

DRAFT MEETING AGENDA

Western Area Power Administration Rocky Mountain Region

**Transmission Planning Stakeholder Meeting
Western's RMR Regional Office
5555 East Crossroads Boulevard, Loveland, CO 80538**

December 8, 2010 – 10:00 am to 12:00 pm MDT

- 1) 10:00 am **Introduction of Attendees \ Finalize Agenda** (Bob Easton)
- 2) 10:05 am **Overview of the Western's Process for FERC Order No. 890** (Debbie Farm)
- 3) 10:15 am **Capital Improvement Plan** (Diane Keirn)
- 4) 10:45 am **West Connect Transmission Update** (Bob Easton)
- 5) 11:00 am **Transmission Planning Studies** (Jim Hirning)
- 6) 11:15 am **Review of 2010 Transmission Planning Study Scope & Process** (Jon Fidrych)
- 7) 11:30 am **Stakeholder Input / Open Discussion** (Bob Easton)
- 8) 11:45 am **Next Meeting Date and Closing Remarks** (Bob Easton)
- 9) 12:00 pm **Adjourn**

Dec 2010

<u>Name</u>	<u>Organization</u>	<u>Email</u>
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Western Rocky Mountain Region Planning Stakeholder Meeting (Western OATT Attachment P)

December 8, 2010

Meeting Purpose

- Opportunity for our customers to be informed about Western's transmission system planning process and provide input
- Allow Western to maximize its understanding of its customers' forecast needs for Western's transmission system
- Review transmission plans



OATT Revision

- Order 890 issued Feb. 16, 2007
- Western maintains a safe harbor OATT with FERC
 - Not required to abide by Order 890 compliance deadlines like jurisdictional TPs
 - Resources and projects are based on statutory or budgetary restrictions
 - Any variances in the FERC approved OATT must be justified to customers and accepted by FERC
 - May make modifications that are consistent with or superior to pro forma OATT provisions
- Western revised OATT to address Order 890
 - Submitted to FERC September 29, 2009
 - **Effective Date: December 1, 2009**

OATT Revision

- Information regarding OATT Revision is posted at the following URL:
<http://www.wapa.gov/transmission/oatt.htm>
- Tariff documents are posted on OASIS at the following URL:
<http://www.oatioasis.com/WAPA/WAPAdocs/WAPA-Tariff-Docs.htm>
- Tariff REDLINE Documents:
<http://www.oatioasis.com/WAPA/WAPAdocs/WAPA-OATT-REDLINE-Effective-2009-1201.pdf>

FERC Order 890 – Planning Principles

- **Transmission Planning:** FERC requires a more inclusive transmission planning process incorporating nine principles:
 - (1) coordination,
 - (2) openness,
 - (3) transparency,
 - (4) information exchange,
 - (5) comparability,
 - (6) dispute resolution,
 - (7) regional participation,
 - (8) economic planning studies, and
 - (9) cost allocation for new projects.

Planning Process

- Types of Studies Performed
- NERC/WECC Reliability Studies
- Sub-regional Coordination (CCPG)
- 2010 Ten Year Capital Program
- Generator Interconnection & Transmission Service Requests



