

Transmission Planning Process and Study Methodology

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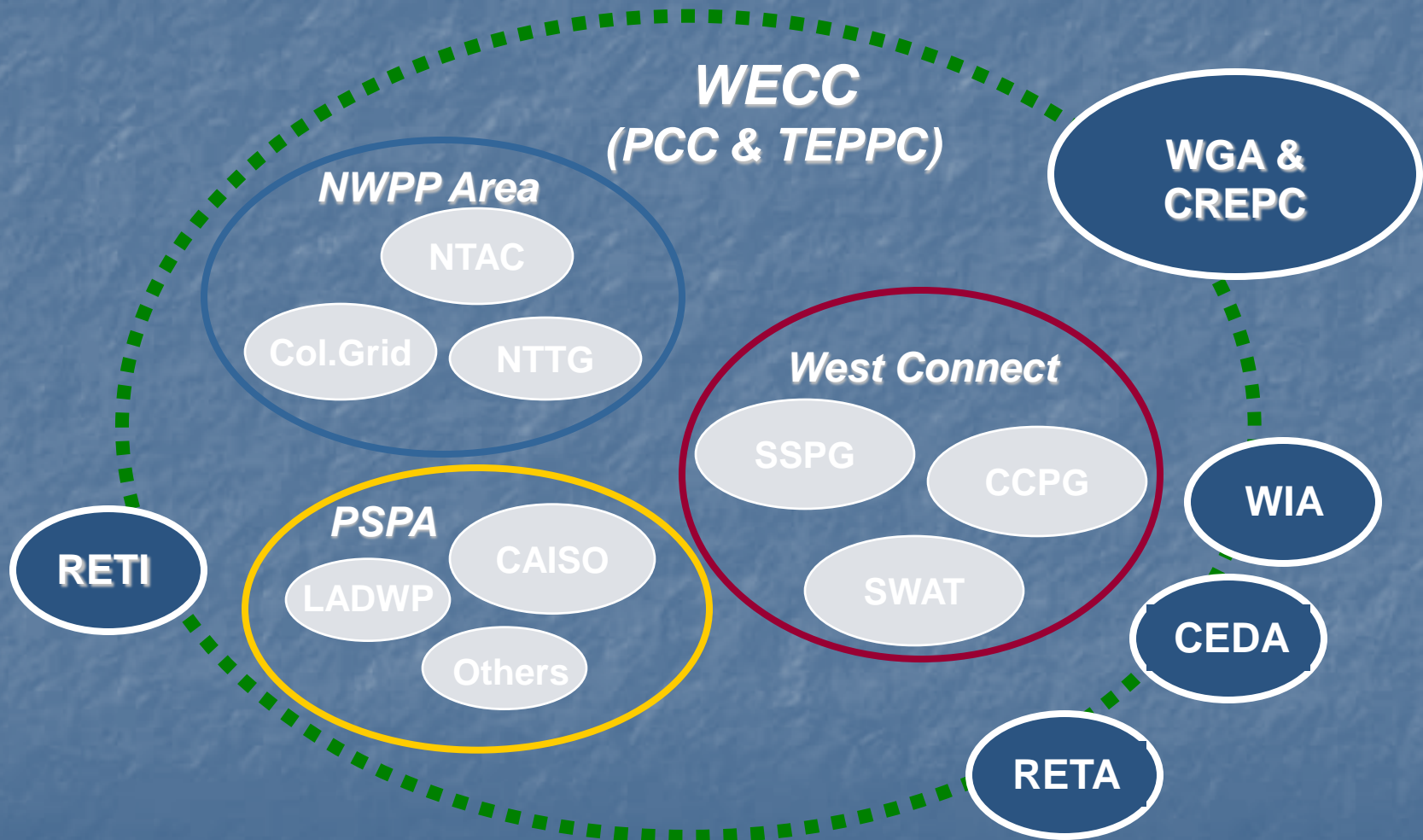
**Transmission Planning & Engineering
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Phoenix, May4. 2009

Planning - Calendar & Methodology

- WECC/TEPPC
- WestConnect Planning Cycle
- SWAT
- APS Planning Calendar
- Methodology

Western Transmission Planning Today



Transmission Expansion Planning Policy Committee Structure

WECC Board of Directors

Transmission Expansion
Planning Policy Committee
(TEPPC)

Technical Advisory
Committee (TAS)

Data Work
Group

Generation
Transmission
Loads
Fuels

Models Work Group

Hydro
Wind
Validation
Evaluation
Marketplace

Studies Work Group

*WECC Transmission
Study (Biennial)
DOE Congestion Study
(Triennial)
Consensus Scenarios*

Historical
Analysis
Work Group

Line Flows
OTC

Organizational Description: TEPPC Charter

- Overseeing development and management of a common economic performance data base for use in transmission planning studies and analysis.
- Providing policy guidance and management of the regional planning process across the region.
- Guiding analyses and modeling for Western Interconnection economic transmission expansion planning.

