

Western Grid Developments

October-December 2007

Doug Larson
Western Interstate Energy Board

Meeting of the
Colorado Clean Energy Development Authority
December 18, 2007

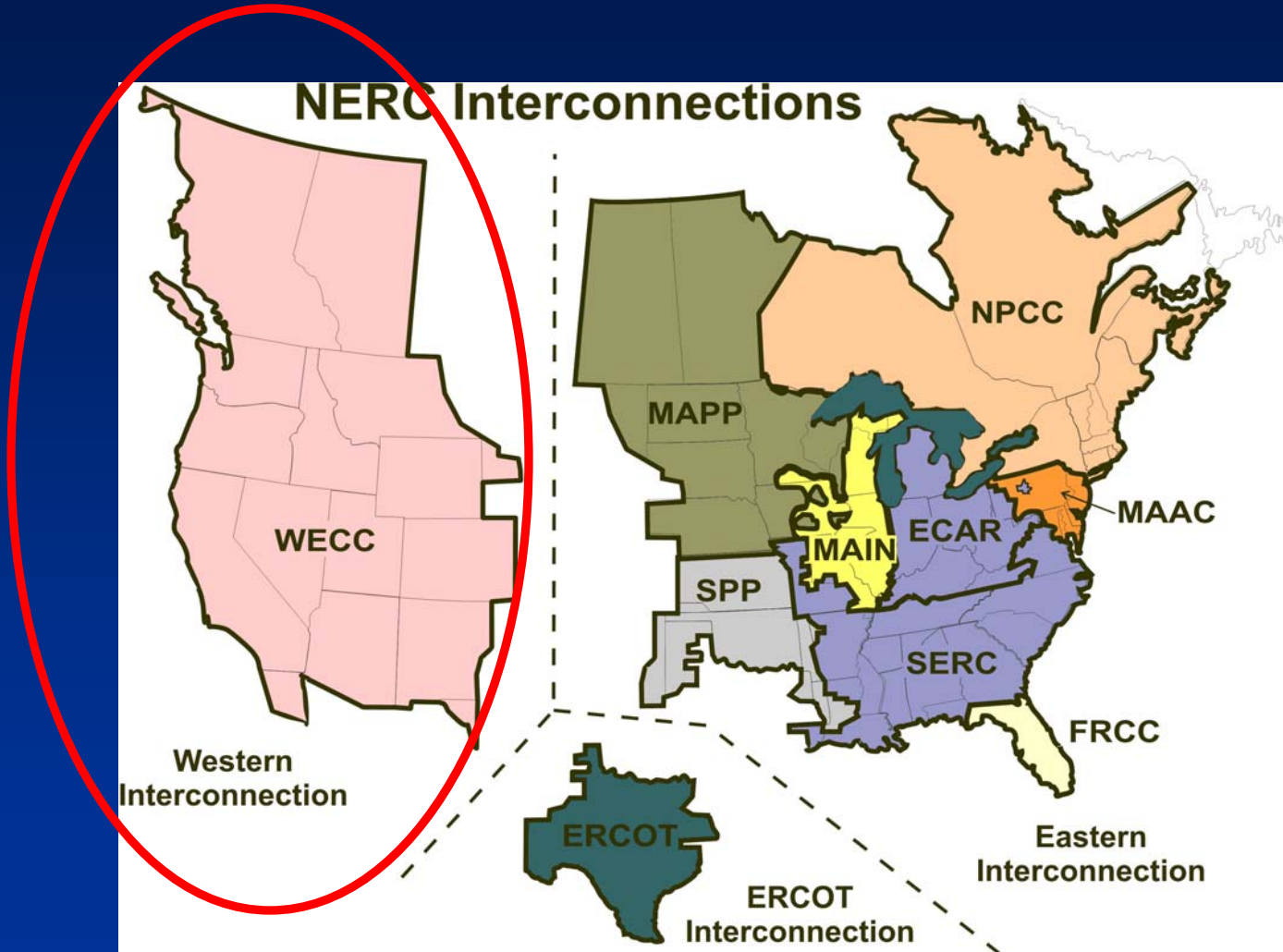


Outline of Presentation

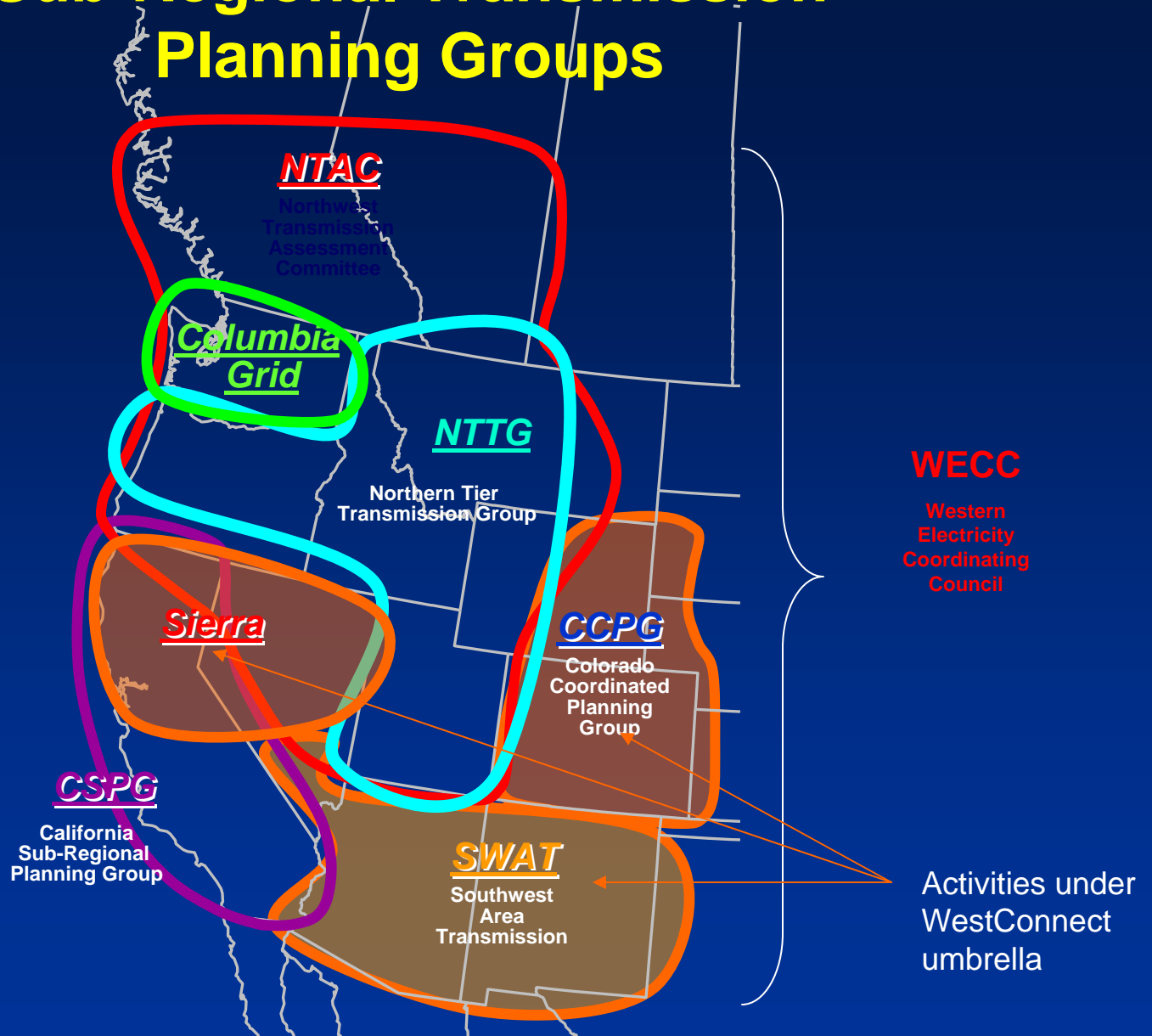
- Geographic reminder
- Developments since November CEDA meeting
 - Renewable Energy Zone initiatives
 - State-specific (CO, CA, AZ)
 - Interconnection-wide (WGA)
 - Transmission expansion update
 - HPX stakeholder meeting
 - Gateway South/TransWest Express
 - WECC planning
 - WestConnect 2007 report
 - Western Wind and Solar Integration Study and Virtual Control Area Study
 - Federal land energy corridor EIS
- Acronymns



