MW
600MW
300MW
290MW
480MW
960MW
20MW
250MW
150MW
280MW
87MW
20MW
200MW
20MW
5MW
20MW
260MW
500MW
1000MW
500MW
500MW
200MW
18.9MW
390MW
300MW
150MW
700MW
300MW
800MW
400MW
900MW
300MW
125MW
700MW
700MW
700MW
700MW
150MW
20MW
20MW
20MW
70MW
500MW
125MW
297MW
45MW
20MW
ARIZONA
NAVAJO
APACHE
GILA
GRAHAM
MARICOPA
PINAL
YUMA
PIMA
COCHISE
SANTA CRUZ

SMRT Project and Study Area Overlaps Solar potential

4 Elements and 1 Sensitivity

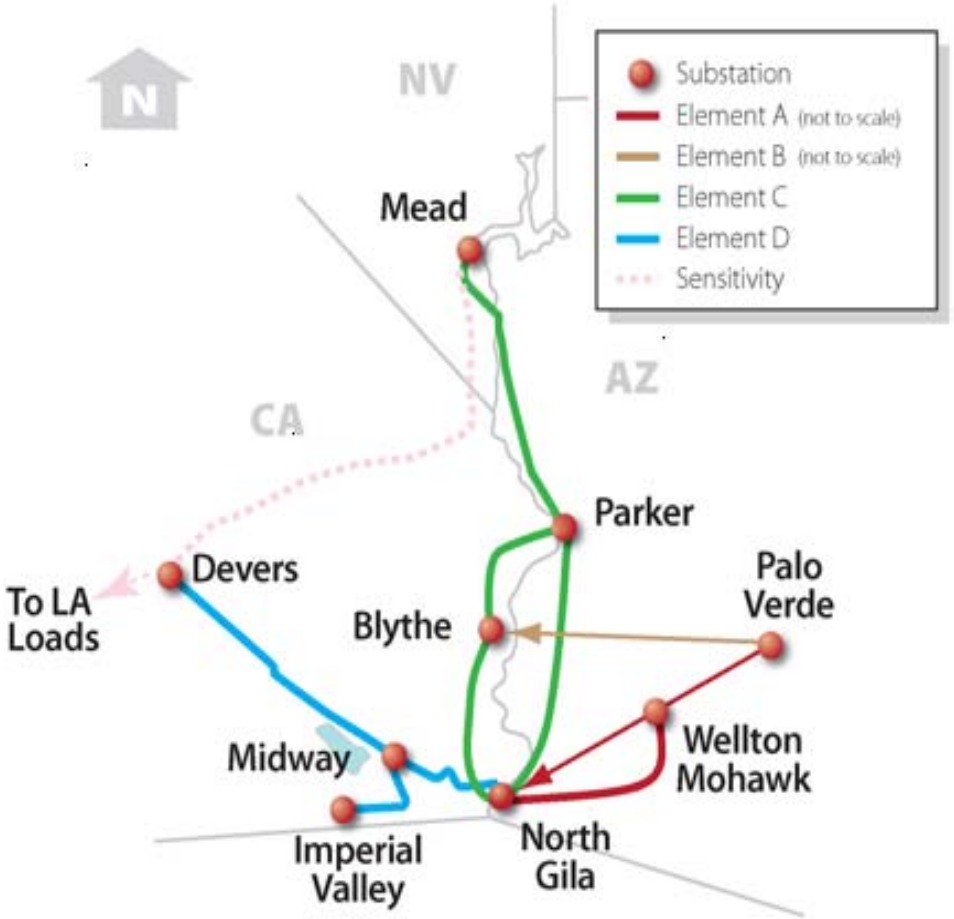
A—Palo Verde-North Gila
- 500-kV, 100 miles