A Layered Approach Using Existing Organizations

Layer Linkages



Attachment K



SPG Charter / Agreement



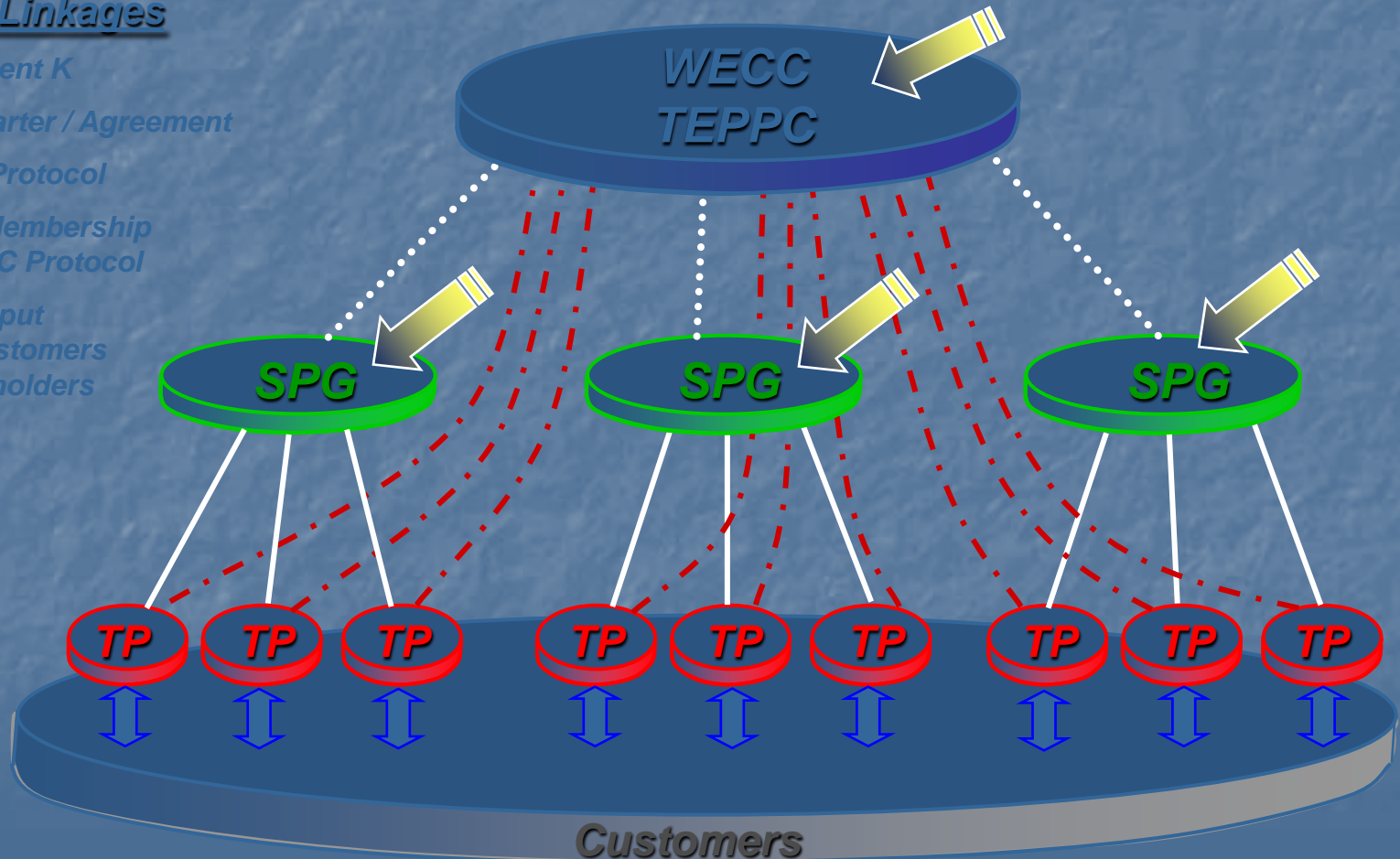
TEPPC Protocol



*WECC Membership
& TEPPC Protocol*



*Direct Input
from Customers
& Stakeholders*



WECC Regional Planning Process Sequence

Stages	Needs	Formation	Technical Studies		Licensing	Construction
Synchronized Study Plan	Screening Studies					
Project Planning Review		Regional Planning Guidelines Assessment				
Project Path Rating Review			Phase 1 Proposed Rating	Phase 2 Planned Rating	Phase 3 Accepted Rating	
Progress Reports		Annual Reports Required Throughout Planning Process				

Column Heading Notes:

Needs = Examination of potential long-term transmission needs.

Formation = Development of proposals of specific project proposals by sponsors.

Technical Studies = Power flow and dynamic stability studies.

Licensing = Project sponsor activities to obtain rights-of-way, certificates of purpose and necessity, etc.

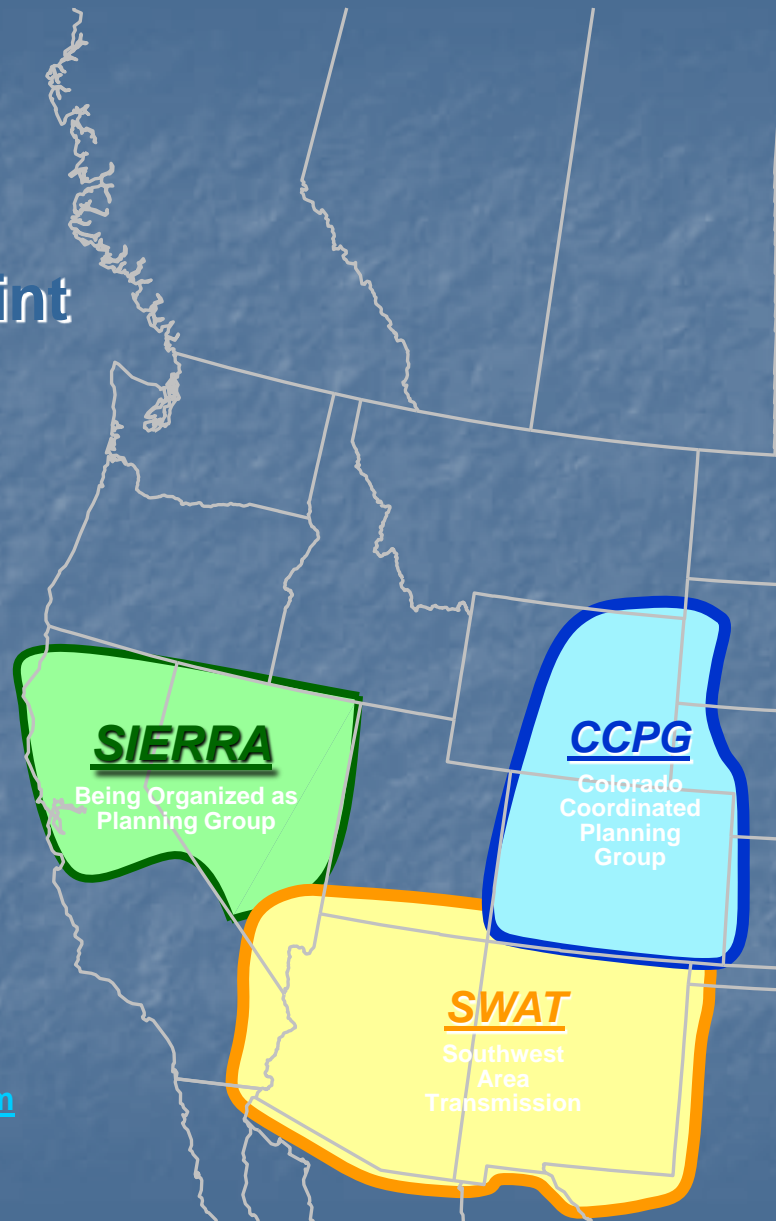
Construction= Building of foundations, towers, conductor, substations, etc.