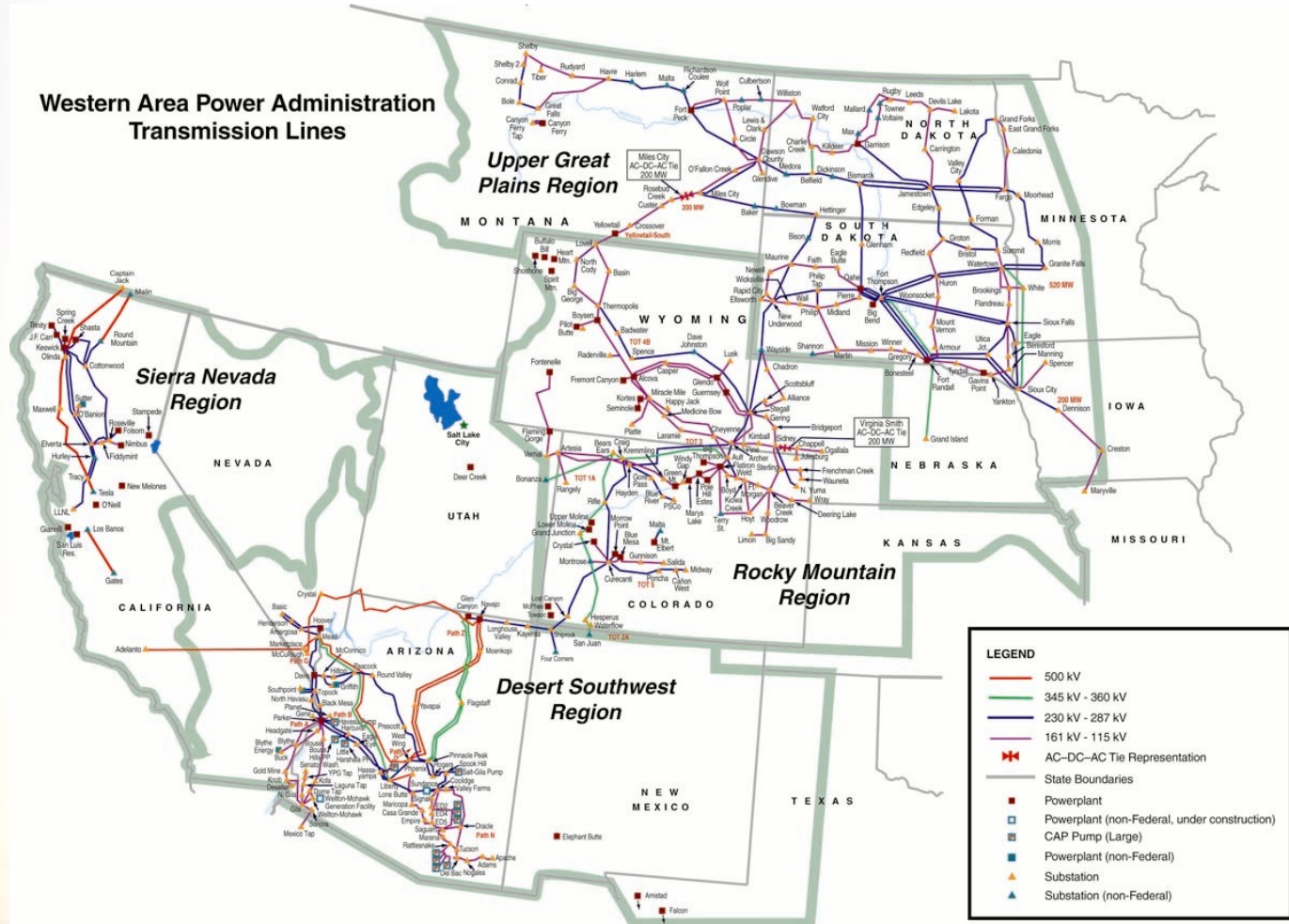
Types of Planning Studies

- » Reliability Studies – Meet NERC/WECC standards and coordinate through CCPG
- » Sub-regional Coordinated Studies – identify congestion and overloads and address integration of new resources and loads
- » Western invites the submittal of transmission study requests from stakeholders for review and discussion
 - » Western's point of contact for study requests is rnrplanningmanager@wapa.gov.



Western's Service Territory

Western Area Power Administration Transmission Lines



Rocky Mountain Region Capital Investment Program Plan

Prepared by
Diane Keirn, J5642
December 1, 2010



CAPITAL INVESTMENT PROGRAM PLAN

- Communicate all **capital investment** projects for the next ten fiscal years internally and to customers.
