

Summary of East-West Transmission Projects in Eastern Arizona Norm “Mick” Meader, Cascabel Working Group, June 9, 2011

The following table, maps, and schedules summarize those interstate transmission projects that are currently being proposed to bring predominantly wind-generated electrical power from New Mexico to Arizona and California. As is apparent from these projects, much effort and planning is now focused on this endeavor and strengthening the east-west grid in the southwestern United States. These projects include the following: (1) Anova¹, (2) Centennial West Clean Line², (3) High Plains Express³, (4) New Mexico RETA/Goldman Sachs Wind Collector⁴, (5) Southline⁵, and (6) SunZia⁶. Of these projects, SunZia is the farthest along in the permitting process, although the Southline and New Mexico RETA (Renewable Energy Transmission Authority)/Goldman Sachs projects may be finished sooner because they are shorter and less complex.

This summary contains project diagrams and schedules for as many of these projects as possible. The Anova Project is still conceptual and partly depends upon the building of the Tres Amigas Superstation in eastern New Mexico, which will unite the three separate U.S. transmission grids (eastern U.S., western U.S. and Texas). Both the Centennial West and Anova Projects would construct single extra-high-voltage DC lines from the wind-generating areas of east-central New Mexico to Nevada and California. The need for AC-to-DC conversion facilities on either end of these projects makes them less amenable to uploading or downloading power in Arizona. No map or specific schedule was available for the New Mexico RETA/Goldman Sachs Project, although the project is extensively discussed in an article in *Platts Energy Week*⁴.

While the New Mexico RETA project will not cross into Arizona, it will deliver power to the Four Corners hub, and this power will potentially be used by Arizona Public Service and the California Independent System Operators (CAISO), thus servicing Arizona and California⁴. In addition, the Lucky Corridor Project (single 500-kV line) across northern New Mexico will potentially deliver renewable and natural-gas-generated energy to the Four Corners hub and could be important in delivering power to Arizona. The project ends at the Taos substation, but the power it carries from eastern New Mexico will be transferred to the Four Corners hub via existing transmission lines for export to Arizona and California.

New Mexico is strongly committed to developing its renewable energy resources, wind in particular. In facilitating this, the state has created the Renewable Energy Transmission Authority (RETA), whose focus is to develop a comprehensive and extensive transmission system. In addition, New Mexico's legislature is much more focused on renewable energy development than Arizona's, sponsoring five related bills in its last legislative session⁷.

¹ http://www.westconnect.com/filestorage/ANOVA_SWAT_V4_FINAL.ppt.

² <http://www.centennialwestcleanline.com/site/home>

³ <http://www.highplainsexpress.com/>

⁴ Bill Loveless, “New Mexico agency, Goldman entity to develop line to export power,” *Platts Energy Week*, April 4, 2011, <http://www.plattsenergyweektv.com/story.aspx?storyid=145026&catid=293>