WestConnect



nect.com

WestConnect Footprint with Sub-Regional Planning Groups



SWAT – <http://www.azpower.org/swat>

CCPG – <http://ccpg.basinelectric.com>

WestConnect – <http://www.westconnect.com>

Parties to WestConnect Planning Project Agreement

Arizona Public Service Co.

El Paso Electric Co.

Imperial Irrigation District

Sierra Pacific Power Co.

Nevada Power Co.

Public Service Company of NM

Sacramento Municipal Utility District

Salt River Project

Southwest Transmission Coop.

Tri-State Transmission & Generation Assoc.

Transmission Agency of Northern California

Public Service Company of CO

Tucson Electric Power Co.

Western Area Power Admin.

WestConnect Planning Support for Attachment K

- **WestConnect obligates TP to participate in Subregional Planning Process**
- **WestConnect each year**
 - Develops WestConnect Planning Area Transmission Plan
 - Publishes WestConnect Transmission Planning Report

Planning Cycle Concept





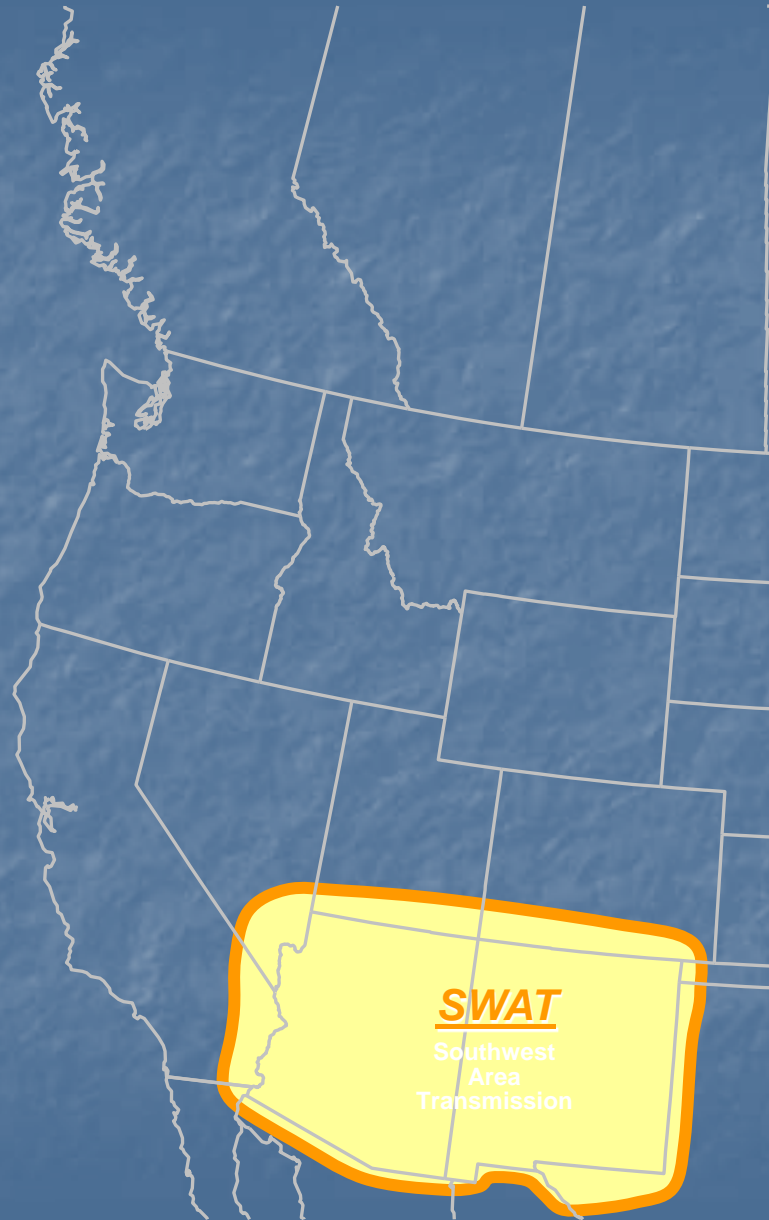
Purpose – To provide an open, transparent, and collaborative forum for all stakeholders to submit input and projects to a subregional transmission planning effort in order to develop a high level transmission plan that maximizes regional benefits, while making efficient use of the existing transmission system.