Context – Western Interconnection



Sub-Regional Transmission Planning Groups



Renewable Energy Zones

- CO – SB 91 and AB 100 (Morey is covering)
- CA – Renewable Energy Transmission Initiative (RETI) begun
- Other state efforts
 - Study by AZ utilities
 - Nevada Governor's transmission committee
- Interconnection-wide REZ effort



Western Renewable Energy Zone (WREZ) initiative

- Recommended at 9/27-28 WGA renewables/transmission summit
- Brainstorming group working to implement recommendation
 - Seamless link to state-specific REZ work
 - Stakeholder consensus on REZs
 - Construction of transmission to low cost REZs to supply LSE needs



Status of WREZ Concept

- Approved by WIEB/CREPC/WGA
- Conceptual proposal to DOE this week
- If (a big “if”) proposed schedule is met
 - Kick-off meeting in March
 - WREZs identified by September
 - Transmission evaluation thereafter



Outline of WREZ Work Plan

- Phase 1
 - Identify commercial potential, aggregate into zones, estimate bus bar price and delivered price of power
 - Maximize consistency with state and sub-regional work
 - Ground truth data through a stakeholder process – complete 9/07
- Phase 2
 - Have sub-regional planning groups and WECC develop conceptual transmission plans to deliver power from highest ranking REZs
- Phase 3
 - Report to Governors on remaining obstacles to transmission to move renewables
 - Investigate reasons for LSEs not procuring renewables
- Phase 4
 - Identify institutional options for coordinated permitting and cost recovery