⁵ <http://www.blackforestpartners.com/>

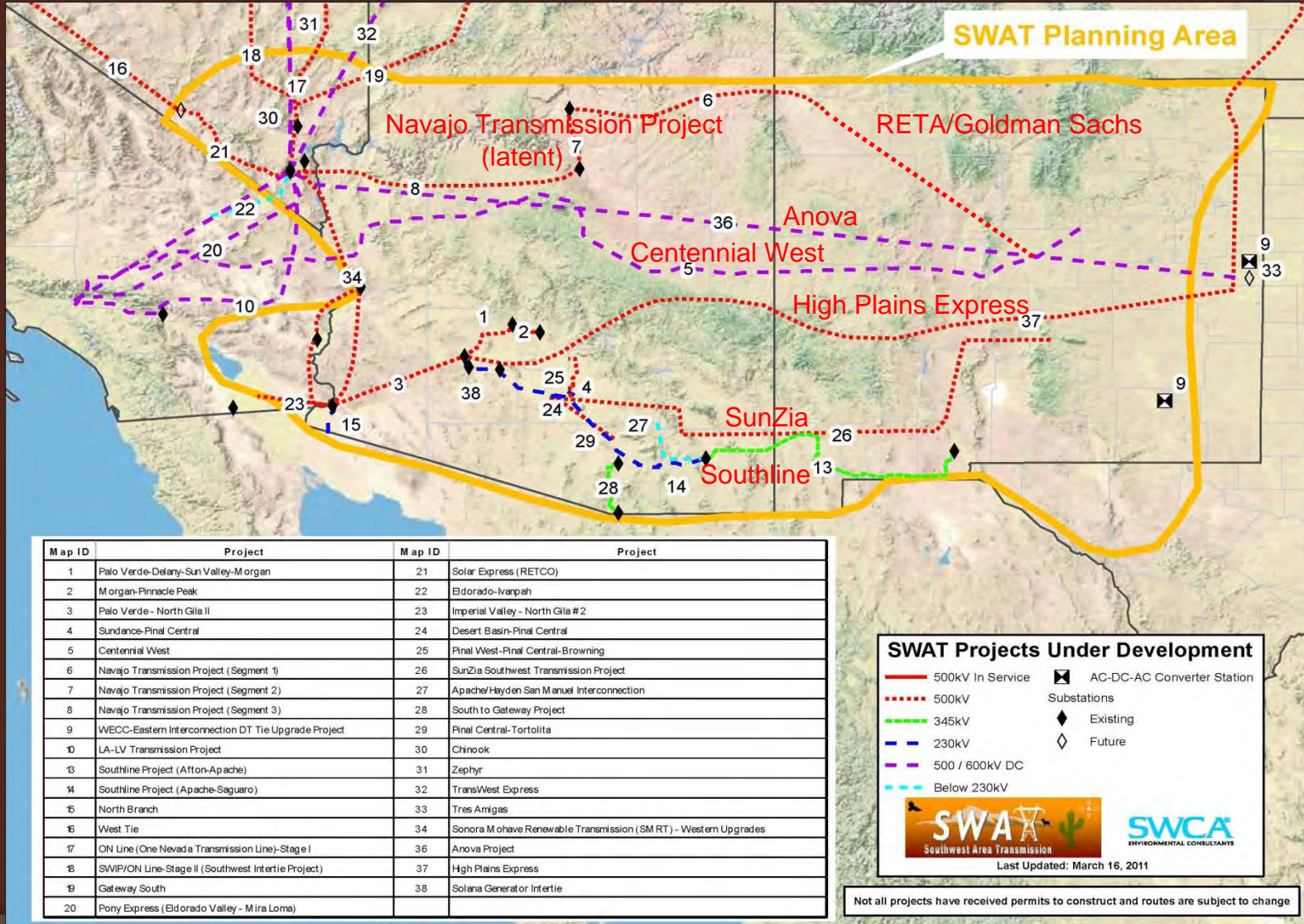
⁶ <http://www.sunzia.net/>

⁷ LeeAnn Torkelson and SWAT Members, “Political Activities 2011,” SWAT Oversight Meeting, May 11, 2011, http://www.westconnect.com/filestorage/07_PoliticalOverview_May112011.ppt.

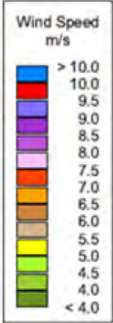
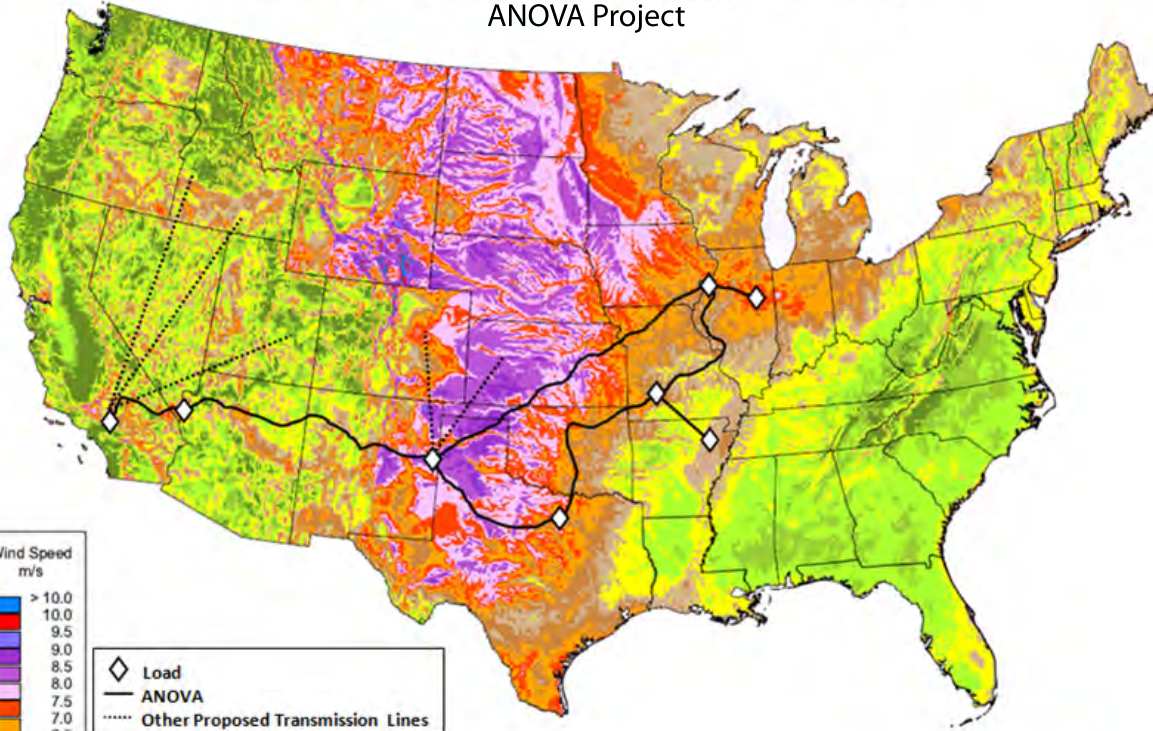
Comparison of East-West Transmission Projects in Eastern Arizona

