

U.S. Department Of Energy
2009 National Congestion Study Technical Workshop



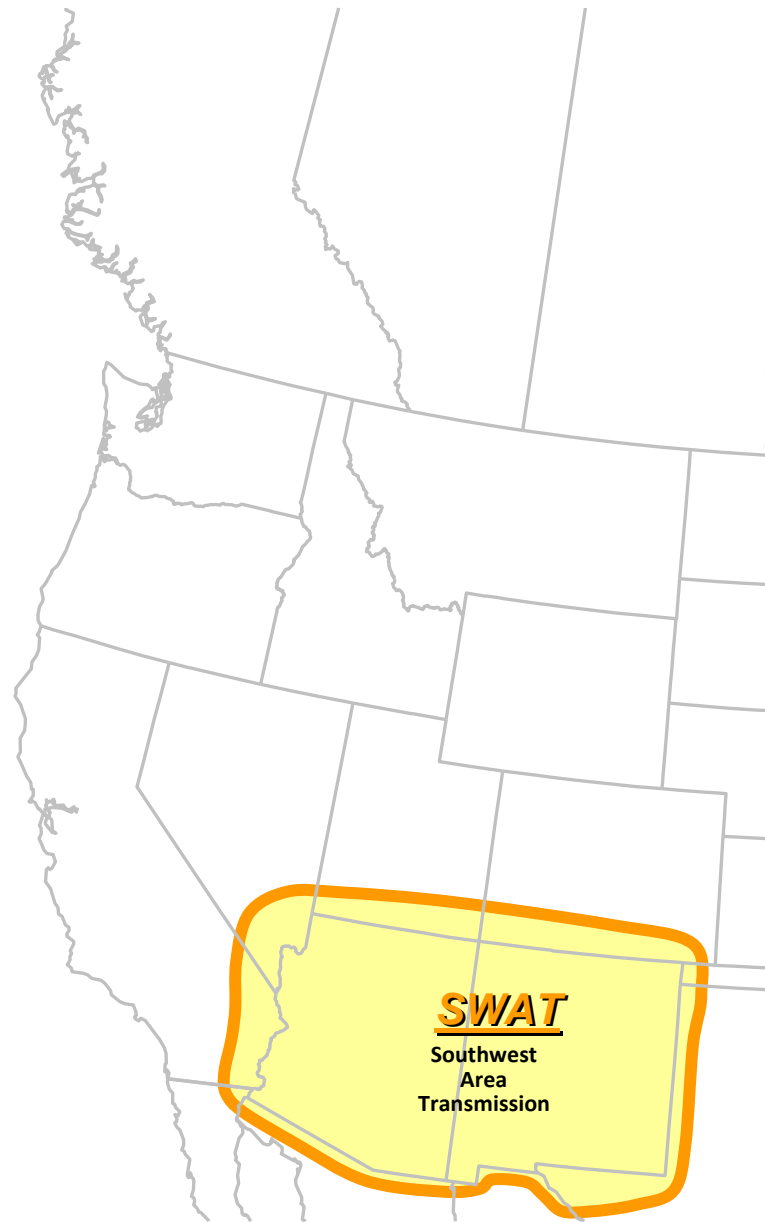
***Western Interconnection
Subregional Planning and Development***