Principles:

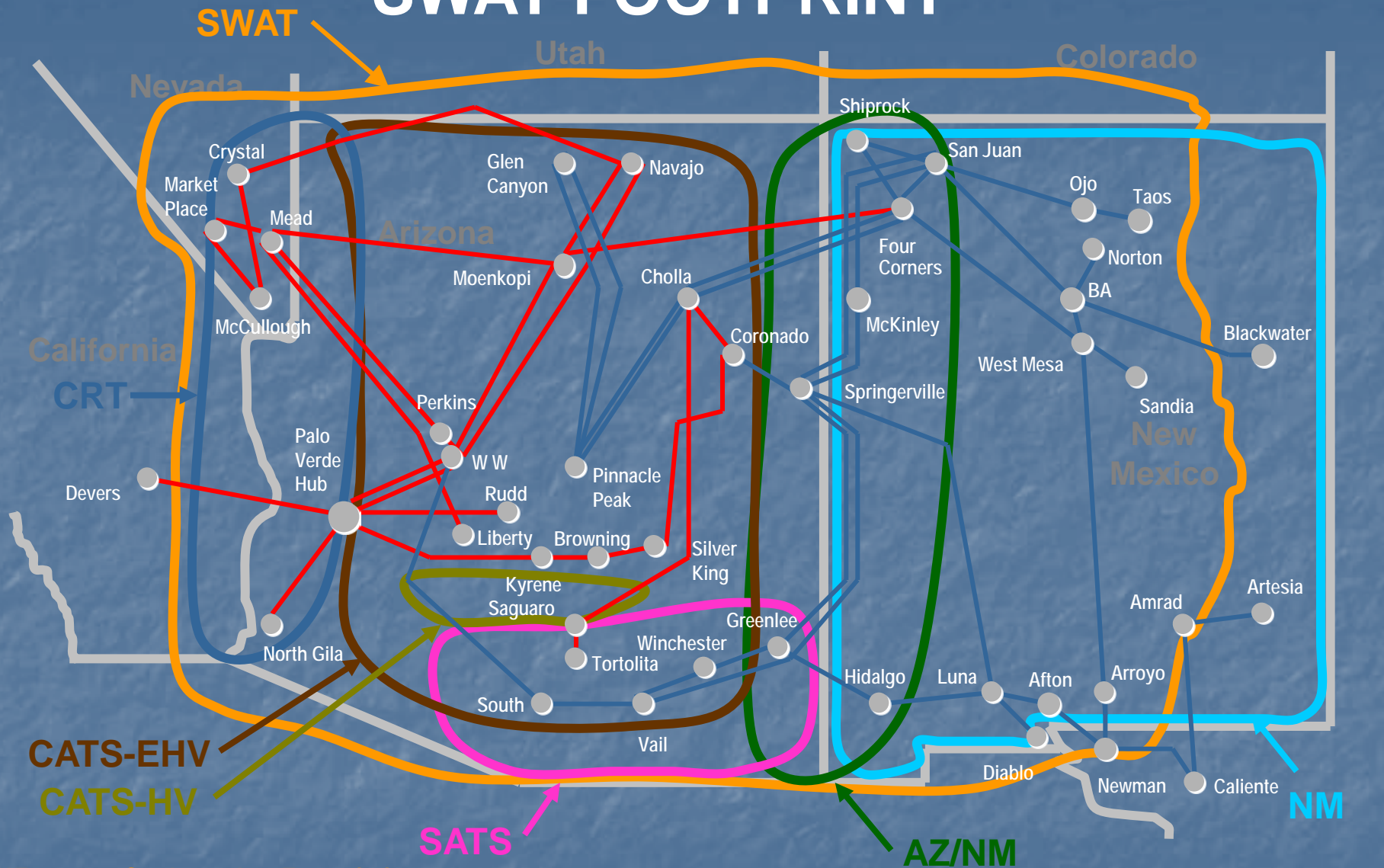
- Open to all sectors of the electrical industry and regulators
- Collaborative planning forum for data exchange and coordination
- Identify common long range transmission needs
- Comparable technical study of alternatives
- Coordinate and integrate with WECC TEPPC and other subregional planning groups

