



Enhancing Arizona's Ability to Export Renewable Energy

Presented to the

SWAT Oversight Committee

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ACC Sixth Biennial Transmission Assessment Decision

Ordered certain Commission-regulated electric utilities to jointly conduct or procure a study and to conduct a stakeholder workshop process to identify the barriers to and solutions for enhancing Arizona's ability to export renewable energy.

Response to Commission Decision No. 72031 by APS, SRP, SWTC, TEP and UNS Electric.

Analysis and report preparation by PDS Consulting, PLC

6th BTA Compliance Report

- ▶ Overview of Renewable Energy Standards and regional renewable energy assessments
- ▶ Prior evaluations regarding Arizona's renewable energy resources and related transmission projects
- ▶ Results of a high level technical evaluation that assessed
 - Deliverability of existing transmission system
 - Incremental deliverability with the addition of the Renewable Transmission Projects
 - Identified transmission corridors to enhance export capability
- ▶ Barriers to and Solutions for enhancing Arizona's ability to export renewable energy
- ▶ Current status of the export market environment
- ▶ Prepared by PDS Consulting

Stakeholder Participation

- ▶ Review background on Arizona renewable energy studies
- ▶ Review technical assessment of RTP export capability, including potential transmission corridors
- ▶ Solicit stakeholder input regarding barriers and solutions to renewable energy export
- ▶ Review report outline

RES and Regional Assessments

- ▶ Renewable Energy Standards
- ▶ Western Renewable Energy Zone (WREZ)
 - Phase 1 Report, WGA and DOE
 - Continuing studies
- ▶ Arizona Renewable Energy Assessment
 - Black and Veatch
- ▶ Arizona Renewable Resource and Transmission Identification Subcommittee (ARRTIS)
- ▶ Renewable Transmission Task Force (RTTF)
- ▶ Arizona Utilities' Renewable Transmission Projects (RTPs)

Technical Assessment Objective

- ▶ Conduct an analysis of the Arizona Renewable Transmission Projects (RTPs) to determine their ability to provide incremental export capability to Southern California.

Clarity of California's policy regarding Arizona renewable resources is needed before commitments can be made to invest in transmission to support renewable energy export.

Assessment Methodology

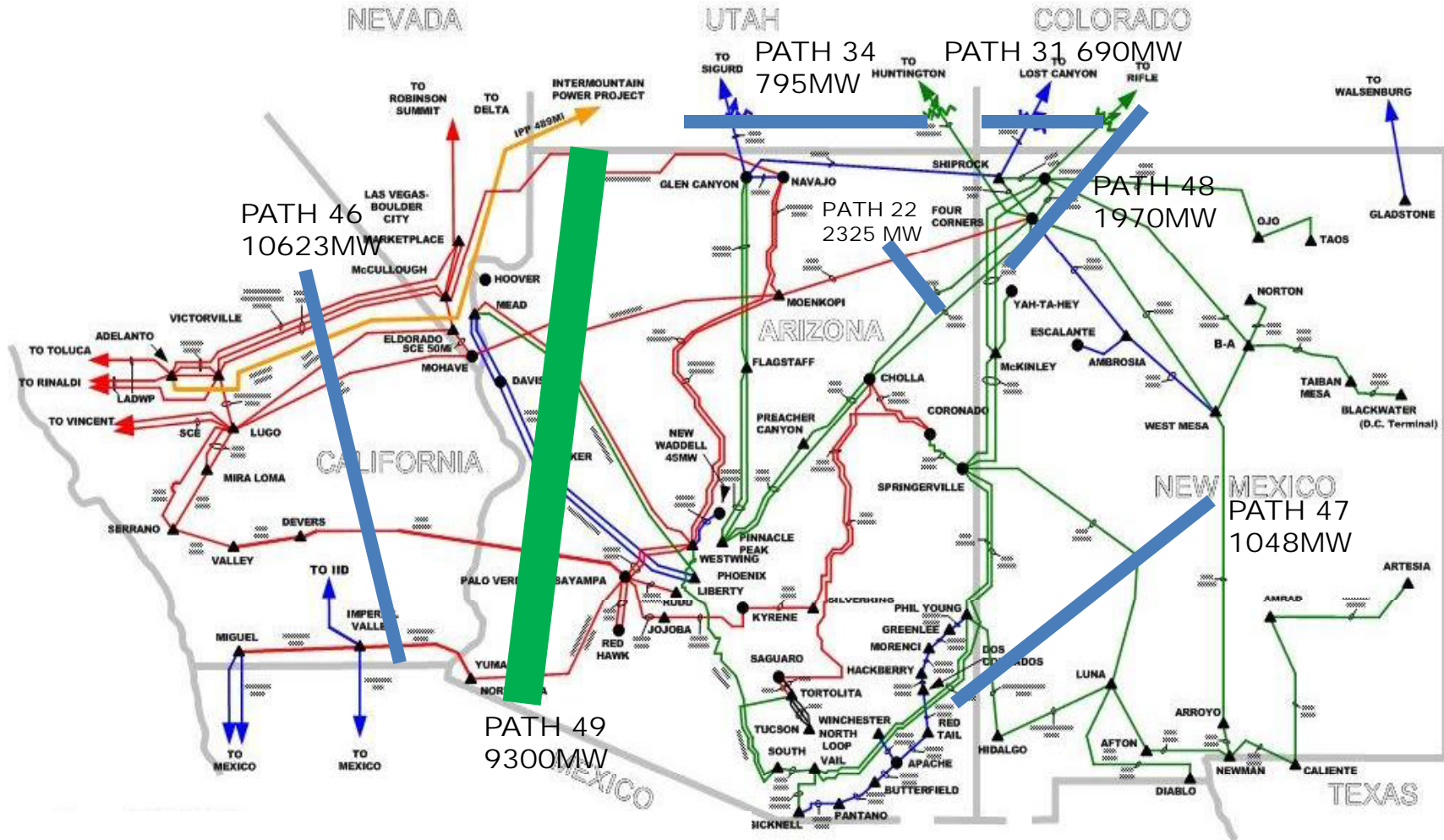
- ▶ Benchmark SWAT 2014 Heavy Summer Base case (Existing System) for Base Export on Path 49
 - Identify Renewable Energy Zones and Injection Locations
 - Develop Delivery Scenario
 1. 20% to Arizona Loads
 2. 80% to California Loads
 - **(N-1) power flow analysis to Path 49**
 - Assessment did not address contractual arrangements
 - Assessment did not indicate type of renewable resource