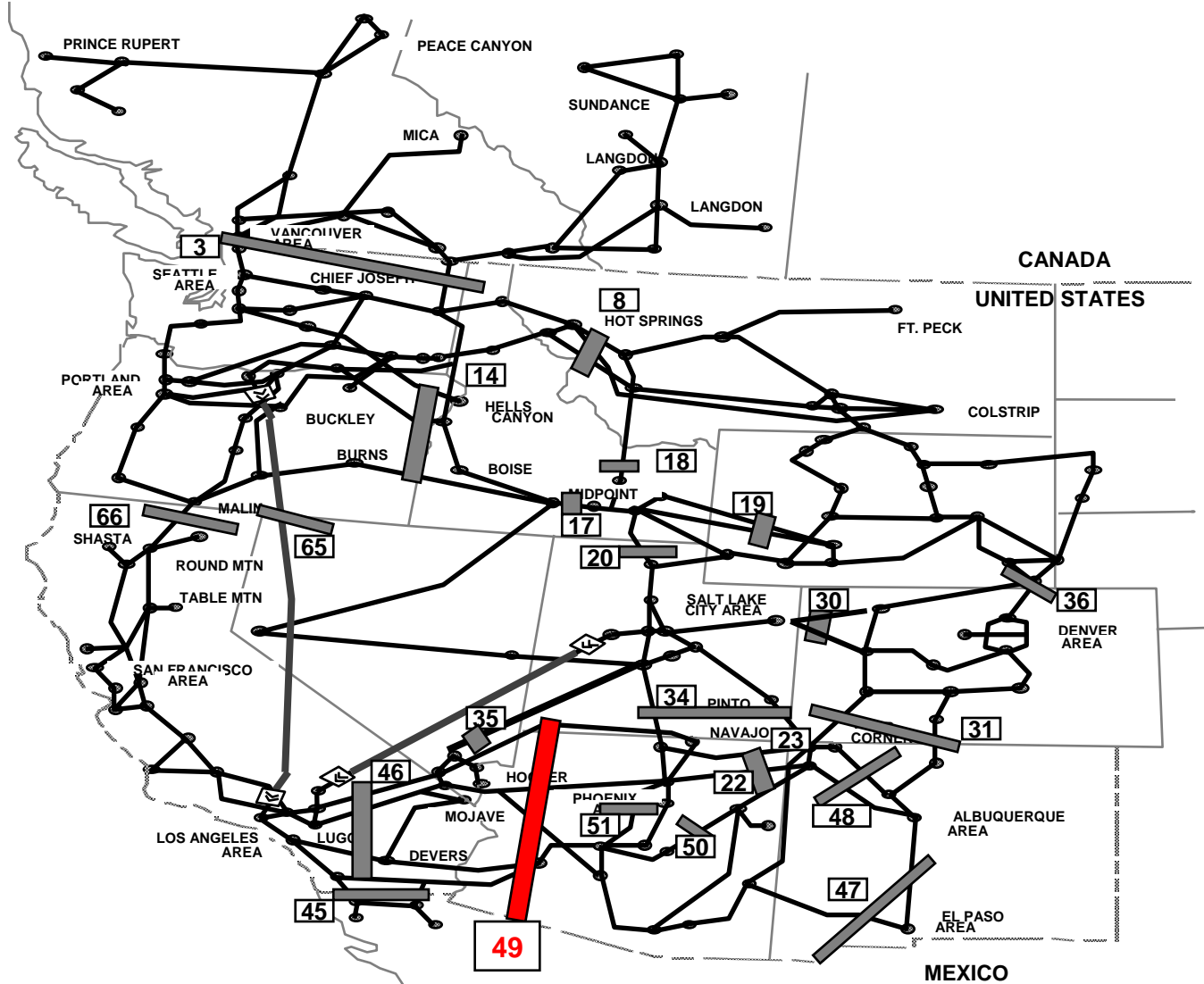
***Robert E. Kondziolka
Salt River Project***

**March 25-26, 2009
Chicago, Illinois**

SWAT Footprint One of the WestConnect Sub-Regional Planning Groups

<http://www.westconnect.com>





East of River Path

Western Interconnection Transmission Paths

Major Congestion Studies of the Western Interconnection

Regional Studies

2001 WGA	Congestion on Path 49
2002	
2003 SSG-WI	Congestion on Path 49
2004 CERA	Congestion on Path 49
2005 SSG-WI	Congestion on Path 49
2006 DOE	Congestion on Path 49
2007 TEPPC	Congestion on Path 49 Not Significant
2008 TEPPC	Congestion on Path 49 Not Significant
2009	
2010	
2011	

2001 Conceptual Plans for Electricity Transmission in the West Report to the Western Governors' Association

2003 Framework for Expansion of the Western Interconnection Transmission System by Seams Steering Group – Western Interconnection

