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February 19, 2021

Docket Control
Arizona Corporation Commission
1200 West Washington
Phoenix, Arizona 85007

RE: RE: Arizona Public Service Company 2021-2030 Ten-Year
Transmission System Plan Docket No. E-99999A-21-0009

APS provides this notice of errata to APS's Ten-Year Plan filed on January 29, 2021. In that filing, Page 11, the map titled "Phoenix Metropolitan Area Transmission Plans," did not reflect the correct in-service date for the Runway 230kV Lines Project. In addition, the map did not indicate in-service dates for the following: Country Club to Lincoln Street 230kV, Country Club to Meadowbrook 230kV, Meadowbrook to Sunnyslope 230kV and Country Club to Grand Terminal 230kV Underground Upgrades.

Attached is a new page that conforms the in-service dates on the map with the narrative in the Ten-Year Plan.

Please let me know if you have questions.

Sincerely,

/s/ Rodney J. Ross

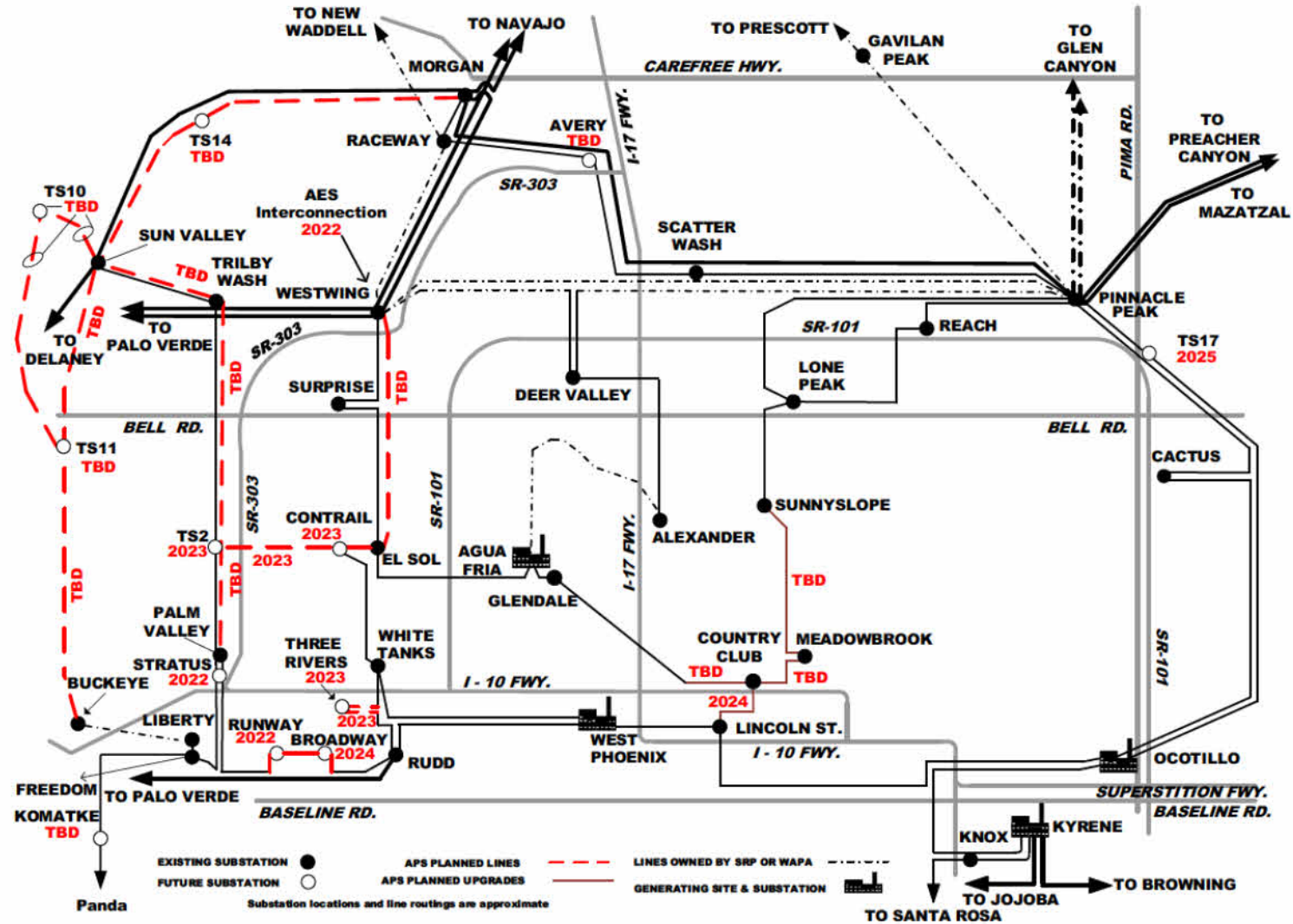
Rodney J. Ross

RJR/agc

Attachment

cc: Thomas Chenal
Elijah Abinah
Robert Geake
Toby Little

PHOENIX METROPOLITAN AREA TRANSMISSION PLANS





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January 29, 2021

Docket Control
Arizona Corporation Commission
1200 West Washington
Phoenix, Arizona 85007

RE: Arizona Public Service Company 2021-2030 Ten-Year Transmission System Plan
Docket No. E-99999A-21-0009

In compliance with A.R.S. § 40-360.02, enclosed please find Arizona Public Service Company's ("APS") 2021-2030 Ten-Year Transmission System Plan ("Ten-Year Plan") for major transmission facilities. This Ten-Year Plan includes approximately 25 miles of new 230kV transmission lines, three miles of 115kV transmission line upgrades, and 33 transformers described as planned projects. The APS investment needed to construct the projects outlined in this plan is approximately \$656 million. These new transmission projects, coupled with additional distribution and sub-transmission investments, will support reliable power delivery in APS's service area, Arizona, and in the western United States.

In this filing, APS includes: (1) Ten-Year Plan, marked as Attachment A; (2) Renewable Transmission Action Plan, marked as Attachment B; and (3) Technical Study on the Effects of DG/EE on Future Transmission Needs, marked as Attachment C.

The technical study report and the internal planning criteria and system ratings are deemed confidential Critical Energy/Electric Infrastructure Information ("CEII"). This confidential information can be made available upon request under separate cover pursuant to a protective agreement.

Please let me know if you have any questions.

