

Seventh Biennial Transmission Assessment (2012-2021) Staff Report

Docket No. E-00000D-11-0017.



Exhibits

October 30, 2012

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Exhibit 1 – Arizona Transmission System Map

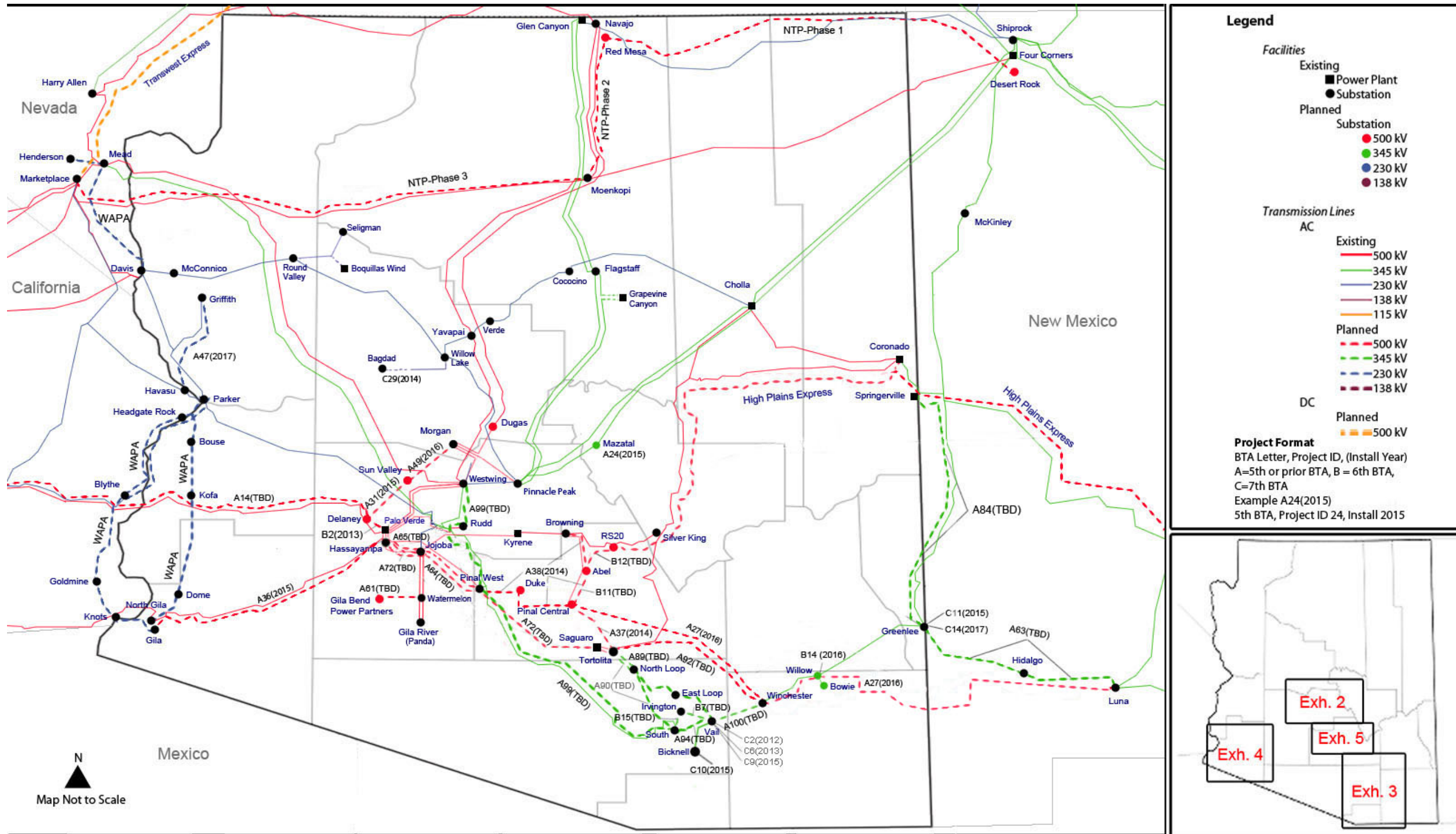


Exhibit 2 - Phoenix Metro Transmission System Map

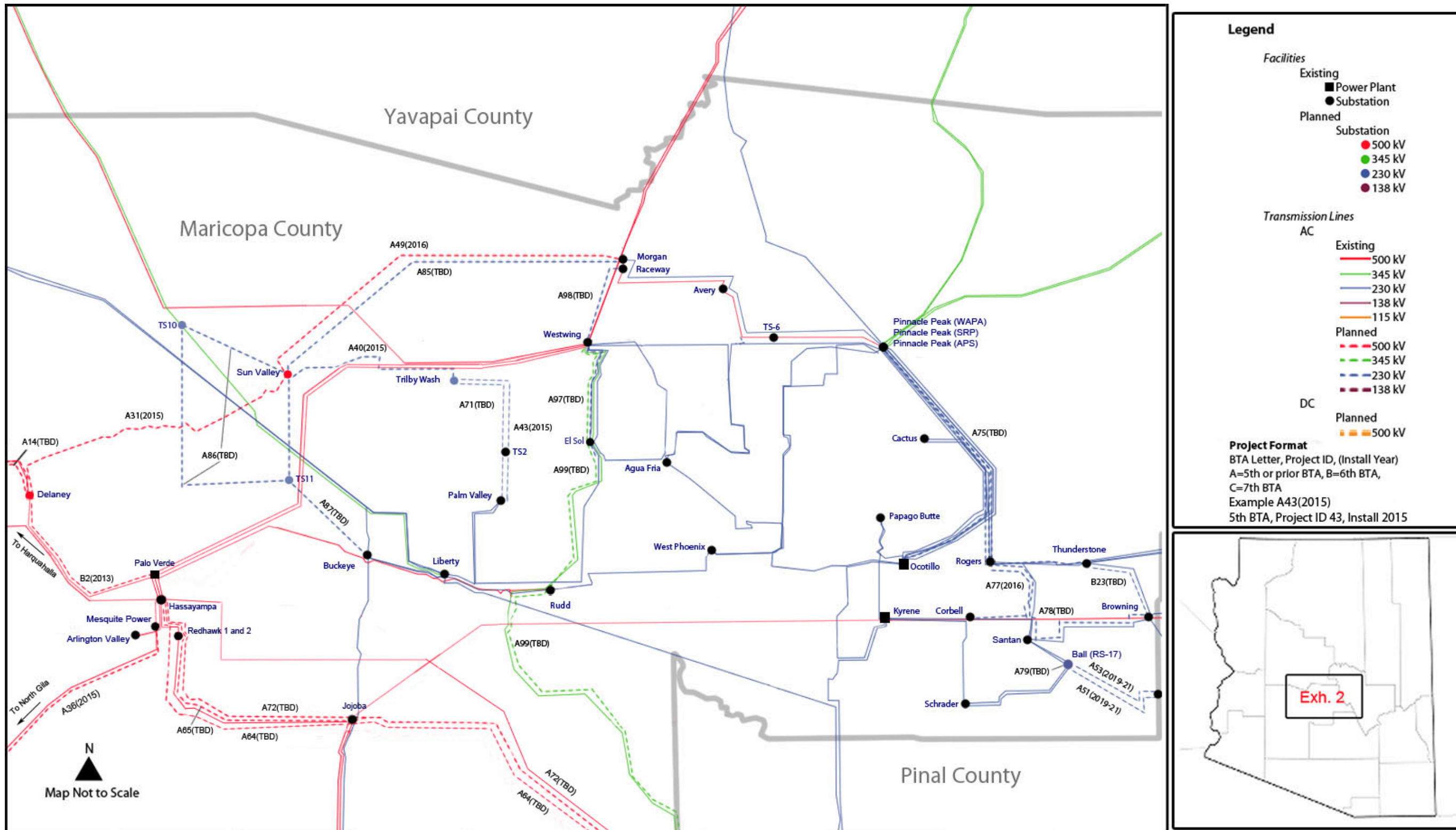


Exhibit 3 – Southeastern Transmission System Map

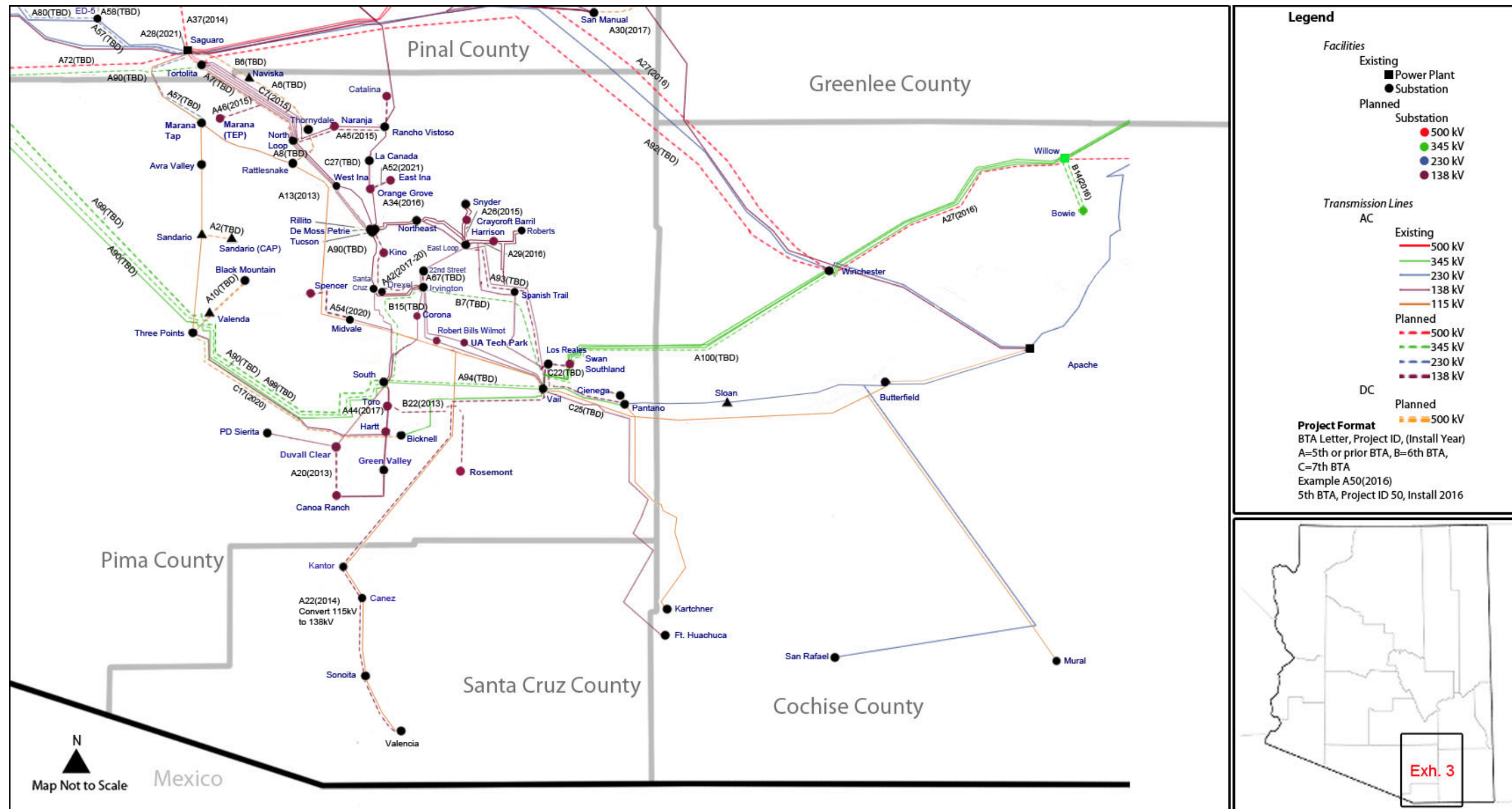


Exhibit 4 – Yuma Transmission System Map

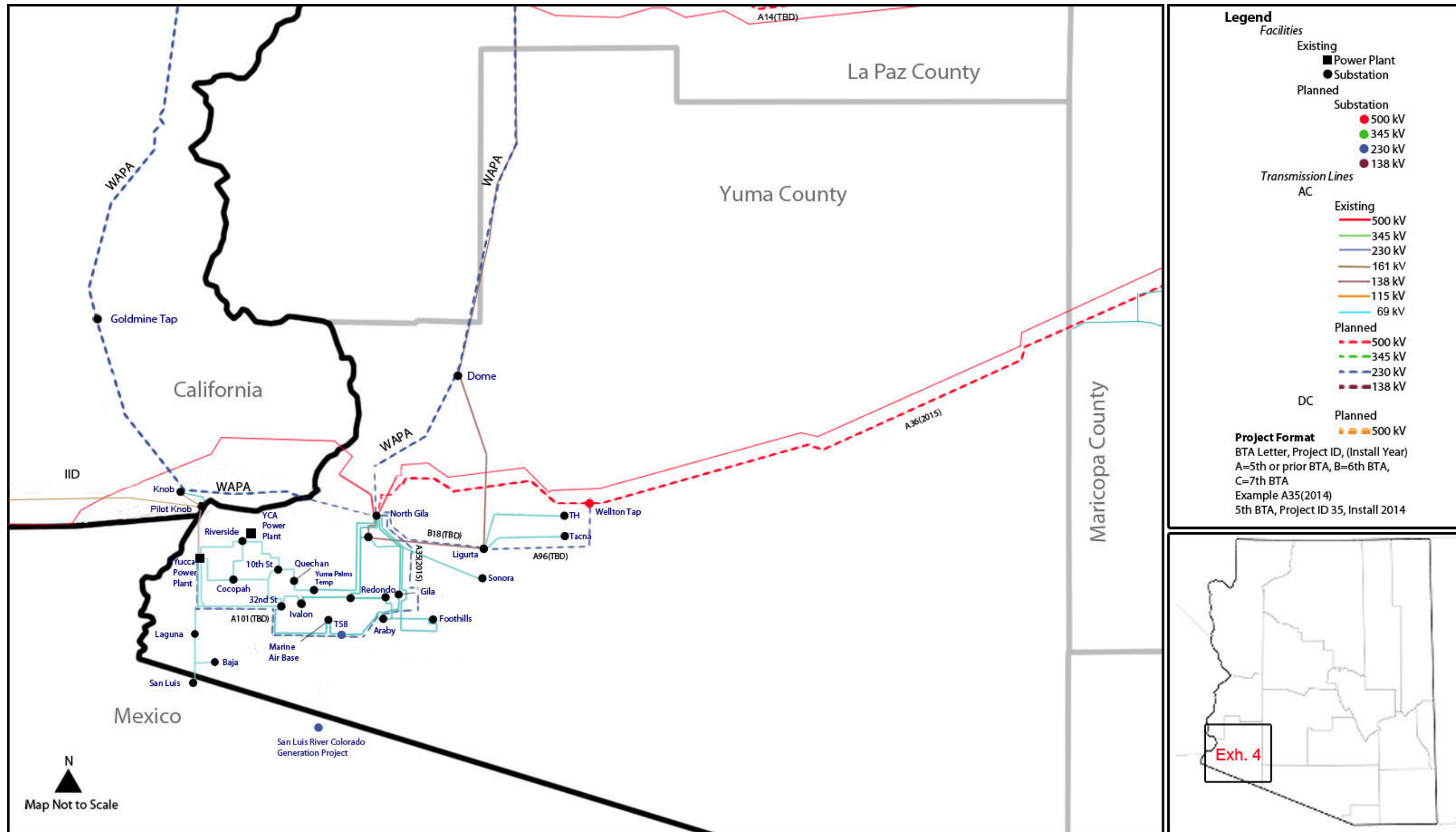


Exhibit 5 – Pinal County Transmission System Map

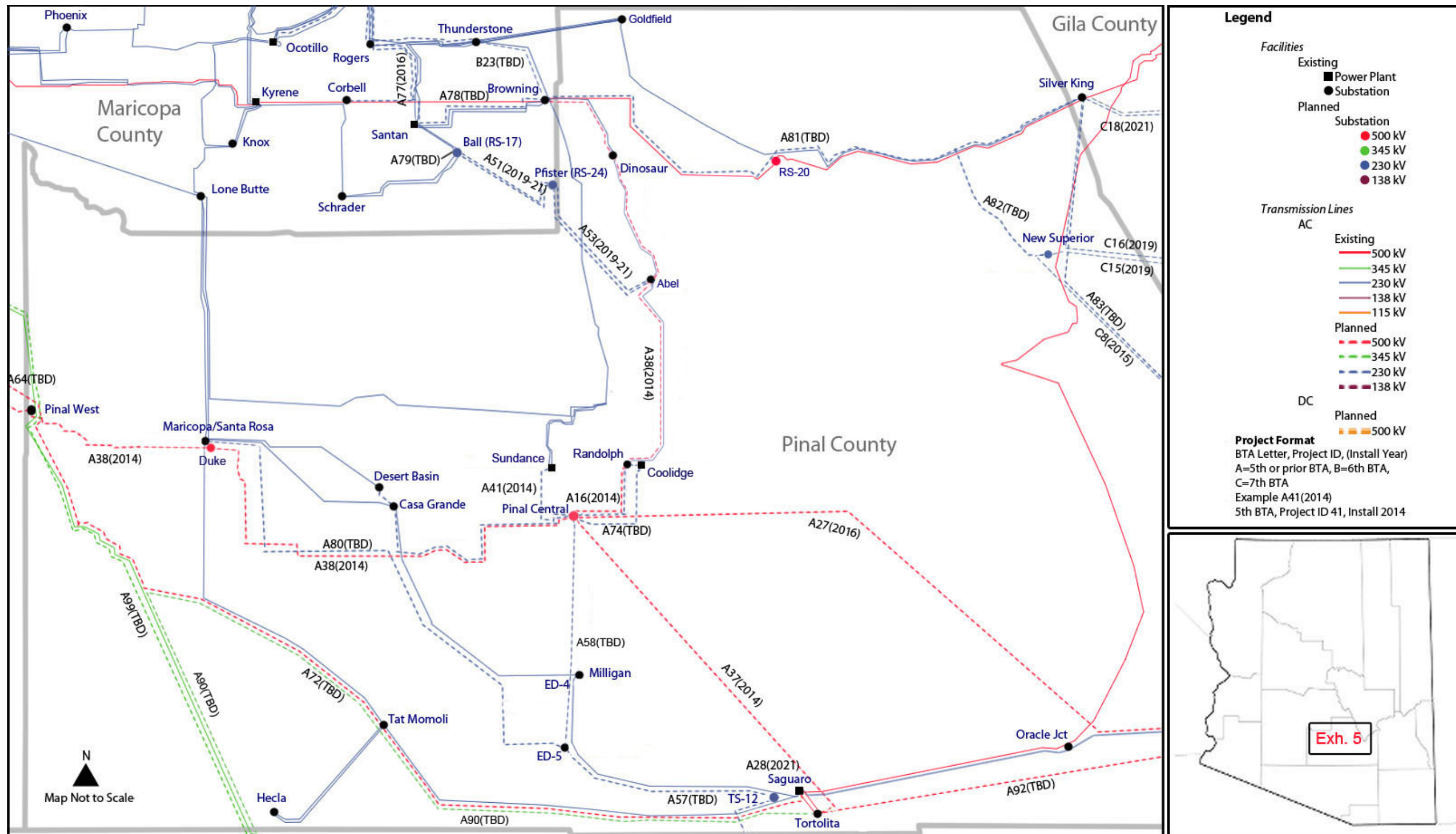


Exhibit 6 – WECC Paths Affecting Arizona

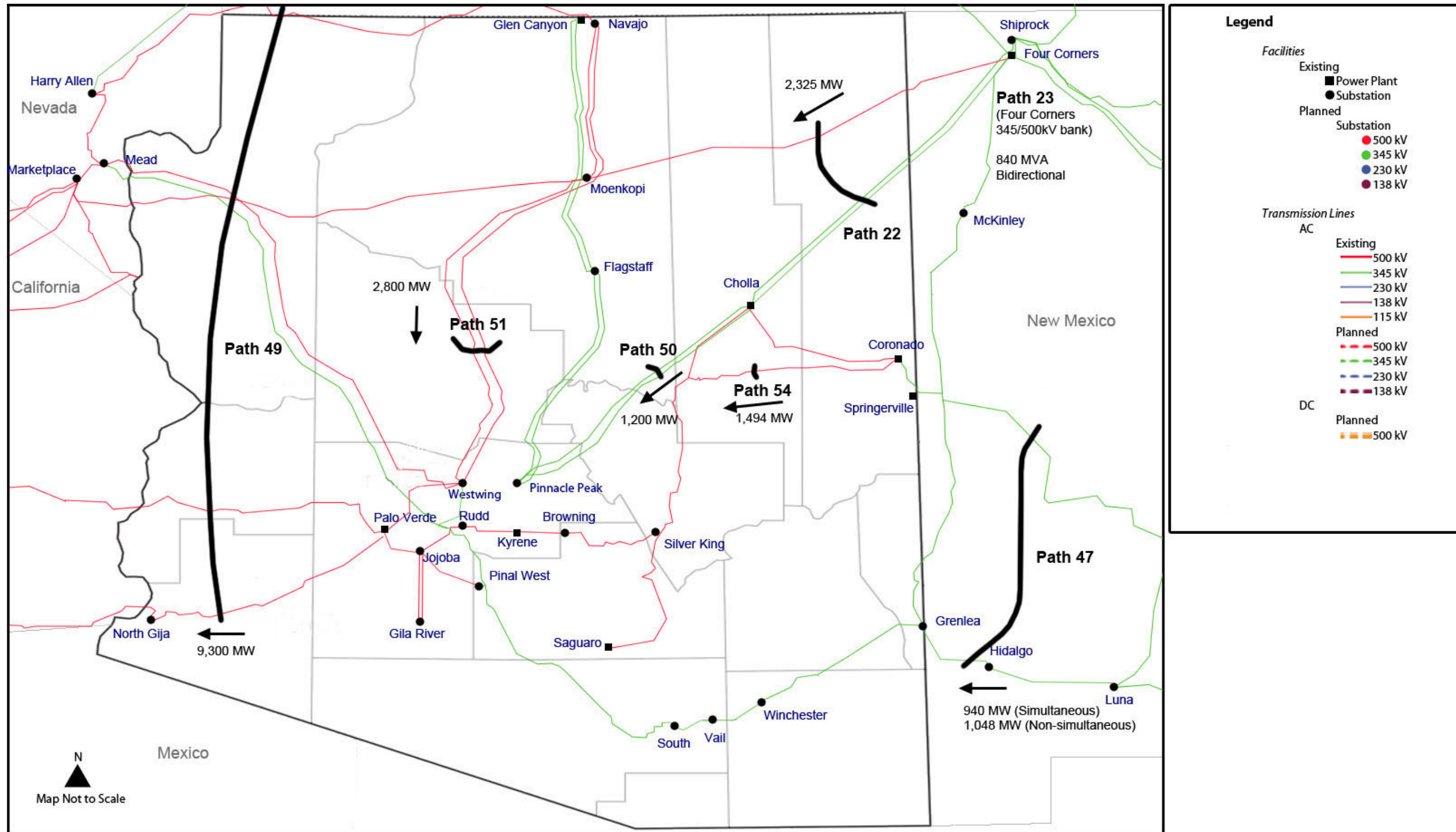


Exhibit 7 – Arizona Planned Project Lookup Table

Project ID	Description	Participants	Length (mi)	Permitting/Siting Status	Year	Voltage (kV)
A19	Youngs Canyon 345/69 kV Interconnection: at Western's Flagstaff 345kV bus	APS	0.95	CEC Not Required	2012	345
C1	McKinley 345kV Reactor Addition	TEP	0	CEC Not Required	2012	345
C2	Vail 345/138kV Transformer #3	TEP	0	CEC Not Required	2012	345/138
A13	DeMoss Petrie-Tucson 138 kV line	TEP	4.5	CEC Approved - Decision #72231, Case #157	2013	138
A20	South-Duval CLEAR - Phase 2b - Extend 138 kV line from Canoa Ranch-(Future) Duval	TEP	24	CEC Approved - Case #84	2013	138
A25	Moenkopi-Eldorado 500 kV Series Capacitor Upgrade Project	SCE, APS	0	CEC Not Required	2013	500
B2	Delaney – Palo Verde 500kV line	APS	15	CEC Approved – Decision #68063 - Case #128	2013	500
B22	Rosemont 138 kV line	TEP	24	CEC Approved – Case #164	2013	138
C3	Superior-Silver King 115kV re-route	SRP	1.25	CEC Approved October 2012 – Decision #73551 – Case #166	2013	115
C4	Saguaro to Tucson 115 kV Line Loop-in to Marana	SWTC	0.2	CEC Approved – Case #161 for original Marana Tap to Marana Project. This project would be a minor modification to this approved Case. Currently under study with Western Area Power Administration.	2013	115
C5	Future Toro Switchyard STATCOM	TEP	0	CEC Not Required	2013	138
C6	Series Capacitor Replacement at Vail 345kV Substation on the Springerville – Vail 345kV Line	TEP	0	CEC Not Required	2013	345
C29	Relocate Bagdad Capacitor Station to Bagdad Mine	APS	5.5	CEC Approved – Decision #71217 – Case #143	2014	115
A16	Pinal Central-Abel	SRP	30	CEC Approved - Decisions #68093 and #68291	2014	230
A22	Upgrade existing 115 kV transmission line to Nogales	UNS ELECTRIC	60	CEC Approved – Case #144	2014	115
A32	Desert Basin-Pinal Central 230 kV	APS, SRP	21	CEC Approved – Decisions #68093, #68291, #69183 and #69647	2014	230
A37	Pinal Central-Tortolita 500 kV line	TEP, SWTC, SRP, SunZia	40	CEC Approved July 2012 – Decision #73282 – Case #165	2014	500

Project ID	Description	Participants	Length (mi)	Permitting/Siting Status	Year	Voltage (kV)
A38	Pinal West-Pinal Central – Randolph - Abel-Browning 500 kV line	SRP, TEP, ED2, ED3, ED4	50	CEC Approved - Case #126 - Decisions #68093 and #68291	2014	500
A41	Sundance-Pinal Central 230 kV line	APS, ED2	6	CEC Approved – Case #136 – Decision #70325	2014	230
B3	Three Terminal Plan Circuit 1 Participation	SPPR	23	CEC Not Yet Filed	2014	115
B4	Three Terminal Plan Circuit 2 Participation	SPPR	31	CEC Not Yet Filed	2014	115
B5	Three Terminal Plan Circuit 3 Participation	SPPR	19	CEC Not Yet Filed	2014	115
A17	Sandario Tap-Three Points 115 kV Line Upgrade	SWTC	13.71	CEC Not Yet Filed	2015	115
A24	Mazatzal Loop-in of Cholla-Pinnacle Peak 345 kV line	APS	0.95	CEC Approved – Decision #72302 – Case #160	2015	345
A26	Northeast-Snyder 138 kV loop-in for Craycroft-Barril substations	TEP	8	CEC Not Required	2015	138
A31	Delaney-Sun Valley 500 kV line	APS, SRP, CAWCD	28	CEC Approved – Decision #68063 - Case #128	2015	500
A35	North Gila-TS8 230 kV line	APS	15	CEC Approved – Case #163 – Decision #72801	2015	230
A36	Palo Verde Hub-North Gila 500 kV #2 line	APS, IID, WMIDD	110	CEC Approved – Decision #70127- Case #135	2015	500
A40	Sun Valley-Trilby Wash - 230 kV line	APS	15	CEC Approved – Decision #67828 - Case #127	2015	230
A43	Palm Valley-TS2-Trilby Wash 230 kV line	APS	12	CEC Approved - Decisions #66646 and #67828. Case #122 and #127	2015	230
A45	North Loop - Rancho Vistoso 138kV line loop-in for future Naranja substation.	TEP	24.5	CEC Not Yet Filed	2015	138
A46	Interconnection of Tortolita – North Loop 138 kV with future Marana 138 kV Substation.	TEP	22	CEC Not Yet Filed	2015	138
B24	Vail-UA Tech Park-Irvington 138 kV line	TEP	2	CEC Not Yet Filed	2015	138
C7	Tortolita – Rancho Vistoso to North Loop – Rancho Vistoso Reconfiguration	TEP	11	CEC Not Required	2015	138
C8	Eastern Mining Expansion 230kV	SRP	12-14	CEC Not Yet Filed	2015	230
C9	Series Capacitor Replacement at Vail 345kV Substation on the Winchester – Vail 345kV Line	TEP	0	CEC Not Required	2015	345

Project ID	Description	Participants	Length (mi)	Permitting/Siting Status	Year	Voltage (kV)
C10	Bicknell 345/230 kV Transformer Replacement	SWTC	0	CEC not required; SWTC sees no current justification for building this project on its own and is soliciting support of neighboring utilities to jointly study the need for this project and participate in a cost share of the project.	2015	345/230
C11	Greenlee 2nd 345/230 kV Transformer	SWTC	0	CEC not required; SWTC sees no current justification for building this project on its own and is soliciting support of neighboring utilities to jointly study the need for this project and participate in a cost share of the project.	2015	345/230