2004 Grounded in Reality, Bottlenecks and Investment Needs – Western Interconnection by Cambridge Energy Research Associates

2005 Western Congestion Analysis by Seams Steering Group – Western Interconnection

2006 National Electric Transmission Congestion Study by U.S. Department of Energy

2007 Annual Report by WECC Transmission Expansion Planning Policy Committee

2008 Annual Report by WECC Transmission Expansion Planning Policy Committee (draft - not approved)

Major Subregional Studies For Arizona – California Area

Regional Studies

Subregional Studies

2001 WGA

2002

STEP Initiates Short Term and Mid Term Alternative Studies

**2003 SSG-WI
Upgrades**

STEP Completes – WECC Path Rating for Short Term

2004 CERA

WECC Path Rating for DPV2 and EOR 9300 Initiated

2005 SSG-WI

WECC Path Rating for DPV2 and EOR 9300 Completed

2006 DOE

2007 TEPPC

2008 TEPPC

2009

2010

2011

Transmission Expansion and Development for Arizona – California Area

<u>Regional Studies</u>	<u>Subregional Studies</u>	<u>Project Development</u>
2001 WGA		
2002	STEP Alt Studies	
2003 SSG-WI	WECC Path Rating	
2004 CERA	WECC Path Rating	
2005 SSG-WI	WECC Path Rating	Short Term Upgrades Begin
2006 DOE		Short Term Upgrades In-Service
2007 TEPPC		
2008 TEPPC		EOR 9300 Upgrades Begin
2009		EOR 9300 Upgrades In-Service
2010		Palo Verde-Devers II Begin
2011		Palo Verde-Devers II In-Service

Path 49 East of the River (EOR) Ownership

<u>Line</u>	<u>Control Area</u>	<u>Owners</u>	<u>Allocation of Rating (MW)</u>
Navajo-Crystal	LADWP	NPC - 26% LADWP - 49% USBR - 25%	371 695 356 TOTAL = 1422
Moenkopi-El Dorado	APS	APS (SCE) - 100%	1555
Perkins-Mead	WAPA	APS - 18% SRP - 18% WAPA - 32% SCPPA - 32%	236 236 412 416 TOTAL = 1300
Liberty-Mead	WAPA	WAPA - 100%	450
Palo Verde-Devers	CAISO	SCE - 100%	1802
Hassayampa-North Gila	CAISO	APS - 11% IID - 13% SDG&E - 76%	168 195 1163 TOTAL = 1526
TOTAL			8055

Three Phase Approach To Increase Path 49 East of River (EOR)

Phase 1 – Short Term Solutions

Projects that can be implemented in a few years by the addition of new equipment or by increasing the ratings of equipment such as series capacitors

Phase 2 – Midterm Solutions

Major new bulk transmission facilities such as a new 500kV transmission line

Phase 3 – Long Term Vision

Conceptual future plan that is flexible for varied resources

Path 49 EOR Alternatives Studied

Analyzed 26 Alternatives in Powerflow

Selected Top 6 Alternatives for Detailed Studies

- 4 AC Alternatives
- 2 DC Alternatives

Study Parameters for Alternatives

- Miles of transmission
- Rating of existing and new series capacitors
- Number of new transformers and phase shifting transformers
- Losses
- VAR support
- Interaction with flows on other paths/interfaces