Project Name	Location	Begin Point	End Point	Length	Lines/Voltage	Power Capacity	Status	Completion Date
Anova	Northern Arizona	Clovis, NM (Tres Amigas)	North of Los Angeles	1000+ miles	1 line, HVDC 500-600 kV	3500 MW	Conceptual	Uncertain
Centennial West (Clean Line)	Northern Arizona	Guadalupe, NM	North of Los Angeles	~900 miles	1 line, HVDC 600 kV	3500 MW	NEPA review to begin 2011	2016
High Plains Express	East-central Arizona	Corona, NM	East Phoenix	~460 miles (NM-AZ segment)	1 or 2 lines 500 kV	1500/3000 MW	Feasibility Study Completed	2020-2025
NM RETA/ Goldman Sachs	Northwestern New Mexico	Central New Mexico	Four Corners Power Hub	~185 miles	1 or 2 lines 345-kV	1,200 MW/ 2,400 MW	Agreement signed with NM RETA March 2011	2014
Southline	Southeastern Arizona	Afton, NM	Saguaro Generation Station, NW Tucson	240 miles new; 130 miles rebuild	1 345 kV to Apache PP; 2 230 kV to Saguaro	750-1500 MW	NEPA review to begin 2011	4Q 2014
SunZia	Southeastern/ central AZ	Corona, NM	Eloy, AZ	~500 miles	2 lines 500 kV	3,000 MW	DEIS due out summer 2011	2015

SWAT Projects Map



United States - Annual Average Wind Speed at 80 m ANOVA Project

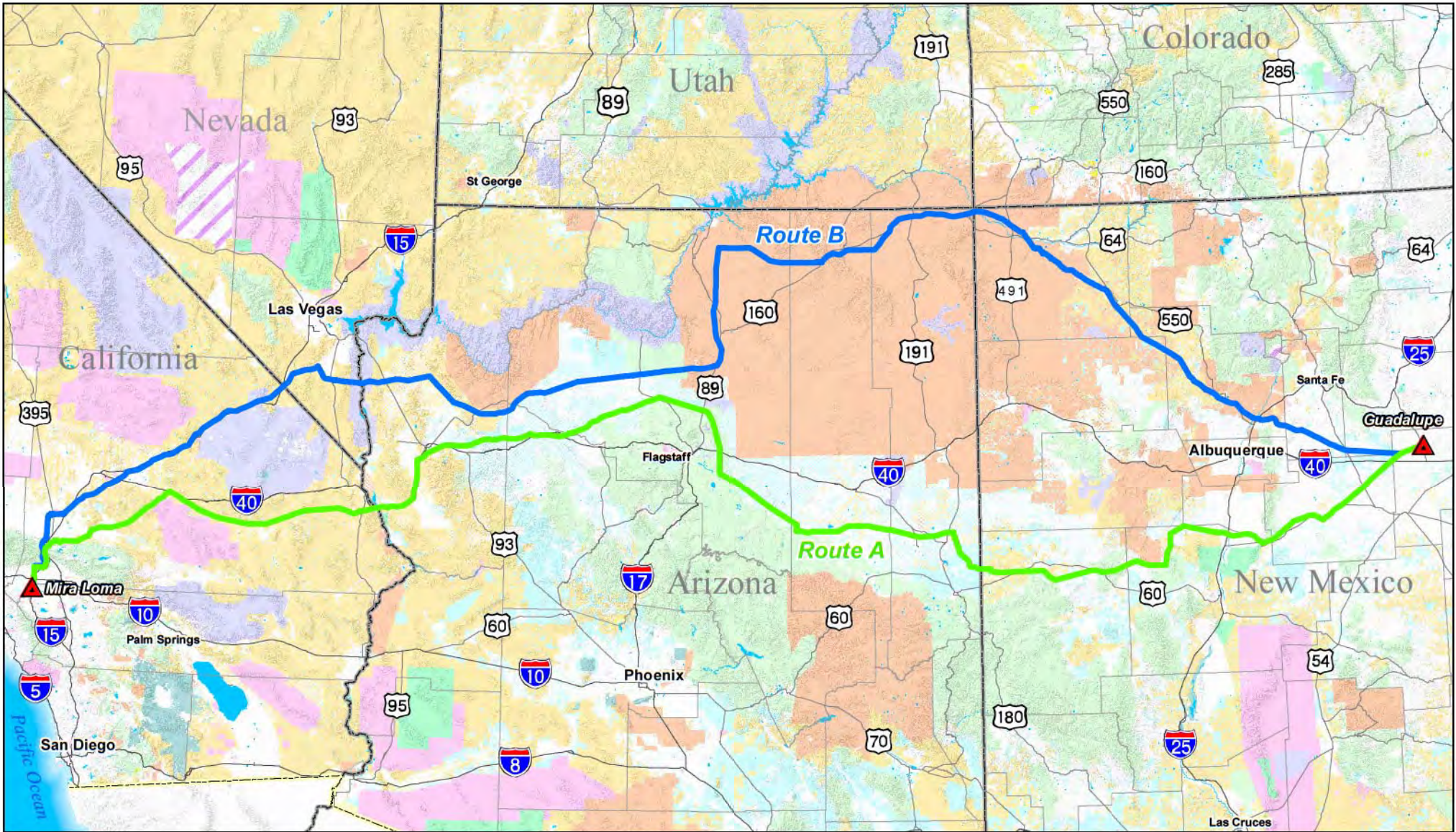


- ◇ Load
- ANOVA
- Other Proposed Transmission Lines

Source: Wind resource estimates developed by AWS Truewind, LLC for windNavigator®. Web: <http://navigator.awstruewind.com> | www.awstruewind.com. Spatial resolution of wind resource data: 2.5 km. Projection: Albers Equal Area WGS84.