Sincerely,

/s/ Rod Ross

Rodney J. Ross

RJR/agc
Attachment

cc: Thomas Chenal
Elijah Abinah
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Attachment A

2021-2030 Ten-Year Transmission System Plan



ARIZONA PUBLIC SERVICE COMPANY
2021-2030
TEN-YEAR TRANSMISSION SYSTEM PLAN

Prepared for the
Arizona Corporation Commission



January 2021

**ARIZONA PUBLIC SERVICE COMPANY
2021-2030
TEN-YEAR TRANSMISSION SYSTEM PLAN**

TABLE OF CONTENTS

GENERAL INFORMATION	1
CHANGES FROM 2020-2029 TEN-YEAR PLAN.....	7
NEW PROJECTS IN THE 2021-2030 TEN-YEAR PLAN.....	8
CONCEPTUAL PROJECTS IN THE FEASIBILITY PLANNING PHASE.....	8
PLANNED TRANSMISSION MAPS	9
PROJECT DESCRIPTIONS.....	13
North Gila – Orchard 230kV Line Circuit #1	14
AES 230kV Interconnection at Westwing 230kV Substation.....	15
Runway 230kV Lines	16
Hashknife Generation Tie Line Project.....	17
Stratus 230kV Lines	18
Three Rivers 230kV Lines.....	19
Contrail 230kV Lines.....	20
TS2 230kV Lines	21
Broadway 230kV Lines	22
TS17 230kV Lines	23
To Be Determined Projects.....	24

**ARIZONA PUBLIC SERVICE COMPANY
2021-2030
TEN-YEAR TRANSMISSION SYSTEM PLAN**

GENERAL INFORMATION

Pursuant to A.R.S. § 40-360.02, Arizona Public Service Company (APS) submits its 2021-2030 Ten-Year Transmission System Plan (Ten-Year Plan), attached as Attachment A. Also included in this filing are the Renewable Transmission Action Plan (Attachment B) as required by Arizona Corporation Commission (ACC or Commission) Decision No. 70635 (December 11, 2008), and the Technical Study on the Effects of DG/EE (Attachment C) as required by ACC Decision No. 74785 (October 24, 2014). The technical study report and the internal planning criteria and system ratings are deemed confidential Critical Energy/Electric Infrastructure Information (CEII). This confidential information can be made available upon request under separate cover pursuant to a protective agreement.

This Ten-Year Plan describes planned transmission lines of 115kV or higher voltage that APS may construct or participate in over the next ten-year period. Pursuant to A.R.S. 40-360(10), underground facilities are not subject to line siting. APS includes underground facilities in the Ten-Year Plan as they are an important part of the transmission system and transmission planning process. There is less than a mile of 500kV transmission line, approximately 25 miles of new 230kV transmission lines, three miles of underground 230kV upgrades, three miles of 115kV transmission line upgrades, and 33 transformers described as planned projects in this Ten-Year Plan. The total investment for the APS projects and the anticipated APS portion of the

participation projects as they are modeled in this filing is estimated to be \$656 million.¹ Table 1 provides an overview of the projects included in this Ten-Year Plan.

Table 1: Ten Year Plan Project Breakdown

<u>Description</u>	<u>Projects in Ten-Year Plan</u>
500kV transmission lines new	Less than 1 mile
230kV transmission lines new	25 miles (approximately)
230kV transmission lines upgrades	3 miles (approximately)
115kV transmission line upgrades	3 miles (approximately)
Transformers	33
Total Investment	\$656 million ²

Consistent with the Commission's Sixth Biennial Transmission Assessment³ (BTA) this Ten-Year Plan includes information regarding planned transmission reconductor projects, substation transformer replacements, and reactive compensation projects. At this time, APS does not plan to reductor any transmission lines, but does have plans to upgrade approximately three miles of underground 230kV. APS does not have any projects related to reactive power support at this time. These types of plans often change as they typically are in direct response to load growth or generator interconnections. Therefore, in-service dates for projects such as transformer replacements/additions, reconductoring transmission lines, and reactive power support may change to reflect the load changes in the local system. Also, there may be projects added throughout the course of the planning year to accommodate changes in system topology, retirement of generation, or new generator interconnections. For example, new projects may be identified or the planned projects may be advanced to serve customers, either single large

¹ This value is not comparable to the Capital Expenditures table presented in the "Liquidity and Capital Resources" section of APS's 10-K filing, which also includes other transmission costs for new subtransmission projects (69kV) and transmission upgrades and replacements. Also, it does not include the allowance for funds used during construction.

² See footnote 1.

³ Decision No. 72031, December 10, 2010.

customers such as new data centers or large master-planned communities such as those being contemplated west of the White Tank Mountains, or the advancement of significant electric vehicle adoption. Table 2, Equipment Additions/Replacements, shows a list of the planned substation transformer additions/replacements and transmission line upgrades.

Table 2: Equipment Additions/Replacements

<u>Description</u>	<u>Year</u>
North Gila 500/230kV Transformer Addition (1 unit) Orchard 230/69kV Transformer Additions (2 units) Adams to Boothill 115kV Transmission Line Upgrade Boothill to Mural 115kV Transmission Line Upgrade Boothill 115kV Substation Rebuild	2021
Stratus 230/69kV Transformer Additions (3 units) Runway 230/69kV Transformer Additions (3 units)	2022
Three Rivers 230/69kV Transformer Additions (3 units) Contrail 230/69kV Transformer Additions (3 units)	2023
Broadway 230/69kV Transformer Additions (3 units) Country Club to Lincoln Street 230kV Underground Upgrade	2024
TS17 230/69kV Transformer Additions (2 units)	2025
Raceway 230/69kV Transformer Addition (1 unit) Sun Valley 500/230kV Transformer Addition (1 unit) Sun Valley 230/69kV Transformer Addition (1 unit) Trilby Wash 230/69kV Transformer Addition (1 unit) Westwing 230/69kV Transformer Addition (1 unit) Scatter Wash 230/69kV Transformer Addition (1 unit) Lone Peak 230/69kV Transformer Addition (1 unit) Palm Valley 230/69kV Transformer Addition (1 unit) Freedom 230/69kV Transformer Addition (1 unit) Ocotillo 230/69kV Transformer Addition (1 unit) West Phoenix 230/69kV Transformer Addition (1 unit) Avery 230/69kV Transformer Addition (1 unit) TS2 230/69kV Transformer Addition (1 unit) Country Club to Meadowbrook 230kV Underground Upgrade Meadowbrook to Sunnyslope 230kV Underground Upgrade Country Club to Grand Terminal 230kV Underground Upgrade	TBD

Some of the facilities reported in prior Ten-Year Plan filings have been completed. Others have been canceled or deferred beyond the upcoming ten-year period and are therefore not included here. The projects that have “To Be Determined” (TBD) in-service dates are projects that have been identified, but are either still outside of the ten-year planning window or have in-service dates that have not yet been established. They are included in this filing for informational purposes. A summary of changes from last year’s Ten-Year Plan is also provided (pg. 7).

APS has included planned transmission maps showing the electrical connections and in-service dates for all overhead transmission projects planned by APS for Arizona Extra High Voltage (EHV) and Outer Divisions (pg. 10), the Phoenix Metropolitan Area (pg. 11), and the Yuma area (pg. 12). Written descriptions of each proposed transmission project are provided on subsequent pages in the currently expected chronological order of each project. The line routings shown on the system maps and the descriptions of each transmission line are intended to be general showing electrical connections and not specific routings and are subject to revision. Specific routings are recommended by the Arizona Power Plant and Transmission Line Siting Committee and approved by the Commission when issuing a Certificate of Environmental Compatibility (CEC) and through subsequent right-of-way acquisition.