 - Includes all power systems and funding types
 - Provide a mechanism for customer collaboration for capital investment projects
 - Define challenges, goals, strategies, and measurements for the Plan.
-

CIP PROCESS TIMELINE

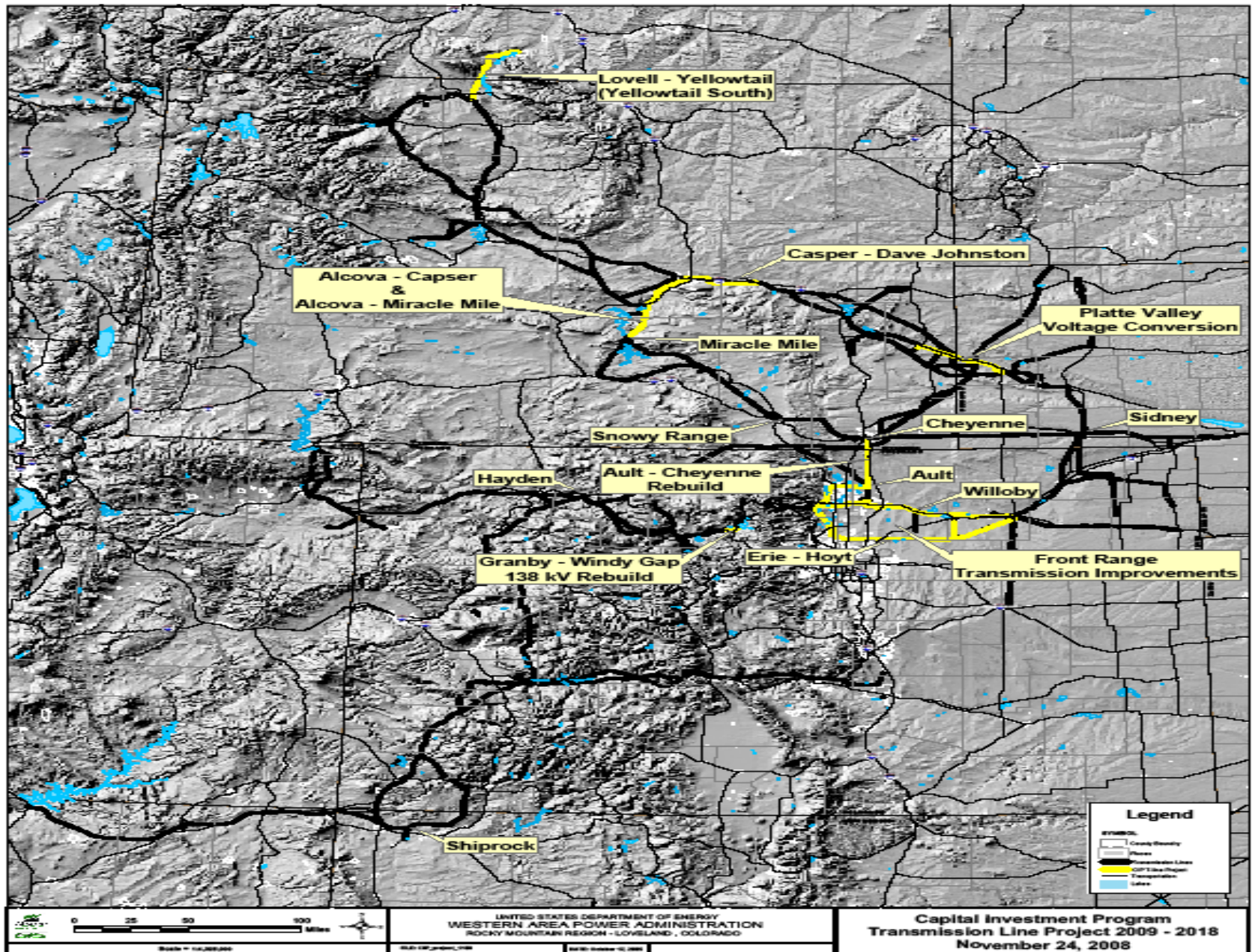
- **October** - RMR data collection and review for updates to existing projects and new projects.
 - **November** – Rates office uses the review and adjusted CIP for analysis of the Transmission Rate projections.
 - **December** - Distribution to Customers
 - **January** – CIP group refines report based on customer feedback
 - **February**- Final plan is provided to the Finance office for budget formulation
 - **March** - Final Distribution of the Plan
-