Potential Organization of WREZ Effort

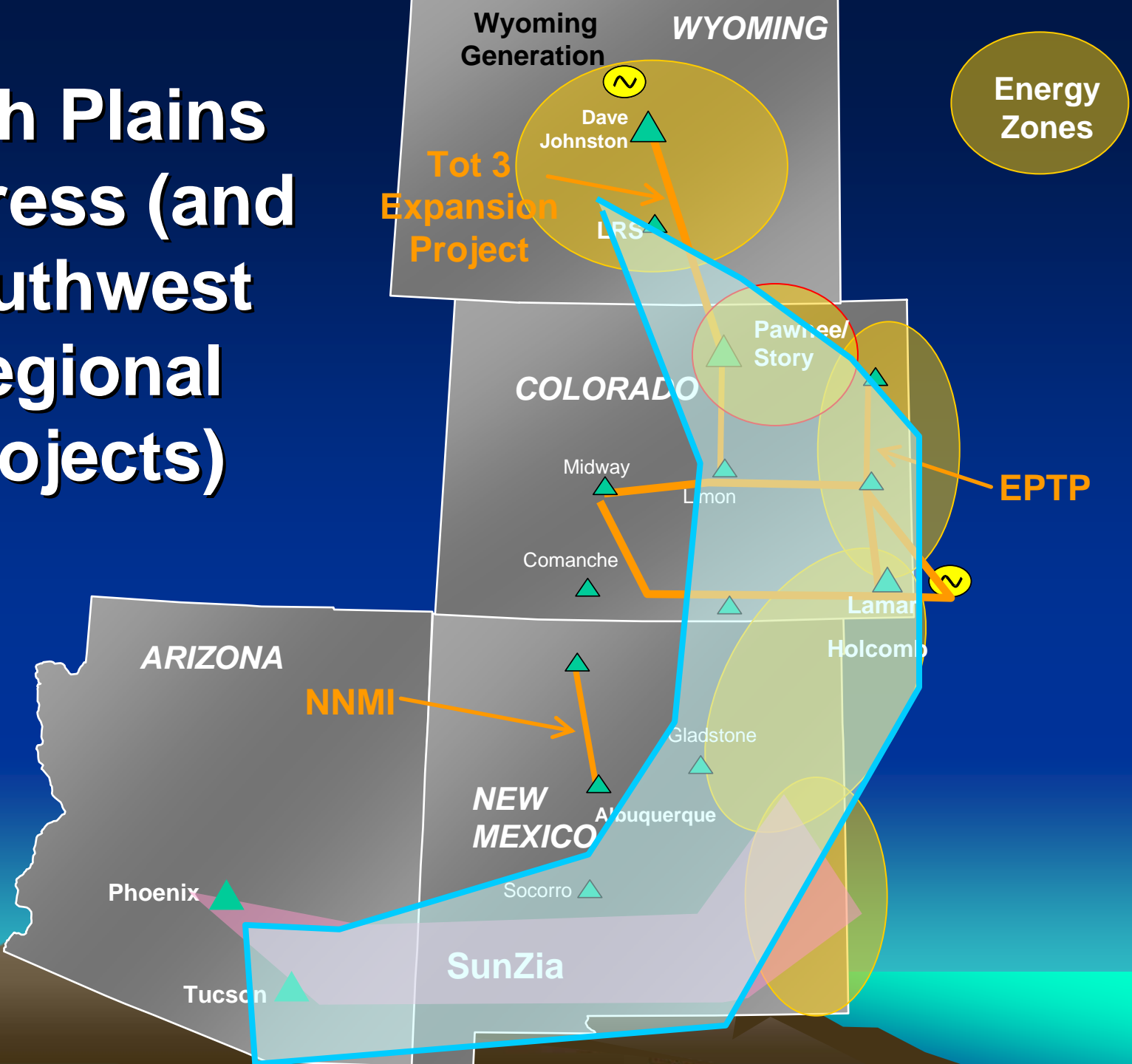


Transmission Expansion Update

- High Plains Express
- Gateway South / TransWest Express
- Other developments affecting major western transmission proposals
- WECC interconnection-wide transmission expansion planning



High Plains Express (and Southwest Regional Projects)



Update: High Plains Express

- **HPX Stakeholder meeting in Denver (Nov. 14)**
 - Complete Phase 1 – Feasibility
 - Preliminary studies – engineering, economics
 - Project cost – \$5.13 billion
 - Move to Phase 2 – Development
 - Next steps: defining the project, ownership negotiation, studies on siting & economics, review of commercial issues, and address regulatory and policy issues
 - Phase 3 – Implementation
 - Design, engineering, ROW, construction, operations