CENTENNIAL WEST CLEAN LINE PROJECT



Legend

Project Features

- Route A
- Route B

Land Jurisdiction

- Indian Reservation

Department of Defense

Department of Energy

USDA Forest Service

USDI Bureau of Land Management

USDI Bureau of Reclamation

USDI Fish and Wildlife Service

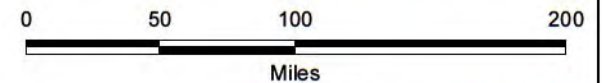
USDI National Park Service

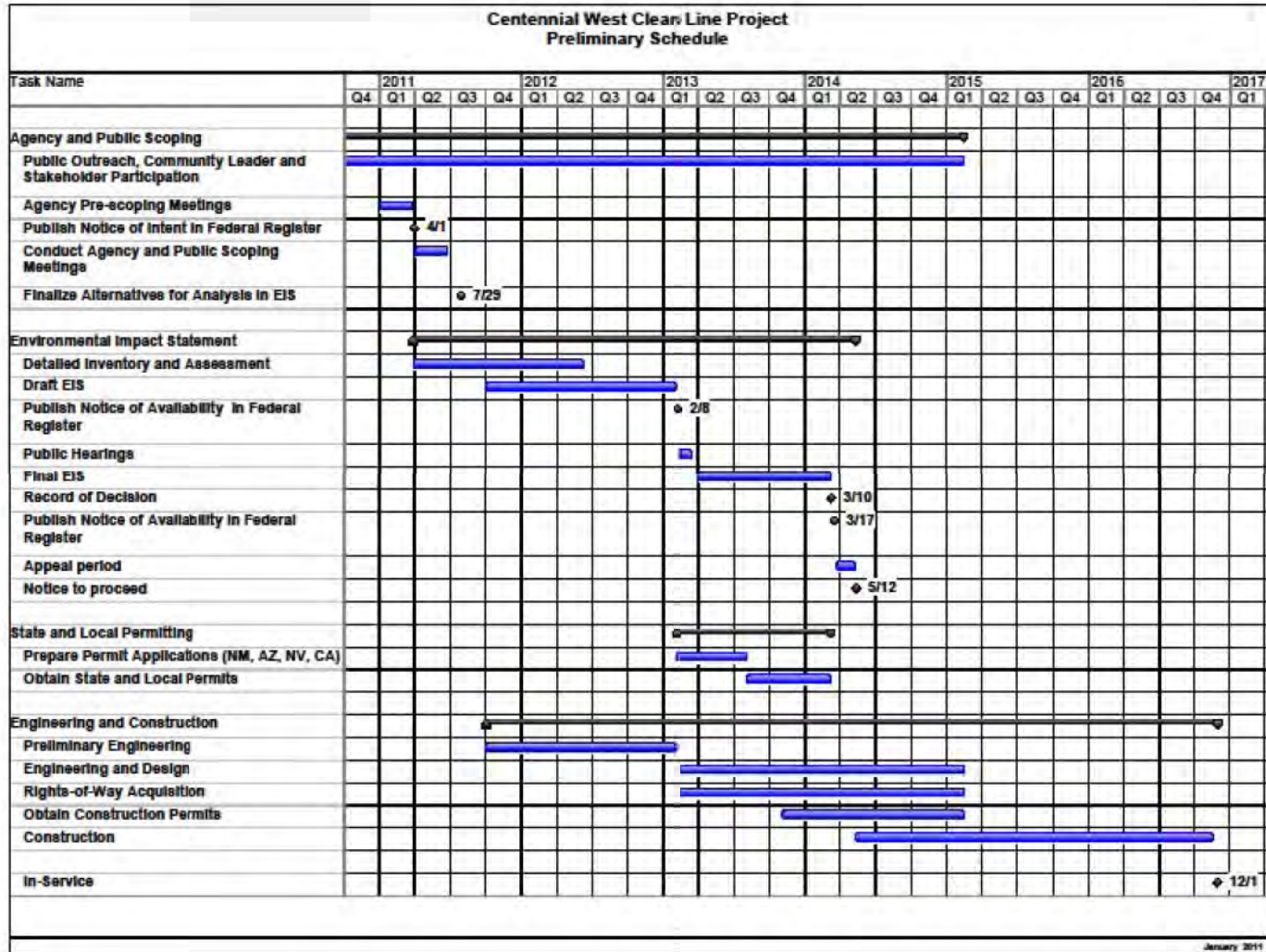
State Land