SWAT Footprint **One of the WestConnect** **Sub-Regional Planning** **Groups**

<http://www.westconnect.com>



SWAT FOOTPRINT



500kV
345kV

Web Sites

WestConnect: http://www.westconnect.com/init_swat.php

SWAT

CRT

CATS – EHV

CATS – HV

SATS

AZ/NM

NM

Southwest Area Transmission

Colorado River Transmission

Central Arizona Transmission Study Extra High Voltage

Central Arizona Transmission Study High Voltage

Southeast Arizona Transmission Study

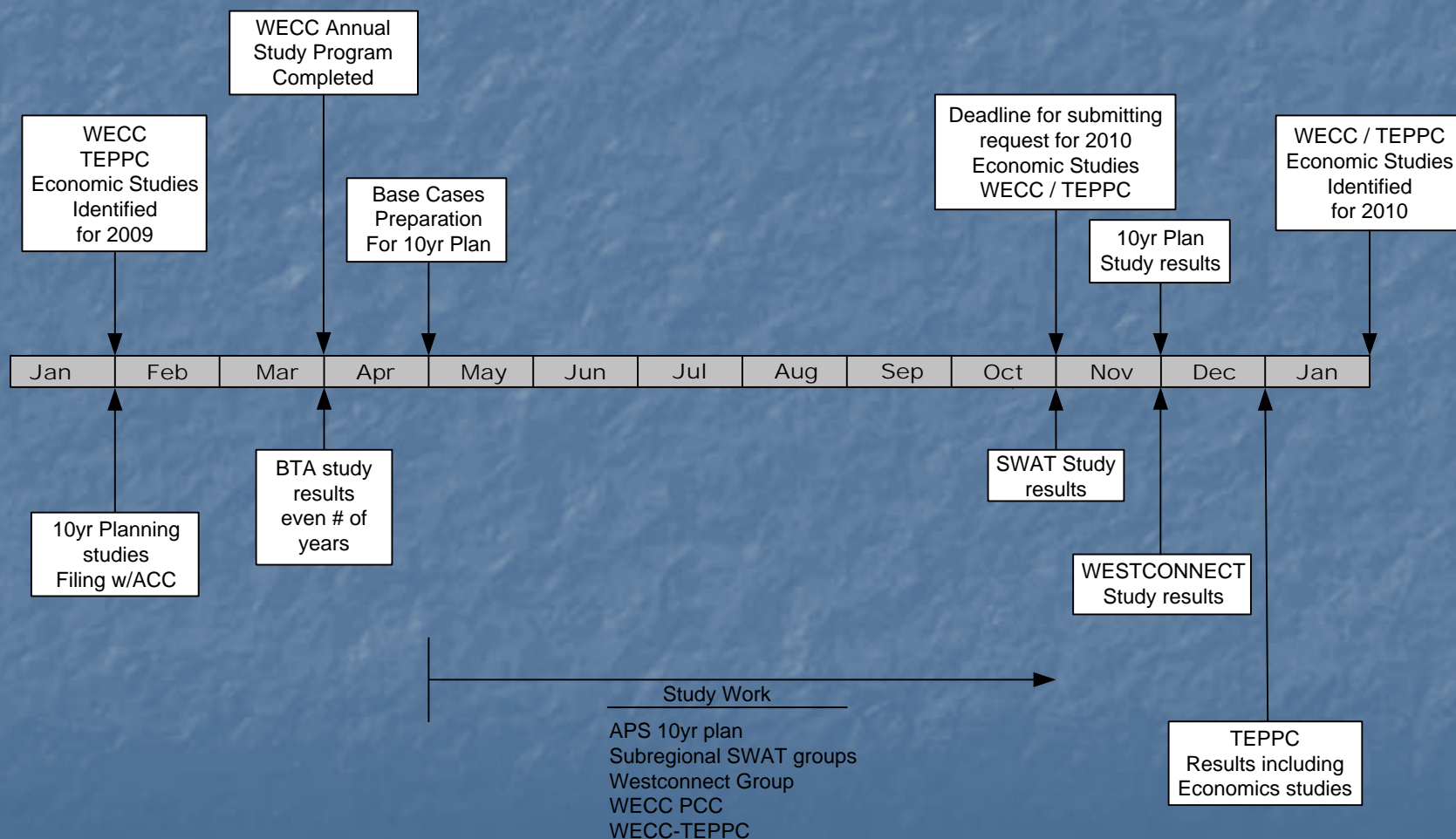
Arizona New Mexico Regional Transmission

New Mexico Transmission

APS Ten Year Planning Cycle and Methodology

2009 Synchronized Study Plan

WECC PCC / WECC - TEPPC / WESTCONNECT



Planning Calendar for Ten-Year Planning Cycle

APS Transmission Planning – 10 Yr Plan

Stakeholder Input

Other Subregional Coordination

Jan.

10yr Plan – Filed with ACC by Jan. 31

10yr. Plans filed by
others

Feb.

WestConnect
Coordinated base case
development

Activities Throughout the Year

Mar.

APS Corporate Load Forecast

- APS/SRP Coordination Meeting
- APS/WAPA Coordination Meeting
- WestConnect Meetings
- SWAT Meetings
 - CATS-EHV
 - CATS-HV
 - CRT
 - AZ/NM
 - SATS
 - Renewables
 - Short-circuit Working Group

Apr.

Arizona Utilities coordinated seed case
development – from WestConnect cases

May

Develop 10yr base cases from AZ seed
cases

2nd Quarter Stakeholder Meeting – Stakeholder
input on studies, request study alternatives,
updates on current projects

Jun.

Jul.

10yr. Plan study effort – Determination
of projects, timings, and scope

Aug.

Sep.

APS Corporate Load Forecast – Post
Summer

Sep. 1 – Network Transmission Customers and
all other Transmission Customers Load &
Resource Forecast

Oct.

Oct. 31 – Deadline to submit Economic Study
Requests for 4th Quarter Meeting review