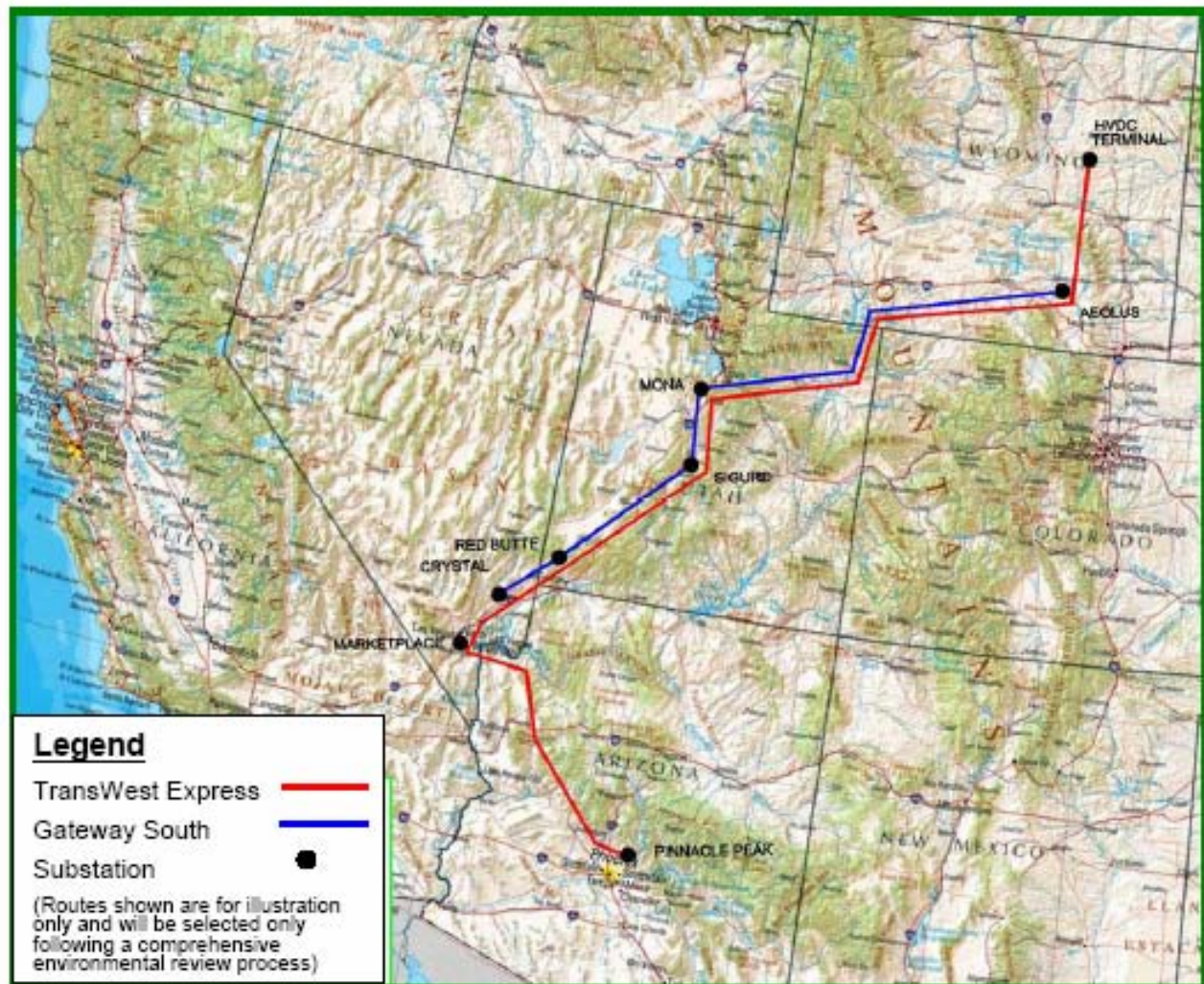
Update: High Plains Express

- **State Team Concept Proposal**
 - Recommended at 9/27-28 WGA Summit
 - Four state (CO, WY, NM, AZ) collaboration on HPX project among
 - Governors' Offices
 - Public utility commissions
 - Infrastructure authorities
 - Objectives
 - State policy goals, e.g. RPS compliance
 - Coordination on cost allocation
 - Coordination on siting with environmental interests
 - Status: being discussed by Governors' offices



TransWest Express and Gateway South Potential Design Solutions

- ◆ Size of combined projects dependent on regional and customer needs
- ◆ Capacity options are under review from 4,500 to 7,500 MW export from WY
- ◆ DC circuit options include 3rd terminal or termination in southern Nevada