A27	SunZia Project	SWPG, SRP, TEP, ECP, Shell, TSGT	500	CEC Not Yet Filed	2016	500
A29	Vail-East Loop - Phase 4 - Harrison loop-in of Roberts-East Loop 138 kV line	TEP	0	CEC Approved - Case #8	2016	138
A34	La Canada-Orange Grove-Rillito 138 kV line	TEP	5.4	CEC Not Yet Filed	2016	138
A49	Sun Valley-Morgan 500 kV line	APS, SRP, CAWCD	TBD	CEC Approved – Decision #70850 - Case #138	2016	500
A77	Rogers-Santan 230 kV line	SRP	9	CEC Not Yet Filed	2016	230
B8	Santa Cruz-Anklam-DeMoss Petrie 138 kV line	TEP	2	CEC Not Yet Filed	2016	138
B14	Interconnection of Greenlee-Winchester 345kV line with future Willow Substation	TEP, Bowie	0	CEC obtained by Southwestern Power Group – Case #118	2016	345
C12	East Valley Industrial Expansion	SRP	5	CEC Not Yet Filed	2016	230
C13	Parker – Davis #1 Loop-in at Black Mesa	UNS ELECTRIC	0	CEC Not Required	2016	230
A30	Apache/Hayden-San Manuel 115 kV line	SWTC	4.5	CEC Approved – Case #142	2017	115
A42	Irvington Substation –Tucson Station #2 138 kV Phase 1	TEP	10.9	CEC Not Yet Filed	2017	138
A44	Toro-Hartt-Green Valley 138 kV line	TEP	6.5	CEC Not Required	2017	138
A47	Griffith-North Havasu 230 kV line	UNS ELECTRIC	40	CEC Approved/Extended - Case #88, Most recent CEC extension request filed March 6, 2012. Staff has recommended support	2017	230

Project ID	Description	Participants	Length (mi)	Permitting/Siting Status	Year	Voltage (kV)
C14	Series Capacitor Replacement at Greenlee 345kV Substation on the Springerville – Greenlee 345kV Line	TEP	0	CEC Not Required	2017	345
A48	Irvington Substation – Corona Substation –South Substation 138kV.	TEP	16.1	CEC Not Yet Filed	2018	138
A23	Interconnection of South – Midvale 138 kV circuit with future Medina, Spencer, and Raytheon 138kV substations - Phase 1.	TEP	19	CEC Not Yet Filed	2019	138
C15	New Superior-New Oak Flat	SRP	3.5	CEC Not Yet Filed	2019	230
C16	New Oak Flat – Silver King	SRP	3	CEC Not Yet Filed	2019	230
A42	Irvington Substation –Tucson Station #2 138 kV Phase 2	TEP	10.9	CEC Not Yet Filed	2020	138
A54	Interconnection of South – Midvale 138 kV circuit with future Medina, Spencer, Raytheon 138kV substations - Phase 2	TEP	11	CEC Not Yet Filed	2020	138
C17	Three Points to Bicknell 115 kV Line Upgrade	SWTC	21	CEC Not Yet Filed	2020	115
A28	Saguaro (TS12) Relocate 230kV yard	APS	0.95	Not Required	2021	230
A52	Orange Grove-East Ina 138 kV line	TEP	3.6	CEC Not Yet Filed	2021	138
C18	Silver King – New Pinto Valley	SRP	7	CEC Not Yet Filed	2021	230
C19	San Rafael 2nd 230/69 kV Transformer	SWTC	0	CEC not required; on-going efforts of the Cochise County Study Group may change this conceptual project to occur sooner within the ten year plan timeframe.	2021	230/69
C20	Interconnection of South-Midvale - 138kV circuit with future Medina, Spencer, and Raytheon 138kV substations - Phase 3.	TEP	8	CEC Not Yet Filed	2021	
A51	Abel-Pfister-Ball 230 kV #1	SRP	20	CEC Approved – Decision #71441	2019-21	230
A53	Abel-Pfister-Ball 230 kV #2	SRP	20	CEC Approved – Decision #71441	2019-21	230
A2	CAP 115 kV line loop-in to SWTC Sandario	SWTC	0.6	CEC Approved – Case #152; Project deferred indefinitely	TBD	115
A6	Naviska-Thornydale 115 kV line	SWTC	7	CEC Approved – Case #149; Project deferred indefinitely	TBD	115

Project ID	Description	Participants	Length (mi)	Permitting/Siting Status	Year	Voltage (kV)
A7	Saguaro to North Loop	SWTC	3.2	CEC approved – Case #149; Project deferred indefinitely	TBD	115
A8	Thornsdale-Rattlesnake 115 kV line	SWTC	19	CEC Approved – Case #152; Project deferred indefinitely	TBD	115
A10	Valencia-CAP Black Mountain 115 kV line	SWTC	2.6	CEC Approved – Case #152; Project deferred indefinitely	TBD	115
A14	Devers - Palo Verde 500 kV #2 line	SCE	230	CEC Denied - Case #130	TBD	500
A39	RS26-Fountain Hill substation	SRP	TBD	CEC Not Yet Filed	TBD	115/230/345
A55	Arlington Power Plant	Dynegy Arlington Valley	TBD	CEC Approved – Decision #64357	TBD	500
A57	ED5-Marana 230 kV line	SCWPDA, SPPR	28	CEC Not Yet Filed	TBD	230
A58	ED5-Pinal South (Pinal Central) 230 kV line	SCWPDA, SPPR	18	CEC Not Yet Filed	TBD	230
A61	Gila Bend Power Plant	GBPP	0	CEC Approved – Case#109 – Extension Request Pending	TBD	500
A63	Greenlee switching station through Hidalgo to Luna	ELPE, PNM, TXNMPC	28	CEC Approved – Case #21	TBD	345
A64	Hassayampa - Pinal West 500 kV #2 line	SRP, TEP, SWTC, ED2, ED3, ED4	51	CEC Approved – Case #124	TBD	500
A65	Hassayampa-Jojoba 500 kV line	GBPP	19	CEC Not Required	TBD	500
A67	Irvington-East Loop Project - Phase 3 - Irvington-22nd Street 2nd Circuit	TEP	9	CEC Approved - Case #66	TBD	138
A68	Jojoba Loop-in of TS4-Panda 230 kV line	APS	0.95	CEC Approved – Decision #62960 – Case #102	TBD	230
A69	New Hayden 115 kV Station Loop-in	SRP	0.75	CEC Not Yet Filed	TBD	115
A71	Palm Valley-TS2-Trilby Wash 230 kV line # 2	APS	12	CEC Approved – Decision #67828. Case #127	TBD	230
A72	Palo Verde-Saguaro 500 kV line	CATS Sub- regional Planning Group	130	CEC Approved – Decision#46802	TBD	500
A73	Pinal Central (Pinal South) – Future substation 6 miles northeast 230 kV line #1	SCWPDA, SPPR	6	CEC Not Yet Filed	TBD	230
A74	Pinal Central (Pinal South) – Future substation 6 miles northeast 230 kV line #2	SCWPDA, SPPR	6	CEC Not Yet Filed	TBD	230
A75	Pinnacle Peak-Brandow 230 kV line	SRP	TBD	CEC Approved - Case #69	TBD	230
A78	Browning-Corbell 230 kV line	SRP	14	CEC Not Required	TBD	230

