SWAT Utilities

- Tucson Electric Power (TEP)
- Arizona Electric Power Cooperative (AEPCO)
- El Paso Electric (EPE)
- Imperial Irrigation District (IID)
- Los Angeles Department of Water and Power (LAWDP)
- NV Energy (NVE)
- Public Service Company of New Mexico (PNM)
- Salt River Project (SRP)
- Tri-State Generation and Transmission
- Western Area Power Administration – Desert Southwest Region (WAPA-DSW)
- Arizona Public Service (APS) (SWAT Chair)
Major Existing SWAT Transmission
Major Planned SWAT Transmission
SWAT Ten Year Plans

- Ten year plans are currently under development
- Project names, dates, and routes are subject to change
- High-level summary information will be presented today
- Contact utilities directly for more information (contact information at the end)
Next SWAT Meeting

• Open to all stakeholders
• November 27, 2018 - 9:00-10:00 AZ time
• Posted to WestConnect Calendar
• Meeting Access Info
  – WebEx only – Click Join Webex meeting or direct link
    https://meetaps.webex.com/meetaps/j.php?MTID=me482a40013d86912d24cd3c8c468f4c
  – 1-408-758-9898 - Meeting number (access code): 809 776 941
Tucson Electric Power (TEP)
TEN YEAR PLAN

Tucson Electric Power Company / Unisource Energy Services
UES Ten Year Plan Overview

To Tucson (WESTERN)

Del Bac

Nogales

Vail

To Adams (WESTERN)

2019 upgrade related to Mexico D.C. Interconnection project

345 kV

Existing Facilities

138 kV

115 kV

Fossil Fuel Generation

Proposed Facilities

138 kV

230 kV

Future Facilities

138 kV

Gateway

Sonoita

Kantor

Canez

2021

2023

Valencia (4 units)

To RNT

2019 upgrade related to Mexico D.C. Interconnection project
TEP Ten Year Plan Project Summary

- **Retirements**
  - Sundt Unit 1 (75MW output): January 2020
  - Sundt Unit 2 (75MW output): January 2020
  - Irvington 138kV main – main substation: May 2021
  - Irvington 138kV ring bus: May 2021

- **Planned Projects studied as in-service**
  - Ten (10) – 20MW reciprocating generators at Irvington substation
  - NextEra Interconnection:
    - 100Mw solar and 30MW battery storage
    - Sonoran 138kV substation
    - Cisne 138kV switchyard
    - 138kV transmission line
  - Rosemont mine
  - Various 138kV re-conductor projects
  - Irvington 138kV / 46kV breaker-and-a-half substation
  - Nine (9) new 138kV / distribution substations
  - One (1) 46kV substation conversion to 138kV
UES Ten Year Plan Project Summary

• **Planned Projects studied as in-service**
  – Nogales Transmission, LLC 138kV / 230kV AC/DC/AC Interconnection with Comisión Federal De Electricidad (CFE) (both as a sink and a source, 150MW initial, 300MW full buildout)
    • UES 138kV / 230kV Gateway substation
    • Unisource Energy Services (UES) 138kV transmission line: Sonoita to Gateway / Gateway to Valencia
• **Planned Projects / Projects resulting from study**
  – Greenlee 345kV Ring: Conversion to Breaker-and-a-half, 2019
  – South 345kV Ring: Conversion to Breaker-and-a-half, 2018
  – DeMoss Petrie 138kV Ring: Conversion to Breaker-and-a-half, 2021
  – Various 138kV uprates
  – Various 138kV re-conductors
  – New 138kV line construction
  – 138kV capacitors at various locations throughout the 138kV TEP BES
  – 138kV breakers at various locations throughout the 138kV TEP BES
  – 138kV disconnect switches at various locations throughout the 138kV TEP BES
  – New 500/138kV T4 transformer at Tortolita
  – Uprate on Winchester to Vail 345kV transmission line
Arizona Electric Power Cooperative (AEPCO)
Ten Year Plan Projects in Northern Area:

• AEPCO is acquiring two distressed 345/230 kV 200 MVA Transformers. One of these is planned to be installed at AEPCO’s Greenlee Substation (2019)

• Move one of the two 50 MVAr Capacitor Banks from Morenci 230 kV Substation to Dos Condados 230 kV Substation (2018)
Ten Year Plan Projects in Southern Area:

- Schieffelin - Boothill Project in Cochise County. The project will provide increased reliability for both AEPCO and APS in southern Arizona by interconnecting the AEPCO Butterfield – San Rafael 230 kV line to APS' Adams Tap – Mural 115 kV line.