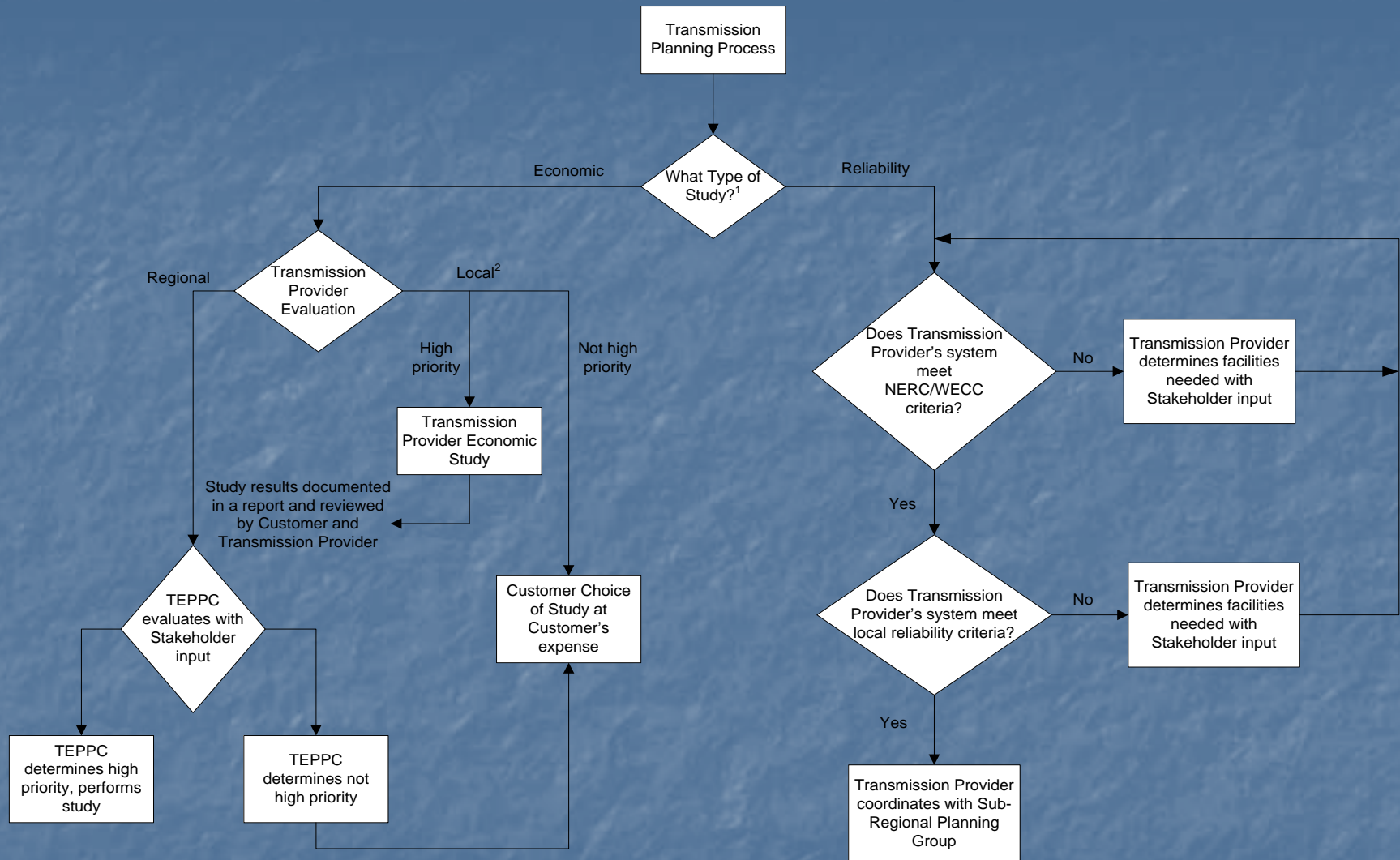
Nov.

10yr. Plan – New load forecast
sensitivity

4th Quarter Stakeholder Meeting – Review draft
of current 10yr plan, discussion Economic Study
requests, receive stakeholder input

Dec.

Exhibit 1 – APS Attachment E



1. Generator Interconnection Request studies are performed pursuant to the Large Generator Interconnection Procedure contained in the Transmission Provider's Open Access Transmission Tariff (OATT). Transmission Service Requests are also performed pursuant to OATT procedures.

2. All requests for economic planning studies received by the Transmission Provider are forwarded to TEPPC for inclusion in the TEPPC Master List. TEPPC will evaluate only those requests that have regional impacts.

APS Planning - Studies Performed & Draft Ten-Year Plan

- Study Assumptions/Methodology
- Types of Studies Performed
- 2009-2018 Ten-Year Plan project descriptions

2009-2018 Study

Assumptions/Methodology

- Coordinated Base Cases (Seed Cases)
 - 2009 - 2008 Summer Operating case
 - 2013 - CATS-EHV 2013 coordinated case
 - 2018 - CATS-EHV 2018 coordinated case
- 69kV transmission models incorporated
- Most up-to-date forecasts for peak summer loads