Project ID	Description	Participants	Length (mi)	Permitting/Siting Status	Year	Voltage (kV)
A79	Ball (RS17)230 kV Loop-in line	SRP	0.95	CEC Approved - Decisions #59791 and #60099	TBD	230
A80	Santa Rosa-ED5 230 kV line	SCWPDA, SPPR	38	CEC Not Yet Filed	TBD	230
A81	Silver King-Browning 230 kV line	SRP	38	CEC Approved - Case #20	TBD	230
A82	Superior 230 kV Loop-in	SRP	0.5	CEC Not Yet Filed	TBD	230
A83	Silver King-Knoll-Future Hayden 230 kV line	SRP	35	CEC Not Yet Filed	TBD	230
A84	Springerville-Greenlee 345 kV line - 2nd circuit	TEP	110	CEC Approved - Case #12, 30, 63, 73	TBD	345
A85	Sun Valley-Morgan 230 kV line	APS	TBD	CEC Approved – Decision #70850 – Case #138	TBD	230
A86	Sun Valley-TS10-TS11 230 kV line	APS	TBD	CEC Not Yet Filed	TBD	230
A87	Sun Valley-TS11-Buckeye 230 kV line	APS	TBD	CEC Not Yet Filed	TBD	230
A88	Test Track-Empire-ED4 230 kV line	WAPA, SCWPDA	20	CEC Not Yet Filed	TBD	230
A89	Tortolita North Loop 345 kV line	TEP	60	CEC Not Yet Filed	TBD	345
A90	Tortolita-South 345 kV line	TEP	68	CEC Approved - Case #50	TBD	345
A92	Tortolita-Winchester 500 kV line	TEP	80	CEC Approved - Case #23	TBD	500
A93	Vail-East Loop - Phase 3 - Third Vail-East Loop 138 kV line	TEP	22	CEC Approved - Case #8	TBD	138
A94	Vail-South 345 kV line - 2nd circuit	TEP	14	CEC Not Required	TBD	345
A96	Wellton-Mohawk 230 kV Line Project	WMIDD	35	CEC Not Yet Filed	TBD	230
A97	Westwing-El Sol 230 kV line	APS	11	CEC Approved – Docket#U-1345 – Case #9	TBD	230
A98	Westwing-Raceway 230 kV line	APS	7	CEC Approved – Decision#65997 – Case #120	TBD	230
A99	Westwing-South 345 kV line - 2nd circuit	TEP	178	CEC Approved - Case #15	TBD	345
A100	Winchester-Vail 345 kV line #2 and #3	TEP	40	CEC Not Yet Filed	TBD	345
A101	Yucca-TS8 230 kV line	APS	TBD	CEC Approved – Case #163 – Decision #72801	TBD	230
B6	Saguaro to Adonis 115 kV Line Loop-in to Naviska	SWTC	0	Project deferred indefinitely	TBD	115
B7	Vail – Irvington 345 kV line	TEP	11	CEC Not Yet Filed	TBD	345
B11	Pinal Central – Abel #2 500kV line	SRP	TBD	CEC Not Yet Filed	TBD	500
B12	Abel – RS20 500kV	SRP	TBD	CEC Not Yet Filed	TBD	500
B15	Irvington – South 345 kV line	TEP	16	CEC Not Yet Filed	TBD	345
B17	Mural – San Rafael 230kV line	APS, ED3	TBD	CEC Not Yet Filed	TBD	230
B18	North Gila-Ligurta 230kV Line	WMIDD	35	CEC Not Yet Filed	TBD	230

Project ID	Description	Participants	Length (mi)	Permitting/Siting Status	Year	Voltage (kV)
B20	Northeast Arizona to Phoenix 500kV	SRP	200	CEC Not Yet Filed	TBD	500
B23	Thunderstone-Browning 230 kV line #2	SRP	8	CEC Not Yet Filed	TBD	230
C21	Rancho Vistoso – La Canada Reconductor	TEP	4.5	CEC Not Required	TBD	138
C22	Los Reales – Vail Reconductor	TEP	8	CEC Not Required	TBD	138
C23	North East – Rillito Reconductor	TEP	5	CEC Not Required	TBD	138
C24	Irvington – Robert Bills Wilmot Reconductor	TEP	11	CEC Not Required	TBD	138
C25	Los Reales – Pantano Reconductor	TEP	9	CEC Not Required	TBD	138
C26	DMP – Northeast Reconductor	TEP	6	CEC Not Required	TBD	138
C27	North Loop – Rillito Reconductor	TEP	11	CEC Not Required	TBD	138
C28		SRP	TBD	CEC Not Yet Filed	TBD	115/230/345

Exhibit 8 – Arizona Demand Forecast Data (5th BTA, 6th vs. 7th BTA)

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
APS										
5th BTA Loads (MW)	8,575	8,834	9,096	9,355	9,624	9,888	NA	NA	NA	NA
6th BTA Loads (MW)	7,536	7,764	8,047	8,264	8,591	8,922	9,229	9,539	NA	NA
7th BTA Loads (MW)	7,015	7,063	7,204	7,271	7,442	7,614	7,797	7,979	8,160	8,307
Change in 7th BTA (MW)	-521	-701	-843	-993	-1,149	-1,308	-1,432	-1,560	NA	NA
Change in 7th BTA (% of 6th BTA)	-6.91%	-9.03%	-10.48%	-12.02%	-13.37%	-14.66%	-15.52%	-16.35%	NA	NA
SRP										
5th BTA Loads (MW)	8,253	8,519	8,786	9,054	9,323	NA	NA	NA	NA	NA
6th BTA Loads (MW)	7,502	7,720	7,955	8,194	8,428	8,702	8,984	NA	NA	NA
7th BTA Loads (MW)	6,769	6,852	6,952	7,062	7,201	7,354	7,528	7,694	7,858	NA
Change in 7th BTA (MW)	-733	-868	-1,003	-1,132	-1,227	-1,348	-1,456	NA	NA	NA
Change in 7th BTA (% of 6th BTA)	-9.77%	-11.24%	-12.61%	-13.81%	-14.56%	-15.49%	-16.21%	NA	NA	NA
SWTC										
5th BTA Loads (MW)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
6th BTA Loads (MW)	652	674	691	709	725	747	769	792	NA	NA
7th BTA Loads (MW) ¹	642	663	678	696	711	731	752	778	800	825
Change in 7th BTA (MW)	-10	-11	-13	-13	-14	-15	-17	-15	NA	NA
Change in 7th BTA (% of 6th BTA)	-1.55%	-1.68%	-1.90%	-1.85%	-1.94%	-2.06%	-2.16%	-1.86%	NA	NA
TEP and UNSE										
5th BTA Loads (MW)	3,392	3,502	3,612	3,722	3,829	3,936	NA	NA	NA	NA
6th BTA Loads (MW)	2,977	3,029	3,087	3,144	3,197	3,251	3,304	3,355	NA	NA
7th BTA Loads (MW)	2,387	2,430	2,388	2,424	2,453	2,485	2,514	2,546	2,582	2,632
Change in 7th BTA (MW)	-590	-599	-699	-720	-744	-766	-790	-809	NA	NA
Change in 7th BTA (% of 6th BTA)	-19.82%	-19.78%	-22.64%	-22.90%	-23.27%	-23.56%	-23.91%	-24.11%	NA	NA
AZ Total										
5th BTA Loads (MW)	20,220	20,855	21,494	22,131	22,776	NA	NA	NA	NA	NA
6th BTA Loads (MW)	18,667	19,187	19,780	20,311	20,941	21,622	22,286	NA	NA	NA
7th BTA Loads (MW)	16,813	17,008	17,222	17,453	17,807	18,184	18,591	18,997	19,400	NA
Change in 7th BTA (MW)	-1,854	-2,179	-2,558	-2,858	-3,134	-3,437	-3,695	NA	NA	NA
Change in 7th BTA (% of 6th BTA)	-9.93%	-11.36%	-12.93%	-14.07%	-14.97%	-15.90%	-16.58%	NA	NA	NA
¹ Studies performed by SWTC for the 2012-2021 ACC Ten Year Plan were stressed using non-coincident load values for worst case scenario analysis.										

Exhibit 9 – Plan Changes between 6th and 7th BTA

In-Service Date	Project	Voltage (kV)	Status
2010	Morgan-Raceway-Avery-Scatter Wash-Pinnacle Peak 230 kV line	230	Completed
2010	White Hills substation	345/69	Removed from UNS ELECTRIC 10-year plan
2010	Morgan-Pinnacle Peak 500 kV line	500	Completed
2011	Tortolita-North Loop-Rancho Vistoso and Tortolita-Rancho Vistoso corridor expansion and reconfiguration Project - Phase 2	138	Removed by TEP
2011	Dinosaur – Abel – Randolph 230kV line	230	Completed
2012	Avra Valley-Sandario Tap 115 kV Line Upgrade	115	Completed
2012	Marana-Avra Valley 115 kV Line Upgrade	115	Completed
2012	McKinley 345kV Reactor Addition	345	New Project - 2012
2012	Youngs Canyon 345/69 kV Interconnection: at Western's Flagstaff 345kV bus	345	Changed project Name
2012	Vail 345/138kV Transformer #3	345/138	–Reporting new transformers was not previously required
2013	Saguaro to Tucson 115 kV Line Loop-in to Marana	115	New Project - 2013
2013	Superior-Silver King 115kV re-route	115	New Project - 2013
2013	DeMoss Petrie-Tucson 138 kV line	138	Changed project Status from "Not Yet Filed" to "Approved" Changed In-Service date from 2011 to 2013
2013	Future Toro Switchyard STATCOM	138	New Project - 2013
2013	Rosemont 138 kV line	138	Changed project Name Changed project Status from "Not Yet Filed" to "Approved" Changed In-Service date from 2011 to 2013
2013	Series Capacitor Replacement at Vail 345kV Substation on the Springerville – Vail 345kV Line	345	New Project - 2013
2013	Delaney – Palo Verde 500kV line	500	Changed In-Service date from 2012 to 2013 Changed project Name
2014	Three Terminal Plan Circuit 1 Participation	115	SWTC no longer a participant in the project SPPR is the project sponsor
2014	Three Terminal Plan Circuit 2 Participation	115	SWTC no longer a participant in the project SPPR is the project sponsor
2014	Three Terminal Plan Circuit 3 Participation	115	SWTC no longer a participant in the project SPPR is the project sponsor
2014	Upgrade existing 115 kV transmission line to Nogales	115	Changed project Status Case # from 111 to 144 Changed In-Service date from 2012 to 2014 Changed Participant from UNSE to UNS ELECTRIC

In-Service Date	Project	Voltage (kV)	Status
2014	Gateway-Sonoita 138 kV line	138	Removed from UNS ELECTRIC 10-year plan
2014	Pinal Central-Abel	230	Changed project Name Changed In-Service date from 2011 to 2014
2014	Sundance-Pinal Central 230 kV line	230	Changed project Status from "Filed" to "Approved"
2014	Pinal Central-Tortolita 500 kV line	500	Changed project Status from "Not Yet Filed" to "Filed April 2012" to "Approved July 2012"
2014	Pinal West-Pinal Central – Randolph - Abel-Browning 500 kV line	500	Removed SWTC from Participants List
2014	Relocate Bagdad Capacitor Station to Bagdad Mine	115	New Project - 2014
2015	Sandario Tap-Three Points 115 kV Line Upgrade	115	Changed In-Service date from 2011 to 2015
2015	Northeast-Snyder 138 kV loop-in for Craycroft-Barril substations	138	Changed project Name Changed In-Service date from 2013 to 2015
2015	Tortolita – Rancho Vistoso to North Loop – Rancho Vistoso Reconfiguration	138	New Project - 2015
2015	Eastern Mining Expansion 230kV	230	New Project - 2015
2015	North Gila-TS8 230 kV line	230	Changed In-Service date from 2014 to 2015 Changed project Status from "To be Filed" to "Approved"
2015	Sun Valley-Trilby Wash - 230 kV line	230	Changed In-Service date from 2014 to 2015
2015	Mazatzal Loop-in of Cholla-Pinnacle Peak 345 kV line	345	Changed In-Service date from 2013 to 2015
2015	Series Capacitor Replacement at Vail 345kV Substation on the Winchester – Vail 345kV Line	345	New Project - 2015
2015	Bicknell 345/230 kV Transformer Replacement	230/345	New Project - 2015
2015	Greenlee 2nd 345/230 kV Transformer	230/345	New Project - 2015
2015	Delaney-Sun Valley 500 kV line	500	Changed project Name Changed In-Service date from 2014 to 2015
2015	Palo Verde Hub-North Gila 500 kV #2 line	500	Removed SRP from Participants List Changed In-Service date from 2014 to 2015
2016	La Canada-Orange Grove-Rillito 138 kV line	138	Changed In-Service date from 2014 to 2016
2016	Vail-East Loop - Phase 4 - Harrison loop-in of Roberts-East Loop 138 kV line	138	Changed project Name Changed In-Service date from 2013 to 2016
2016	East Valley Industrial Expansion	230	New Project - 2016
2016	Parker – Davis #1 Loop-in at Black Mesa	230	New Project - 2016
2016	Rogers-Santan 230 kV line	230	Changed project Name Changed In-Service date from TBD to 2016

In-Service Date	Project	Voltage (kV)	Status
2016	Upgrade of Apache-Butterfield 230 kV line	230	Project cancelled
2016	Interconnection of Greenlee-Winchester 345kV line with future Willow Substation	345	Changed In-Service date from TBD to 2016
2016	SunZia Project	500	Changed In-Service date from 2013 to 2016
2017	Apache/Hayden-San Manuel 115 kV line	115	Changed In-Service date from 2014 to 2017
2017	Irvington Substation –Tucson Station #2 138 kV Phase 1	138	Changed In-Service date from 2015 to 2017
2017	North Loop - Rancho Vistoso 138kV line loop-in for future Naranja substation	138	Changed project Name Changed In-Service date from 2015 to 2017
2017	Toro-Hartt-Green Valley 138 kV line	138	Changed project Name Changed Line Length from 145 to 65 miles Changed project Status from "Not Yet Filed" to "Not Required" Changed In-Service date from 2015 to 2017
2017	Butterfield to Bicknell 230 kV Line Upgrade	230	Project cancelled
2017	Griffith-North Havasu 230 kV line	230	Changed Participant from UNSE to UNS ELECTRIC Changed project Status from "Extension request not yet filed" to "Extension request filed March 6,2012" Changed In-Service date from 2016 to 2017
2017	Series Capacitor Replacement at Greenlee 345kV Substation on the Springerville – Greenlee 345kV Line	345	New Project - 2017
2018	CAP 115 kV Line Loop-in to Picture Rocks	115	Project cancelled
2018	Interconnection of Tortolita – North Loop 138 kV with future Marana 138 kV Substation	138	Changed In-Service date from 2015 to 2018
2018	Irvington Substation – Corona Substation –South Substation 138kV	138	Changed In-Service date from 2016 to 2018
2019	Interconnection of South – Midvale 138 kV circuit with future Medina, Spencer, and Raytheon 138kV substations - Phase 1	138	Changed project Name
2019	Vail-UA Tech Park-Irvington 138 kV line	138	Changed In-Service date from 2015 to 2019
2019	New Oak Flat – Silver King	230	New Project - 2019
2019	New Superior-New Oak Flat	230	New Project - 2019
2020	Three Points to Bicknell 115 kV Line Upgrade	115	New Project - 2020
2020	Interconnection of South – Midvale 138 kV circuit with future Medina, Spencer, Raytheon 138kV substations - Phase 2	138	Changed project Name Changed Line Length from 13 to 11 miles Changed In-Service date from 2018 to 2020
2020	Irvington Substation –Tucson Station #2 138 kV Phase 2	138	Changed In-Service date from 2010 to 2020