- Kartchner – Fort Huachuca 69 kV Interconnection. The project will connect AEPCO’s 69 kV system to TEP’s 138 kV system at Fort Huachuca with a 69 kV line between the two substations. Increased reliability will be the key benefit with this project.
Ten Year Plan Projects in Mohave Area:

- Bagdad Interconnection project in the Mohave Electric Cooperative area. This project will provide mutual backup for AEPCO and APS loads by installing a 115/69 kV transformer and 115 kV line connecting AEPCO’s Bagdad substation to APS’s Prescott – Bagdad 115 kV line. (2019)

Ten Year Plan Projects in Western Area:

- Capacitor Bank planned at AEPCO’s Valencia substation (2019)
- Valencia to CAP Black Mountain 115 KV Interconnection (2019)
- New Saguaro to Marana 115 kV line (2020-21)
Future New Stations

- 2019 – Add Miner (CE-1) 115kV Substation*
- 2019 – Add Nuway 115 kV Substation
- 2020 – Add Afton North Substation (345/115)
- 2020 – Add Triumph 115kV (FE-1) Substation
- 2021 – Add Talavera 115 kV Substation
- 2021 – Add Moongate (LE-1) 115kV Substation
- 2022 – Add Leasburg 115kV Substation
- 2022 – Add “E-1” 115 kV Substation east of Coyote
- 2022 – Add “E-2” 115 kV Substation south of “E-1”
- 2022 – Add Newman East 115 kV Substation
- 2022 – Add 115 kV portion of Vado Substation
- 2022 – Add 345 kV portion of Vado Substation

* Substation has been tentatively scheduled for 2019, but the final location and in-service date are not yet defined.
PDF Version
Future Plan Projects – Transmission Upgrades or Re-conductor

- 2018 - Reconductor Sunset North to Durazno 115 kV line (fall)
- 2018 - Reconductor Copper to Pendale 115 kV line (fall)
- 2019 - Reconductor Durazno–Ascarate 115 kV (fall)
- 2019 - Reconductor Santa Fe-Sunset 69 kV
- 2020 - Build Afton to Afton North 345 kV line
- 2021 - Upgrade Sparks to Felipe 69 KV line to 115 kV
- 2021 - Build Caliente-Amrad In-n-Out @ Picante Substation
- 2022 - Build Afton North to Airport 115 kV line
- 2022 - Re-conductor Coyote to “E1” 115 kV line
- 2022 - Build “E1” to “E2” 115 kV line
Future Plan Projects – Transmission Upgrades or Re-conductor Continued

- 2022 - Build “E2” to Horizon 115 kV line
- 2022 - Build “E2” to Felipe 115 kV line
- 2022 - Convert Cox-Apollo 69 kV line to 115 kV - Connect line to “Moongate” sub.
- 2022 - Build four 2-mile 115 kV circuits from Newman East to Newman 115 kV
- 2026 - Vado to Anthony 115 kV line reconductor
- 2026 - Vado to Salopek 115 kV line reconductor
- 2028 - Tap in-&-out to Vado 115 kV from Arroyo to Anthony 115 kV line
- 2028 - Tap in and out to Vado from Afton North-Newman 345 kV line
Future Improvement Projects

- 2019 - Add 2 x 15 MVAR Capacitor Bank to Nuway 115 kV bus.
- 2020 - Add 2 x 15 MVAR Capacitor Banks to Industry 115 kV bus
- 2021 - Add new Felipe 115 kV section to Felipe 69kV Substation
## NEW GENERATION AND RETIREMENTS

### NEW GENERATION

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<th>Description</th>
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<td>PV</td>
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### GENERATION RETIREMENTS