State Park

Other

Figure 1 - Centennial West Clean Line Project





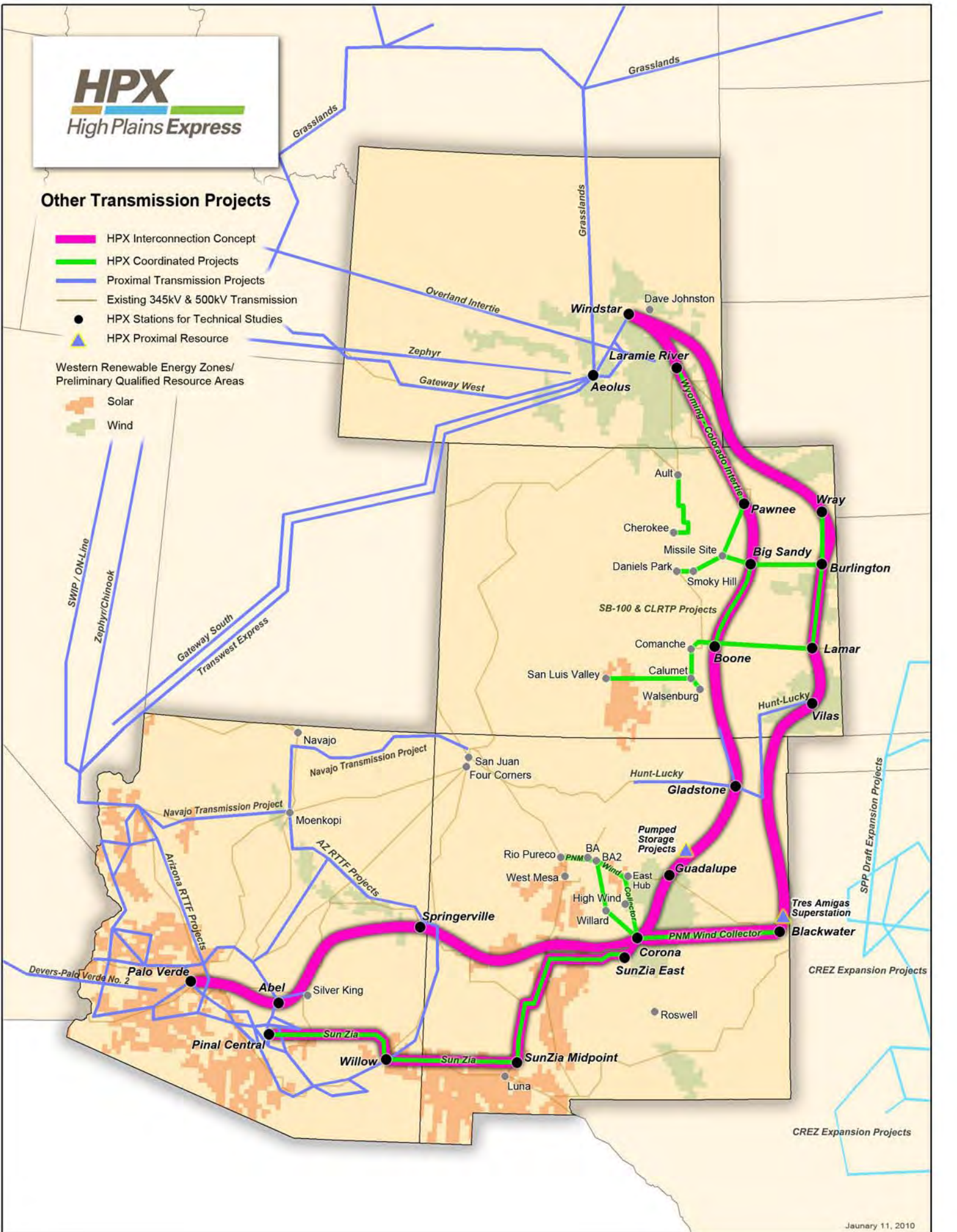
HPX High Plains Express

Other Transmission Projects

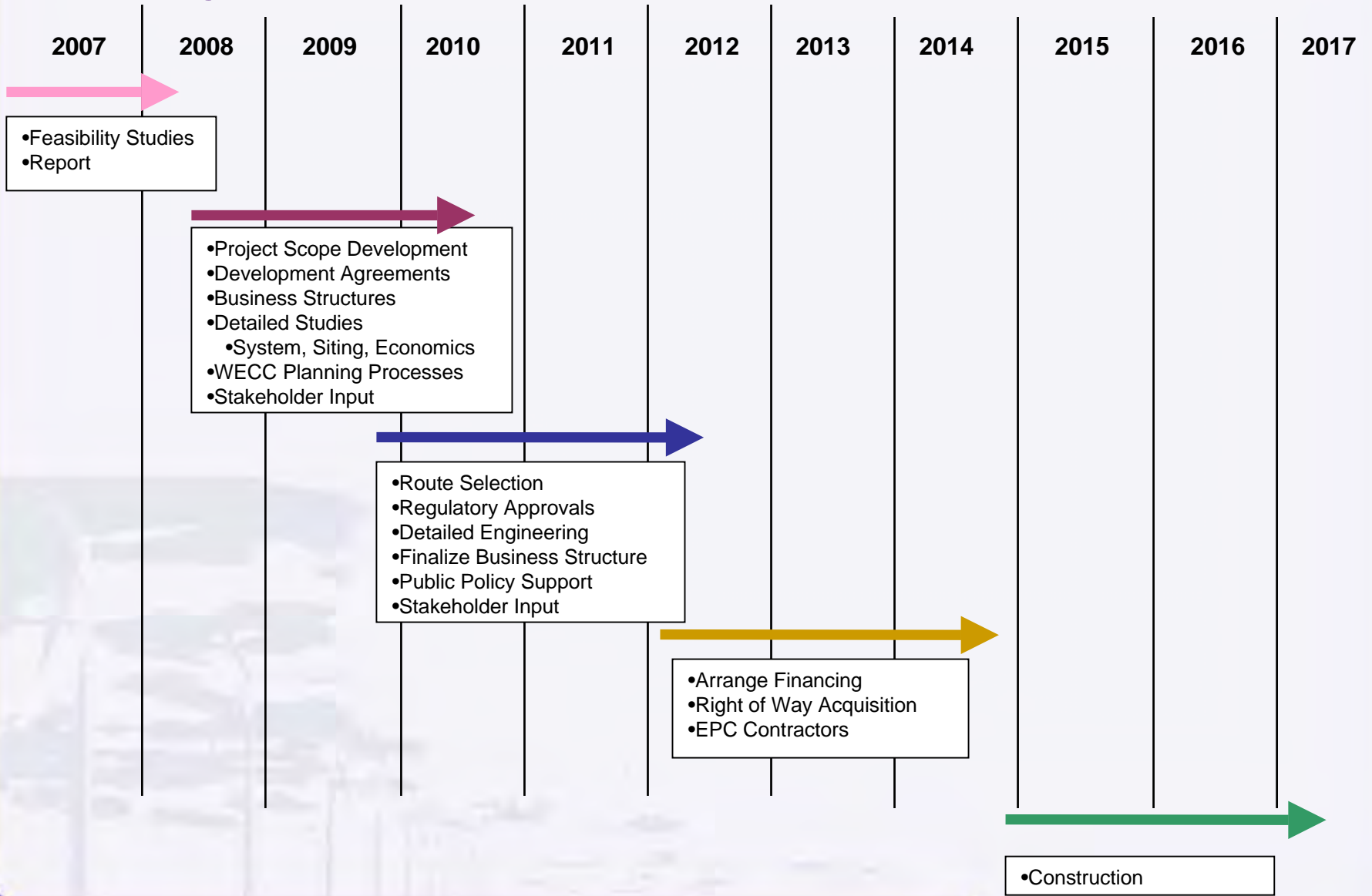
- █ HPX Interconnection Concept
- █ HPX Coordinated Projects
- █ Proximal Transmission Projects
- █ Existing 345kV & 500kV Transmission
- HPX Stations for Technical Studies
- ▲ HPX Proximal Resource