In-Service Date	Project	Voltage (kV)	Status
2020	Santa Cruz-Anklam-DeMoss Petrie 138 kV line	138	Changed project Name Changed In-Service date from 2016 to 2020
2021	Orange Grove-East Ina 138 kV line	138	Changed In-Service date from 2017 to 2021
2021	Saguaro (TS12) Relocate 230kV yard	230	Changed project Name Changed In-Service date from 2013 to 2021
2021	Silver King – New Pinto Valley	230	New Project - 2021
2021	San Rafael 2nd 230/69 kV Transformer	230/69	New Project - 2021
2021	Interconnection of South-Midvale - 138kV circuit with future Medina, Spencer, and Raytheon 138kV substations - Phase 3		Changed project Name
			Changed participants to TEP
			Changed Line Length from 16 to 8 miles
			Changed project Status from "Not Required" to "Not Yet Filed"
			Changed In-Service date from 2019 to 2020
2019-21	Abel-Pfister-Ball 230 kV #1	230	Changed project Name Changed In-Service date from 2018 to 2019-21
TBD	CAP 115 kV line loop-in to SWTC Sandario	115	Appended "deferred indefinitely" to project status
TBD	Naviska-Thornsdale 115 kV line	115	Appended "deferred indefinitely" to project status
TBD	Pantano to Kartchner 115 kV Line Upgrade	115	Project cancelled
TBD	Saguaro to North Loop	115	Appended "deferred indefinitely" to project status
TBD	Thornsdale-Rattlesnake 115 kV line	115	Appended "deferred indefinitely" to project status
TBD	Valencia-CAP Black Mountain 115 kV line	115	Appended "deferred indefinitely" to project status
TBD	Rancho Vistoso-(Future) Sun City 138 kV line	138	Removed from TEP 10-year plan
TBD	DMP – Northeast Reconductor	138	New Project - TBD
TBD	Irvington – Robert Bills Wilmot Reconductor	138	New Project - TBD
TBD	Los Reales – Pantano Reconductor	138	New Project - TBD
TBD	Los Reales – Vail Reconductor	138	New Project - TBD
TBD	Nogales Transmission line #2 (Gateway – Valencia)	138/115	Removed from UNS ELECTRIC 10-year plan
TBD	North East – Rillito Reconductor	138	New Project - TBD
TBD	North Loop – Rillito Reconductor	138	New Project - TBD
TBD	Rancho Vistoso – La Canada Reconductor	138	New Project - TBD
TBD	Ball (RS17)230 kV Loop-in line	230	Changed project Name
TBD	Browning-Corbell 230 kV line	230	Changed project Name
			Changed Line Length from 12 to 14 miles
TBD	Dinosaur-RS21 230 kV line	230	Removed from List

In-Service Date	Project	Voltage (kV)	Status
TBD	Golden Valley 230 kV Project - McConico-Mercator Mill 230 kV line	230	Removed from UNS ELECTRIC 10-year plan
TBD	Kartchner to CS2 230 kV Line	230	Project cancelled
TBD	San Rafael to CS2 230 kV Line	230	Project cancelled
TBD	Superior 230 kV Loop-in	230	Changed project Name
TBD	Thunderstone-Browning 230 kV line #2	230	Changed project Name
TBD	Yucca-TS8 230 kV line	230	Changed project Status from "Not Yet Filed" to "Approved"
TBD	CS2 Substation	230/115	Project cancelled
TBD	Future Gateway-Comision Federale de Electricidad 345 kV line	345	Removed from TEP 10-year plan
TBD	Interconnection line -South-future Gateway 345 kV line	345	Removed from TEP, UNS ELECTRIC 10-year plan
TBD	Springerville-Greenlee 345 kV line - 2nd circuit	345	Changed project Status from "Not Yet Filed" to "Approved"
TBD	Tortolita North Loop 345 kV line	345	Removed from TEP 10-year plan
TBD	Winchester-Vail 345 kV line #2 and #3	345	Removed from TEP 10-year plan
TBD	Gateway 345/115 kV or 345/138 kV substations	345/138	Removed from UNS ELECTRIC 10-year plan
TBD	RS26-Fountain Hill substation	345/230/115	Changed In-Service date from 2014 to TBD
TBD	Northeast Arizona to Phoenix 500kV	500	Changed project Name
			Changed Line Length from TBD to 200 miles
TBD	Pinal Central – Abel #2 500kV line	500	Changed In-Service date from 2020 to TBD

Exhibit 10 – Generation Interconnection Queue(s)

Interconnecting Utility and Queue list	Maximum Output	Interconnection Location	In-Service Date	Technology	Comment
SRP-ANPP	700	Hassayampa 500 kV	4/30/2013-2017	Photovoltaic	One 175MW unit per year
SRP-ANPP	300	Jojoba	12/1/2015	Concentrated Solar Power	
SRP-ANPP	125	Hassayampa 500 kV	1/29/2016	Photovoltaic	
SRP-ANPP	125	Hassayampa 500 kV	1/29/2016	Photovoltaic	
SRP-ANPP	200	Hassayampa 500 kV	5/1/2013	Photovoltaic	
SRP-ANPP	150	Hassayampa 500 kV	2/1/2014	Photovoltaic	
SRP-MP	500	Mead-Perkins	10/1/2009	Wind	
SRP-MP	250	Mead-Perkins	5/1/2016	Concentrated Solar Power	
SRP Transmission	658	Abel 230	5/1/2016	Natural Gas	
SRP Transmission	304	Abel 69	5/1/2015	Natural Gas	
SRP Transmission	1,315	Pinal New Sub	5/1/2018	Natural Gas	
SRP Transmission	20	Germann 69kV	7/1/2012	Photovoltaic	
SRP Transmission	45	Coolidge - Bonneybrook 115kV	8/15/2013	Photovoltaic	
SRP-Joint Participation	125	Pinal Central 230kV	11/1/2014	Solar (steam)	
APS	260	Round Valley - Seligman 230 kV line	Unknown	Wind	Signed LGIA – Project entered Suspension
APS	125	Cholla/Show Low Eastern 69 kV line	12/31/2013	Wind	FaS in-progress
APS	87	Paloma 69kV Substation	10/1/2010-12/31/2011	Solar	Negotiating LGIA
APS	1,000	Moenkopi 500kV	2015	Wind	Negotiating LGIA
APS	400	Proposed Harquahala Junction (Delaney) 500 kV Switchyard	3/31/2015	Solar	Negotiating LGIA
APS	800	Proposed Harquahala Junction (Delaney) 500 kV Switchyard	3/31/2015	Solar	Negotiating LGIA
APS	500	PV-NG1 500kV line (New Hoodoo Wash 500 kV Switchyard)	12/1/2011	Solar	LGIA executed – Phase 1 in-service
APS	500	PV-NG1 500kV line (New Hoodoo Wash 500 kV Switchyard)	12/1/2011	Solar	Phase 2 scheduled
APS	280	Panda 230 kV Substation	4/1/2013-6/30/2013	Solar	LGIA executed – in construction
APS	300	PV-NG1 500 kV Line	5/1/2014	Solar	Negotiating LGIA
APS	80	SW6 Substation	3/1/2013	Solar	FaS in-progress
APS	150	North Gila System	4/1/2015	Solar	FaS in-progress
APS	150	Cholla-PNPK 345 kV line	8/1/2014	Wind	Negotiating LGIA
APS	300	Proposed Delaney Switchyard	1/31/2014	Solar	Negotiating LGIA

Interconnecting Utility and Queue list	Maximum Output	Interconnection Location	In-Service Date	Technology	Comment
APS	99	Hassayampa-N Gila 500 kV line	4/1/2012-12/31/2012	Solar	Negotiating LGIA
APS	99	Hassayampa-N Gila 500 kV line	4/1/2013-12/31/2013	Solar	Negotiating LGIA
APS	40	Hassayampa-N Gila 500 kV line	4/1/2012-6/30/2012	Solar	Negotiating LGIA
APS	500	Moenkopi 500 kV Switchyard	8/31/2015	Wind	FaS in-progress
APS	150	Gila Bend 230 kV Substation	7/1/2013	Solar	FaS in-progress
APS	480	Hassayampa-N Gila 500 kV line	1/1/2014	Solar	Negotiating LGIA
APS	480	Hassayampa-N Gila 500 kV line	1/1/2014	Solar	Negotiating LGIA
APS	390	Four Corners – Cholla 345 kV line	12/31/2012	Wind	Negotiating LGIA
APS	20	Vicksburg Area 69 kV	12/31/2012	Solar	FaS in-progress
APS	108	Cholla – Pinnacle Peak 345 kV line	12/1/2014	Wind	SIS in-progress
APS	20	69 kV Interconnection – Hwy 60 & Farm Access Road	12/31/2012	Solar	FaS In -progress
APS	50	Sugarloaf 69 kV Substation	12/1/2012	Solar	SIS in-progress
APS	20	Paulden-Pollock 69 kV line	2/28/2012	Solar	FaS in-progress
APS	20	Cholla-Snowflake 69 kV line	12/31/2012	Solar	FaS in-progress
APS	320 Gas	Delaney 500 kV Switchyard	1/1/2014	Solar & Natural Gas	SIS completed
	300 Solar		9/1/2014		
			5/1/2015		
APS	20	San Pedro 12 kV substation	6/1/2012	Solar	FaS In-progress
APS	450	Hassayampa-North Gila 500 kV line	4/1/2013	Solar	FaS in-progress
			1/1/2015		
APS	300.8 Wind	Moenkopi-Yavapai 500 kV line	11/30/2012	Wind & Solar	SIS In-progress
	60 Solar				
APS	252 Wind	Moenkopi-El Dorado 500 kV line	12/31/2013	Wind & Solar	SIS In-progress
	50.35 Solar				
APS	20	Yavapai-Old Home Manor 69 kV line	6/30/2014	Solar	SIS In-progress
APS	150	Panda 230 kV switchyard	12/31/2014	Solar	SIS in-progress
APS	30	Conley 69 kV switchyard	6/1/2013	Solar	SIS In-progress
APS	35	Foothills-North Gila 69 kV line	1/15/2013	Solar	SIS completed

Interconnecting Utility and Queue list	Maximum Output	Interconnection Location	In-Service Date	Technology	Comment
APS	Various	Buckeye/Gila Bend 69 kV system	Various	Solar	Formerly 38 projects @ 970MW
TEP	500	Greenlee-Winchester 345 kV line	12/31/2016	Generator	TEP
TEP	150	Springerville 345 kV line	3/15/2013	Wind	TEP
TEP	50	Tortolita 138 kV Yard	6/3/2013	Solar	TEP
TEP	700	Springerville 345 kV Yard	6/30/2015	Wind	TEP
UNSE	9.5	Steel Park, Old Trails Rd, Kingman, AZ	12/31/2011	Wind/Solar	UNSE

Exhibit 11 – Listing of Projects by In-Service Date

Year	Project ID	Description	Participants	Length (mi)	Permitting/Siting Status	Voltage (kV)
2012	A19	Youngs Canyon 345/69 kV Interconnection: at Western's Flagstaff 345kV bus	APS	0.95	CEC Not Required	345
2012	C1	McKinley 345kV Reactor Addition	TEP	0	CEC Not Required	345
2012	C2	Vail 345/138kV Transformer #3	TEP	0	CEC Not Required	345/138
2013	A13	DeMoss Petrie-Tucson 138 kV line	TEP	4.5	CEC Approved - Decision #72231, Case #157	138
2013	A20	South-Duval CLEAR - Phase 2b - Extend 138 kV line from Canoa Ranch-(Future) Duval	TEP	24	CEC Approved - Case #84	138
2013	A25	Moenkopi-Eldorado 500 kV Series Capacitor Upgrade Project	SCE, APS	0	CEC Not Required	500
2013	B2	Delaney – Palo Verde 500kV line	APS	15	CEC Approved – Decision #68063 – Case #128	500
2013	B22	Rosemont 138 kV line	TEP	24	CEC Approved – Case #164	138
2013	C3	Superior-Silver King 115kV re-route	SRP	1.25	CEC Approved October 2012 – Decision #73551 – Case #166	115
2013	C4	Saguaro to Tucson 115 kV Line Loop-in to Marana	SWTC	0.2	CEC Approved – Case #161 for original Marana Tap to Marana Project. This project would be a minor modification to this approved Case. Currently under study with Western Area Power Administration.	115
2013	C5	Future Toro Switchyard STATCOM	TEP	0	CEC Not Required	138
2013	C6	Series Capacitor Replacement at Vail 345kV Substation on the Springerville – Vail 345kV Line	TEP	0	CEC Not Required	345
2014	A16	Pinal Central-Abel	SRP	30	CEC Approved - Decisions #68093 and #68291	230
2014	A22	Upgrade existing 115 kV transmission line to Nogales	UNS ELECTRIC	60	CEC Approved – Case #144	115
2014	A32	Desert Basin-Pinal Central 230 kV	APS, SRP	21	CEC Approved – Decisions #68093, #68291, #69183 and #69647	230
2014	A37	Pinal Central-Tortolita 500 kV line	TEP, SWTC, SRP, SunZia	40	CEC Approved July 2012 – Decision #73282 – Case #165	500

Year	Project ID	Description	Participants	Length (mi)	Permitting/Siting Status	Voltage (kV)
2014	A38	Pinal West-Pinal Central – Randolph - Abel-Browning 500 kV line	SRP, TEP, ED2, ED3, ED4	50	CEC Approved - Case #126 - Decisions #68093 and #68291	500
2014	A41	Sundance-Pinal Central 230 kV line	APS, ED2	6	CEC Approved – Case #136 – Decision #70325	230
2014	B3	Three Terminal Plan Circuit 1 Participation	SPPR	23	CEC Not Yet Filed	115
2014	B4	Three Terminal Plan Circuit 2 Participation	SPPR	31	CEC Not Yet Filed	115
2014	B5	Three Terminal Plan Circuit 3 Participation	SPPR	19	CEC Not Yet Filed	115
2014	C29	Relocate Bagdad Capacitor Station to Bagdad Mine	APS	5.5	CEC Approved – Decision #71217 – Case #143	
2015	A36	Palo Verde Hub-North Gila 500 kV #2 line	APS, IID, WMIDD	110	CEC Approved – Decision #70127 –Case #135	500
2015	A17	Sandario Tap-Three Points 115 kV Line Upgrade	SWTC	13.71	CEC Not Yet Filed	115
2015	A24	Mazatzal Loop-in of Cholla-Pinnacle Peak 345 kV line	APS	0.95	CEC Approved – Decision #72032 – Case #160	345
2015	A26	Northeast-Snyder 138 kV loop-in for Craycroft-Barril substations	TEP	8	CEC Not Required	138
2015	A31	Delaney-Sun Valley 500 kV line	APS, SRP, CAWCD	28	CEC Approved – Decision #68063 –Case #128	500
2015	A35	North Gila-TS8 230 kV line	APS	15	CEC Approved – Case #163 – Decision #72801	230
2015	A40	Sun Valley-Trilby Wash - 230 kV line	APS	15	CEC Approved – Decision #67828 –Case #127	230
2015	A43	Palm Valley-TS2-Trilby Wash 230 kV line	APS	12	CEC Approved - Decisions #66646 and #67828 –Case #122 and #127	230
2015	A45	North Loop - Rancho Vistoso 138kV line loop-in for future Naranja substation.	TEP	24.5	CEC Not Yet Filed	138
2015	A46	Interconnection of Tortolita – North Loop 138 kV with future Marana 138 kV Substation.	TEP	22	CEC Not Yet Filed	138
2015	B24	Vail-UA Tech Park-Irvington 138 kV line	TEP	2	CEC Not Yet Filed	138
2015	C7	Tortolita – Rancho Vistoso to North Loop – Rancho Vistoso Reconfiguration	TEP	11	CEC Not Required	138
2015	C8	Eastern Mining Expansion 230kV	SRP	12-14	CEC Not Yet Filed	230
2015	C9	Series Capacitor Replacement at Vail 345kV Substation on the Winchester – Vail 345kV Line	TEP	0	CEC Not Required	345

Year	Project ID	Description	Participants	Length (mi)	Permitting/Siting Status	Voltage (kV)
2015	C10	Bicknell 345/230 kV Transformer Replacement	SWTC	0	CEC not required; SWTC sees no current justification for building this project on its own and is soliciting support of neighboring utilities to jointly study the need for this project and participate in a cost share of the project.	345/23
2015	C11	Greenlee 2nd 345/230 kV Transformer	SWTC	0	CEC not required; SWTC sees no current justification for building this project on its own and is soliciting support of neighboring utilities to jointly study the need for this project and participate in a cost share of the project.	345/230
2016	A27	SunZia Project	SWPG, SRP, TEP, ECP, Shell, TSGT	500	CEC Not Yet Filed	500
2016	A29	Vail-East Loop - Phase 4 - Harrison loop-in of Roberts-East Loop 138 kV line	TEP	0	CEC Approved - Case #8	138
2016	A34	La Canada-Orange Grove-Rillito 138 kV line	TEP	5.4	CEC Not Yet Filed	138
2016	A49	Sun Valley-Morgan 500 kV line	APS, SRP, CAWCD	TBD	CEC Approved – Decision #70850 – Case #138	500
2016	A77	Rogers-Santan 230 kV line	SRP	9	CEC Not Yet Filed	230
2016	B8	Santa Cruz-Anklam-DeMoss Petrie 138 kV line	TEP	2	CEC Not Yet Filed	138
2016	B14	Interconnection of Greenlee-Winchester 345kV line with future Willow Substation	TEP, Bowie	0	CEC obtained by Southwestern Power Group – Case #118	345
2016	C12	East Valley Industrial Expansion	SRP	5	CEC Not Yet Filed	230
2016	C13	Parker – Davis #1 Loop-in at Black Mesa	UNS ELECTRIC	0	CEC Not Required	230
2017	A30	Apache/Hayden-San Manuel 115 kV line	SWTC	4.5	CEC Approved – Case #142	115
2017	A42	Irvington Substation –Tucson Station #2 138 kV Phase 1	TEP	10.9	CEC Not Yet Filed	138
2017	A44	Toro-Hartt-Green Valley 138 kV line	TEP	6.5	CEC Not Required	138
2017	A47	Griffith-North Havasu 230 kV line	UNS ELECTRIC	40	CEC Approved/Extended - Case #88, Most recent CEC extension request filed March 6, 2012. Staff has recommended support	230