CIP USES

- **RMR managers and finance personnel**
 - A guide for managing project budgets and execution.
 - Primary tool for program managers to ensure efficient execution of the capital program for the Region.
 - **Capital Investment Committee**
 - Review and adjust the region's capital program priorities on a monthly basis.
 - **RMR Finance Office**
 - Formulate the budget.
 - **Rates office**
 - Update Transmission Rates studies
 - **RMR customers**
 - Annual baseline to gauge the region's performance and accomplishments.
-

MAJOR CIP PROJECTS COMPLETED FY10

- CRSP
 - Shiprock KU1A replacement \$2,065k
- Pick Sloan
 - Ault-MM 230-kV
 - Ault-Black Hollow Re-conductor \$653k
 - Erie-Hoyt 230-kV Upgrade \$27,804k
 - Ault 230-kV additions (AU-MM 230) \$685k
 - Cheyenne 230-kV additions \$9,500k
 - Miracle Mile 230-kV additions \$9,842k
 - Ogallala Transformer upgrade \$873k



PICK SLOAN MAJOR CAPITAL PROJECTS

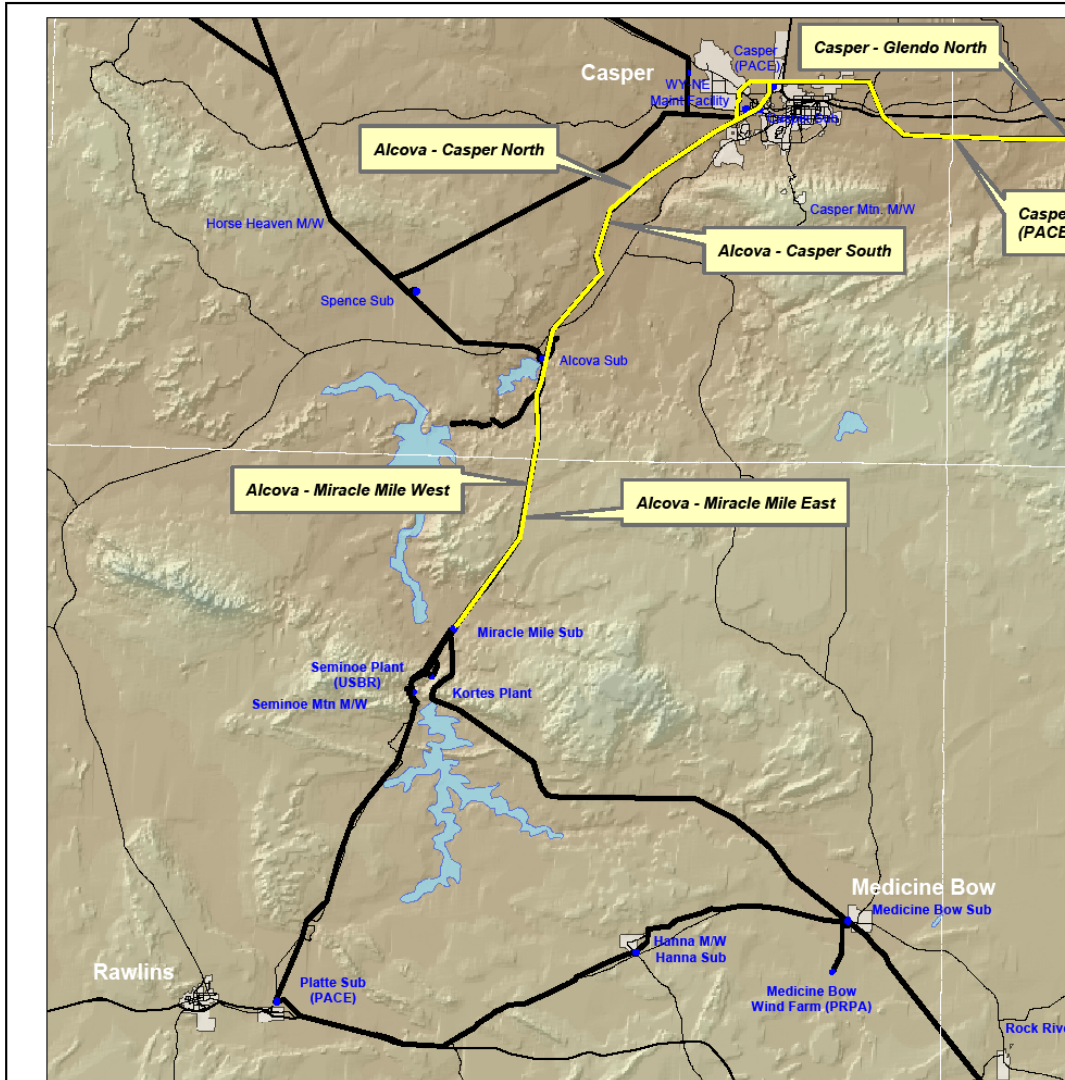
Transmission Lines

- Central Wyoming Transmission Project (CWTP)
 - Platte Valley Voltage Conversion Project (PVVC)
 - Granby-Windy Gap 69-kV Rebuild
 - Estes-Flatirons 115-kV Rebuild
 - Lovell Basin -115-kV Upgrade
 - Lovell-Yellowtail #1 & #2 TL Rebuilds Phase 1
 - Lovell-Yellowtail #1 & #2 TL Rebuilds Phase 1
 - Front Range Transmission Improvements
 - Dixon Creek Substation – Horsetooth Tap
 - Longmont NW – Fordham
-

PICK SLOAN MAJOR CAPITAL PROJECTS

Transformers & Capacitor Banks

- Ault Stage 07 – transformer installation
 - Cheyenne 230/115-kV Transformer – Stage 04
 - Shunt Capacitor Banks – Fort Morgan West, Frenchman Creek, Sidney
 - Lingle Substation 69-kV Additions
 - Torrington Substation 69-kV Additions
 - Weld 230/115-kV Transformer Addition – Stage 04
 - Willoby Switchyard 115-kV
-



CENTRAL WYOMING TRANSMISSION IMPROVEMENT PROJECT - CWTIP

A phased project to address reliability, structure condition due to age

- Phase I : Construct 24.1-mile Alcova-Miracle Mile West transmission line. Construction planned for 2015.
- Phase II : Construction 28.6-mile Alcova-Casper South transmission line. Construction planned for 2016
- Phase III: Construct 28-mile Casper-Glendo South transmission line. Construction planned for 2017.
- Phase IV: Construct 36.1-mile Casper-Glendo North transmission line. Construction planned for 2018.
- Phase V : Construct 28.6-mile Alcova-Casper North transmission line. Construction planned for 2019.
- Phase VI : Construct 24.1-mile Alcova- Miracle Mile East transmission line. Construction planned for 2020.

PLATTE VALLEY 34.5 - 69-KV CONVERSION

- East Morrill Tap – Sievers Rural Tap Transmission Line :Construct eleven miles of new \$1,395k FY12
- Sievers Rural Tap: Install a 69/34.5-kV 25 MVA transformer and associated equipment. \$4,045k FY12
- Lingle Substation: Install a 115/69-kV 40 MVA transformer and associated equipment. \$4,730k FY FY12
- Torrington Substation: Install a 69/34.5-kV 50 MVA transformer and associated equipment. \$5,400k FY12

Planned ISD: FY2015

GRANBY-WINDY GAP TL

Status: Environmental Assessment

Public Process: January 2011

Record of Decision: March 2011

Estimated Budget: \$12,794k ISD: FY13

ESTES-FLATIRON 115-KV DOUBLE CIRCUIT

Rebuild the two 115-kV lines, about 16 miles each, between the Estes and Flatiron Switchyards.

- Rebuild due to age and condition
- Improve the ROW to help with vegetation management criteria.
- Improve Maintenance access to structures.

Current Status: FDD draft, Environmental, Lands
Estimated Budget: \$18,800k ISD: FY14

LOVELL BASIN UPRATE

Scope: Project to rebuild to Lovell Basin 115-kV lines.