Improvements to Path 49

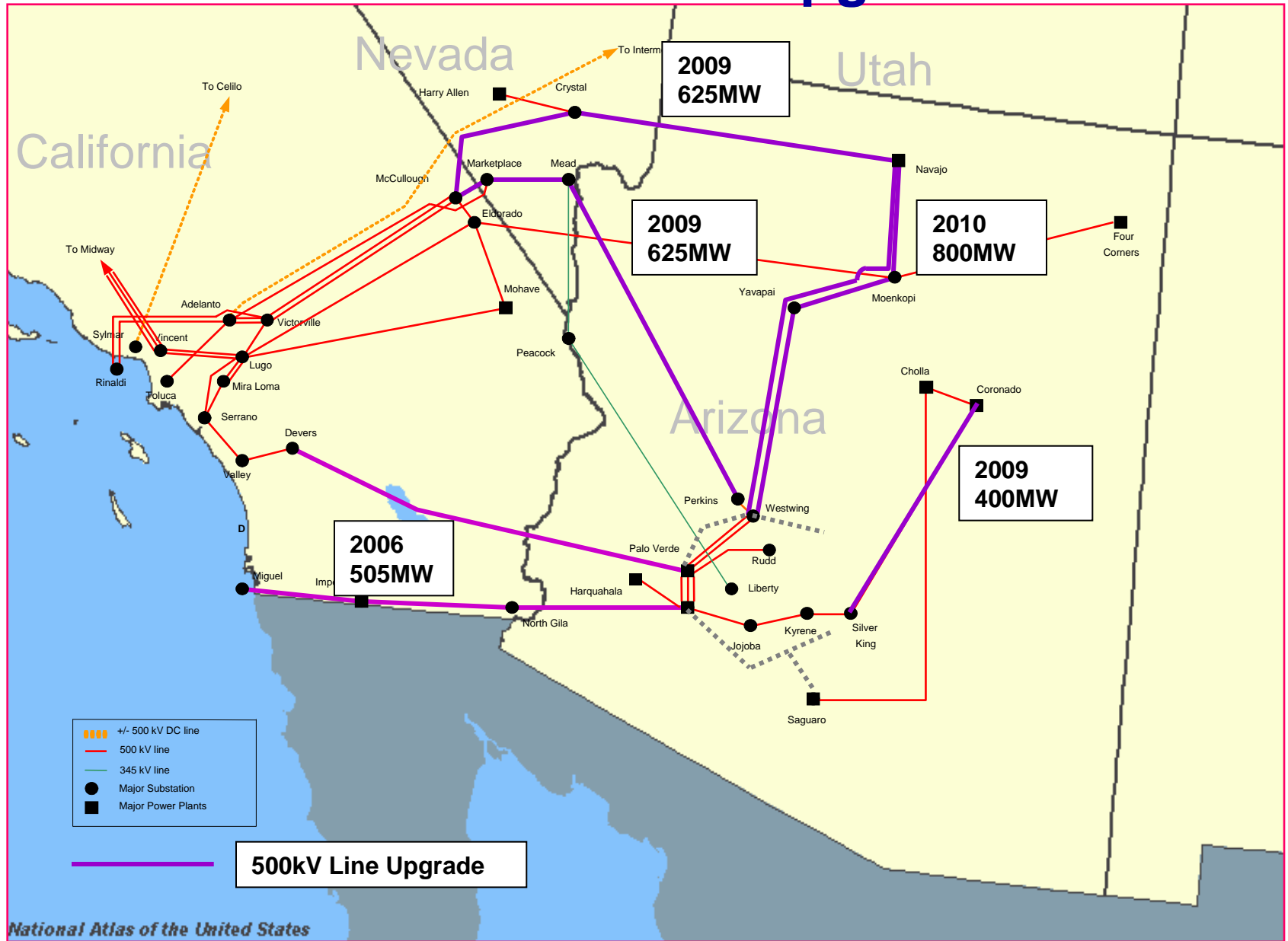
Path Element	Path Rating (MW)	Change (MW)	Date of Change	Improvement
Navajo – Crystal 500 kV Perkins –Mead 500 kV Moenkopi – Eldorado 500 kV Liberty – Peacock –Mead 345 kV Hassayampa – North Gila 500 kV Palo Verde – Devers 500 kV	7,550		2006 2006	- - - - Upgrade series capacitors Upgrade series capacitors
Existing EOR Path Rating	8,055	505	2006	
Perkins – Mead 500kV Navajo – Crystal 500kV	9,300	1245	2009	Upgrade series capacitors By-pass phase shifting transformers
Palo Verde – Devers No.2 500 kV	10,500	1200	2011	New 500kV Line Permit denied by ACC Re-filing planned for 2009
Palo Verde – North Gila No. 2 500 kV	11,700	1200	2014	New 500kV Line Permit approved by ACC.