Year	Project ID	Description	Participants	Length (mi)	Permitting/Siting Status	Voltage (kV)
2017	C14	Series Capacitor Replacement at Greenlee 345kV Substation on the Springerville – Greenlee 345kV Line	TEP	0	CEC Not Required	345
2018	A48	Irvington Substation – Corona Substation –South Substation 138kV.	TEP	16.1	CEC Not Yet Filed	138
2019	A23	Interconnection of South – Midvale 138 kV circuit with future Medina, Spencer, and Raytheon 138kV substations - Phase 1.	TEP	19	CEC Not Yet Filed	138
2019	C15	New Superior-New Oak Flat	SRP	3.5	CEC Not Yet Filed	230
2019	C16	New Oak Flat – Silver King	SRP	3	CEC Not Yet Filed	230
2020	A42	Irvington Substation –Tucson Station #2 138 kV Phase 2	TEP	10.9	CEC Not Yet Filed	138
2020	A54	Interconnection of South – Midvale 138 kV circuit with future Medina, Spencer, Raytheon 138kV substations - Phase 2	TEP	11	CEC Not Yet Filed	138
2020	C17	Three Points to Bicknell 115 kV Line Upgrade	SWTC	21	CEC Not Yet Filed	115
2021	A28	Saguaro (TS12) Relocate 230kV yard	APS	0.95	Not Required	230
2021	A52	Orange Grove-East Ina 138 kV line	TEP	3.6	CEC Not Yet Filed	138
2021	C18	Silver King – New Pinto Valley	SRP	7	CEC Not Yet Filed	230
2021	C19	San Rafael 2nd 230/69 kV Transformer	SWTC	0	CEC not required; on-going efforts of the Cochise County Study Group may change this conceptual project to occur sooner within the ten year plan timeframe.	230/69
2021	C20	Interconnection of South-Midvale - 138kV circuit with future Medina, Spencer, and Raytheon 138kV substations - Phase 3.	TEP	8	CEC Not Yet Filed	2021
2019-21	A51	Abel-Pfister-Ball 230 kV #1	SRP	20	CEC Approved – Decision #71441	230
2019-21	A53	Abel-Pfister-Ball 230 kV #2	SRP	20	CEC Approved – Decision #71441	230
TBD	A2	CAP 115 kV line loop-in to SWTC Sandario	SWTC	0.6	CEC Approved – Case #152; Project deferred indefinitely	115
TBD	A6	Naviska-Thornydale 115 kV line	SWTC	7	CEC Approved – Case #149; Project deferred indefinitely	115
TBD	A7	Saguaro to North Loop	SWTC	3.2	CEC approved – Case #149; Project deferred indefinitely	115

Year	Project ID	Description	Participants	Length (mi)	Permitting/Siting Status	Voltage (kV)
TBD	A8	Thornsdale-Rattlesnake 115 kV line	SWTC	19	CEC Approved – Case #152; Project deferred indefinitely	115
TBD	A10	Valencia-CAP Black Mountain 115 kV line	SWTC	2.6	CEC Approved – Case #152; Project deferred indefinitely	115
TBD	A14	Devers - Palo Verde 500 kV #2 line	SCE	230	CEC Denied - Case #130	500
TBD	A39	RS26-Fountain Hill substation	SRP	TBD	CEC Not Yet Filed	115/230/345
TBD	A55	Arlington Power Plant	Dynegy Arlington Valley	TBD	CEC Approved – Decision #64357	500
TBD	A57	ED5-Marana 230 kV line	SCWPDA, SPPR	28	CEC Not Yet Filed	230
TBD	A58	ED5-Pinal South (Pinal Central) 230 kV line	SCWPDA, SPPR	18	CEC Not Yet Filed	230
TBD	A61	Gila Bend Power Plant	GBPP	0	CEC Approved – Case#109 – Extension Request Pending	500
TBD	A63	Greenlee switching station through Hidalgo to Luna	ELPE, PNM, TXNMPC	28	CEC Approved – Case #21	345
TBD	A64	Hassayampa - Pinal West 500 kV #2 line	SRP, TEP, SWTC, ED2, ED3, ED4	51	CEC Approved – Case #124	500
TBD	A65	Hassayampa-Jojoba 500 kV line	GBPP	19	CEC Not Required	500
TBD	A67	Irvington-East Loop Project - Phase 3 - Irvington-22nd Street 2nd Circuit	TEP	9	CEC Approved - Case #66	138
TBD	A68	Jojoba Loop-in of TS4-Panda 230 kV line	APS	0.95	CEC Approved – Decision #62960 – Case #102	230
TBD	A69	New Hayden 115 kV Station Loop-in	SRP	0.75	CEC Not Yet Filed	115
TBD	A71	Palm Valley-TS2-Trilby Wash 230 kV line # 2	APS	12	CEC Approved – Decision #67828 – Case #127	230
TBD	A72	Palo Verde-Saguaro 500 kV line	CATS Sub-regional Planning Group	130	CEC Approved – Decision#46802	500
TBD	A73	Pinal Central (Pinal South) – Future substation 6 miles northeast 230 kV line #1	SCWPDA, SPPR	6	CEC Not Yet Filed	230
TBD	A74	Pinal Central (Pinal South) – Future substation 6 miles northeast 230 kV line #2	SCWPDA, SPPR	6	CEC Not Yet Filed	230
TBD	A75	Pinnacle Peak-Brandow 230 kV line	SRP	TBD	CEC Approved - Case #69	230
TBD	A78	Browning-Corbell 230 kV line	SRP	14	CEC Not Required	230
TBD	A79	Ball (RS17)230 kV Loop-in line	SRP	0.95	CEC Approved - Decisions #59791 and #60099	230

Year	Project ID	Description	Participants	Length (mi)	Permitting/Siting Status	Voltage (kV)
TBD	A80	Santa Rosa-ED5 230 kV line	SCWPDA, SPPR	38	CEC Not Yet Filed	230
TBD	A81	Silver King-Browning 230 kV line	SRP	38	CEC Approved - Case #20	230
TBD	A82	Superior 230 kV Loop-in	SRP	0.5	CEC Not Yet Filed	230
TBD	A83	Silver King-Knoll-Future Hayden 230 kV line	SRP	35	CEC Not Yet Filed	230
TBD	A84	Springerville-Greenlee 345 kV line - 2nd circuit	TEP	110	CEC Approved - Case #12, 30, 63, 73	345
TBD	A85	Sun Valley-Morgan 230 kV line	APS	TBD	CEC Approved – Decision #70850 – Case #138	230
TBD	A86	Sun Valley-TS10-TS11 230 kV line	APS	TBD	CEC Not Yet Filed	230
TBD	A87	Sun Valley-TS11-Buckeye 230 kV line	APS	TBD	CEC Not Yet Filed	230
TBD	A88	Test Track-Empire-ED4 230 kV line	WAPA, SCWPDA	20	CEC Not Yet Filed	230
TBD	A89	Tortolita North Loop 345 kV line	TEP	60	CEC Not Yet Filed	345
TBD	A90	Tortolita-South 345 kV line	TEP	68	CEC Approved - Case #50	345
TBD	A92	Tortolita-Winchester 500 kV line	TEP	80	CEC Approved - Case #23	500
TBD	A93	Vail-East Loop - Phase 3 - Third Vail-East Loop 138 kV line	TEP	22	CEC Approved - Case #8	138
TBD	A94	Vail-South 345 kV line - 2nd circuit	TEP	14	CEC Not Required	345
TBD	A96	Wellton-Mohawk 230 kV Line Project	WMIDD	35	CEC Not Yet Filed	230
TBD	A97	Westwing-El Sol 230 kV line	APS	11	CEC Approved – Docket#U-1345 – Case #9	230
TBD	A98	Westwing-Raceway 230 kV line	APS	7	CEC Approved – Decision #65997 – Case #120	230
TBD	A99	Westwing-South 345 kV line - 2nd circuit	TEP	178	CEC Approved - Case #15	345
TBD	A100	Winchester-Vail 345 kV line #2 and #3	TEP	40	CEC Not Yet Filed	345
TBD	A101	Yucca-TS8 230 kV line	APS	TBD	CEC Approved – Case #163 – Decision #72801	230
TBD	B6	Saguaro to Adonis 115 kV Line Loop-in to Naviska	SWTC	0	Project deferred indefinitely	115
TBD	B7	Vail – Irvington 345 kV line	TEP	11	CEC Not Yet Filed	345
TBD	B11	Pinal Central – Abel #2 500kV line	SRP	TBD	CEC Not Yet Filed	500
TBD	B12	Abel – RS20 500kV	SRP	TBD	CEC Not Yet Filed	500
TBD	B15	Irvington – South 345 kV line	TEP	16	CEC Not Yet Filed	345
TBD	B17	Mural – San Rafael 230kV line	APS, ED3	TBD	CEC Not Yet Filed	230
TBD	B18	North Gila-Ligurta 230kV Line	WMIID	35	CEC Not Yet Filed	230

Year	Project ID	Description	Participants	Length (mi)	Permitting/Siting Status	Voltage (kV)
TBD	B20	Northeast Arizona to Phoenix 500kV	SRP	200	CEC Not Yet Filed	500
TBD	B23	Thunderstone-Browning 230 kV line #2	SRP	8	CEC Not Yet Filed	230
TBD	C21	Rancho Vistoso – La Canada Reconductor	TEP	4.5	CEC Not Required	138
TBD	C22	Los Reales – Vail Reconductor	TEP	8	CEC Not Required	138
TBD	C23	North East – Rillito Reconductor	TEP	5	CEC Not Required	138
TBD	C24	Irvington – Robert Bills Wilmot Reconductor	TEP	11	CEC Not Required	138
TBD	C25	Los Reales – Pantano Reconductor	TEP	9	CEC Not Required	138
TBD	C26	DMP – Northeast Reconductor	TEP	6	CEC Not Required	138
TBD	C27	North Loop – Rillito Reconductor	TEP	11	CEC Not Required	138
TBD	C28		SRP	TBD	CEC Not Yet Filed	115/230/345

Exhibit 12 – Listing of Projects by Voltage Class

Project ID	Description	Participants	Length (mi)	Permitting/Siting Status	Year	Voltage (kV)
A14	Devers - Palo Verde 500 kV #2 line	SCE	230	CEC Denied - Case #130	TBD	500
A25	Moenkopi-Eldorado 500 kV Series Capacitor Upgrade Project	SCE, APS	0	CEC Not Required	2013	500
A27	SunZia Project	SWPG, SRP, TEP, ECP, Shell, TSGT	500	CEC Not Yet Filed	2016	500
A31	Delaney-Sun Valley 500 kV line	APS, SRP, CAWCD	28	CEC Approved – Decision #68063 – Case #128	2015	500
A36	Palo Verde Hub-North Gila 500 kV #2 line	APS, IID, WMIDD	110	CEC Approved – Decision #70127 – Case #135	2015	500
A37	Pinal Central-Tortolita 500 kV line	TEP, SWTC, SRP, SunZia	40	CEC Approved July 2012 – Decision #73282 – Case #165	2014	500
A38	Pinal West-Pinal Central – Randolph - Abel-Browning 500 kV line	SRP, TEP, ED2, ED3, ED4	50	CEC Approved - Case #126 - Decisions #68093 and #68291	2014	500
A49	Sun Valley-Morgan 500 kV line	APS, SRP, CAWCD	TBD	CEC Approved – Decision #70850 - Case #138	2016	500
A55	Arlington Power Plant	Dynegy Arlington Valley	TBD	CEC Approved – Decision #64357	TBD	500
A61	Gila Bend Power Plant	GBPP	0	CEC Approved – Case#109 – Extension Request Pending	TBD	500
A64	Hassayampa - Pinal West 500 kV #2 line	SRP, TEP, SWTC, ED2, ED3, ED4	51	CEC Approved – Case #124	TBD	500
A65	Hassayampa-Jojoba 500 kV line	GBPP	19	CEC Not Required	TBD	500
A72	Palo Verde-Saguaro 500 kV line	CATS Sub-regional Planning Group	130	CEC Approved – Decision#46802	TBD	500
A92	Tortolita-Winchester 500 kV line	TEP	80	CEC Approved - Case #23	TBD	500
B2	Delaney – Palo Verde 500kV line	APS	15	CEC Approved – Decision #68063 – Case #128	2013	500
B11	Pinal Central – Abel #2 500kV line	SRP	TBD	CEC Not Yet Filed	TBD	500
B12	Abel – RS20 500kV	SRP	TBD	CEC Not Yet Filed	TBD	500
B20	Northeast Arizona to Phoenix 500kV	SRP	200	CEC Not Yet Filed	TBD	500
A19	Youngs Canyon 345/69 kV Interconnection: at Western's Flagstaff 345kV bus	APS	0.95	CEC Not Required	2012	345

Project ID	Description	Participants	Length (mi)	Permitting/Siting Status	Year	Voltage (kV)
A24	Mazatzal Loop-in of Cholla-Pinnacle Peak 345 kV line	APS	0.95	CEC Approved – Decision #72302 – Case #160	2015	345
A39	RS26-Fountain Hill substation	SRP	TBD	CEC Not Yet Filed	TBD	345/230/115
A63	Greenlee switching station through Hidalgo to Luna	ELPE, PNM, TXNMPC	28	CEC Approved – Case #21	TBD	345
A84	Springerville-Greenlee 345 kV line - 2nd circuit	TEP	110	CEC Approved - Case #12, 30, 63, 73	TBD	345
A89	Tortolita North Loop 345 kV line	TEP	60	CEC Not Yet Filed	TBD	345
A90	Tortolita-South 345 kV line	TEP	68	CEC Approved - Case #50	TBD	345
A94	Vail-South 345 kV line - 2nd circuit	TEP	14	CEC Not Required	TBD	345
A99	Westwing-South 345 kV line - 2nd circuit	TEP	178	CEC Approved - Case #15	TBD	345
A100	Winchester-Vail 345 kV line #2 and #3	TEP	40	CEC Not Yet Filed	TBD	345
B7	Vail – Irvington 345 kV line	TEP	11	CEC Not Yet Filed	TBD	345
B14	Interconnection of Greenlee-Winchester 345kV line with future Willow Substation	TEP, Bowie	0	CEC obtained by Southwestern Power Group – Case #118	2016	345
B15	Irvington – South 345 kV line	TEP	16	CEC Not Yet Filed	TBD	345
C1	McKinley 345kV Reactor Addition	TEP	0	CEC Not Required	2012	345
C2	Vail 345/138kV Transformer #3	TEP	0	CEC Not Required	2012	345/138
C6	Series Capacitor Replacement at Vail 345kV Substation on the Springerville – Vail 345kV Line	TEP	0	CEC Not Required	2013	345
C9	Series Capacitor Replacement at Vail 345kV Substation on the Winchester – Vail 345kV Line	TEP	0	CEC Not Required	2015	345
C10	Bicknell 345/230 kV Transformer Replacement	SWTC	0	CEC not required; SWTC sees no current justification for building this project on its own and is soliciting support of neighboring utilities to jointly study the need for this project and participate in a cost share of the project.	2015	345/230

Project ID	Description	Participants	Length (mi)	Permitting/Siting Status	Year	Voltage (kV)
C11	Greenlee 2nd 345/230 kV Transformer	SWTC	0	CEC not required; SWTC sees no current justification for building this project on its own and is soliciting support of neighboring utilities to jointly study the need for this project and participate in a cost share of the project.	2015	345/230
C14	Series Capacitor Replacement at Greenlee 345kV Substation on the Springerville – Greenlee 345kV Line	TEP	0	CEC Not Required	2017	345
A16	Pinal Central-Abel	SRP	30	CEC Approved - Decisions #68093 and #68291	2014	230
A28	Saguaro (TS12) Relocate 230kV yard	APS	0.95	Not Required	2021	230
A32	Desert Basin-Pinal Central 230 kV	APS, SRP	21	CEC Approved – Decisions #68093, #68291, #69183 and #69647	2014	230
A35	North Gila-TS8 230 kV line	APS	15	CEC Approved – Case #163 – Decision #72801	2015	230
A40	Sun Valley-Trilby Wash - 230 kV line	APS	15	CEC Approved – Decision #67828 – Case #127	2015	230
A41	Sundance-Pinal Central 230 kV line	APS, ED2	6	CEC Approved – Case #136 – Decision #70325	2014	230
A43	Palm Valley-TS2-Trilby Wash 230 kV line	APS	12	CEC Approved - Decisions #66646 and #67828 – Case #122 and #127	2015	230
A47	Griffith-North Havasu 230 kV line	UNS ELECTRIC	40	CEC Approved/Extended - Case #88, Most recent CEC extension request filed March 6, 2012. Staff has recommended support	2017	230
A51	Abel-Pfister-Ball 230 kV #1	SRP	20	CEC Approved – Decision #71441	2019-21	230
A53	Abel-Pfister-Ball 230 kV #2	SRP	20	CEC Approved – Decision #71441	2019-21	230
A57	ED5-Marana 230 kV line	SCWPDA, SPPR	28	CEC Not Yet Filed	TBD	230
A58	ED5-Pinal South (Pinal Central) 230 kV line	SCWPDA, SPPR	18	CEC Not Yet Filed	TBD	230
A68	Jojoba Loop-in of TS4-Panda 230 kV line	APS	0.95	CEC Approved – Decision #62960 – Case #102	TBD	230
A71	Palm Valley-TS2-Trilby Wash 230 kV line # 2	APS	12	CEC Approved – Decision #67828 – Case #127	TBD	230
A73	Pinal Central (Pinal South) – Future substation 6 miles northeast 230 kV line #1	SCWPDA, SPPR	6	CEC Not Yet Filed	TBD	230
A74	Pinal Central (Pinal South) – Future substation 6 miles northeast 230 kV line #2	SCWPDA, SPPR	6	CEC Not Yet Filed	TBD	230