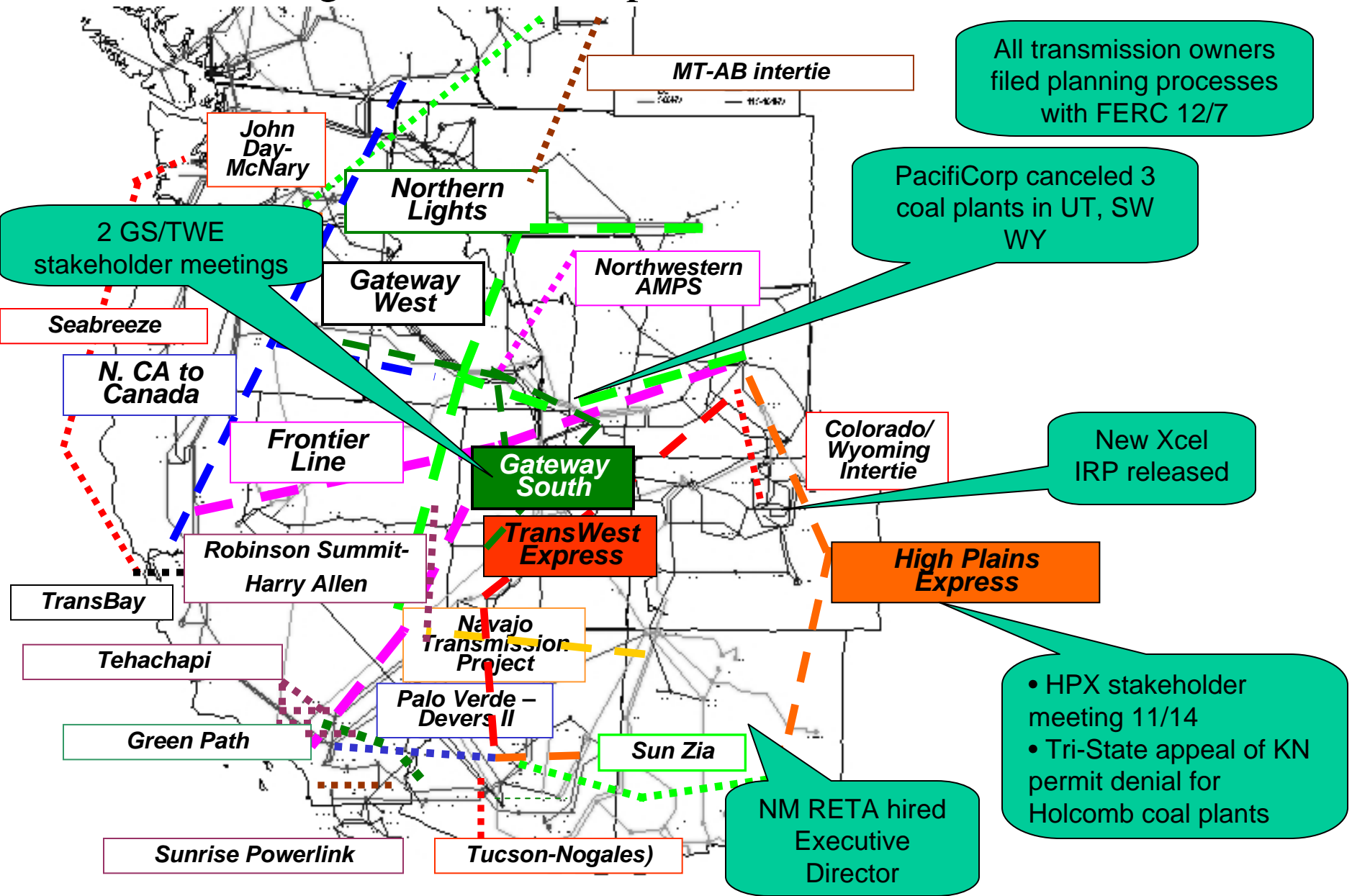


Update: Gateway South/ TransWest Express

- Co-development agreement
 - PacifiCorp – Gateway South
 - APS – TransWest Express
 - National Grid
 - Wyoming Infrastructure Authority
- GS/TWE Stakeholder Meetings in Cheyenne (Nov. 7) & Phoenix (Dec. 5)
- Transmission line WY to AZ
 - WY generation wind/coal 4500 MW to 7500 MW
 - Load centers in Salt Lake, Phoenix, and Las Vegas



Proposed Transmission Projects and Several Significant Developments Since October



Interconnection-wide Transmission Expansion Modeling

- Being done by WECC's Transmission Expansion Planning Policy Committee
- Scenarios to be modeled in next few months
 - Achieve compliance with state RPS requirements



RPS Renewable Generation Requirements

RPS States	2017	2020
AZ	7%	15%
CA	20%	33%*
CO	15%	20%
MT	15%	Same
NV	20%	Same
NM	15%	20%
OR	15%	20%
TX	+/- 5%	Same
WA	9%	15%

Big jump in RPS requirements in 2020

* Official state goal

RPS Renewable Generation in 2017

RPS States	RPS Energy (GWh) 2017
AZ	4,164
CA	52,859
CO	6,630
MT	993
NV	6,108
NM	2,763
OR	5,837
TX	420
WA	8,186
Total	87,960

TEPPC 2017 Scenario 1

- **High Wind Case**

- Renewable shares: 70% wind, 10% solar, 15% geothermal, 5% biomass
- Wind Nameplate about 13,712 MW
- Transmission from wind exporting states (WY, NM-CO, WA-OR) to load areas (CA, AZ, NV)
- Gas/Coal share fills about 87% of the Gap at peak



TEPPC Scenario 2

- **High Solar CSP Case**

- Renewable shares: 40% wind, 40% solar, 15% geothermal, 5% biomass
- Solar CSP nameplate increases to 7,835 MW from 1,959 MW; Wind drops to 7,835 MW from 13,712 MW
- Solar reduces wind imports (CA, AZ, NV) and fossil generation to meet peak
- Gas/Coal share fills 72% of the Gap, down from 87% of the Gap