Critical Congestion and Areas of Concern in the Western Interconnection

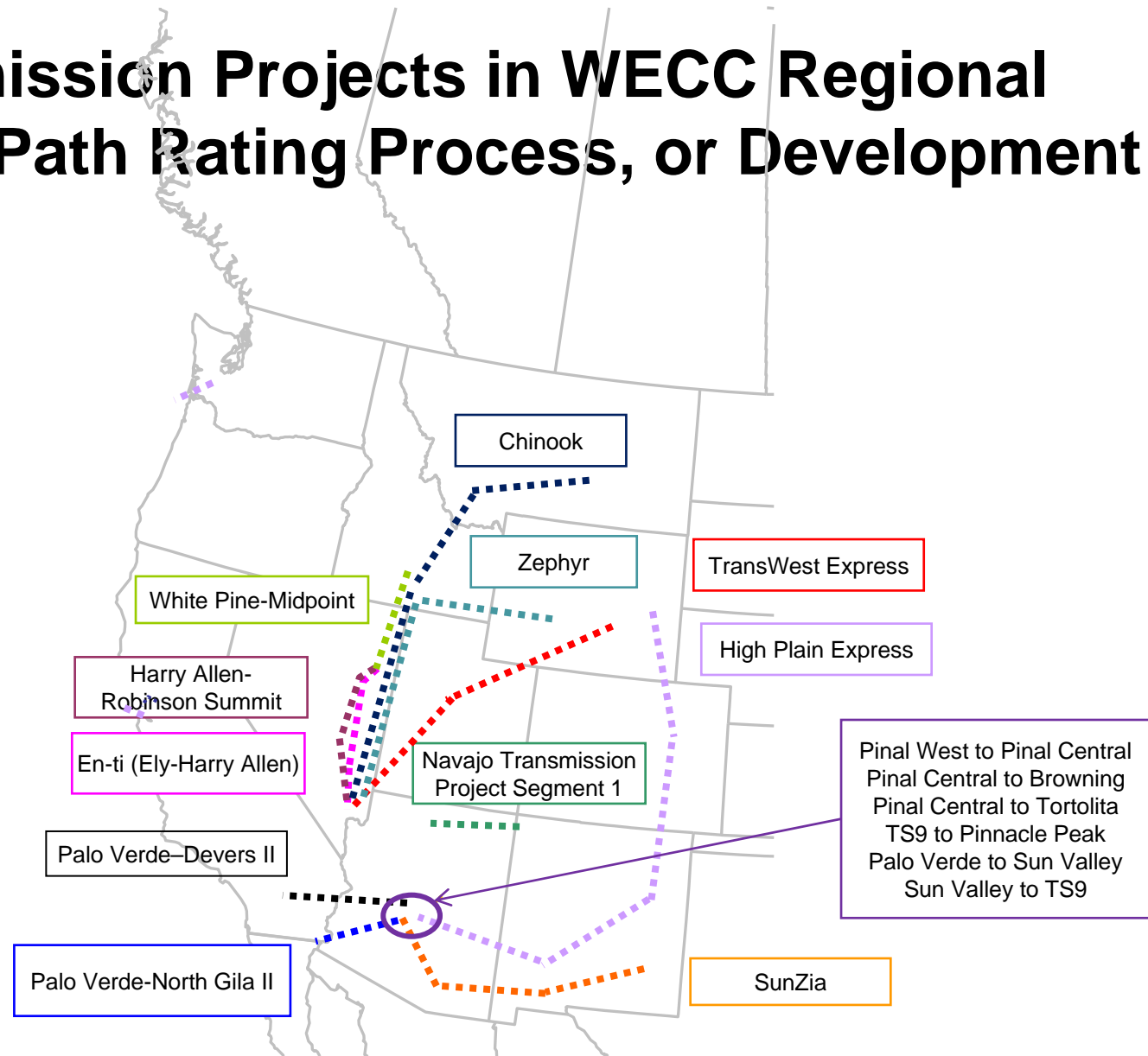


Source:
Figures ES-3 & 5-2
U.S. Department of Energy
National Electric Transmission
Congestion Study
2006