Project ID	Description	Participants	Length (mi)	Permitting/Siting Status	Year	Voltage (kV)
A75	Pinnacle Peak-Brandow 230 kV line	SRP	TBD	CEC Approved - Case #69	TBD	230
A77	Rogers-Santan 230 kV line	SRP	9	CEC Not Yet Filed	2016	230
A78	Browning-Corbell 230 kV line	SRP	14	CEC Not Required	TBD	230
A79	Ball (RS17)230 kV Loop-in line	SRP	0.95	CEC Approved - Decisions #59791 and #60099	TBD	230
A80	Santa Rosa-ED5 230 kV line	SCWPDA, SPPR	38	CEC Not Yet Filed	TBD	230
A81	Silver King-Browning 230 kV line	SRP	38	CEC Approved - Case #20	TBD	230
A82	Superior 230 kV Loop-in	SRP	0.5	CEC Not Yet Filed	TBD	230
A83	Silver King-Knoll-Future Hayden 230 kV line	SRP	35	CEC Not Yet Filed	TBD	230
A85	Sun Valley-Morgan 230 kV line	APS	TBD	CEC Approved – Decision #70850 – Case #138	TBD	230
A86	Sun Valley-TS10-TS11 230 kV line	APS	TBD	CEC Not Yet Filed	TBD	230
A87	Sun Valley-TS11-Buckeye 230 kV line	APS	TBD	CEC Not Yet Filed	TBD	230
A88	Test Track-Empire-ED4 230 kV line	WAPA, SCWPDA	20	CEC Not Yet Filed	TBD	230
A96	Wellton-Mohawk 230 kV Line Project	WMIDD	35	CEC Not Yet Filed	TBD	230
A97	Westwing-EI Sol 230 kV line	APS	11	CEC Approved – Docket#U-1345 – Case #9	TBD	230
A98	Westwing-Raceway 230 kV line	APS	7	CEC Approved – Decision#65997 – Case #120	TBD	230
A101	Yucca-TS8 230 kV line	APS	TBD	CEC Approved – Case #163 – Decision #72801	TBD	230
B17	Mural – San Rafael 230kV line	APS, ED3	TBD	CEC Not Yet Filed	TBD	230
B18	North Gila-Ligurta 230kV Line	WMIID	35	CEC Not Yet Filed	TBD	230
B23	Thunderstone-Browning230 kV line #2	SRP	8	CEC Not Yet Filed	TBD	230
C8	Eastern Mining Expansion 230kV	SRP	12-14	CEC Not Yet Filed	2015	230
C12	East Valley Industrial Expansion	SRP	5	CEC Not Yet Filed	2016	230
C13	Parker – Davis #1 Loop-in at Black Mesa	UNS ELECTRIC	0	CEC Not Required	2016	230
C15	New Superior-New Oak Flat	SRP	3.5	CEC Not Yet Filed	2019	230
C16	New Oak Flat – Silver King	SRP	3	CEC Not Yet Filed	2019	230
C18	Silver King – New Pinto Valley	SRP	7	CEC Not Yet Filed	2021	230

Project ID	Description	Participants	Length (mi)	Permitting/Siting Status	Year	Voltage (kV)
C19	San Rafael 2nd 230/69 kV Transformer	SWTC	0	CEC not required; on-going efforts of the Cochise County Study Group may change this conceptual project to occur sooner within the ten year plan timeframe.	2021	230/69
A13	DeMoss Petrie-Tucson 138 kV line	TEP	4.5	CEC Approved - Decision #72231, Case #157	2013	138
A20	South-Duval CLEAR - Phase 2b - Extend 138 kV line from Canoa Ranch- (Future) Duval	TEP	24	CEC Approved - Case #84	2013	138
A23	Interconnection of South – Midvale 138 kV circuit with future Medina, Spencer, and Raytheon 138kV substations - Phase 1.	TEP	19	CEC Not Yet Filed	2019	138
A26	Northeast-Snyder 138 kV loop-in for Craycroft-Barril substations	TEP	8	CEC Not Required	2015	138
A29	Vail-East Loop - Phase 4 - Harrison loop-in of Roberts-East Loop 138 kV line	TEP	0	CEC Approved - Case #8	2016	138
A34	La Canada-Orange Grove-Rillito 138 kV line	TEP	5.4	CEC Not Yet Filed	2016	138
A42	Irvington Substation – Tucson Station #2 138 kV Phase 1	TEP	10.9	CEC Not Yet Filed	2017	138
A42	Irvington Substation – Tucson Station #2 138 kV Phase 2	TEP	10.9	CEC Not Yet Filed	2020	138
A44	Toro-Hartt-Green Valley 138 kV line	TEP	6.5	CEC Not Required	2017	138
A45	North Loop - Rancho Vistoso 138kV line loop-in for future Naranja substation.	TEP	24.5	CEC Not Yet Filed	2015	138
A46	Interconnection of Tortolita – North Loop 138 kV with future Marana 138 kV Substation.	TEP	22	CEC Not Yet Filed	2015	138
A48	Irvington Substation – Corona Substation –South Substation 138kV.	TEP	16.1	CEC Not Yet Filed	2018	138
A52	Orange Grove-East Ina 138 kV line	TEP	3.6	CEC Not Yet Filed	2021	138

Project ID	Description	Participants	Length (mi)	Permitting/Siting Status	Year	Voltage (kV)
A54	Interconnection of South – Midvale 138 kV circuit with future Medina, Spencer, Raytheon 138kV substations - Phase 2	TEP	11	CEC Not Yet Filed	2020	138
A67	Irvington-East Loop Project - Phase 3 - Irvington-22nd Street 2nd Circuit	TEP	9	CEC Approved - Case #66	TBD	138
A93	Vail-East Loop - Phase 3 - Third Vail-East Loop 138 kV line	TEP	22	CEC Approved - Case #8	TBD	138
B8	Santa Cruz-Anklam-DeMoss Petrie 138 kV line	TEP	2	CEC Not Yet Filed	2016	138
B22	Rosemont 138 kV line	TEP	24	CEC Approved – Case #164	2013	138
B24	Vail-UA Tech Park-Irvington 138 kV line	TEP	2	CEC Not Yet Filed	2015	138
C5	Future Toro Switchyard STATCOM	TEP	0	CEC Not Required	2013	138
C7	Tortolita – Rancho Vistoso to North Loop – Rancho Vistoso Reconfiguration	TEP	11	CEC Not Required	2015	138
C20	Interconnection of South-Midvale - 138kV circuit with future Medina, Spencer, and Raytheon 138kV substations - Phase 3.	TEP	8	CEC Not Yet Filed	2021	138
C21	Rancho Vistoso – La Canada Reconductor	TEP	4.5	CEC Not Required	TBD	138
C22	Los Reales – Vail Reconductor	TEP	8	CEC Not Required	TBD	138
C23	North East – Rillito Reconductor	TEP	5	CEC Not Required	TBD	138
C24	Irvington – Robert Bills Wilmot Reconductor	TEP	11	CEC Not Required	TBD	138
C25	Los Reales – Pantano Reconductor	TEP	9	CEC Not Required	TBD	138
C26	DMP – Northeast Reconductor	TEP	6	CEC Not Required	TBD	138
C27	North Loop – Rillito Reconductor	TEP	11	CEC Not Required	TBD	138
C28		SRP	TBD	CEC Not Yet Filed	TBD	115/230/345
A2	CAP 115 kV line loop-in to SWTC Sandario	SWTC	0.6	CEC Approved – Case #152; Project deferred indefinitely	TBD	115
A6	Naviska-Thornycroft 115 kV line	SWTC	7	CEC Approved – Case #149; Project deferred indefinitely	TBD	115

Project ID	Description	Participants	Length (mi)	Permitting/Siting Status	Year	Voltage (kV)
A7	Saguaro to North Loop	SWTC	3.2	CEC approved – Case #149; Project deferred indefinitely	TBD	115
A8	Thornsdale-Rattlesnake 115 kV line	SWTC	19	CEC Approved – Case #152; Project deferred indefinitely	TBD	115
A10	Valencia-CAP Black Mountain 115 kV line	SWTC	2.6	CEC Approved – Case #152; Project deferred indefinitely	TBD	115
A17	Sandario Tap-Three Points 115 kV Line Upgrade	SWTC	13.71	CEC Not Yet Filed	2015	115
A22	Upgrade existing 115 kV transmission line to Nogales	UNS ELECTRIC	60	CEC Approved – Case #144	2014	115
A30	Apache/Hayden-San Manuel 115 kV line	SWTC	4.5	CEC Approved – Case #142	2017	115
A52	Orange Grove-East Ina 138 kV line	TEP	3.6	CEC Not Yet Filed	2021	138
A69	New Hayden 115 kV Station Loop-in	SRP	0.75	CEC Not Yet Filed	TBD	115
B3	Three Terminal Plan Circuit 1 Participation	SPPR	23	CEC Not Yet Filed	2014	115
B4	Three Terminal Plan Circuit 2 Participation	SPPR	31	CEC Not Yet Filed	2014	115
B5	Three Terminal Plan Circuit 3 Participation	SPPR	19	CEC Not Yet Filed	2014	115
B6	Saguaro to Adonis 115 kV Line Loop-in to Naviska	SWTC	0	Project deferred indefinitely	TBD	115
C3	Superior-Silver King 115kV re-route	SRP	1.25	CEC Approved October 2012 – Decision #73551 – Case #166	2013	115
C4	Saguaro to Tucson 115 kV Line Loop-in to Marana	SWTC	0.2	CEC Approved – Case #161 for original Marana Tap to Marana Project. This project would be a minor modification to this approved Case. Currently under study with Western Area Power Administration.	2013	115
C17	Three Points to Bicknell 115 kV Line Upgrade	SWTC	21	CEC Not Yet Filed	2020	115

Exhibit 13 – Arizona Public Service Project Summary

Project ID	Description	Participants	Length (mi)	Permitting/Siting Status	Year	Voltage (kV)
B2	Delaney – Palo Verde 500kV line	APS	15	CEC Approved – Decision #68063 – Case #128	2013	500
A31	Delaney-Sun Valley 500 kV line	APS, SRP, CAWCD	28	CEC Approved – Decision #68063 – Case #128	2015	500
A32	Desert Basin-Pinal Central 230 kV	APS, SRP	21	CEC Approved – Decisions #68093, #68291, #69183 and #69647	2014	230
A68	Jojoba Loop-in of TS4-Panda 230 kV line	APS	0.95	CEC Approved – Decision #62960 – Case #102	TBD	230
A24	Mazatzal Loop-in of Cholla-Pinnacle Peak 345 kV line	APS	0.95	CEC Approved – Decision #72302 – Case #160	2015	345
A25	Moenkopi-Eldorado 500 kV Series Capacitor Upgrade Project	SCE, APS	0	CEC Not Required	2013	500
B17	Mural – San Rafael 230kV line	APS, ED3	TBD	CEC Not Yet Filed	TBD	230
A35	North Gila-TS8 230 kV line	APS	15	CEC Approved – Case #163 – Decision #72801	2015	230
A43	Palm Valley-TS2-Trilby Wash 230 kV line	APS	12	CEC Approved - Decisions #66646 and #67828 – Case #122 and #127	2015	230
A71	Palm Valley-TS2-Trilby Wash 230 kV line # 2	APS	12	CEC Approved – Decision #67828 – Case #127	TBD	230
A36	Palo Verde Hub-North Gila 500 kV #2 line	APS, IID, WMIDD	110	CEC Approved – Decision #70127 – Case #135	2015	500
A28	Saguaro (TS12) Relocate 230kV yard	APS	0.95	Not Required	2021	230
A85	Sun Valley-Morgan 230 kV line	APS	TBD	CEC Approved – Decision #70850 – Case #138	TBD	230
A49	Sun Valley-Morgan 500 kV line	APS, SRP, CAWCD	TBD	CEC Approved – Decision #70850 - Case #138	2016	500
A40	Sun Valley-Trilby Wash - 230 kV line	APS	15	CEC Approved – Decision #67828 – Case #127	2015	230
A86	Sun Valley-TS10-TS11 230 kV line	APS	TBD	CEC Not Yet Filed	TBD	230
A87	Sun Valley-TS11-Buckeye 230 kV line	APS	TBD	CEC Not Yet Filed	TBD	230
A41	Sundance-Pinal Central 230 kV line	APS, ED2	6	CEC Approved – Case #136 – Decision #70325	2014	230
A97	Westwing-El Sol 230 kV line	APS	11	CEC Approved – Docket#U-1345 – Case #9	TBD	230
A98	Westwing-Raceway 230 kV line	APS	7	CEC Approved – Decision#65997 – Case #120	TBD	230
A19	Youngs Canyon 345/69 kV Interconnection: at Western's Flagstaff 345kV bus	APS	0.95	CEC Not Required	2012	345
A101	Yucca-TS8 230 kV line	APS	TBD	CEC Approved – Case #163 – Decision #72801	TBD	230

Exhibit 14 – Salt River Project Summary

Project ID	Description	Participants	Length (mi)	Permitting/Siting Status	Year	Voltage (kV)
B12	Abel – RS20 500kV	SRP	TBD	CEC Not Yet Filed	TBD	500
A51	Abel-Pfister-Ball 230 kV #1	SRP	20	CEC Approved – Decision #71441	2019-21	230
A53	Abel-Pfister-Ball 230 kV #2	SRP	20	CEC Approved – Decision #71441	2019-21	230
A79	Ball (RS17)230 kV Loop-in line	SRP	0.95	CEC Approved - Decisions #59791 and #60099	TBD	230
A78	Browning-Corbell 230 kV line	SRP	14	CEC Not Required	TBD	230
C12	East Valley Industrial Expansion	SRP	5	CEC Not Yet Filed	2016	230
C8	Eastern Mining Expansion 230kV	SRP	12-14	CEC Not Yet Filed	2015	230
A64	Hassayampa - Pinal West 500 kV #2 line	SRP, TEP, SWTC, ED2, ED3, ED4	51	CEC Approved – Case #124	TBD	500
A69	New Hayden 115 kV Station Loop-in	SRP	0.75	CEC Not Yet Filed	TBD	115
C16	New Oak Flat – Silver King	SRP	3	CEC Not Yet Filed	2019	230
C15	New Superior-New Oak Flat	SRP	3.5	CEC Not Yet Filed	2019	230
B20	Northeast Arizona to Phoenix 500kV	SRP	200	CEC Not Yet Filed	TBD	500
B11	Pinal Central – Abel #2 500kV line	SRP	TBD	CEC Not Yet Filed	TBD	500
A16	Pinal Central-Abel	SRP	30	CEC Approved - Decisions #68093 and #68291	2014	230
A37	Pinal Central-Tortolita 500 kV line	TEP, SWTC, SRP, SunZia	40	CEC Approved July 2012 – Decision #73282 – Case #165	2014	500
A38	Pinal West-Pinal Central – Randolph - Abel-Browning 500 kV line	SRP, TEP, ED2, ED3, ED4	50	CEC Approved - Case #126 - Decisions #68093 and #68291	2014	500
A75	Pinnacle Peak-Brandow 230 kV line	SRP	TBD	CEC Approved - Case #69	TBD	230
A77	Rogers-Santan 230 kV line	SRP	9	CEC Not Yet Filed	2016	230
A39	RS26-Fountain Hill substation	SRP	TBD	CEC Not Yet Filed	TBD	115/230/345
C18	Silver King – New Pinto Valley	SRP	7	CEC Not Yet Filed	2021	230
A81	Silver King-Browning 230 kV line	SRP	38	CEC Approved - Case #20	TBD	230
A83	Silver King-Knoll-Future Hayden 230 kV line	SRP	35	CEC Not Yet Filed	TBD	230
A27	SunZia Project	SWPG, SRP, TEP, ECP, Shell, TSGT	500	CEC Not Yet Filed	2016	500
A82	Superior 230 kV Loop-in	SRP	0.5	CEC Not Yet Filed	TBD	230
C3	Superior-Silver King 115kV re-route	SRP	1.25	CEC Approved October 2012 – Decision #73551 – Case #166	2013	115

Project ID	Description	Participants	Length (mi)	Permitting/Siting Status	Year	Voltage (kV)
C29	Relocate Bagdad Capacitor Station to Bagdad Mine	APS	5.5	CEC Approved – Decision #71217 – Case #143	2014	115

Project ID	Description	Participants	Length (mi)	Permitting/Siting Status	Year	Voltage (kV)
B23	Thunderstone-Browning 230 kV line #2	SRP	8	CEC Not Yet Filed	TBD	230
C28		SRP	TBD	CEC Not Yet Filed	TBD	115/230/345
A32	Desert Basin – Pinal Central 230 kV	SRP, APS	21	CEC Approved – Decisions #68093, #68291, #69183, and #69647	2014	230