B—Palo Verde-Blythe
- 500-kV, 110 miles

C—

North of Parker
- 230/500-kV 190 miles

South of Parker
- 230/500-kV, 330 miles



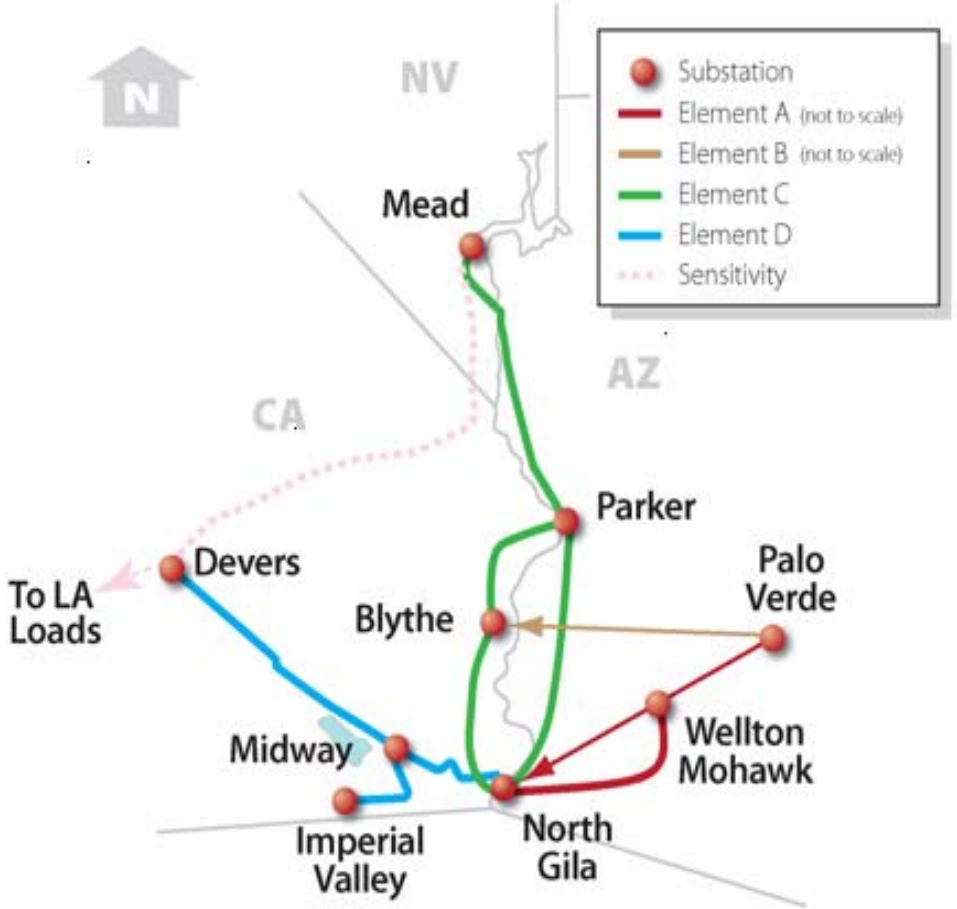
SMRT – Project and Study Area Overlaps Solar Potential

D–Imperial Valley

- 500-kV network addition to the Southern CA grid in Imperial County, miles TBD

Sensitivity- Las Vegas to Los Angeles Loads

- 500/230-KV Eldorado/Marketplace/Mead area towards Mohave - terminating in LA Load Center



SMRT preliminary feasiblity Study

- Purpose: high-level renewable potential, system impacts and benefits

- Participants: APS, Citizens, ECP, IID, SRP, Starwood, Trans-Elect, WMIDD, Western (Parker Davis Project) and Department of Energy Solar Program