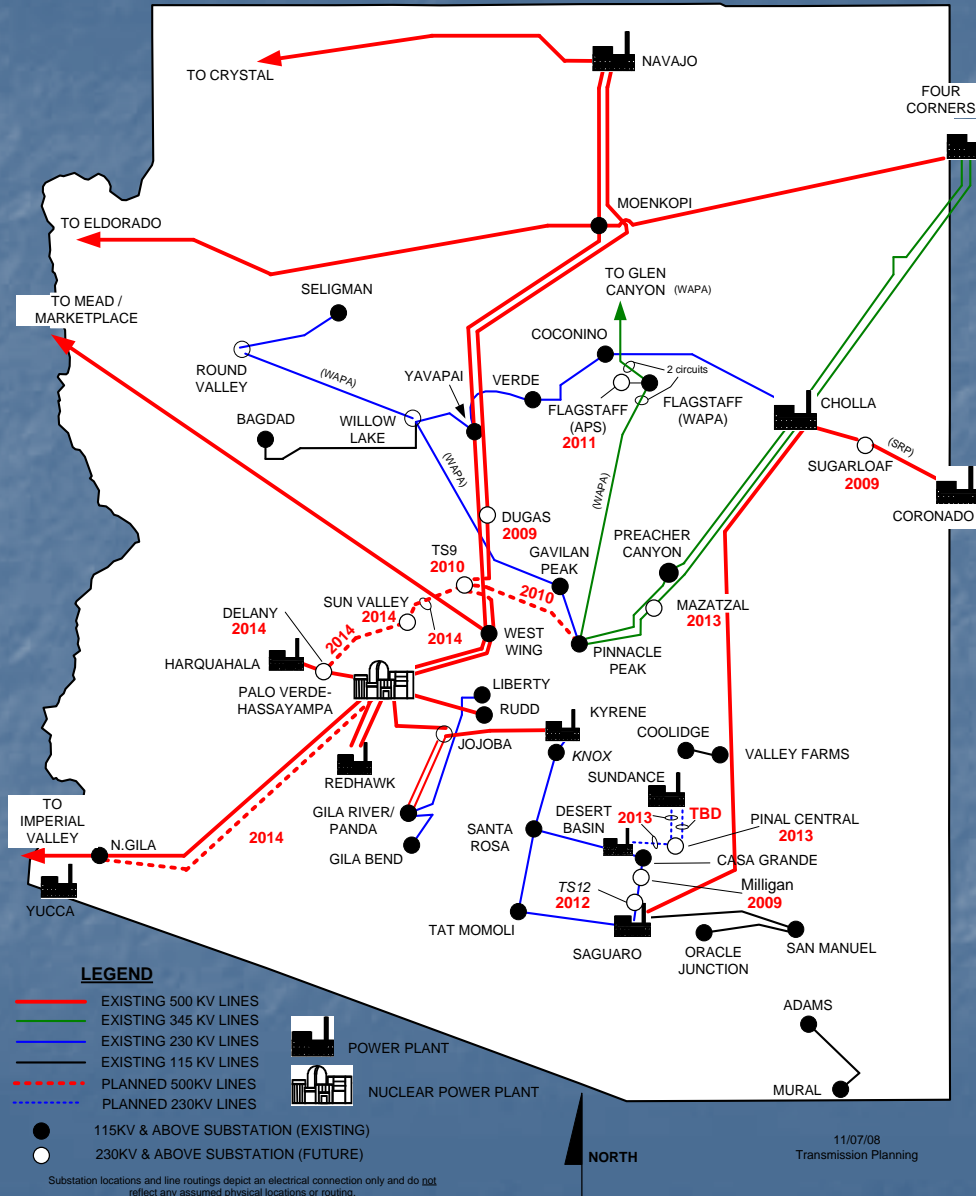
2009-2018 Study Assumptions/Methodology

- Summer Peak cases
 - Thermal analysis
 - Post-Transient
 - Transient Stability (2011 & 2016)
- Maximum Load Serving Capability (Phx & Yuma)
 - Thermal and Post transient

TPL Planning Methodology				
NERC STANDARD		STUDIES COMPLETED		
TPL -001(n-0)		Thermal	Transient Stability	Post Transient
2011	SIL	X		
2011	PEAK	X		
2016	SIL	X		
2016	PEAK	X		
TPL-002 (n-1)				
2011	SIL	X		X
2011	PEAK	X	X	
2011	MLSC	X		X
2016	SIL	X		X
2016	PEAK	X	X	
2016	MLSC	X		X
2011	XFMR	X	X	X
2016	XFMR	X	X	X
2011	GENERATION	X	X	X
2016	GENERATION	X	X	X
TPL-003 (n-2)				
2011	Stuck Breaker	X	X	X
2011	N-1-1	X	X	X
2016	Stuck Breaker	X	X	X
2016	N-1-1	X	X	X
TPL-004 (n-xx)				
2011	Major Substations With/Without Generation	X	X	X
2011	Common Corridor + Elements	X	X	X
2016	Major Substations With/Without Generation	X	X	X
2016	Common Corridor + Elements	X	X	X

APS Ten Year Plan Projects 2009-2018

APS EHV & OUTER DIVISION 115/230 KV TRANSMISSION PLANS 2009 - 2018



2009:

- Dugas & Sugarloaf 500/69kV substations
- Milligan 230/69kV substation

2010:

- TS9-Pinnacle Peak 500/230kV line

2011:

- Flagstaff 345/69kV substation

2012:

- TS12 230/69kV substation

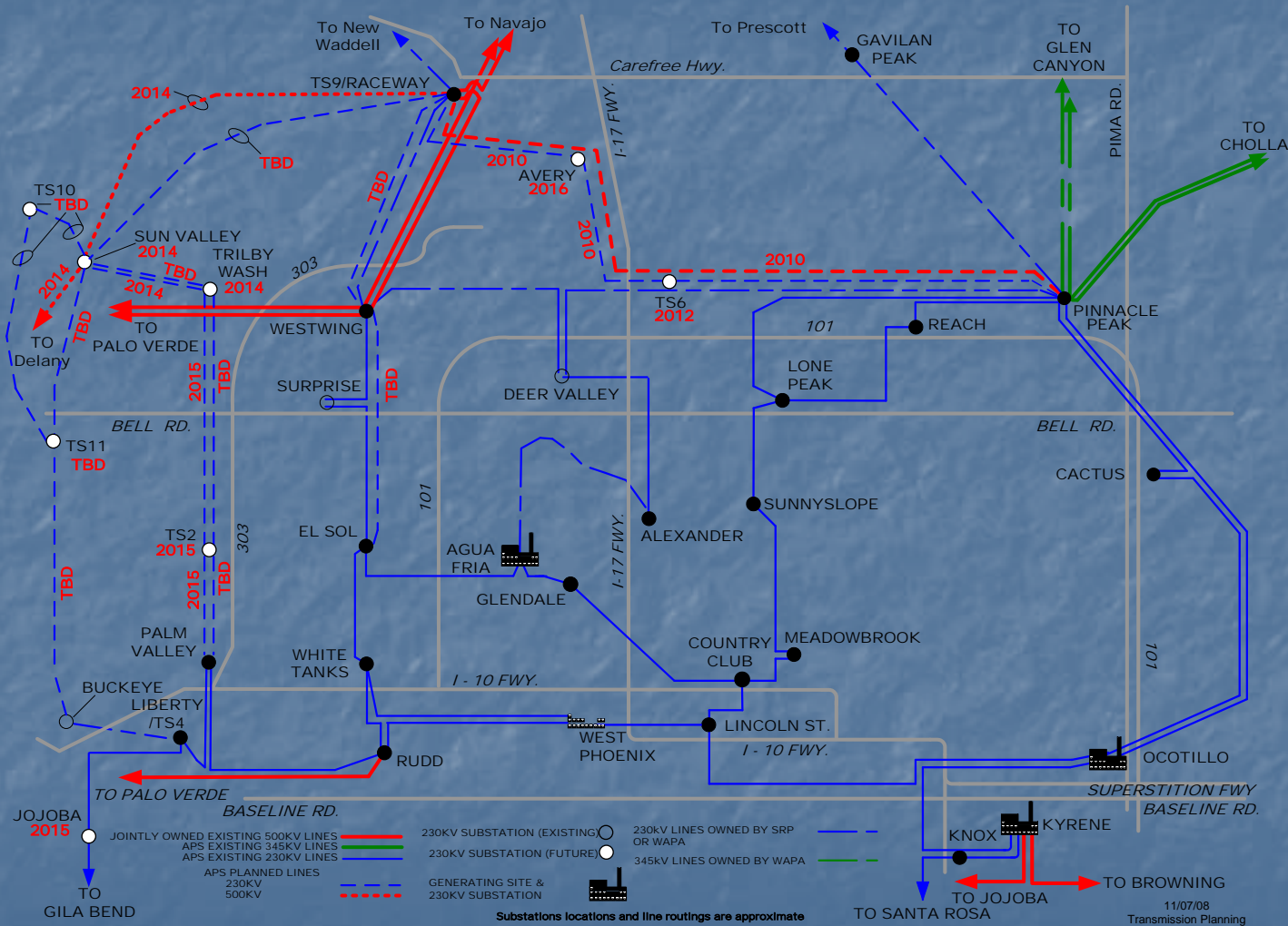
2013:

- Mazatzal 345/69kV substation
- Sundance-Pinal Central 230kV line

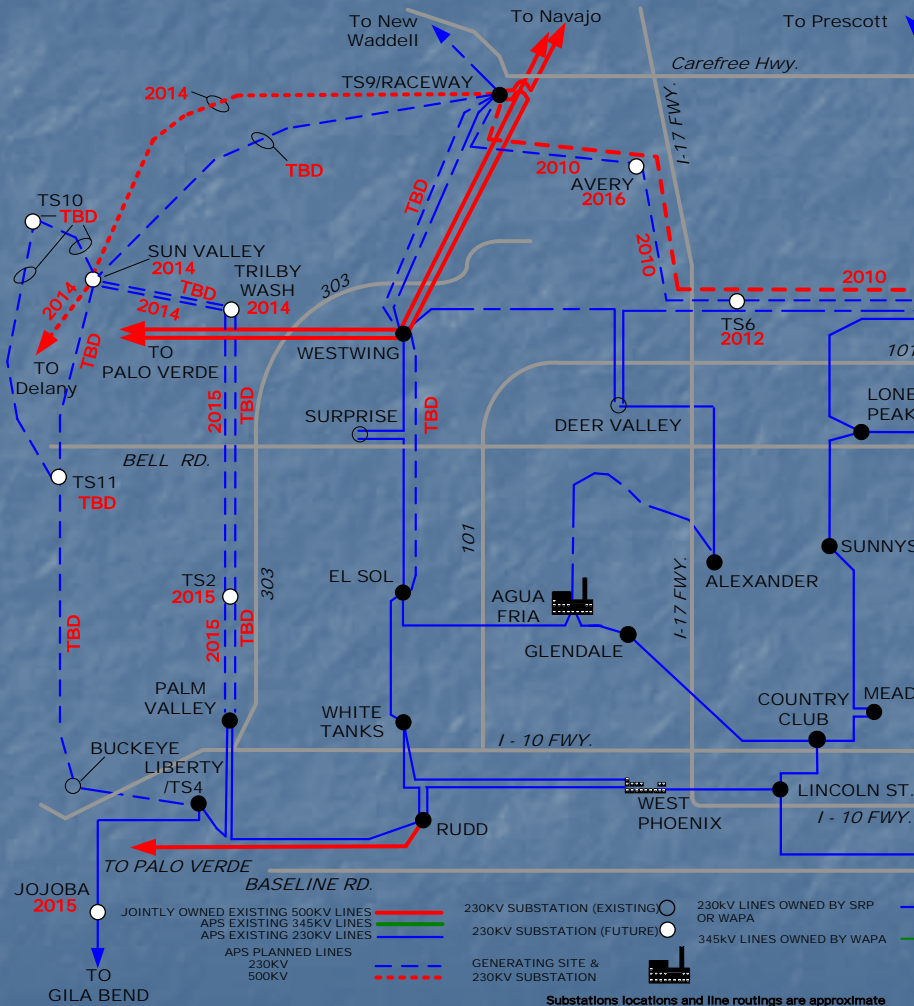
2014:

- Delany-Sun Valley 500kV
- Sun Valley-TS9 500kV
- Hassayampa-N.Gila 500kV line

PHOENIX METROPOLITAN AREA TRANSMISSION PLANS 2009-2018



PHOENIX METROPOLITAN AREA TRANSMISSION PLANS 2009-2018



2012:

- TS6 230/69kV substation

2014:

- Sun Valley-Trilby Wash
230kV

2015:

- Trilby Wash-Palm Valley
230kV

- TS2 & Jojoba 230/69kV substations

2016:

- Avery 230/69kV substation

APS Planning - Study Requests

- Generation Interconnection requests
 - APS OASIS contains Generation Interconnection Queue
 - 23 Solar projects
 - 8 Wind projects
 - 5 Others
- Currently one Transmission Service Requests under study

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Department Leader

Phoenix, May4. 2009