Exhibit 15 – Southwest Transmission Cooperative Project Summary

Project ID	Description	Participants	Length (mi)	Permitting/Siting Status	Year	Voltage (kV)
A30	Apache/Hayden-San Manuel 115 kV line	SWTC	4.5	CEC Approved – Case #142	2017	115
C10	Bicknell 345/230 kV Transformer Replacement	SWTC	0	CEC not required; SWTC sees no current justification for building this project on its own and is soliciting support of neighboring utilities to jointly study the need for this project and participate in a cost share of the project.	2015	345/230
A2	CAP 115 kV line loop-in to SWTC Sandario	SWTC	0.6	CEC Approved – Case #152; Project deferred indefinitely	TBD	115
C11	Greenlee 2nd 345/230 kV Transformer	SWTC	0	CEC not required; SWTC sees no current justification for building this project on its own and is soliciting support of neighboring utilities to jointly study the need for this project and participate in a cost share of the project.	2015	345/230
A64	Hassayampa - Pinal West 500 kV #2 line	SRP, TEP, SWTC, ED2, ED3, ED4	51	CEC Approved – Case #124	TBD	500
A6	Naviska-Thornycastle 115 kV line	SWTC	7	CEC Approved – Case #149; Project deferred indefinitely	TBD	115
A37	Pinal Central-Tortolita 500 kV line	TEP, SWTC, SRP, SunZia	40	CEC Approved July 2012 – Decision #73282 – Case #165	2014	500
B6	Saguaro to Adonis 115 kV Line Loop-in to Naviska	SWTC	0	Project deferred indefinitely	TBD	115
A7	Saguaro to North Loop	SWTC	3.2	CEC approved – Case #149; Project deferred indefinitely	TBD	115
C4	Saguaro to Tucson 115 kV Line Loop-in to Marana	SWTC	0.2	CEC Approved – Case #161 for original Marana Tap to Marana Project. This project would be a minor modification to this approved Case. Currently under study with Western Area Power Administration.	2013	115

Project ID	Description	Participants	Length (mi)	Permitting/Siting Status	Year	Voltage (kV)
C19	San Rafael 2nd 230/69 kV Transformer	SWTC	0	CEC not required; on-going efforts of the Cochise County Study Group may change this conceptual project to occur sooner within the ten year plan timeframe.	2021	230/69
A17	Sandario Tap-Three Points 115 kV Line Upgrade	SWTC	13.71	CEC Not Yet Filed	2015	115
A8	Thornsdale-Rattlesnake 115 kV line	SWTC	19	CEC Approved – Case #152; Project deferred indefinitely	TBD	115
C17	Three Points to Bicknell 115 kV Line Upgrade	SWTC	21	CEC Not Yet Filed	2020	115
A10	Valencia-CAP Black Mountain 115 kV line	SWTC	2.6	CEC Approved – Case #152; Project deferred indefinitely	TBD	115

Exhibit 16 – Tucson Electric Power Project Summary

Project ID	Description	Participants	Length (mi)	Permitting/Siting Status	Year	Voltage (kV)
A13	DeMoss Petrie-Tucson 138 kV line	TEP	4.5	CEC Approved - Decision #72231, Case #157	2013	138
C26	DMP – Northeast Reconductor	TEP	6	CEC Not Required	TBD	138
C5	Future Toro Switchyard STATCOM	TEP	0	CEC Not Required	2013	138
A64	Hassayampa - Pinal West 500 kV #2 line	SRP, TEP, SWTC, ED2, ED3, ED4	51	CEC Approved – Case #124	TBD	500
A66	Interconnection line -South-future Gateway 345 kV line	TEP, UNSE	60	CEC Approved - Case #111	TBD	345
B14	Interconnection of Greenlee-Winchester 345kV line with future Willow Substation	TEP, Bowie	0	CEC obtained by Southwestern Power Group – Case #118	2016	345
A23	Interconnection of South – Midvale 138 kV circuit with future Medina, Spencer, and Raytheon 138kV substations - Phase 1.	TEP	19	CEC Not Yet Filed	2019	138
A54	Interconnection of South – Midvale 138 kV circuit with future Medina, Spencer, Raytheon 138kV substations - Phase 2	TEP	11	CEC Not Yet Filed	2020	138
C20	Interconnection of South-Midvale - 138kV circuit with future Medina, Spencer, and Raytheon 138kV substations - Phase 3.	TEP	8	CEC Not Yet Filed	2021	
A46	Interconnection of Tortolita – North Loop 138 kV with future Marana 138 kV Substation.	TEP	22	CEC Not Yet Filed	2015	138
C24	Irvington – Robert Bills Wilmot Reconductor	TEP	11	CEC Not Required	TBD	138
B15	Irvington – South 345 kV line	TEP	16	CEC Not Yet Filed	TBD	345
A48	Irvington Substation – Corona Substation –South Substation 138kV.	TEP	16.1	CEC Not Yet Filed	2018	138
A42	Irvington Substation – Tucson Station #2 138 kV Phase 1	TEP	10.9	CEC Not Yet Filed	2017	138
A42	Irvington Substation – Tucson Station #2 138 kV Phase 2	TEP	10.9	CEC Not Yet Filed	2020	138
A67	Irvington-East Loop Project - Phase 3 - Irvington-22nd Street 2nd Circuit	TEP	9	CEC Approved - Case #66	TBD	138

Project ID	Description	Participants	Length (mi)	Permitting/Siting Status	Year	Voltage (kV)
A34	La Canada-Orange Grove-Rillito 138 kV line	TEP	5.4	CEC Not Yet Filed	2016	138
C25	Los Reales – Pantano Reconductor	TEP	9	CEC Not Required	TBD	138
C22	Los Reales – Vail Reconductor	TEP	8	CEC Not Required	TBD	138
C1	McKinley 345kV Reactor Addition	TEP	0	CEC Not Required	2012	345
C23	North East – Rillito Reconductor	TEP	5	CEC Not Required	TBD	138
A45	North Loop - Rancho Vistoso 138kV line loop-in for future Naranja substation.	TEP	24.5	CEC Not Yet Filed	2015	138
C27	North Loop – Rillito Reconductor	TEP	11	CEC Not Required	TBD	138
A26	Northeast-Snyder 138 kV loop-in for Craycroft-Barril substations	TEP	8	CEC Not Required	2015	138
A52	Orange Grove-East Ina 138 kV line	TEP	3.6	CEC Not Yet Filed	2021	138
A37	Pinal Central-Tortolita 500 kV line	TEP, SWTC, SRP, SunZia	40	CEC Approved July 2012 – Decision #73282 – Case #165	2014	500
A38	Pinal West-Pinal Central – Randolph - Abel-Browning 500 kV line	SRP, TEP, ED2, ED3, ED4	50	CEC Approved - Case #126 - Decisions #68093 and #69291	2014	500
C21	Rancho Vistoso – La Canada Reconductor	TEP	4.5	CEC Not Required	TBD	138
B22	Rosemont 138 kV line	TEP	24	CEC Approved – Case #164	2013	138
B8	Santa Cruz-Anklam-DeMoss Petrie 138 kV line	TEP	2	CEC Not Yet Filed	2016	138
C14	Series Capacitor Replacement at Greenlee 345kV Substation on the Springerville – Greenlee 345kV Line	TEP	0	CEC Not Required	2017	345
C6	Series Capacitor Replacement at Vail 345kV Substation on the Springerville – Vail 345kV Line	TEP	0	CEC Not Required	2013	345
C9	Series Capacitor Replacement at Vail 345kV Substation on the Winchester – Vail 345kV Line	TEP	0	CEC Not Required	2015	345
A20	South-Duval CLEAR - Phase 2b - Extend 138 kV line from Canoa Ranch-(Future) Duval	TEP	24	CEC Approved - Case #84	2013	138

Project ID	Description	Participants	Length (mi)	Permitting/Siting Status	Year	Voltage (kV)
A84	Springerville-Greenlee 345 kV line - 2nd circuit	TEP	110	CEC Approved - Case #12, 30, 63, 73	TBD	345
A27	SunZia Project	SWPG, SRP, TEP, ECP, Shell, TSGT	500	CEC Not Yet Filed	2016	500
A44	Toro-Hartt-Green Valley 138 kV line	TEP	6.5	CEC Not Required	2017	138
C7	Tortolita – Rancho Vistoso to North Loop – Rancho Vistoso Reconfiguration	TEP	11	CEC Not Required	2015	138
A89	Tortolita North Loop 345 kV line	TEP	60	CEC Not Yet Filed	TBD	345
A90	Tortolita-South 345 kV line	TEP	68	CEC Approved - Case #50	TBD	345
A92	Tortolita-Winchester 500 kV line	TEP	80	CEC Approved - Case #23	TBD	500
B7	Vail – Irvington 345 kV line	TEP	11	CEC Not Yet Filed	TBD	345
C2	Vail 345/138kV Transformer #3	TEP	0	CEC Not Required	2012	345/138
A93	Vail-East Loop - Phase 3 - Third Vail-East Loop 138 kV line	TEP	22	CEC Approved - Case #8	TBD	138
A29	Vail-East Loop - Phase 4 - Harrison loop-in of Roberts-East Loop 138 kV line	TEP	0	CEC Approved - Case #8	2016	138
A94	Vail-South 345 kV line - 2nd circuit	TEP	14	CEC Not Required	TBD	345
B24	Vail-UA Tech Park-Irvington 138 kV line	TEP	2	CEC Not Yet Filed	2015	138
A99	Westwing-South 345 kV line - 2nd circuit	TEP	178	CEC Approved - Case #15	TBD	345
A100	Winchester-Vail 345 kV line #2 and #3	TEP	40	CEC Not Yet Filed	TBD	345

Exhibit 17 – UNS Electric Projects Summary

Project ID	Description	Participants	Length (mi)	Permitting/Siting Status	Year	Voltage (kV)
A47	Griffith-North Havasu 230 kV line	UNS ELECTRIC	40	CEC Approved/Extended - Case #88, Most recent CEC extension request filed March 6, 2012. Staff has recommended support	2017	230
A66	Interconnection line -South-future Gateway 345 kV line	TEP, UNSE	60	CEC Approved - Case #111	TBD	345
C13	Parker – Davis #1 Loop-in at Black Mesa	UNS ELECTRIC	0	CEC Not Required	2016	230
A22	Upgrade existing 115 kV transmission line to Nogales	UNS ELECTRIC	60	CEC Approved – Case #144	2014	115