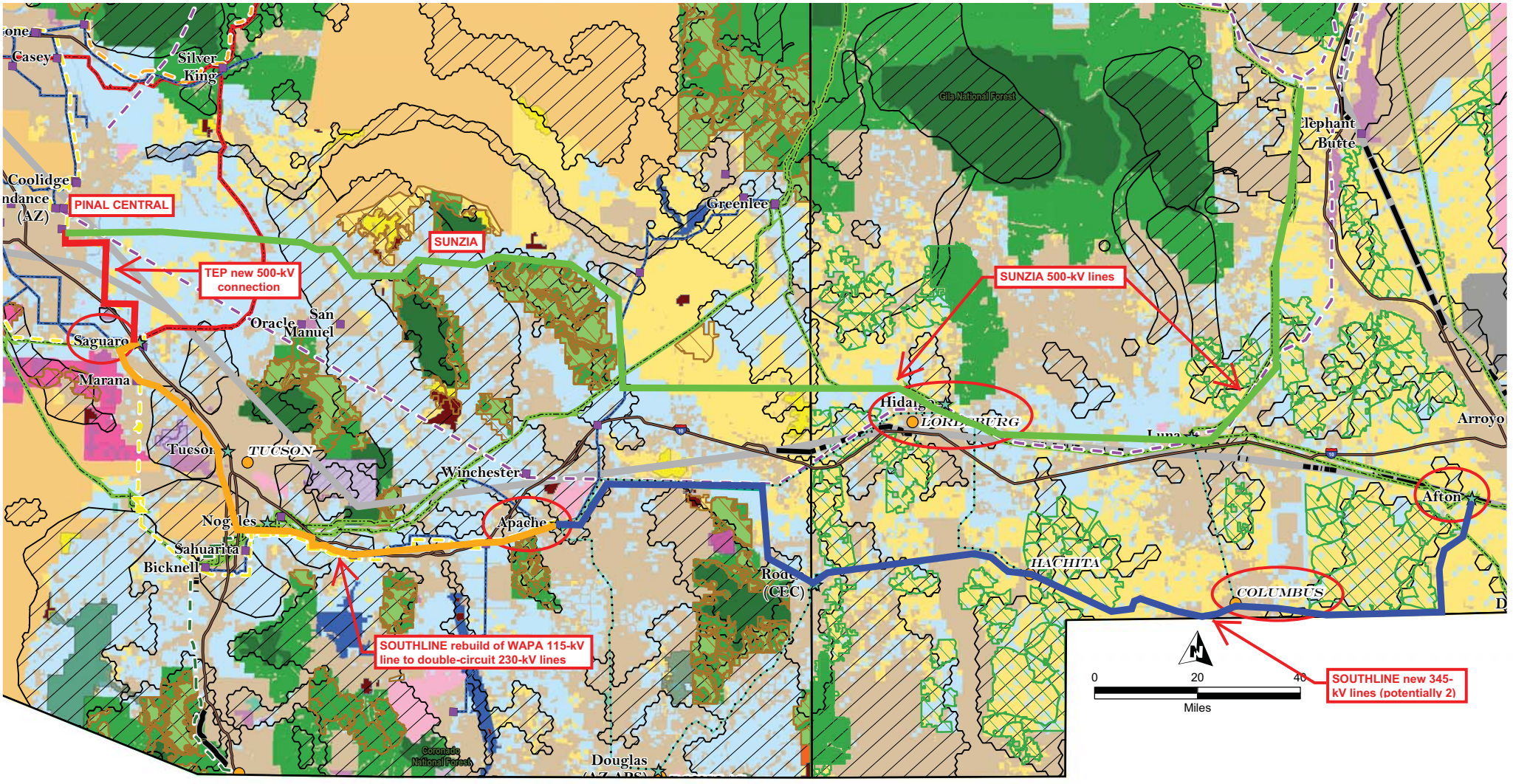
Western Renewable Energy Zones/
Preliminary Qualified Resource Areas