- Study results in summer, will be made publicly available

SMRT Commercial Business Model

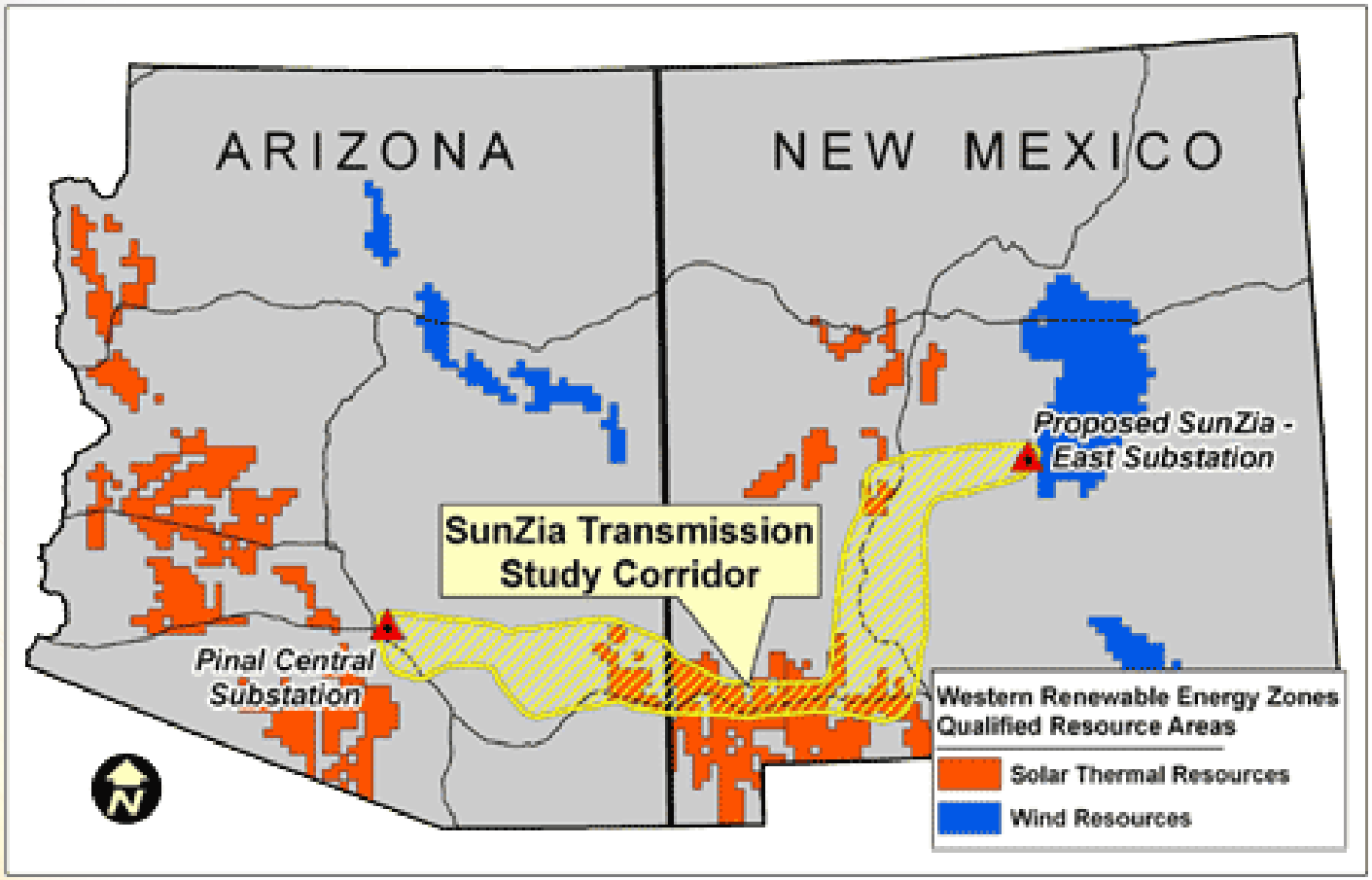
- Business discussions underway in parallel with study
- Business framework for:
  - decision-making on further participation in funding and project development
  - to define a request for TIP funding and participation in the project that can be certified to have a reasonable expectation of repayment
- Parker Davis Project participation if project benefits Parker Davis customers