- Approximately 40 miles
- Re-conductor the line at 115-kV with 477 ACSS conductor.
- Line rating will be 330 MW
- Estimated Budget: \$2,839k Start: FY11 ISD FY12

LOVELL-YELLOWTAIL REBUILDS

- **Phase 1** –National Park Service only.
- **Scope** : Project to rebuild to LV-YT 115-kV #1 and #2 lines. Each are 11 miles (22 miles total).
 - Initiated due to age and condition
 - 115-kV construction with 795 ACSS conductor.
 - Line rating will be 330 MW each
 - Estimated Budget: \$15,000k Start: FY11 ISD: FY12

LOVELL-YELLOWTAIL REBUILDS

- **Phase 2 – Outside of the NPS: Crow Reservation, and Privately Owned Lands**
- **Scope** : Project to rebuild to LV-YT 115-kV #1 and #2 lines. Each are 36 miles (70 miles total).
 - Initiated due to age and condition
 - The lines will be rebuilt at 115-kV with 795 ACSS conductor.
 - Line rating will be 330 MW each
 - Increases capacity across Yellowtail South constraint path.
 - Goal: Sufficient capacity to carry entire Yellowtail generation on either line.
 - Estimated Budget: \$20,400k Start: FY11 ISD: FY13

LOVELL-YELLOWTAIL REBUILD TIMELINE

- Project Start: 2007
- Environmental EA: 2010
- Design: 2010
- Phase 1 construction contract award: 2011
- Phase 2 construction contract award: 2012
- Construction completion: 2013 or early 2014

FRONT RANGE TRANSMISSION IMPROVEMENTS

- Western owned, operated. Funded by PRPA
 - Dixon Creek Substation – Horsetooth Tap
 - Overhead core-ten 230-kV construction double circuit, replaced H-Frame
 - PRPA operated at 230-kV
 - Western operated at 115-kV
 - Budget \$3500k ISD January 2012
 - Longmont NW – Fordham
 - Hybrid 230-kV construction double circuit
 - PRPA operated at 230-kV
 - Western operated at 115-kV
 - Budget \$1400k ISD OH 6/2011 UG 7/2011

PICK SLOAN TRANSFORMER PROJECTS

- Ault Stage 07 230/115-kV
 - Budget \$6,493k ISD: FY12
- Weld KV2A – 230/115-kV 150 MVA – 2012
 - Budget \$1,275k ISD: FY12
- Cheyenne Stage 04 – 230/115-kV 250 MVA
 - Budget \$4,705k ISD: FY14
- Willoby Switchyard (greenfield)
 - Budget \$4,617k ISD: FY11

115-KV SHUNT CAPACITOR BANKS

Project to improve TOT3 transfer capabilities.

- Fort Morgan West 15MVAR
 - Budget \$1,300k ISD: FY11
- Frenchman Creek 8.1MVAR installation
 - Budget \$1,300k ISD: FY11
- Sidney 15 MVAR
 - Budget \$1,300k ISD: FY11

Current Status: Design in progress; purchasing equipment

CRSP MAJOR CAPITAL PROJECTS

Transmission Line

- Craig Rifle 230-kV Transmission Line

Transformers

- Curecanti KZ2A Transformer Addition
 - Flaming Gorge KY2B Transformer Replacement
 - Hayden KZ1A Transformer Replacement
 - Hayden KZ2A Transformer Replacement
 - Shiprock Tri-State Interconnection
 - Weld 230/115-kV Transformer Addition – Stage 04
-

CRAIG-RIFLE 230-KV

Proposed Scope #1 : Increase current limit on line to a minimum of 1600 amps.

- RFL Replace 6-230-kV disconnect switches and jumpers
- Re-conductor four spans of TL into Rifle w/ACSS
- Re-conductor two spans of t-line into Craig w/ACSS
- CRG Replace CT's

Estimate: \$1,850k ISD: FY12

Proposed Scope #2: Operate CRG-RFL at 345-kV

- New 345/230-kV 500MVA Transformation at Ute Rifle (PsCo)
- New 230-kV TL 3.5 miles btw Ute Rifle/Rifle
 - Investigate double circuit.

Budget: At Tri-State expense: ISD: FY13

CRSP TRANSFORMER PROJECTS

- Hayden KZ1A -250 MVA Budget: \$4,285k FY11
- Weld KV2A – 230/115-kV 150 MVA Budget \$1,275k ISD: FY12
- Hayden KZ2A - 250 MVA Budget: \$7,000k FY14
- Shiprock Tri-State Interconnection Budget: \$7,075 FY14
- Curecanti KZ2A addition Budget: \$4,750k FY16
- Flaming Gorge KY2B - 250 MVA Budget: \$4,500 Fy18