Exhibit 18 – California Transmission Plan for Renewables

2011 CTPG Statewide Transmission Plan High and Medium Potential Transmission Upgrades and Corridors

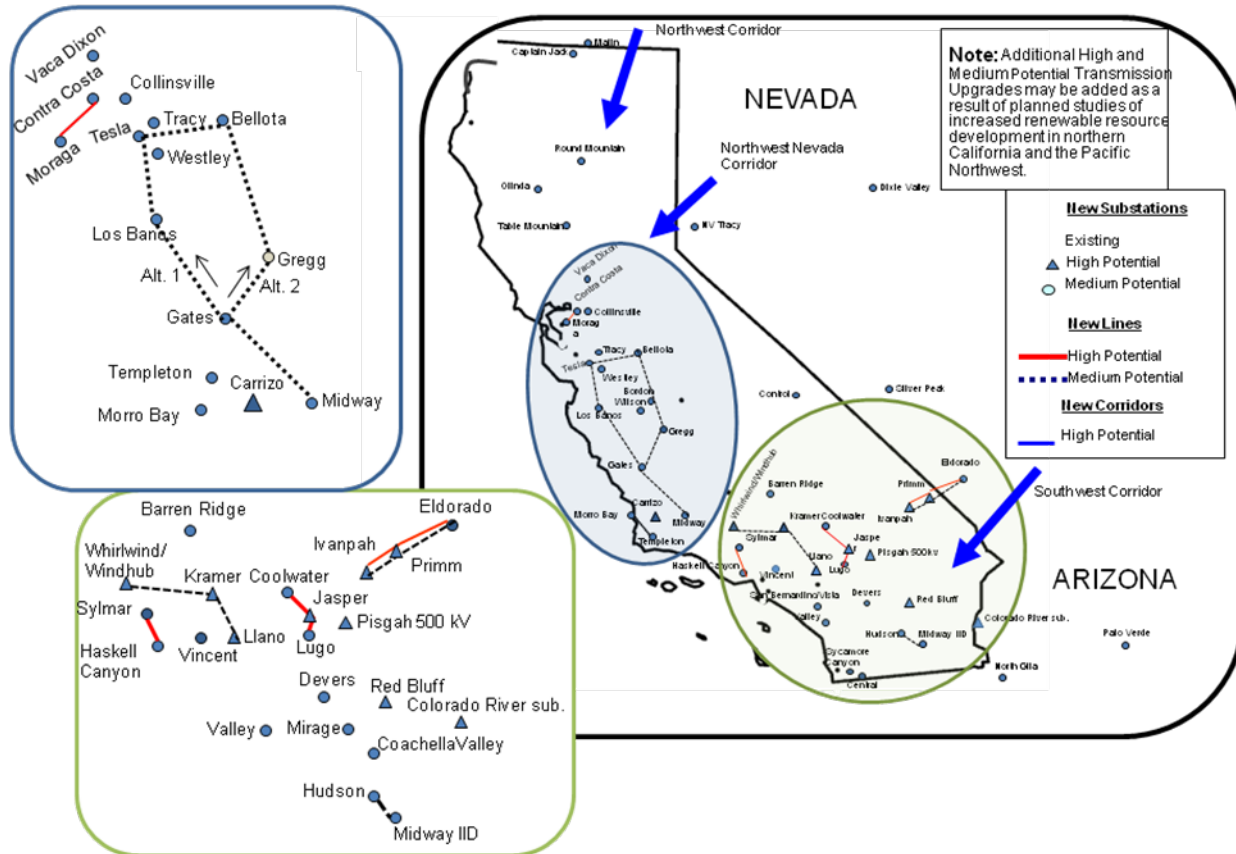


Exhibit 19 - SunZia Route Map

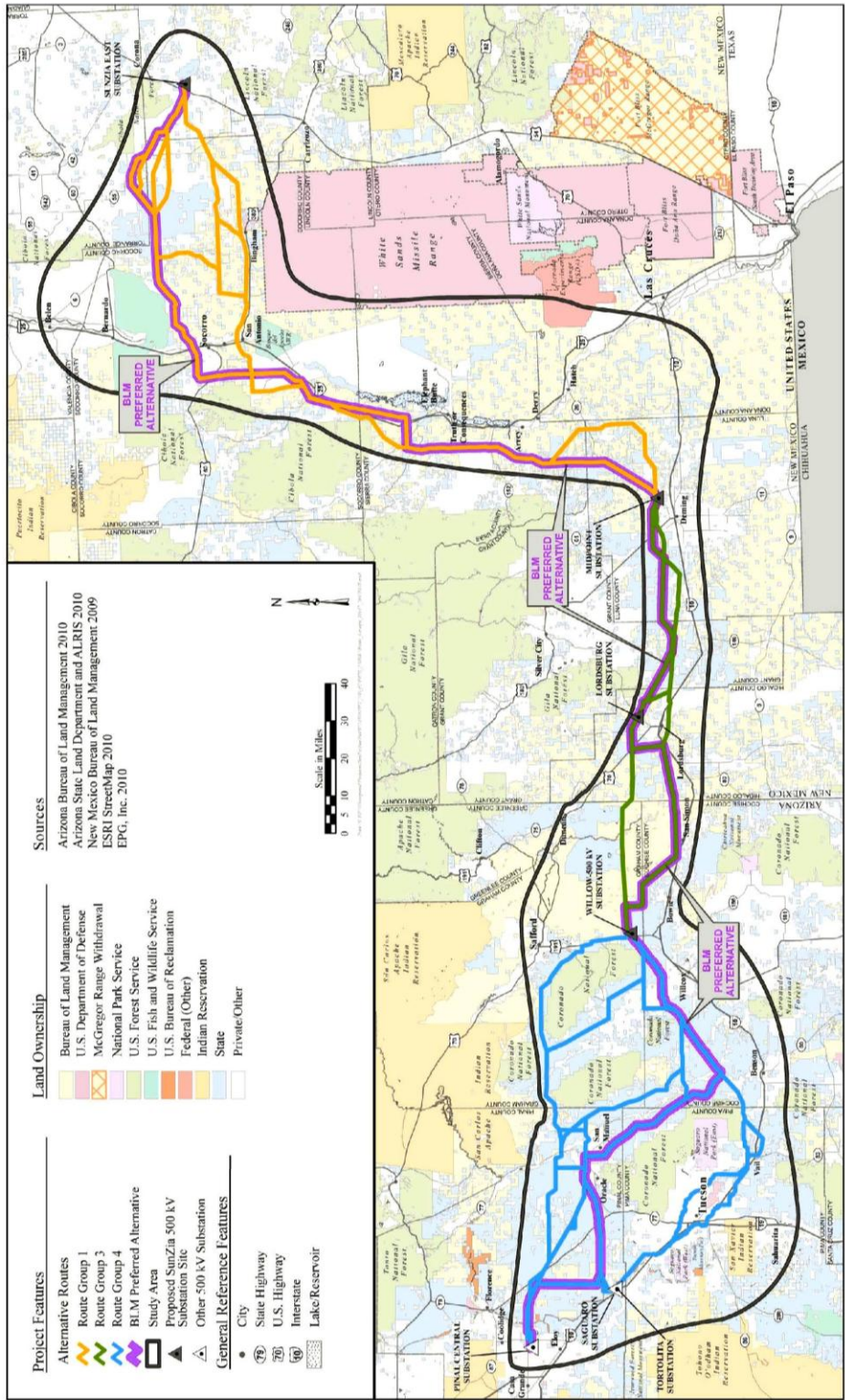


Figure 2-3. Alternative Routes

Exhibit 20 – Centennial West Clean Line Project

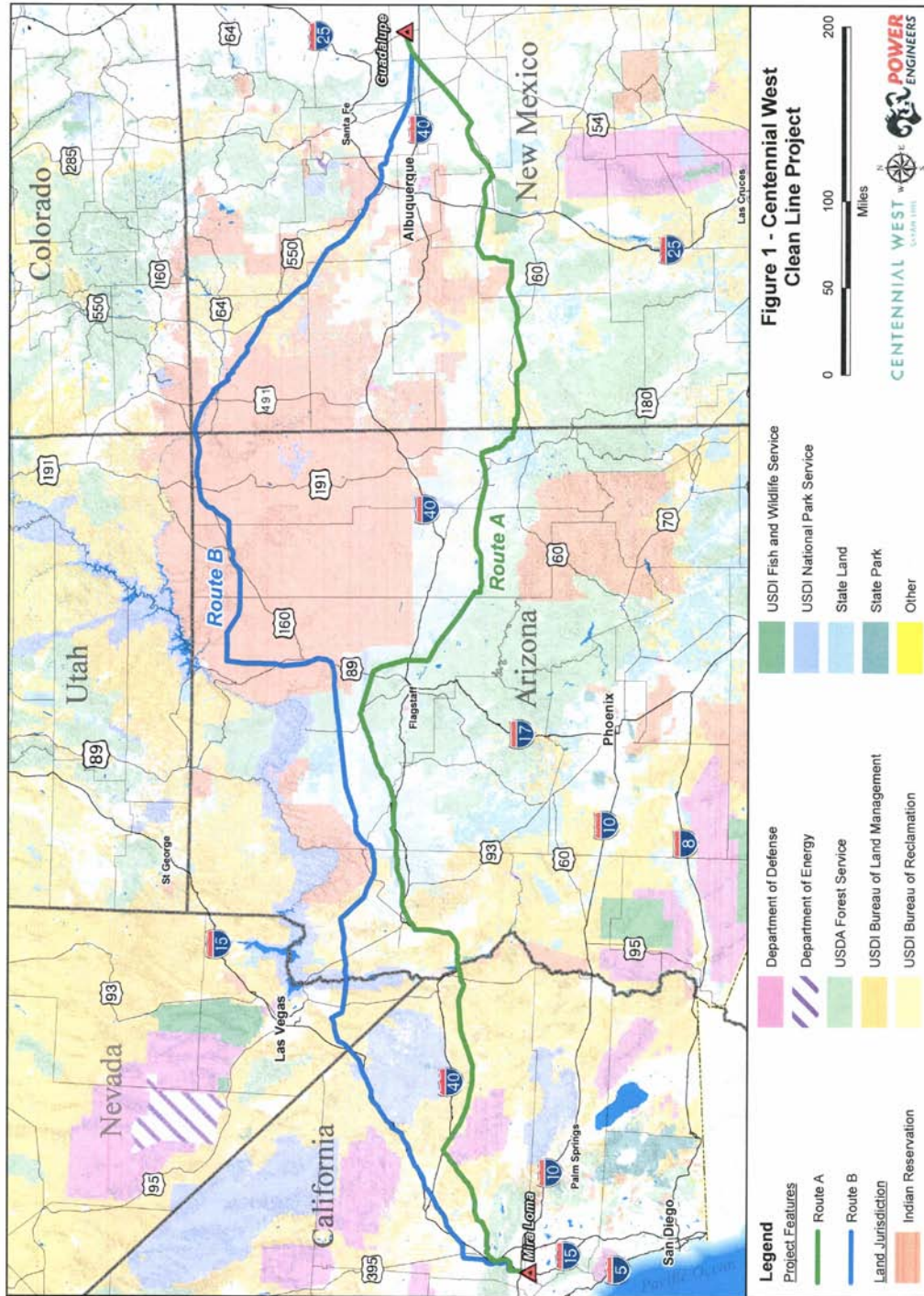
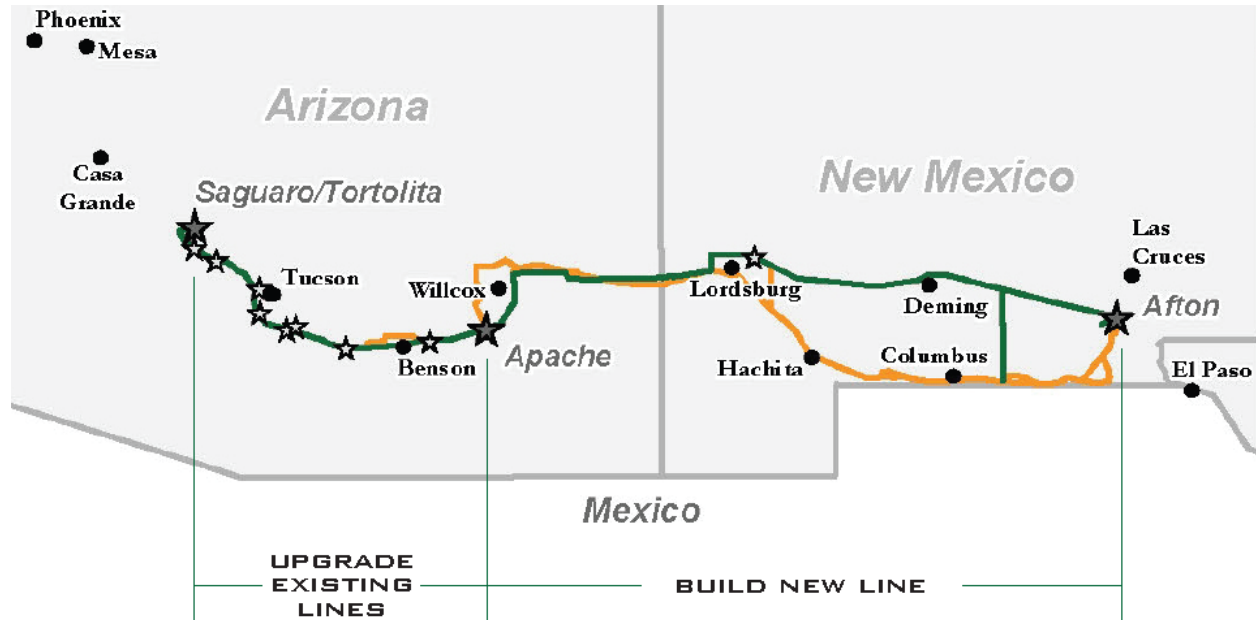


Exhibit 21 – Southline Siting Map



Connects to Multiple Existing Arizona Substations

Exhibit 22 – CCSG Expansion Plan Facilities List

Cochise County Study Group Progress Report Filing, June 30, 2011
Docket No. E00000D-09-0020

TABLE 1

**Cochise County Study Group
Facilities Evaluation**

Project ID	Description of Construction Element	Entity	Total Time Estimate (mo.)	2011 Estimated Cost
1	Kartchner-Buffalo Soldier 69 kV New	SSVEC	36	\$13,850,000
2	Heraford -Palominas 69 kV Tie New (2 ml.)	SSVEC	26	\$950,000
3	Ft. Huachuca -Buffalo Soldier UG 69 kV Line	SSVEC	72	\$4,000,000
4	Webb Substation Improvements	SSVEC	36	\$5,250,000
5	Ramsey 69 kV Sectionalizing Breaker	SSVEC	12	\$550,000
6	Ramsey 69 kV Breaker and Capacitor (8 MVAR)	SSVEC	22	\$580,000
7	San Rafael - Ramsey 69 kV Line Rebuild	SSVEC	34	\$3,968,000
8	Hawas 2-69 kV Sectionalizing Breakers	SSVEC	16	\$1,000,000
9	Hawas 69 kV Breaker and Capacitor (8 MVAR)	SSVEC	30	\$1,000,000
10	Pueblo Substation Breaker and Capacitor	SSVEC	30	\$1,000,000
11	Bella Vista 69 kV GOAB to Double Circuit 69 kV	SSVEC	12	\$100,000
12	Bella Vista 2-69 kV Sectionalizing Breakers	SSVEC	28	\$1,050,000
13	Bella Vista single circuit 69 kV to Double Circuit	SSVEC	22	\$512,000
14	New San Rafael to Charleston Jct 69 kV Line	SSVEC	54	\$5,331,000
15	Charleston Jct to Tombstone Jct 69 kV Rebuild	SSVEC	45	\$12,062,000
16	Webb - Tombstone Jct 69 kV Line Rebuild	SSVEC	51	\$15,470,000
17	Kansas Settlement - Chiricahua 69 kV Line Rebu	SSVEC	45	\$9,680,000
18	Replace Chiricahua with Sunizona Substation	SSVEC	24	\$500,000
19	Webb 2-69 kV Breakers & a Cap. (13.2 MVAR)	SSVEC	16	\$1,000,000
20	Webb 1-69 kV Breaker & Cap (6 MVAR)	SSVEC	16	\$500,000
21	Loop Webb - Tombstone 69 kV into Boothill	SSVEC	28	\$550,000
22	Benson 1- 69 kV Breaker & Capacitor (8 MVAR)	SSVEC	22	\$550,000
			Subtotal	\$79,453,000
23	San Pedro Substation Improvements	APS	52	\$1,575,000
24	Palominas Substation Improvements	APS	26	\$750,000
25	Don Luis - Mural 69 kV Upgrade	APS	26	\$1,900,000
26	Boothill Substation Improvements	APS	52	\$8,100,000
			Subtotal	\$12,325,000
27	Kartchner Substation Improvements	SWTC	8	\$695,093
28	San Rafael Substation Improvements	SWTC	31	\$3,670,910
			Subtotal	\$4,367,003
29	Ft. Huachuca Substation Improvements	TEP	24	\$6,750,000
			Subtotal	\$6,750,000
			Total	\$102,895,003

Exhibit 23 – Gila Bend Power Partners Interconnection Diagram

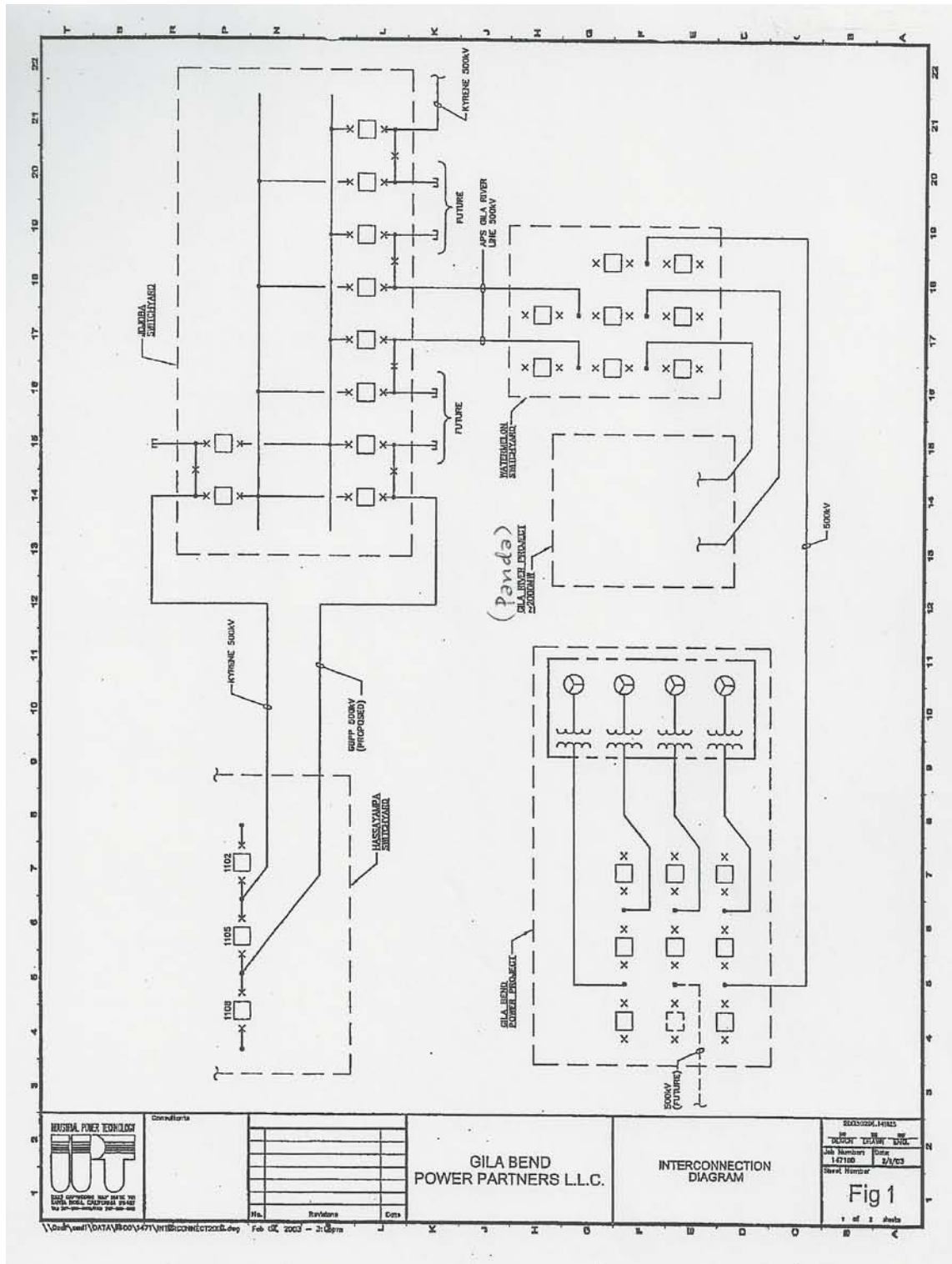
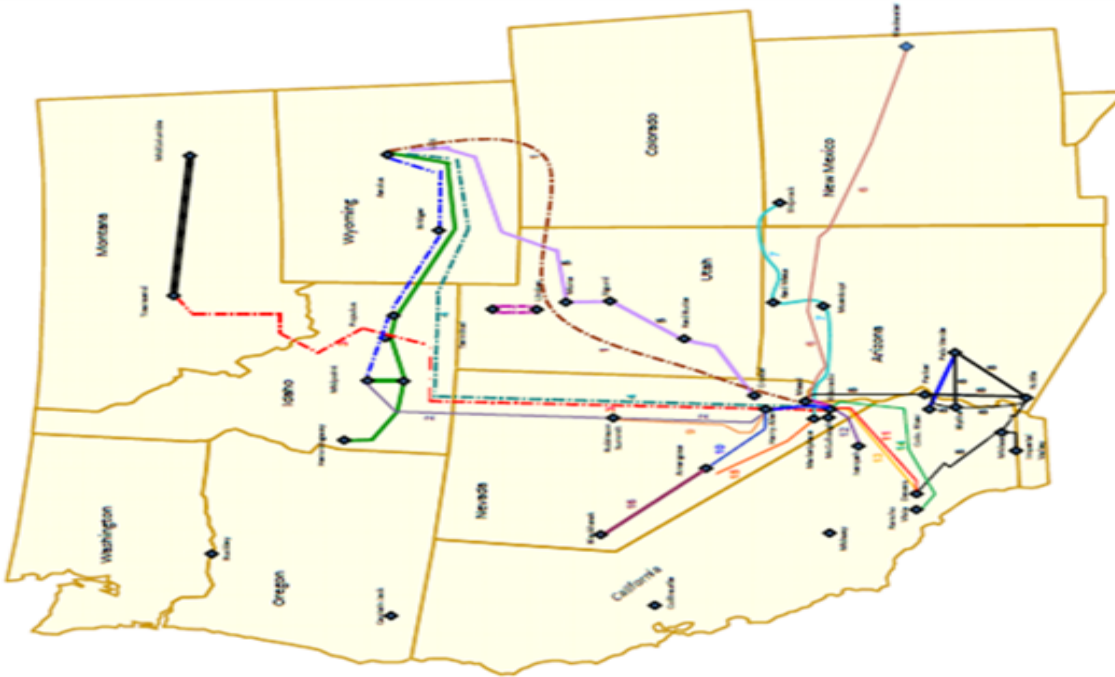


Exhibit 24 – Proposed Eldorado Valley Projects



- TransWest Express (TWE) (WECC Phase 2 – (Ph2))
- Southwest Intertie Project (SWIP)
- Southern Nevada Intertie Project (SNIP)/(LSP) (Ph2)
- Chinook (TransCanada) (Ph1)
- Zephyr (TransCanada) (Ph1)
- Gateway South (PacifiCorp) (Ph2)
- Centennial West (Clean Line) (Pre-PCR)
- Navajo Transmission Project (NTUA)(Ph2)
- SMRT Elements, various (WAPA) (Pre-PCR)
- ON Line Project (NV Energy) (Ph2)
- TCP Project (NV Energy/WAPA.) (Pre-PCR)
- Pony Express (Eldorado Valley to Devers) (Pre-PCR)
- Eldorado - Ivanpah 220 kV (Pre-PCR.)
- Anova Project (Pre-PCR)
- LV – LA Transmission Project (Energy Capital Partners/PDS) (Pre-PCR)
- Solar Express (RETCO)(Pre-PCR)
- West Tie (NVE) Pre-PCR)

Source: SWAT-EVSG Work Plan V5 4. 29. 2011.