APS participates in numerous regional planning organizations, which provide an opportunity for other entities to participate in future planned projects. Through membership and participation in these organizations, the needs of multiple entities, and the region as a whole, can be identified and studied, which maximizes the effectiveness and use of new projects. Regional organizations in which APS is a member include the Western Electricity Coordinating Council (WECC), the Southwest Area Transmission Planning (SWAT), and WestConnect. The plans included in this filing are the result of these coordinated planning efforts.

The Commission's Sixth BTA ordered that utilities include the effects of distributed generation (DG) and energy efficiency (EE) programs on future transmission needs. APS's modeled load, as described in the Technical Study Report, addresses the requirements of the Commission's Sixth BTA. Additionally, in the Eighth BTA Decision⁴ the Commission directed utilities to conduct or procure a study to more directly identify the effects of DG and EE installations and/or programs on their future transmission needs. This study is marked as Attachment C to this filing.

The Commission's decision in the Seventh BTA⁵ to suspend the requirement for performing Reliability Must Run (RMR) studies in every BTA unless certain criteria is met to restart such studies is still in effect. Since APS's last RMR, there have been no triggering events that would require restarting a RMR study for Phoenix and Yuma load pockets, which are the two major areas in APS's service territory where load cannot be served entirely by imports over transmission lines. The Commission's Ninth BTA Decision⁶ ordered utilities to describe, in general terms, the driving factor(s) for each transmission project in the Ten-Year Plan. This information is included in the project descriptions.

Also, consistent with the Commission's Decision in the Seventh BTA, APS continues to monitor reliability in Cochise County. To improve reliability in Cochise County, APS, Arizona Electric Cooperative (AEPCO) and Sulphur Springs Valley Electric Cooperative (SSVEC) have executed agreements⁷ to coordinate and jointly participate in a number of projects and upgrades within the Cochise County area. These agreements incorporate, among other things, plans for the

⁴ Decision No. 74785, October 24, 2014.

⁵ Decision No. 73625, December 12, 2012.

⁶ Decision No. 75817, November 21, 2016.

⁷ See Cochise County Mutual Standby Transmission Service Agreement, APS Service Agreement No. 372, filed with the Federal Energy Regulatory Commission (FERC) on May 21, 2019, in FERC Docket No. ER19-1915-000.

230kV, 115kV and 69kV area additions that include new and upgraded transmission lines, new transformers, and system reconfigurations to sustain reliable operation in the area.

Power flow analysis was conducted to identify thermal overloads under normal and contingency conditions in compliance with North American Electric Reliability Corporation (NERC) Reliability Standards and WECC System Performance Criteria. The projects identified in this Ten-Year Plan, with their anticipated in-service dates, will ensure that APS's transmission system meets all applicable reliability criteria for Category P0 and P1 conditions as defined in NERC Reliability Standard TPL-001-4. Changes in regulatory requirements, regulatory approvals, or underlying assumptions such as load forecasts, generation or transmission expansions, economic issues, retirement of generation, changes in the system topology, and other utilities' plans may substantially impact this Ten-Year Plan and could result in changes to anticipated in-service dates or project scopes. Additionally, future federal and regional mandates may impact this Ten-Year Plan specifically and the transmission planning process in general. This Ten-Year Plan contains tentative information only and is subject to change without notice at the discretion of APS in accordance with A.R.S. § 40-360.02(F).

CHANGES FROM 2020-2029 TEN-YEAR PLAN

The following list of projects were removed or changed from APS's January and subsequent June 2020 Supplemental filing to the 2020-2029 Ten-Year Plan:

- Scatter Wash 230/69kV Substation project went in-service in 2020
- Freedom 230/69kV Substation project went in-service in January 2021
- Runway 230kV Lines project in-service date has moved from 2021 to 2022
- AES 230kV Interconnection at Westwing 230kV Substation in-service date has moved from 2021 to 2022

NEW PROJECTS IN THE 2021-2030 TEN-YEAR PLAN

The following transmission project is a new project in APS's 2021-2030 Ten-Year Plan (the project, including the gen-tie line, was included in Invenenergy's 2020-2029 Ten Year Plan):

- Hashknife Generation Tie Line Project interconnecting at APS's Cholla 500kV substation in December 2022

CONCEPTUAL PROJECTS IN THE FEASIBILITY PLANNING PHASE

New transmission source into the Southwest Phoenix Metropolitan load area:

West and southwest parts of the Phoenix metropolitan area are experiencing rapid economic development. A new 500kV transmission source into the area will be studied to provide reliable electric service for potential load growth, such as high-load data center customers. Additionally, this new source would provide customers in the area greater access to a diverse mix of resources from around the region.

PLANNED TRANSMISSION MAPS

Legend:

- POWER PLANT
- EXISTING LINES
- PLANNED LINES
- PLANNED UPGRADES LINES/SUBSTATION
- EXISTING SUBSTATION
- FUTURE SUBSTATION

Map Labels:

NAVAJO, MOENKOPI, COCONINO, VERDE, YOUNGS CANYON, FLAGSTAFF (WAPA), CHOLLA, SUGARLOAF, CORONADO, PREACHER CANYON, MAZATZAL, PINNACLE PEAK, LOCOT LLO, KYRENE, COOLIDGE, VALLEY FARMS, PINAL CENTRAL, CASA GRANDE, MILLIGAN, SAN MANUEL, ORACLE JUNCTION, SAGUARO, TAT MOMOLI, SANTA ROSA, GILA BEND, SOLANA, GILA RIVER/PANDA, REDHAWK, HOODOO WASH, N. GILA, TO IMPERIAL VALLEY, PALO VERDE-HASSAYAMPA, DELANEY, SUN VALLEY, WEST W'NG, FREEDOM, RUDD, JOJOBA, DESERT BASIN, SUNDANCE, KNOX, KYRENE, LOCOT LLO, PINNACLE PEAK, MAZATZAL, PREACHER CANYON, DUGAS, GAVILAN PEAK, MORGAN, DUGAS, YOUNGS CANYON, VERDE, COCONINO, CEDAR MOUNTAIN, YAVAPAI, WILLOW LAKE, BAGDAD, ROUND VALLEY, SELIGMAN, TO ELDORADO, TO MEAD / MARKETPLACE, TO COLORADO RIVER, TO CRYSTAL, TO GLEN CANYON (WAPA), TO CRISTO RE, and TO SAN CARLOS.