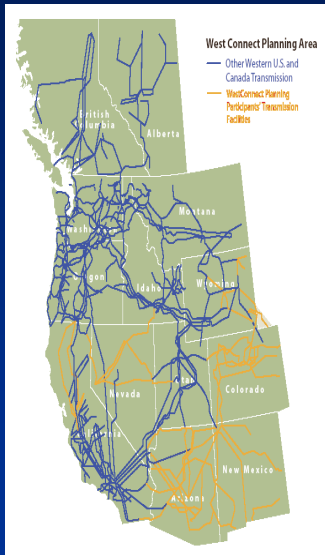


Emerging Issues for TEPPC to model in the future

- RPS increasing over time
 - Existing requirements increase in 2020
 - Statutory changes by new/existing RPS states
 - Possible Federal RPS
- Climate change and carbon regulation
 - Western Climate Initiative cap and trade system for 7 states/2 provinces
 - Federal carbon regulations
- Growing dependence on natural gas



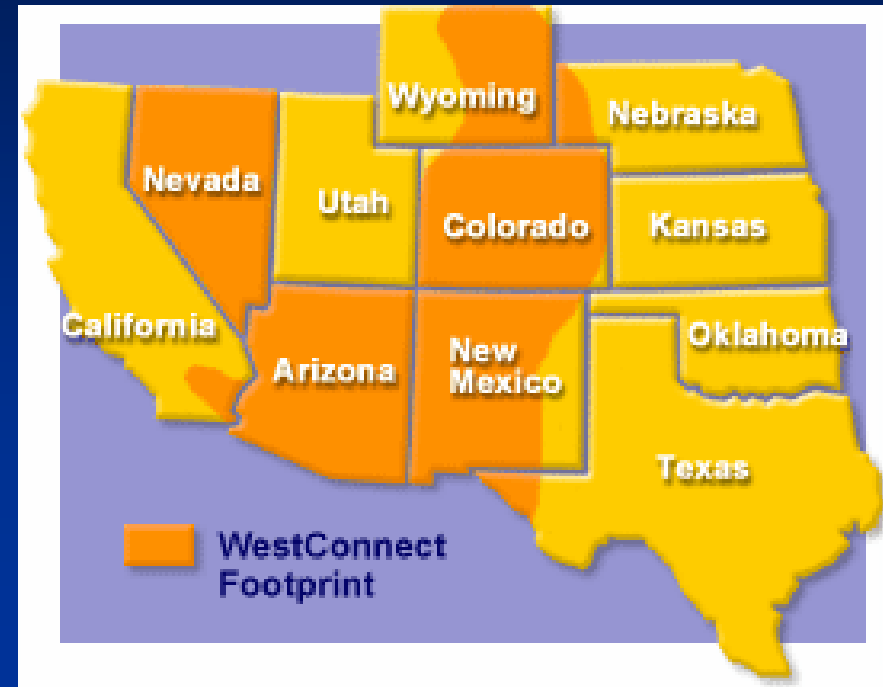
WestConnect 2007 Draft Report



http://www.westconnect.com/filestorage/WestConnect_Planning_Report_Rev1_6_DRAFT.pdf