WestConnect Transmission Planning Update

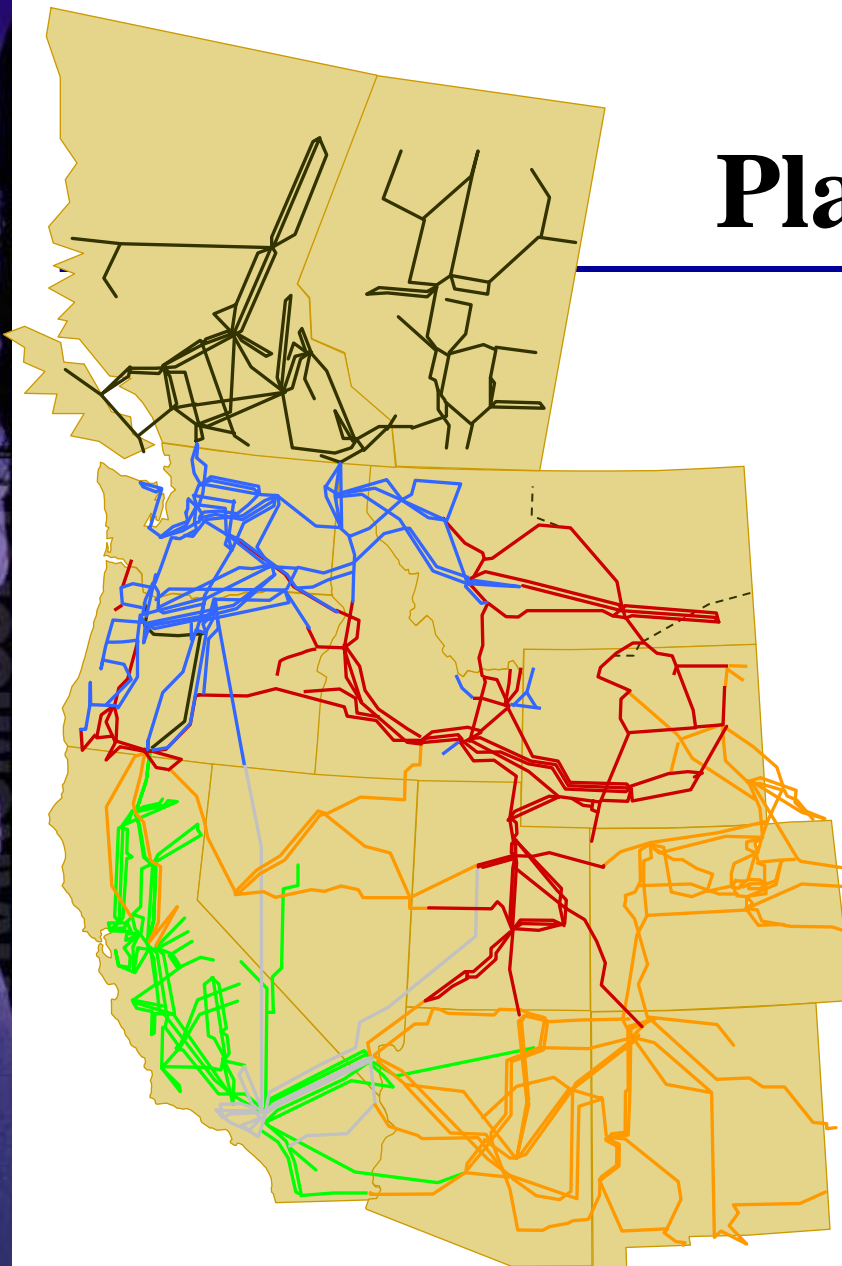
**Bob Easton
890 Stakeholder Meeting**

December 8, 2010








WestConnect Planning Footprint

Enhancing wholesale
electricity markets

WEST
CONNECT



WECC **Subregional Planning Groups** **Major Transmission Facilities**

-  ColumbiaGrid
-  Northern Tier Transmission Group (NTTG)
-  Northwest Transmission Assessment Committee (NTAC) that are not part of ColumbiaGrid or NTTG
-  WestConnect (SWAT, CCPG & Sierra)
-  California ISO
-  California Transmission Planning Group that are not part of CAISO
-  Other Facilities

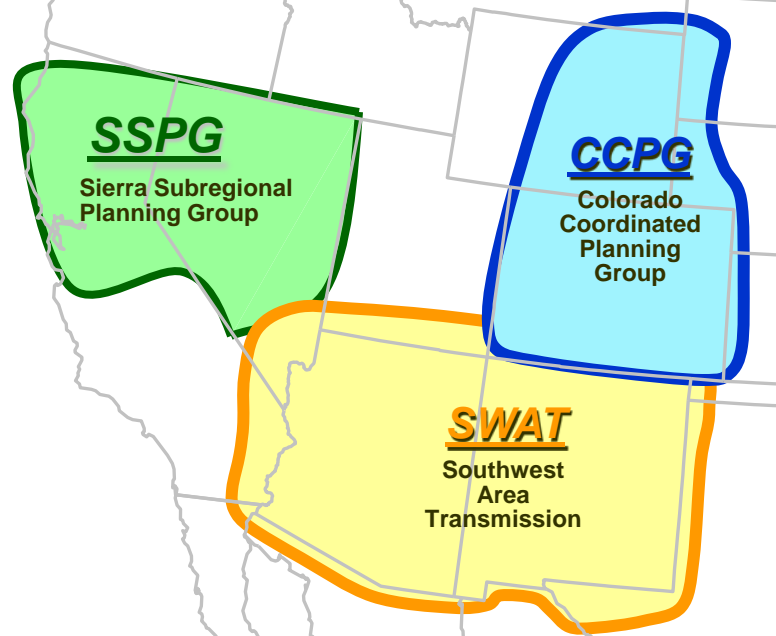
Parties to WestConnect STP Project Agreement