Projects:

- Hashknife Interconnection Project 2022
- Mead-Perkins Interconnection Project TBD
- TS21 TBD
- SUNDANCE TBD

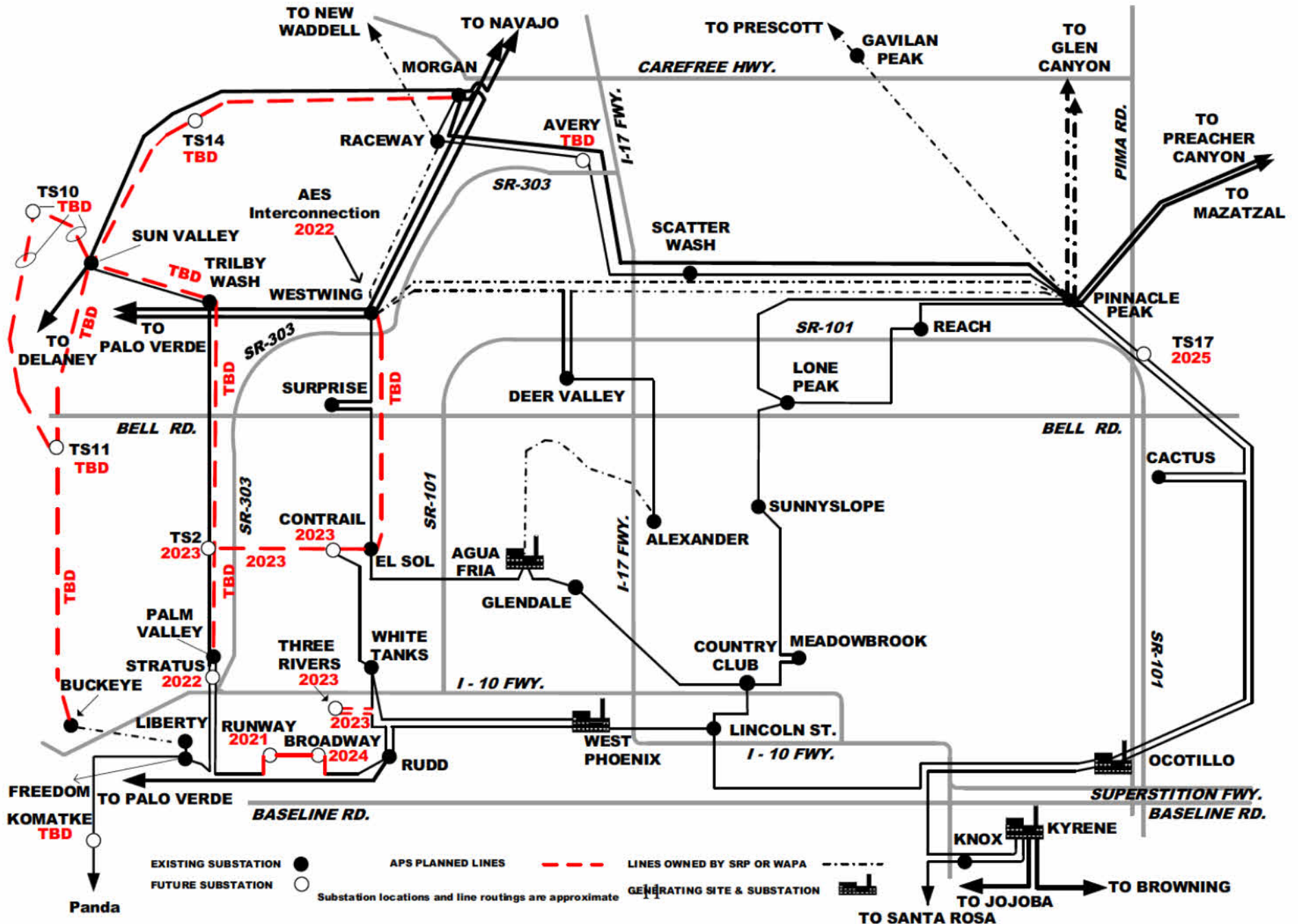
Other Labels:

- ADAMS, BOOTHILL, MURAL (2021)
- FOUR CORNERS

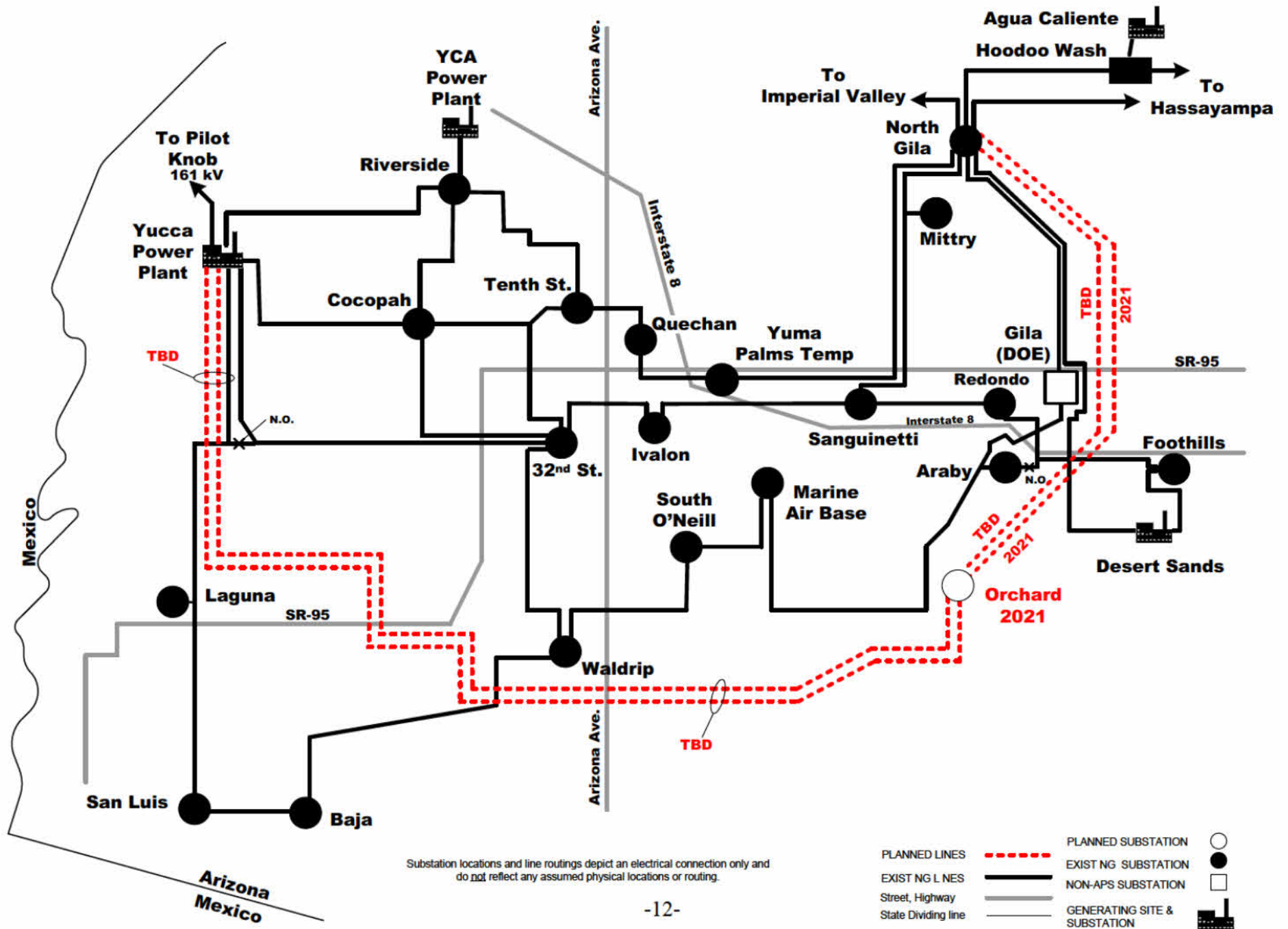
North Arrow: NORTH

Disclaimer: Substation locations and line routings depict an electrical connection only and do not reflect any assumed physical locations or routing.