- █ Solar
- █ Wind

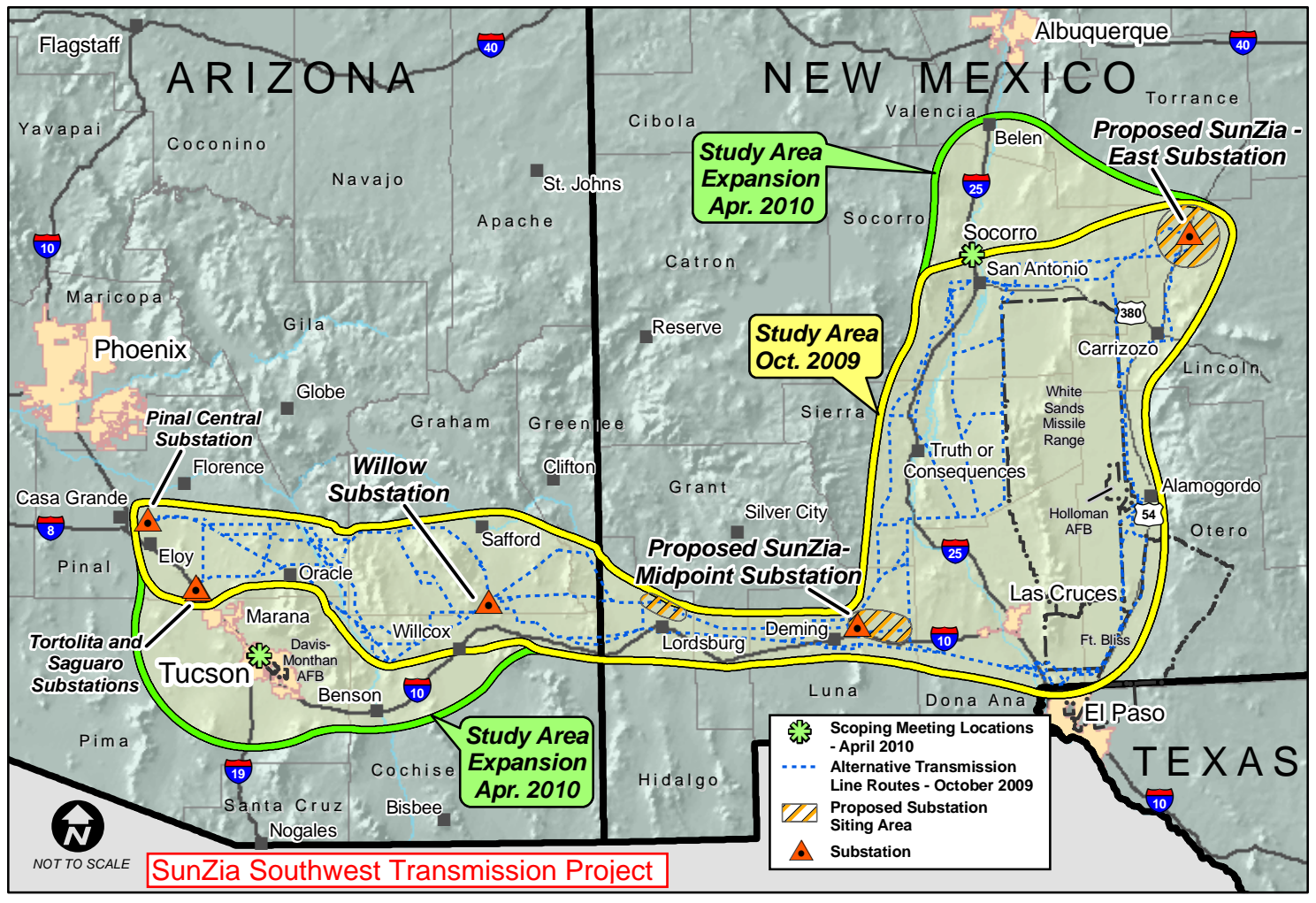


Project Milestone Schedule





SOUTHLINE TRANSMISSION PROJECT



ARIZONA

NEW MEXICO

TEXAS

SunZia Southwest Transmission Project

Study Area Expansion Apr. 2010

Study Area Expansion Oct. 2009

Study Area Expansion Apr. 2010





Proposed SunZia - East Substation

Proposed SunZia - Midpoint Substation

Pinal Central Substation

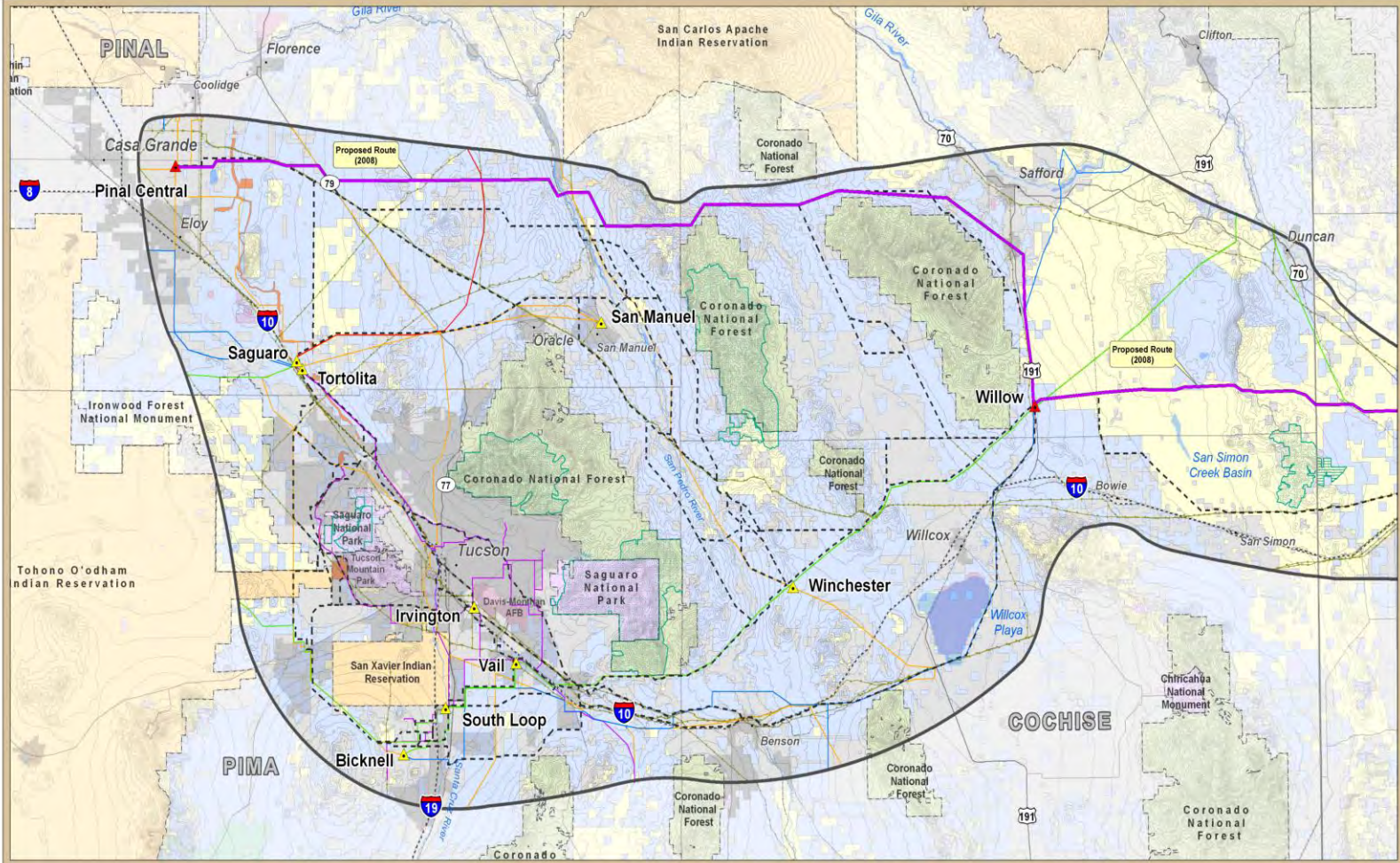
Willow Substation

Tortolita and Saguaro Substations

-  Scoping Meeting Locations - April 2010
-  Alternative Transmission Line Routes - October 2009
-  Proposed Substation Siting Area
-  Substation



NOT TO SCALE



SunZia Southwest Transmission Project

Proposed and Alternative Routes



LEGEND

Land Ownership	
Bureau of Land Management	U.S. Fish and Wildlife Service
U.S. Dept. of Defense	U.S. Bureau of Reclamation
McGregor Range Withdrawal	Indian Reservation
National Park Service	State/Trust Land
U.S.D.A. Forest Service	Local or State Parks
U.S.D.A. Other	Private/Other

Base Features

Project Features	
SunZia Proposed Route - Sept. 8, 2008	Study Area - April 2010
Alternative Route Segments	

Utilities

Proposed Substation	500kV Transmission Line
Existing Substation	345kV Transmission Line