Assessment Methodology

(Continued)

- ▶ Utility Proposed Renewable Transmission Projects:
 - Confirm models from the RTP technical utility leads
 - Updated the Base Case to reflect a new Post-RTP case
 - Assess the incremental deliverability of the RTP to export from the REZs to Path 49
- ▶ RTP projects were analyzed together as a whole (not individually)
- ▶ Injections were analyzed at individual buses only (not simultaneously)

Arizona WECC Transmission Paths



Reference: Public WECC DRAFT REPORT DATED 5/11/11

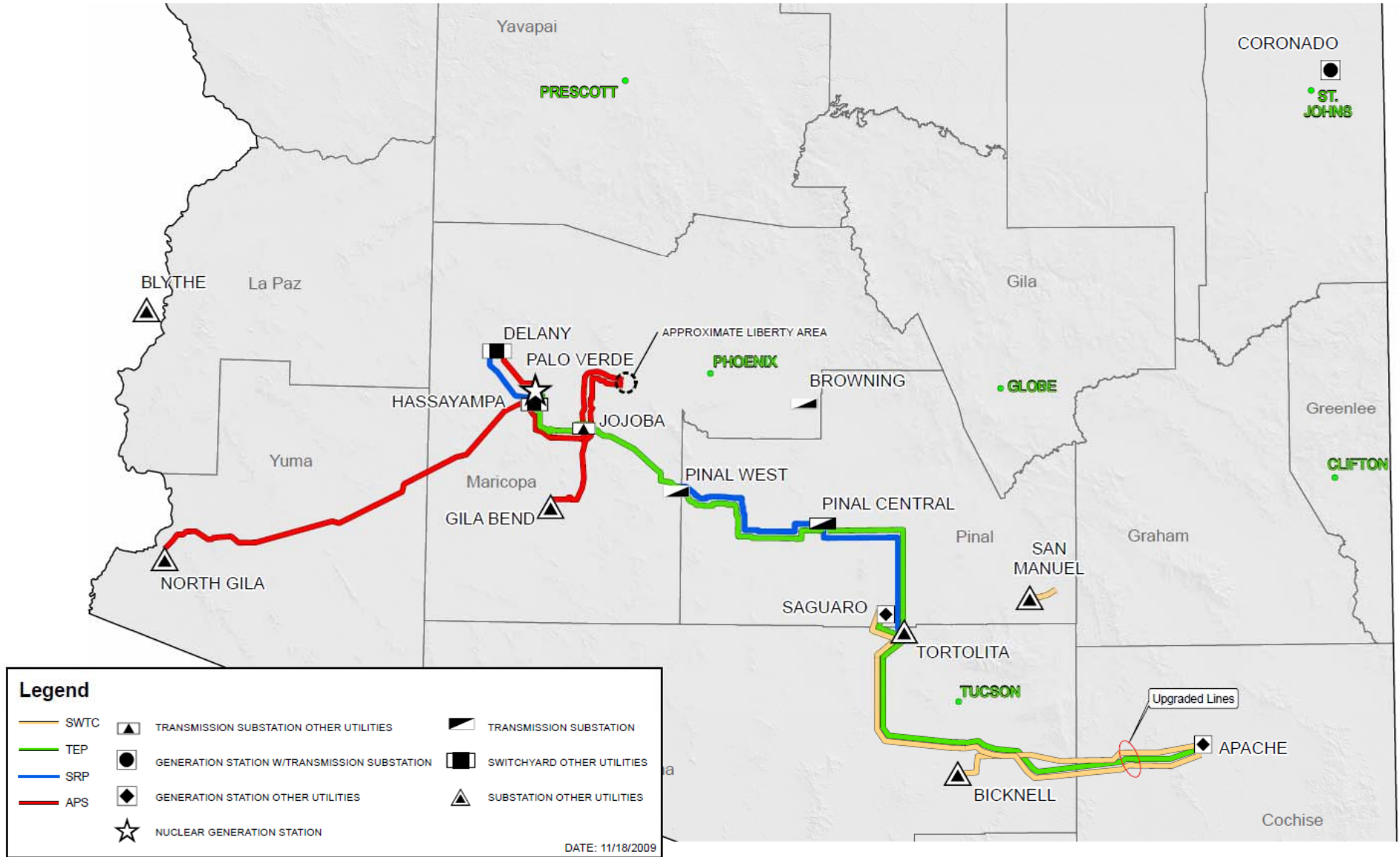
Arizona Utilities' Top RTP Projects

1. Delaney to Palo Verde (APS, SRP)
2. Palo Verde to North Gila #2 (APS)
3. Pinal West to Pinal Central (SRP, TEP)
4. Pinal Central to Tortolita (SRP, TEP)
5. Western Apache to Tortolita (TEP, SWTC)
6. San Manuel Interconnect Project (SWTC)
7. Apache to Bicknell 230 Line Upgrades (SWTC)

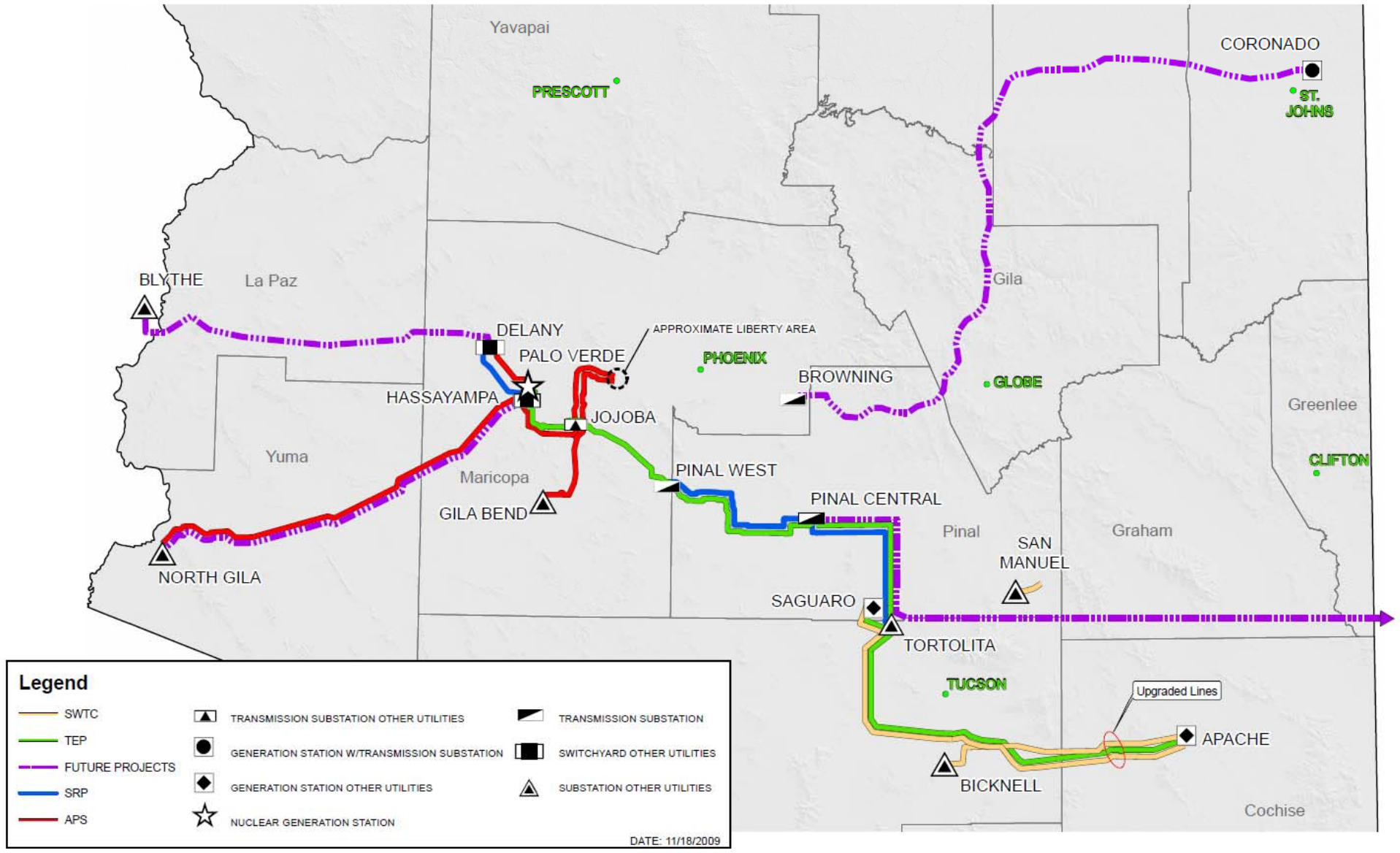
Sensitivities:

1. Delaney to Colorado River 500kV Line (Palo Verde Injection)
2. North Gila to Imperial Valley 500kV Line #2 (Palo Verde Injection)

ARIZONA UTILITIES TOP THREE RENEWABLE TRANSMISSION PROJECTS



ARIZONA UTILITIES TOP THREE RENEWABLE AND FUTURE TRANSMISSION PROJECTS



Technical Assessment Conclusions

- ▶ RTP projects bring incremental export capability to Southern California.
- ▶ Southern California system limits the amount of energy that can be scheduled from Arizona to Southern California.
- ▶ Incremental export can be increased by adding transmission within existing corridors:
 - Delaney to Colorado River
 - North Gila to Imperial Valley

Barriers and Solutions

Preliminary Stakeholder Input - May 19, 2011

Stakeholder Workshop - October 5, 2011

Barrier and Solution Categories

- ▶ Physical Limitations
- ▶ Economic Concerns
- ▶ Permitting Corridors or Rights-of-Way
- ▶ Regulatory Structure

Physical Limitations

- ▶ Technical Limitations
- ▶ Contractual Obligations and Agreements
- ▶ System Reliability Concerns
- ▶ Coordination of Transmission Planning with other Subregional Planning Groups

Economic Concerns

- ▶ Insufficient Demand for AZ Renewables
- ▶ Cost Recovery
- ▶ Cost Allocation
- ▶ Permitting Risk
- ▶ Customer Interconnection and Delivery Cost

Permitting Corridors or Rights-of-Way

- ▶ Duplication of Permit Process
- ▶ Creating New Corridors
- ▶ Permitting Risks
- ▶ Public Perception

Regulatory Structure

- ▶ California Intent for In-State Renewables
- ▶ Cohesive State Vision
- ▶ Interstate Coordination (“Seams” Issue)
- ▶ Changing Regulatory Landscape
- ▶ Applicability of ARS 40-360 (AZ CEC Process)
- ▶ Lack of Other Organized Markets

Solutions to Exporting Renewable Energy

- ▶ Arizona State Vision
- ▶ Maintain a Competitive Edge
- ▶ Streamline Permitting
- ▶ Improve Existing System Efficiency
- ▶ Improve Interstate Coordination (“Seams” Issue)
- ▶ Revise ARS 40-360
- ▶ Create Incentives
- ▶ Develop More Physical Connections with CAISO (increase Export Capability)
 - Potential Corridors (I-10 & I-8)

Barrier Solutions

(continued)

- ▶ ACC participate as a Cooperating Agency in the NEPA processes
- ▶ Eminent Domain with CEC
- ▶ Develop a statewide vision for renewable energy development
- ▶ Develop incentives to advance transmission projects
- ▶ OTHERS??