PHOENIX METROPOLITAN AREA TRANSMISSION PLANS



Yuma Area Transmission Plans



PROJECT DESCRIPTIONS

**Arizona Public Service Company
2021 - 2030
Ten-Year Plan
Planned Transmission Description**

2021

<u>Project Name</u>	North Gila – Orchard 230kV Line Circuit #1
<u>Project Sponsor</u>	Arizona Public Service Company
<u>Other Participants</u>	None
<u>Size</u>	
(a) Voltage Class	230kV AC
(b) Facility Rating	3000 A
(c) Point of Origin	North Gila Substation
(d) Intermediate Points of Interconnection	None
(e) Point of Termination	Orchard 230kV Substation
(f) Length	Approximately 13 miles
<u>Routing</u>	The line will generally proceed south from the North Gila Substation until the route proceeds west near the County 13½ Street alignment and then it will turn south to the Orchard Substation.
<u>Purpose</u>	Driving Factor(s): To increase ability to import resources into the Yuma load pocket. The project will also be used to improve reliability, serve the need for electric energy, and provide continuity of service for the greater Yuma area by adding a transmission source in a new area of the Yuma system. This project will have double-circuit capability with one circuit in-service in 2021 and the second circuit in-service TBD.
<u>Date</u>	
(a) Construction Start	2020
(b) Estimated In-Service	2021
<u>Permitting / Siting Status</u>	<i>CEC issued 2/2/2012 (Case No. 163, Decision No. 72801). Note – North Gila to TS8 230kV Transmission Line is now referred to as North Gila – Orchard 230kV Line.</i>

**Arizona Public Service Company
2021 - 2030
Ten-Year Plan
Planned Transmission Description**

2022

<u>Project Name</u>	AES 230kV Interconnection at Westwing 230kV Substation
<u>Project Sponsor</u>	AES
<u>Other Participants</u>	Arizona Public Service Company
<u>Size</u>	
(a) Voltage Class	230kV AC
(b) Facility Rating	TBD
(c) Point of Origin	AES 200MW Battery Energy Storage Project, Sec. 1, T4N, RIW
(d) Intermediate Points of Interconnection	None
(e) Point of Termination	Westwing 230kV Substation
(f) Length	Less than 1 mile
<u>Routing</u>	The AES Battery Energy Storage Project will be located just north of the Westwing substation property. Generally, the transmission line is planned to proceed in a southeasterly direction until getting close to the eastern edge of the Westwing substation and then proceed south into the Westwing 230kV substation. After approximately the first span outside the AES site, the new line will be co-locating with an existing APS 69kV sub-transmission line.
<u>Purpose</u>	Driving Factor(s): This will be a generator tie-line to connect the AES Battery Energy Storage Project to the Westwing 230kV Substation.
<u>Date</u>	
(a) Construction Start	2021
(b) Estimated In-Service	2022
<u>Permitting / Siting Status</u>	<i>An application for a CEC has not yet been filed. APS anticipates filing a CEC application in 2021.</i>

**Arizona Public Service Company
2021 - 2030
Ten-Year Plan
Planned Transmission Description**

2022

<u>Project Name</u>	Runway 230kV Lines
<u>Project Sponsor</u>	Arizona Public Service Company
<u>Other Participants</u>	None
<u>Size</u>	
(a) Voltage Class	230kV AC
(b) Facility Rating	TBD
(c) Point of Origin	Palm Valley-Rudd 230kV line
(d) Intermediate Points of Interconnection	None
(e) Point of Termination	Runway Substation
(f) Length	Less than 1 mile per circuit
<u>Routing</u>	The Runway Substation will be located less than one mile to the north of the Palm Valley-Rudd 230kV line, on the north side of Broadway Road. The cut-in and extension of the existing line will generally head directly north and connect to the new Runway substation. Then a new line will be routed from the Runway substation generally directly east to the planned Broadway substation and then continue south to the existing line. This will cut the new substations in and out of the existing line. Each new circuit will be on separate structures.
<u>Purpose</u>	Driving Factor(s): To provide electric energy to a new high load customer in the area. In-service date is predicated on ramp rate of customer load.
<u>Date</u>	
(a) Construction Start	2019
(b) Estimated In-Service	2022
<u>Permitting / Siting Status</u>	CEC issued 11/7/2019 (Case No. 183, Decision No. 77469).

**Arizona Public Service Company
2021 - 2030
Ten-Year Plan
Planned Transmission Description**

2022

<u>Project Name</u>	Hashknife Generation Tie Line Project
<u>Project Sponsor</u>	Hashknife Energy Center LLC
<u>Other Participants</u>	Arizona Public Service Company
<u>Size</u>	
(a) Voltage Class	500kV AC
(b) Facility Rating	TBD
(c) Point of Origin	New substation interconnecting Hashknife Solar Project
(d) Intermediate Points of Interconnection	None
(e) Point of Termination	Cholla 500kV Substation
(f) Length	Less than 1 mile per circuit
<u>Routing</u>	The route commences near the Cholla substation property boundary and heads southeast for approximately 0.3 miles to the point of interconnection at the Cholla substation.
<u>Purpose</u>	This will be a generator tie-line to connect Hashknife Solar Project to the Cholla 500kV Substation.
<u>Date</u>	
(a) Construction Start	2021
(b) Estimated In-Service	2022
<u>Permitting / Siting Status</u>	<i>On 1/22/2021, in Decision Nos. 77888 and 77889, the Commission granted Invenergy CEC-1 and CEC-2, respectively (Case No. 187). CEC-1 is for the portion of the Project that originates at the Hashknife Solar Project to the point of future ownership change (the Point of Physical Demarcation ("POPD") near the Cholla Substation property boundary. The companion CEC-2 is for the portion of the Project from the POPD to the point of interconnection at the Cholla Substation. At a future date, Invenergy intends to transfer CEC-2 to APS.</i>

**Arizona Public Service Company
2021 - 2030
Ten-Year Plan
Planned Transmission Description**

2022

<u>Project Name</u>	Stratus 230kV Lines
<u>Project Sponsor</u>	Arizona Public Service Company
<u>Other Participants</u>	None
<u>Size</u>	
(a) Voltage Class	230kV AC
(b) Facility Rating	TBD
(c) Point of Origin	Freedom-Palm Valley and Palm Valley-Rudd 230kV lines
(d) Intermediate Points of Interconnection	None
(e) Point of Termination	Stratus Substation
(f) Length	Less than 1 mile
<u>Routing</u>	The Stratus substation will be located directly south of the Freedom-Palm Valley and Palm Valley-Rudd 230kV lines on the southeast corner of Indian School Road and Citrus Road. The cut-in and extension of the existing lines will head directly south and connect to the Stratus substation. The new lines will then be routed from the Stratus substation north back to the existing lines. This will cut the Stratus substation in and out of the existing lines. Four separate circuits will be brought in on two separate structures.
<u>Purpose</u>	Driving Factor(s): To provide electric energy to a new high load customer in the area. In service date is predicated on ramp rate of customer load.
<u>Date</u>	
(a) Construction Start	2021
(b) Estimated In-Service	2022
<u>Permitting / Siting Status</u>	<i>CEC issued on 12/22/2003 (Case No. 122, Decision No. 66646, West Valley South Project). Decision No. 73937 amended CEC on 6/27/2013 approving APS's application to extend the CEC term to 12/23/2018 for the first circuit of the Project and to 12/23/2028 for the second circuit and other facilities. Decision No. 77761 amended CEC on 10/2/2020 authorizing two short segments of 230kV double-circuit lines and the Stratus substation. The transmission lines and Stratus substation tie into an existing 230kV transmission line authorized on 12/22/2003 in CEC 122.</i>