- **Arizona Public Service Company**
- **Basin Electric Power Cooperative**
- **Black Hills Corporation**
- **El Paso Electric Company**
- **Imperial Irrigation District**
- **Public Service Company of CO**
- **Public Service Company of NM**
- **Sacramento Municipal Utility District**
- **Salt River Project**
- **NV Energy**
- **Southwest Transmission Cooperative**
- **Transmission Agency of Northern California**
- **Tri-State Generation & Transmission, Assoc.**
- **Tucson Electric Power Company**
- **Western Area Power Administration**

WestConnect Subregional Planning Groups

CCPG, SSPG and SWAT are technical planning work groups within the WestConnect Footprint

- Coordinate Information for use by all study participants
- Define subregional study plans, provide study resources, and perform studies
- Provide forum for coordination and peer review of planning studies and 10-year plans



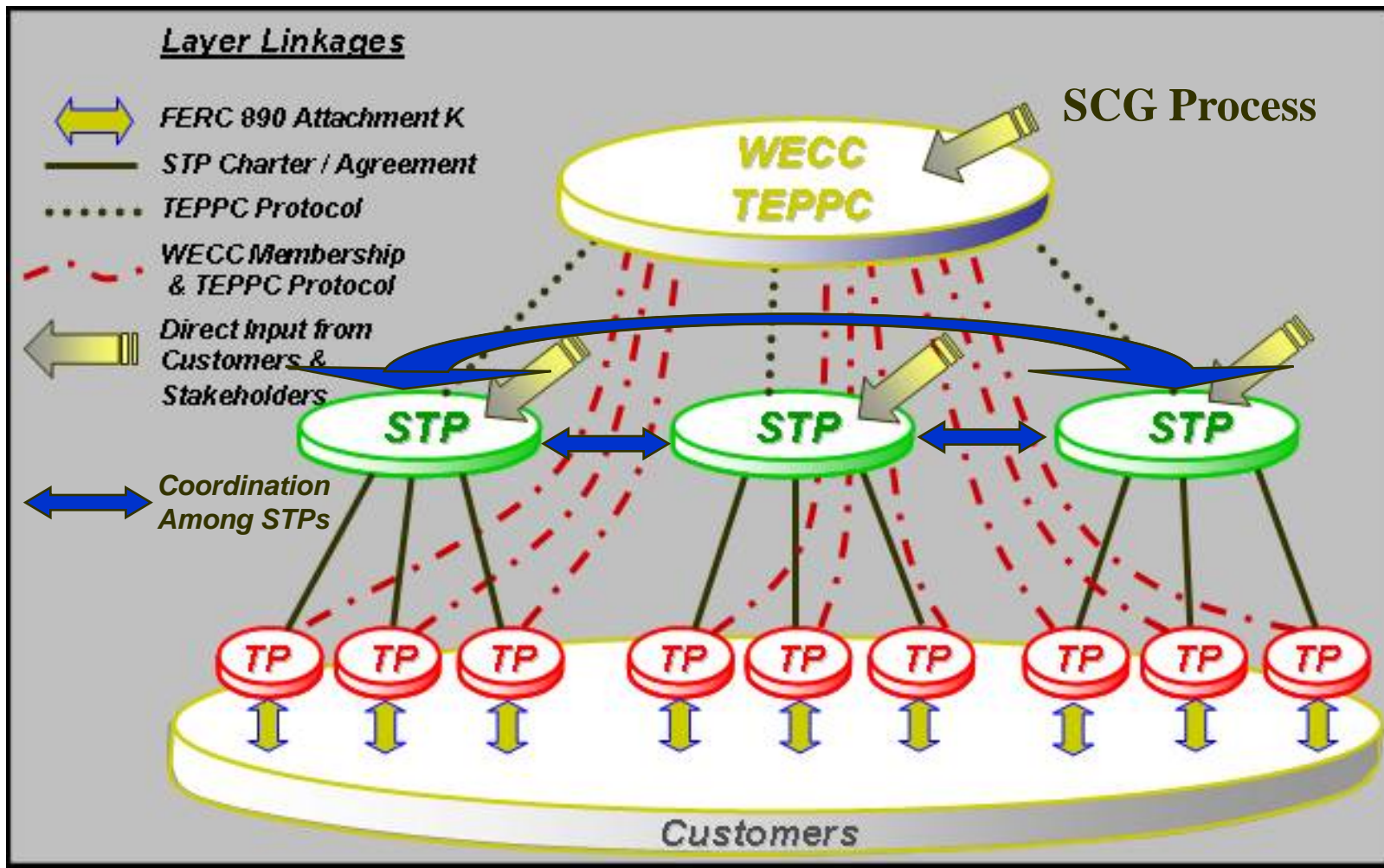
2011 SCOPE of Work

- **Manage Annual Planning Process**
- **Update the 10-Yr Planning Documents**
- **Coordinate Annual TTC/ATC Workshop**
- **Participate in WECC TEPPC**
- **Coordinate WestConnect-wide 10-Yr Base Case - OPTIONAL**