EHV Transmission Upgrades



Transmission Projects in WECC Regional Planning, Path Rating Process, or Development



Status of Major New Transmission Projects

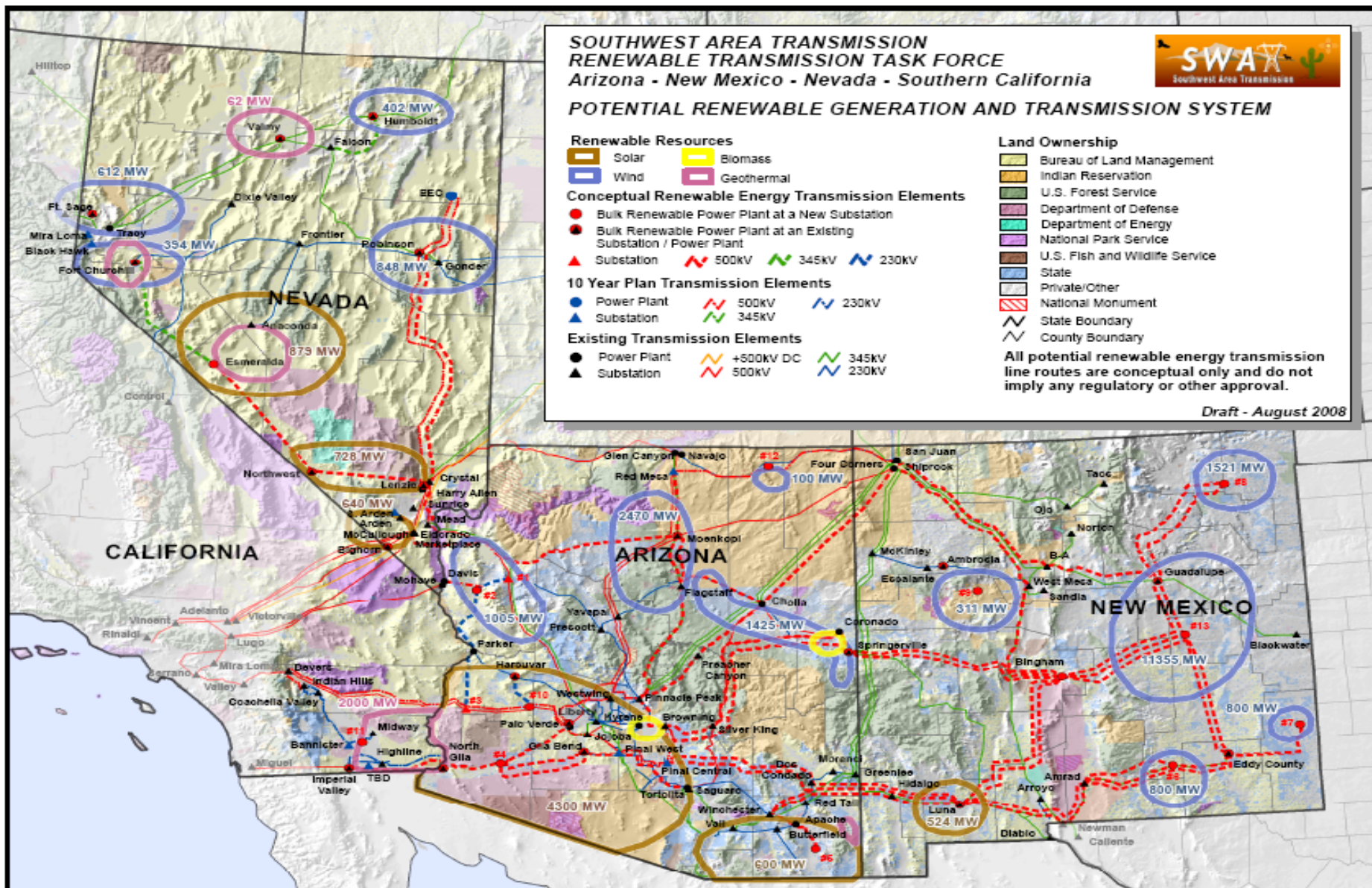
Project Name	Voltage	Capacity	Proposed In-Service	Sponsor	Status
Pinal Central to Browning	500kV	1400MW	2011 - 2nd Qtr	SRP	In Design & Material/ROW Acquisition
Pinal West to Pinal Central	500kV	1400MW	2013 - 2nd Qtr	SRP	In Design & ROW Acquisition
Palo Verde to TS5 (Sun Valley)	500kV	650MW	2012 - 2nd Qtr	APS	In Design & ROW Acquisition
TS5 (Sun Valley) to TS9	500kV	1200MW	2014 - 2nd Qtr	APS	Siting & Permitting Completed
TS9 (Raceway) to Pinnacle Peak	500kV	1000MW	2010 - 2nd Qtr	APS	In Construction
Arizona Gateway South (Double Circuit)	345kV	2000MW	2011	TEP	In Siting & Permitting
Navajo Transmission Project	500kV	1500MW	2011	DPA	In Path Rating Study Process
Palo Verde to North Gila II	500kV	1250MW	2012 - 2nd Qtr	APS	In Design & ROW Acquisition
Palo Verde to Devers II	500kV	1200MW	2011 – 4 th Qtr	SCE	In Siting & Permitting
TransWest Express (Bi-Pole DC)	500kV	3000MW	2015	Anschutz	In Path Rating Process
Chinook and Zephyr (Bi-Pole DC)	500kV	6000MW	2015	TransCan	In Siting & Permitting
Pinal Central to Tortolita	500kV	1200MW	2013 - 2nd Qtr	TEP	In Siting & Permitting
Eastern Nevada Transmission Intertie	500kV	2000MW	2011 - 4th Qtr	NVEnergy	In Siting & Permitting & Path Rating
Great Basin Energy Project	500kV	1650MW	2012 - 4th Qtr	LS Power	In Siting & Permitting & Path Rating
Eastern Plains Transmission Project	500kV	1700MW	2011	TriState	In Siting & Permitting
SunZia Southwest Trans Project (2 Circuits)	500kV	3000MW	2013	SW Power	In Path Rating Process
High Plains Express Initiative (2 Circuits)	500kV	3500MW	2016 - 2017	Xcel	Feasibility Studies