**Arizona Public Service Company
2021 - 2030
Ten-Year Plan
Planned Transmission Description**

2023

<u>Project Name</u>	Three Rivers 230kV Lines
<u>Project Sponsor</u>	Arizona Public Service Company
<u>Other Participants</u>	None
<u>Size</u>	
(a) Voltage Class	230kV AC
(b) Facility Rating	TBD
(c) Point of Origin	Rudd-White Tanks 230kV line
(d) Intermediate Points of Interconnection	None
(e) Point of Termination	Three Rivers Substation
(f) Length	Approximately 4 miles
<u>Routing</u>	The Three Rivers Substation will be located approximately three and a half miles to the west of the Rudd-White Tanks 230kV line on the southwest corner of Van Buren Street and Bullard Avenue. The cut-in and extension of the existing line will generally head west to connect to the new Three Rivers substation. Then a second line will be routed from the new substation generally directly east back to the existing line. This will cut the new substation in and out of the existing line. Pending results of the line siting study, portions of the new lines may be double circuit capable.
<u>Purpose</u>	Driving Factor(s): To provide electric energy to a new high load customer in the area. In service date is predicated on ramp rate of customer load.
<u>Date</u>	
(a) Construction Start	2022
(b) Estimated In-Service	2023
<u>Permitting / Siting Status</u>	<i>An application for a CEC has not yet been filed. APS anticipates filing a CEC application in 2021.</i>

**Arizona Public Service Company
2021 - 2030
Ten-Year Plan
Planned Transmission Description**

2023

<u>Project Name</u>	Conrail 230kV Lines
<u>Project Sponsor</u>	Arizona Public Service Company
<u>Other Participants</u>	None
<u>Size</u>	
(a) Voltage Class	230kV AC
(b) Facility Rating	TBD
(c) Point of Origin	El Sol Substation
(d) Intermediate Points of Interconnection	Conrail Substation
(e) Point of Termination	TS2 Substation
(f) Length	Approximately 7 miles
<u>Routing</u>	The Conrail substation will be located on the southeast corner Olive Avenue and Dysart Road. The line will originate in the El Sol substation and will head generally west and interconnect at the Conrail substation. The line will then continue from Conrail substation and head generally west and terminate at the TS2 substation. Pending results of the line siting study, portions of the new lines may be double circuit capable.
<u>Purpose</u>	Driving Factor(s): To provide electric energy to a new high load customer in the area. In service date is predicated on ramp rate of customer load.
<u>Date</u>	
(a) Construction Start	2022
(b) Estimated In-Service	2023
<u>Permitting / Siting Status</u>	<i>An application for a CEC has not yet been filed. APS anticipates filing a CEC application in 2021.</i>

**Arizona Public Service Company
2021 - 2030
Ten-Year Plan
Planned Transmission Description**

2023

<u>Project Name</u>	TS2 230kV Lines
<u>Project Sponsor</u>	Arizona Public Service Company
<u>Other Participants</u>	None
<u>Size</u>	
(a) Voltage Class	230kV AC
(b) Facility Rating	TBD
(c) Point of Origin	Palm Valley-Trilby Wash 230kV line
(d) Intermediate Points of Interconnection	None
(e) Point of Termination	TS2 Substation
(f) Length	Less than 1 mile
<u>Routing</u>	The TS2 Substation will be located less than one mile east of the Palm Valley – Trilby Wash 230kV line. The substation will be located north of Olive Avenue between the Loop 303 and Cotton Lane.
<u>Purpose</u>	Driving Factor(s): To provide electric energy to a new high load customer in the area. In service date is predicated on ramp rate of customer loads.
<u>Date</u>	
(a) Construction Start	2022
(b) Estimated In-Service	2023
<u>Permitting / Siting Status</u>	<i>CEC issued on 12/22/2003 (Case No. 122, Decision No. 66646, West Valley-South Project). Decision No. 73937 amended CEC on 6/27/2013 approving APS's application to extend the CEC term to 12/23/2018 for the first circuit of the Project and to 12/23/2028 for the second circuit and other facilities.</i>

**Arizona Public Service Company
2021 - 2030
Ten-Year Plan
Planned Transmission Description**

2024

<u>Project Name</u>	Broadway 230kV Lines
<u>Project Sponsor</u>	Arizona Public Service Company
<u>Other Participants</u>	None
<u>Size</u>	
(a) Voltage Class	230kV AC
(b) Facility Rating	TBD
(c) Point of Origin	Palm Valley-Rudd 230kV line
(d) Intermediate Points of Interconnection	None
(e) Point of Termination	Broadway Substation
(f) Length	Less than 1 mile per circuit
<u>Routing</u>	The Broadway Substation will be located less than one mile to the north of the Palm Valley-Rudd 230kV line, on the north side of Broadway Road. The cut-in and extension of the existing line will generally head directly north and connect to the new Broadway substation. Then a new line from the new Runway substation will be routed to the new Broadway substation. This will cut the new substations in and out of the existing line. Each new circuit will be on separate structures.
<u>Purpose</u>	Driving Factor(s): To provide electric energy to a new high load customer in the area. In service date is predicated on ramp rate of customer load.
<u>Date</u>	
(a) Construction Start	2023
(b) Estimated In-Service	2024
<u>Permitting / Siting Status</u>	CEC issued 11/7/2019 (Case No. 183, Decision No. 77469).