Discussing Single Project Concepts

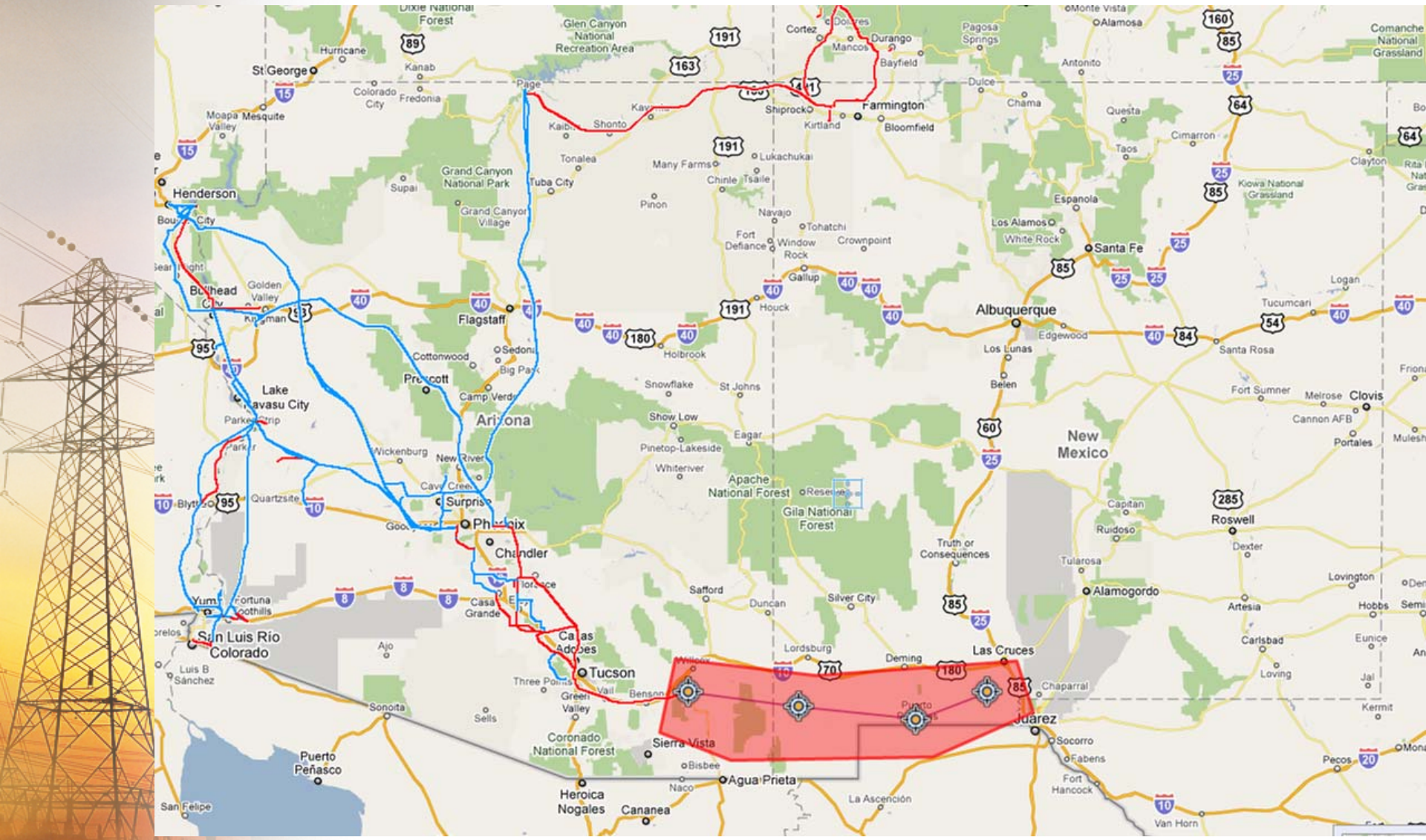
- Phased development- based upon element readiness
- Multiple elements with flexibility
- Participation consistent with each entity's interests
- Participation in the whole project and/or individual project elements

Other Projects in the Southwest

SunZia


ARIZONA
NEW MEXICO
Proposed SunZia - East Substation
SunZia Transmission Study Corridor
Pinal Central Substation
Western Renewable Energy Zones
Qualified Resource Areas
Solar Thermal Resources
Wind Resources

Southline Project



Thank You!