SWAT 2009 Progress

- CRT Subcommittee
 - Monitoring Short Term Path 49 Upgrades and EOR 9300 Project
 - Devers-Palo Verde 1 and 2 with Harcuvar Option
- SATS Subcommittee
 - Issued Final Report
 - WestConnect Base Case and Scenario Analysis
- Short Circuit Work Group
 - Perfecting database and implementing small areas
 - Expanding area to include southern California
- NM Subcommittee
 - Focusing efforts through Renewable Transmission Task Force
- SWAT Renewable Transmission Task Force
 - ARRTIS (Arizona Renewable Resource and Transmission Identification Subcommittee)
 - Finance Subcommittee
 - Definition of Renewable Transmission Project

SWAT 2009 Progress

- AZ/NM Subcommittee
 - Focusing efforts through Renewable Energy Transmission Task Force
- CATS HV Subcommittee
 - Issued Final Report
 - Development of corridors with cities and county
- CATS EHV Subcommittee
 - Issued Final Report
 - Development of WestConnect Base Case
 - Development of ACC BTA Studies
- Transmission Corridor Planning Work Group
- Common Corridor Structure Separation Task Force
 - Draft report in March
- Arizona Corporation Commission Biennial Transmission Assessment
 - April workshop on renewable energy zones and transmission lines
 - October report identifying top 3 renewable transmission projects



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Questions?



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