**Arizona Public Service Company
2021 - 2030
Ten-Year Plan
Planned Transmission Description**

2025

<u>Project Name</u>	TS17 230kV Lines
<u>Project Sponsor</u>	Arizona Public Service Company
<u>Other Participants</u>	None
<u>Size</u>	
(a) Voltage Class	230kV AC
(b) Facility Rating	367 MVA
(c) Point of Origin	Ocotillo – Pinnacle Peak 230kV line
(d) Intermediate Points of Interconnection	None
(e) Point of Termination	TS17 Substation
(f) Length	Less than 1 mile
<u>Routing</u>	The TS17 Substation will be located adjacent to the existing Ocotillo – Pinnacle Peak 230kV line generally between Bell Road and Thompson Peak Parkway near the existing Downing 69/12kV substation.
<u>Purpose</u>	Driving Factor(s): To provide electric energy in the northeastern portions of the Phoenix Metropolitan area. The load demands in northeastern portions of the Phoenix Metropolitan area are increasing and this substation will provide a new transmission source to maintain reliability of the local 69kV system serving the area. Additionally, this substation offloads multiple heavily loaded 230kV lines in the Phoenix Metropolitan area.
<u>Date</u>	
(a) Construction Start	2023
(b) Estimated In-Service	2025
<u>Permitting / Siting Status</u>	<i>An application for a CEC has not yet been filed. APS anticipates filing a CEC application in 2021.</i>

**Arizona Public Service Company
2021 - 2030
Ten-Year Plan
Planned Transmission Description**

To Be Determined Projects

<u>Project Name</u>	<u>Permitting/Siting Status</u>
El Sol – Westwing 230kV Line	CEC issued (Case No. 9, Docket No. U-1345)
Palo Verde – Saguaro 500kV Line	CEC issued (Case No. 24, Decision No. 46802)
Komatke 230/69kV Substation	CEC issued (Case No. 102, Decision No. 62960)
Avery 230/69kV Substation	CEC issued (Case No. 120, Decision No. 65997, amended by Decision No. 73824, North Valley Project)
Palm Valley – TS2 – Trilby Wash 230kV Line Circuit #2	The Palm Valley-TS2 segment CEC issued (Case No. 122, Decision No. 66646, amended by Decision No. 73937, West Valley-South 230kV Transmission Line Project) The Trilby Wash-TS2 segment CEC issued (Case No. 127, Decision No. 67828, amended by Decision No. 75045, West Valley North 230kV Transmission Line project)
Sun Valley – Trilby Wash 230kV Line Circuit #2	CEC issued (Case No. 127, Decision No. 67828, amended by Decision No. 75045, West Valley North 230kV Transmission Line project)
Pinal Central – Sundance 230kV Line	CEC issued (Case No. 136, Decision No. 70325, Sundance to Pinal South 230kV Transmission Line project)
Morgan – Sun Valley 230kV Line	CEC issued (Case No. 138, Decision No. 70850, amended by Decision No. 75092, TS5-TS9 500/230kV Project)
Orchard – Yucca 230kV Line	CEC issued (Case No. 163, Decision No. 72801, North Gila to TS8 to Yucca 230kV Transmission Line Project)
Sun Valley – TS10 – TS11 230kV Line	An application for a CEC has not yet been filed
Buckeye – TS11 – Sun Valley 230kV Line	An application for a CEC has not yet been filed
TS14 230kV Lines	An application for a CEC has not yet been filed
TS21 500/230kV Substation	An application for a CEC has not yet been filed
Mead-Perkins 500kV Interconnection Project	An application for a CEC has not yet been filed

Attachment B

Renewable Transmission Action Plan

Arizona Public Service Company Renewable Transmission Action Plan January 2021

In the Fifth Biennial Transmission Assessment (BTA) Decision, (Decision No. 70635, December 11, 2008), the Arizona Corporation Commission (Commission) ordered Arizona Public Service Company (APS) to file a document identifying APS's top potential Renewable Transmission Projects (RTPs) that would support the growth of renewable resources in Arizona. On January 29, 2010, APS filed with the Commission its top potential RTPs, which were identified in collaboration with the Southwest Area Transmission planning group and its subgroups, other utilities and stakeholders. In its filing, APS included a Renewable Transmission Action Plan (RTAP), which included the method used to identify RTPs, project approval and financing of the RTPs.

On January 6, 2011, the Commission approved APS's RTAP (Decision No. 72057, January 6, 2011¹), which allows APS to pursue the development steps indicated in APS's RTAP. The Decision, in part, ordered:

IT IS FURTHER ORDERED that the timing of the next Renewable Transmission Action Plan filing shall be in parallel with the 2012 Biennial Transmission Assessment process.

IT IS FURTHER ORDERED that Arizona Public Service Company shall, in any future Renewable Transmission Action Plans filed with the Commission, identify Renewable Transmission Projects, which include the acquisition of transmission capacity, such as, but not limited to, (i) new transmission line(s), (ii) upgrade(s) of existing line(s), or (iii) the development of transmission project(s) previously identified by the utility (whether conceptual, planned, committed and/or existing), all of which provide either:

- 1. Additional direct transmission infrastructure providing access to areas within the state of Arizona that have renewable energy resources, as defined by the Commission's Renewable Energy Standard Rules (A.A.C. R14-2-1801, et seq.), or are likely to have renewable energy resources; or*
- 2. Additional transmission facilities that enable renewable resources to be delivered to load centers.*

Two of the three RTPs that APS filed in its original RTAP in January 2010 have been completed. In this filing, APS reports that the Palo Verde to Liberty and Gila Bend to Liberty projects (the remaining RTP that APS filed in its original RTAP) continues to be viable and will be developed as reliability and resource needs arise. These are conceptual 500kV transmission line projects from the Palo Verde hub and from the Gila Bend/Gila River area to a new substation near the existing Liberty substation located in the west valley. APS's 2021-2030 Ten-Year Transmission System Plan does not show a need for these projects and, as a result, no further progress on the development plan has been made.

APS also reports that its 2021-2030 Ten-Year Transmission System Plan does not show a need for additional RTPs beyond what the Commission previously approved in

¹ Commission Decision No. 72057 found that APS's 2010 RTAP process and Plan is appropriate and consistent with the Commissions' Fifth Biennial Transmission Assessment final order.

**Arizona Public Service Company
Renewable Transmission Action Plan
January 2021**

Decision No. 72057. As a result, in this RTAP, APS is not proposing new RTPs. APS will explore new renewable transmission opportunities when appropriate.

Finally, APS continues to see increased growth of renewable energy resources in its service territory. Over the last decade, APS has seen development of smaller scale solar renewable projects with interconnection requests into the local distribution system (69kV or below). In addition to smaller scale solar projects, the current large generator interconnection queue indicates increased interest in interconnecting large scale renewable resources to APS's transmission system.

Attachment C

Technical Study on the Effects of Distributed
Generation/Energy Efficiency on Future Transmission Needs



Technical Study

Effects of Distributed Generation and Energy Efficiency on Future Transmission Needs

ARIZONA PUBLIC SERVICE COMPANY

January 2021

Executive Summary

In Decision No. 74785 (October 24, 2014), the Eighth Biennial Transmission Assessment (Eighth BTA), the Commission ordered Arizona utilities with retail load to study the effects of Distributed Generation (DG) and Energy Efficiency (EE) on their future planned transmission systems in their fifth planning year (the Study).

To perform the Study, Arizona Public Service Company (APS) used the 2025 Heavy summer base case, which was reviewed and updated by APS, Salt River Project (SRP), Tucson Electric Power (TEP), UNS Electric (UNSE), Arizona Electric Power Co-op (AEPCO), and Western Area Power Administration (WAPA) (Arizona entities).

- The first case is the base case or typical system peak planning load, which includes the effects of DG and EE in the load.
- The second case is the base case with the projected increases in DG and EE over the next five (5) years backed out of the load forecast. The projected increases of DG and EE in APS's footprint for 2021 to 2025 that are backed out of the forecast for this case total 416 MW, which includes 35 MW for DG and 381 MW for EE.