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<td>NEWMAN4</td>
<td>S1</td>
<td>December</td>
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**TOTAL NEW GENERATION = 835 MW**  
**TOTAL RETIREMENT = -500 MW**
Los Angeles Department of Water and Power (LAWDP)
2018
Long-Term Transmission Assessment
LADWP Infrastructure Improvements
LADWP Infrastructure Improvements
LADWP Infrastructure Improvements

Diagram showing connections between various infrastructure components:
- Owens Gorge
- Pine Tree Wind
- Pine Tree Solar
- RE Cinco Solar
- Springbok I & II
- Beacon Solar and Battery Storage
- Barren Ridge Switching Station
- Barren Ridge SVC (June 2021)
- Haskell Canyon Switching Station

Connections lead to the Los Angeles Area.
LADWP Infrastructure Improvements
LADWP Infrastructure Improvements

[Diagram showing connections between Celilo BPA, P65 PDCI, Sylmar LADWP, Filter Bank Replacement (April 2020)].
LADWP Infrastructure Improvements

- Intermountain
- Adelanto
- Victorville
- Victorville Lugo Upgrade (June 2021)
- Lugo
- Apex
- Harry Allen
- Crystal
- McCullough
LADWP Infrastructure Improvements

Intermountain

Apex-Crystal Line (March 2022)

Apex
Harry Allen
Crystal
McCullough
Victorville
Lugo

Adelanto
LADWP Infrastructure Improvements

Intermountain Coal Unit Replacement (December 2026)

STS Renewal Project (December 2026)

Adelanto

Apex

Harry Allen

Crystal

McCullough

Victorville

Lugo
Ten Year Plan Projects

- Completed projects
- New Projects
- Deferred projects
- System maps
1. McDonald Transformer Addition 230/138 kV 336 MVA Transformer: planned in service 05/31/2019.

2. Fold of Ford – Burnham line into Pebble 138 kV sub: planned in service 06/01/2021.

3. Several smaller 230/138/69 kV projects are planned in NVES area in the next 10 year horizon (in the WC TPPL DB).
NPC New Regional Transmission Projects

1. Desert Link T-T Interconnection at H Allen 500 kV: 60 mile 3-1590 ACSR, 70 % series compensated line to Eldorado (SCE/CAISO); project is sponsored by CAISO; ISD 05/01/2020.

2. LADWP’s (SCPPA) Apex 500 MW Plant interconnection to Crystal 500 kV (own by Navajo Transmission): 11 mile, 525 kV line to Crystal (LADWP, NTP). Project is sponsored by LADWP; ISD 03/20/2022.
Conceptual Transmission Projects

Centennial II Projects under WECC Portal (formerly TCP/RTI):

- Harry Allen – Northwest 500 kV Line Permitting (conceptual)
- Northwest - Amargosa 500 & 230 kV Permitting (conceptual)
- Harry Allen – El Dorado 500 kV Line Permitting (conceptual)
• Joined NPC & SPPC 2018 IRP currently is in the process of filing with Public Utilities Commission of Nevada.
Public Service Company of New Mexico (PNM)
Public Service Company of New Mexico

- **Completed Projects**
  - Guadalupe SVC
  - Cabezon 345 kV Station

- **Continuing Projects**
  - Blackwater 170 MVA Synchronous Condenser

- **New Projects**
  - 2020
    - West Mesa-Huning Ranch 115 kV Double Circuit Rebuild
    - Diamond Tail 345 kV Station and Diamond Tail-Clines Corners 345 kV Line
Central/Western New Mexico

- Cabezon Switching Station
- Central/Western New Mexico
- West Mesa-Huning Ranch 115 kV Double Circuit Rebuild (ISD 2020)
- Britton Solar

Completed Project
PNM Planned Project
Developer
Eastern New Mexico

- Guadalupe SVC (Complete)
- Grady Wind Farm (ISD 2019) – 200 MW
- Blackwater Synchronous Condenser (2019)
- Diamond Tail 345 kV Station and Diamond Tail-Clines Corners 345 kV Line (ISD 2020)
- Lajoya Wind Farm (ISD 2020)