WestConnect Virtual Control Area Study

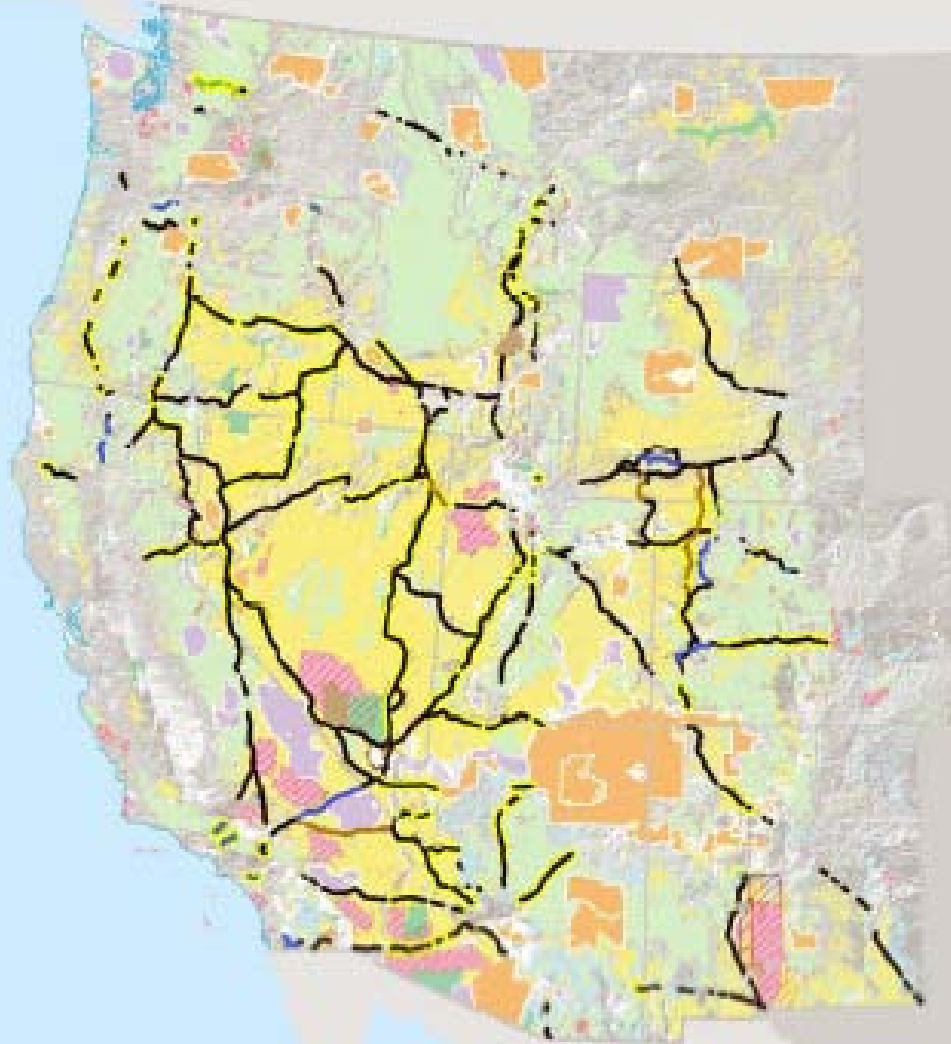
- Original response to WestConnect RFP was too expensive so NREL and BP agreed to help co-fund
- Work Group met Oct 19 and determined:
 - The Western Study will include 20 and 30% scenarios, considering control areas individually and control areas as one to determine benefits of sharing regulation and load following
 - Section or chapter of final report to report on these results
 - WestConnect will conduct reserve sharing as a separate study



Schedule

Kickoff Stakeholder Meeting	5/23/07
Data Collection	Jun-Dec '07
Wind/solar mesoscale modeling	Oct '07-May '08
Preliminary Analysis	Feb-Jun '08
Prelim. results stakeholder mtg	Jul '08
Production Cost Modeling	Jul '08-Jan '09
Interim Technical Results mtg	Dec '09
Draft report	Feb '09
Draft results Stakeholder mtg	Mar '09
Final Report	Apr '09

Federal Lands Energy Corridors



West-wide Energy Corridor
Programmatic EIS

Draft Corridors
November 2007

Corridor Transmission Designation*

- Multi-modal
- Electric-only, Upgrade-only
- Electric-only
- Underground-only
- Locally Designated

* Corridor widths are not to scale.

- State Owned
- Tribal Lands
- DCD Installations and Ranges
- Federal Ownership**
 - Bureau of Land Management
 - Bureau of Reclamation
 - Department of Defense
 - Department of Energy
 - Fish and Wildlife Service
 - National Park Service
 - Other
 - US Forest Service



- DEIS issued 11/19
- Denver hearing 1/31
- Comment deadline 2/19

Key Acronyms

- CCPG – Colorado Coordinated Planning Group
- CREPC – Committee on Regional Electric Power Cooperation (WIEB committee of western PUCs/energy agencies)
- HPX – High Plains Express transmission project
- LSE – load serving entities (e.g. utilities)
- NTTG – Northern Tier Transmission Group
- SWAT- Southwest Area Transmission group
- TEPPC – WECC’s Transmission Expansion Planning Policy Committee
- WECC – Western Electricity Coordinating Council
 - TEPPC – WECC’s Transmission Expansion Planning Policy Committee
- WGA- Western Governors’ Association
- WIEB – Western Interstate Energy Board (energy arm of WGA)
- WREZ – West-wide Renewable Energy Zone initiative