The Study indicates that delayed or non-implemented DG and EE have no effect on APS's Bulk Electric System (BES) as currently planned in 2025. The increase of 416 MW of additional load did not show a need for any additional transmission projects beyond what APS has already planned and presented in its 2021-2030 Ten Year Transmission System Plan. However, the Study indicated that the delayed or non-implemented DG and EE over APS and SRP's combined footprint causes thermal overloads over SRP's transmission facilities. SRP is aware of these overloads and is investigating mechanisms to mitigate these issues.

Table of Contents

1. Introduction 1

2. Study Requirements and Assumptions 1

 2.1. Study Requirements..... 1

 2.2. Studied Cases Assumptions 2

3. APS’s Distributed Generation and Energy Efficiency Forecasting Methodology Description 2

 3.1. Energy Efficiency Impact 2

 3.2. Distributed Generation Impact 3

4. Study Results 3

5. Conclusion 3

1. Introduction

In Decision No. 74785 (October 24, 2014), the Eighth Biennial Transmission Assessment (Eighth BTA), the Commission ordered Arizona utilities with retail load to study the effects of Distributed Generation (DG) and Energy Efficiency (EE) installations and/or programs on their future planned transmission systems. The Decision states:

The technical study should be performed on the fifth year transmission plan by disaggregating the utilities' load forecasts from effects of DG and EE and performing contingency analysis with and without the disaggregate DG and EE. The technical study should at a minimum discuss DG and EE forecasting methodologies and transmission loading impacts. The study should monitor transmission down to and including the 115kV level. Alternative methodologies or study approaches will be acceptable on condition that the study results satisfy the minimum requirements [above].¹

2. Study Requirements and Assumptions

2.1. Study Requirements

To fulfill this requirement in the Eighth BTA the Study looks at two load scenarios outlined in Table 1 below. The first case uses the forecasted load including the effects of DG and EE per the typical planning process. The second case uses the forecasted load excluding the effects of projected increases in DG and EE between 2021 and 2025 This scenario is equivalent to “disaggregating the utilities load forecasts from effects of DG and EE.”²

Table 1 - Summary of Cases

Case	Scenario	Load	EE	DG	Utility Solar
1	Base	Peak	On	On	On
2	EE/DG	Peak	Pre 2021 only	Pre 2021 only	On

The Study monitored the loading impacts to the transmission system and performed reliability analysis similar to how APS analyzes it in the ten-year planning process. For the two cases, BES facilities (>100kV) are examined to ensure there are no thermal or voltage criteria violations. These facilities are examined with all lines in-service and for all single contingencies.

¹ Decision No. 74785 at 9:22-27 and 10:1-2.

² *Id.* at 9:22-24.

2.2. Studied Cases Assumptions

This Study used the 2025 power flow case, which was also used in APS's 2021-2030 Ten-Year Plan. The 2025 heavy summer case was a "seed case" created by Arizona entities for use in planning studies during 2020. For the EE/DG scenario case the APS load in the 2025 planning case was increased to reflect the values of DG and EE, as described below.

- For APS, 77% of the MW contributions of DG were estimated to be from metro Phoenix load areas, while 23% of the MW contributions of DG were estimated to be from areas outside the metro area. Similarly, 75% of the MW contributions of EE were estimated to be from metro Phoenix load areas, while 25% of the MW contributions of EE were estimated to be from areas outside the metro area. Identified large industrial loads were not scaled during the process of creating the scenario cases.
- Available generation within Arizona was increased to account for the increased load.

SRP's forecasting group estimated EE and DG would contribute 778 MW in 2025. For the EE/DG scenario case the SRP load in the 2025 planning case was increased by this value to study its delayed/non-implemented impact.

3. APS's Distributed Generation and Energy Efficiency Forecasting Methodology Description

DG and EE estimates were developed to determine what each program's role was at the time of the system peak in 2025. The combined total DG and EE impacts at peak on APS's transmission system in 2025 are estimated to be 416 MW. This total is comprised of about 92% EE and 8% DG. The details of the EE and DG estimates are described below.

3.1. Energy Efficiency Impact

To forecast the EE program impact (net of demand response curtailment) on APS's system peak in 2025, several steps were taken. First, efficiency measures in 2021-2025 were forecasted by assuming levels associated with APS's 2020 IRP. Then, when the EE amounts were determined, as defined above, they were assessed to establish the EE programs overall impact coincident to APS's system peak. Table 2 provides the projected increases in EE at peak hour annually between 2021 and 2025.

Table 2: APS Energy Efficiency Forecast 2021-2025³

	2021	2022	2023	2024	2025
EE 2021+ impact to peak	84 MW	170 MW	253 MW	334 MW	381 MW

³ Estimates shown in Tables 2 and 3 are incremental increases to existing systems with cumulative values shown in years 2021+.

3.2. Distributed Generation Impact

The impact to APS load from DG systems in 2021-2025 was based on APS projections of new DG system installations starting in 2021. That number of installations was then applied to each month of the forecast period until 2025 to forecast the total amount of DG on the network. From this, the impacts to the 2025 APS system coincident peaks from DG were determined. The forecasted incremental DG at peak hour for years 2021 to 2025 is provided in Table 3.

Table 3: APS Distributed Generation Forecast 2021-2025

	2021	2022	2023	2024	2025
DG 2021+ impact to peak	4 MW	9 MW	15 MW	22 MW	35 MW

4. Study Results

The 2025 base case and the case with delayed or non-implemented EE and DG showed no thermal violations on the monitored elements for all lines in service condition. Also, under this condition no voltage violations were noted.

Single contingency power flow analysis showed no thermal or voltage violations on the base case. The results for the case with delayed or non-implemented EE and DG over the entire APS and SRP combined footprint shows overloads on SRP's BES as detailed in Table 4. No thermal violations were noted on the APS's BES with the single contingency power flow analysis. Additionally, no voltage violations on the BES were observed in this analysis.

Table 4: Thermal results of base case and EE/DG scenario case in 2025

Contingency	Overloaded Element	2025 Base case Loading	2025 EE/DG scenario case Loading	Comments
One of Orme to Rudd 230 kV line	The other of Orme to Rudd 230 kV line	91.5%	105.6%	SRP facility overloaded ⁴ .

5. Conclusion

The Study indicates that delayed or non-implemented DG and EE have no effect on the reliability of APS's BES as currently planned in 2025. Studies performed, with the APS load increased by 416 MW, indicated there were no new reliability planning criteria violations observed. Therefore, no APS project advancements or new projects would be required to reliably

⁴ SRP is currently investigating the Orme – Rudd 230 kV overload with mitigation options including re-conductoring the lines currently planned for 2027.

meet the increased load. This Study only addresses APS's BES and there may be some impacts at the subtransmission level due to variations in timing and quantity of implemented DG and EE.

In 2025, with all of APS and SRP EE and DG delayed or non-implemented, thermal concerns were noted on SRP's BES, which SRP is currently investigating with preliminary plans in place for mitigation.