Pipeline (Diameter 6'-4")	230kV Transmission Line
	138kV/116kV Transmission Line
	115kV Transmission Line

Reference Features

City	State Highway	County Boundary
River/Stream	U.S. Highway	State Boundary
Lake/Reservoir	Interstate	Jurisdictional Boundary
Urban Area	Railroad	Wilderness Area
		Wilderness Study Area (WSA)

Arizona Portion, SunZia Southwest Transmission Project

Sources:

AZ BLM 2009
 AZ State Land Department and ALRIS 2008
 ESRI StreetMap 2008, Minires RMP 1989
 NM BLM 2009, Socorro PRMP 2009
 TUCOUNTY RMP 2009
 POWERmap, powermap.platts.com
 ©2009 Platts, a Division of the McGraw-Hill Companies
 USGS, EPIC, Inc. 2010



Contour Interval 200 feet

May 17, 2010



EIS SCHEDULE

SunZia Southwest Transmission Project

PROJECT TIMELINE

SUMMER 2009/SUMMER 2010

SPRING 2011

SUMMER 2012

FALL 2012

2015

Scoping

**Comment Periods
Public Meetings**

**Draft
Environmental
Impact
Statement**

**Final
Environmental
Impact
Statement**

**Record of
Decision
Right-of-Way
Permit**

**Construction
& Operation**

Jun - Aug 2009

Oct - Nov 2009

Apr - May 2010

**Initial
Study
Area**

**Expanded
Study Area
in
NM**

**Expanded
Study Area
in
AZ and NM**

90 Days

45 Days

45 Days

**Public
Review
Period**

90 Days

**Public
Review
Period**

30 Days