Completed Project
PNM Planned Project
Developer
Salt River Project (SRP)
2021:
- SunZia Southwest Transmission 500kV Line Project

2024:
- Hassayampa – Pinal West 500kV #2 Line
SRP 230kV System – West

LEGEND
- EXISTING 230kV SUBSTATION
- FUTURE 230kV SUBSTATION
- GENERATING STATION
- EXISTING 230kV LINE
- FUTURE 230kV LINE
- DOUBLE CIRCUIT, PHASE TIED LINE

SRP Ten Year Transmission Plan 2019-2028
SRP 115kV System – Eastern Mining Area

NEW OAK FLAT 2026

SUPERIOR SILVER KING Re-route 2027

NEW SUPERIOR 2026

COOLIDGE – HAYDEN RE-ROUTE 2020

SRP Ten Year Transmission Plan 2019-2028
Questions?

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Tri-State Generation and Transmission
Tri-State SWAT Area Projects

Tri-State System

- Existing Delivery Points
- Tri-State Transmission
- Other Utilities Transmission

Map showing the Tri-State System with the locations of existing delivery points, Tri-State Transmission, and other utilities' transmission lines.
### NENM Transmission Improvements Phase I

**Description:** Construct a second 115kV line from the existing Springer Substation to the existing Gladstone Substation.

**Voltage:** 115 kV

**Length:** 32 miles

**Type:** Line

**Status:** Planned

**Planned ISD:** 2024

**Purpose:** Reliability; Load Serving.
NENM Transmission Improvements Phase II

**Description:**
Sectionalize Gladstone – Bravo Dome West (Hess) at the new Antelope Springs Substation; Sectionalize Clapham – Bravo Dome – 115kV at the new Mosquero Substation; Construct a new 230kV line from the planned Antelope Springs Substation to the planned Mosquero Substation; Convert Gladstone – Antelope Springs 115kV to 230kV.

**Voltage:** 230, 115 kV

**Length:** 29 miles

**Type:** Line.

**Status:** Planned.

**Planned ISD:** 2024

**Purpose:** Reliability; Load Serving.
For more information

**Tri-State webpage:**
www.tristategt.org

  click “Operations”
  then “Transmission Planning”

(http://www.tristategt.org/transmissionPlanning/puc3627_TransmissionProjects.cfm)

**Email:**
(transmissionplanning@tristategt.org)
Western Area Power Administration – Desert Southwest Region (WAPA-DSW)
ED2-Saguaro 115 kV Rebuild Completed 2018
Tucson 115 kV Substation Rebuild Completed 2018
Hassayampa Tap 230 kV Rebuild to 230 kV Switching Station 2019
Hassayampa Switching Station to Sun Valley 230 kV Rebuild 2019
Liberty 230 kV Series Capacitor Replacement 2020
Gila 161 kV Substation Rebuild 2020
Coolidge-Valley Farms 115 kV Rebuild 2021
Dome Tap-Gila 161 kV Rebuild 2021
Dome Tap-Kofa 161 kV Rebuild 2021
Bouse-Kofa 161 kV Rebuild 2024
Blythe Parker 161 kV Rebuild 2024
Parker 161/230 kV Substation Rebuild 2026
2026 South of Parker
  - Upgrade Bouse 161 kV substation to include 230 kV
  - Directly Connect Bouse to Headgate Rock with a 161 kV jumper
  - Remove Portions of Headgate Rock-Parker and Bouse-Parker 161 kV lines
  - Loopin Liberty-Parker #2 230 kV line into Bouse 230 kV
Arizona Public Service (APS)
Ten Year Plan

APS Transmission Planning
November 2018
2018 Completed Projects

- Mazatzal 345/69kV Substation (June 2018)
- Morgan-Sun Valley 500kV Line (April 2018)
- Ocotillo Modernization Project – 230 kV Tie (February 2018)
Planned

➢ None
Planned

- Freedom 230/69 kV Substation (previously TS4) (2020)
- Scatter Wash 230/69 kV Substation (2020)
Planned

- North Gila-Orchard (TS8) 230kV Line (2021)
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