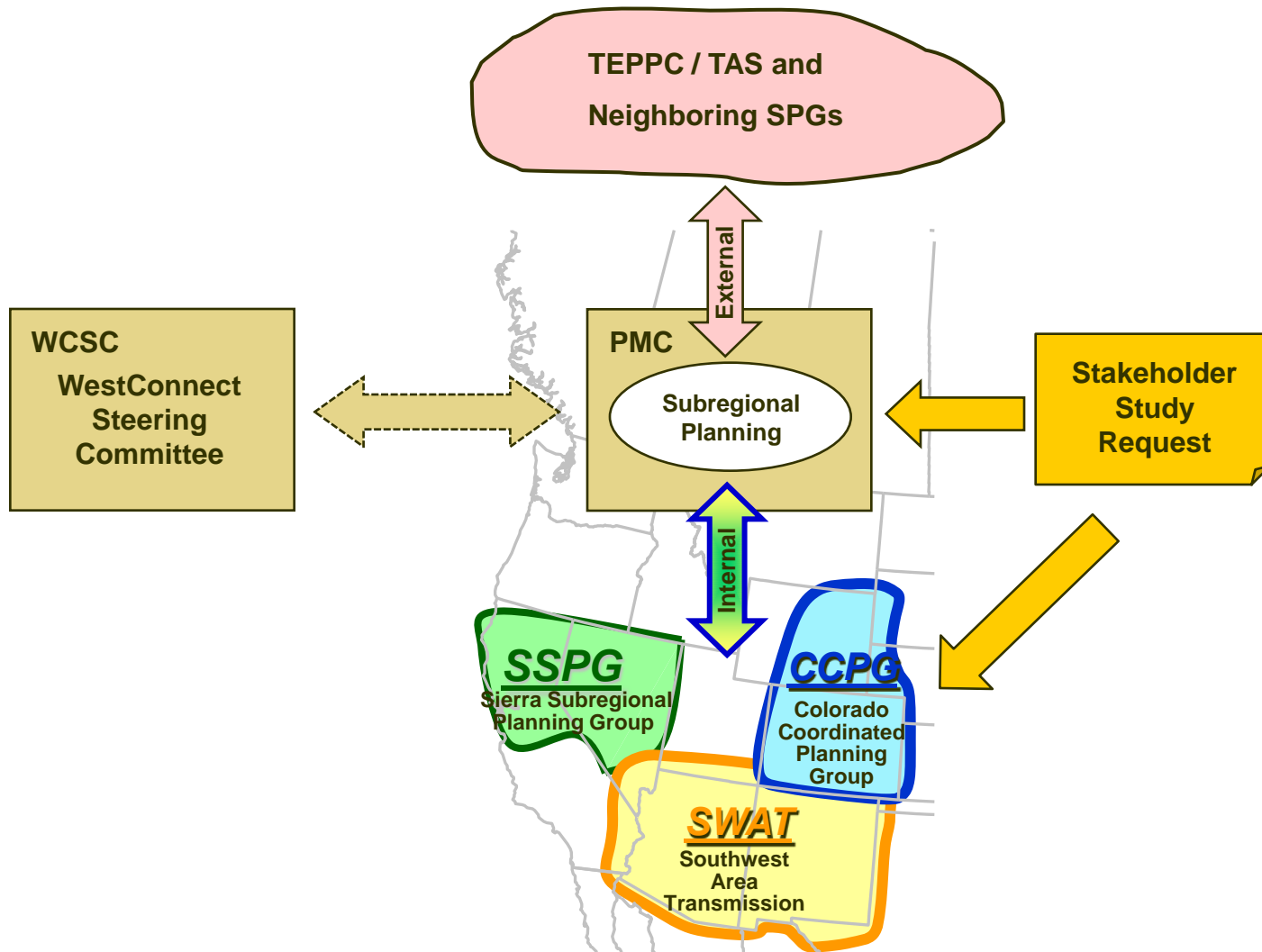
2011 SCOPE of Work

- **Coordinate with SCG (Result of DOE FOA)**
- **Attend CCPG/SWAT/SSPG Joint Meeting**
- **Maintain TPM Database**

Western Interconnection Planning Process



Planning Coordination



WestConnect Synchronized Planning Cycle

TEPPC Economic Study Results For WestConnect Footprint



WestConnect Economic Study Request of TEPPC

Commence coordination / collaboration with
Subregional Planning Coordination Group (SCG)

Western RMR Transmission Planning Stakeholder Meeting

2010 Transmission Planning Studies

Jim Hirning
Transmission Planner
Loveland, CO

December 8, 2010

NERC/WECC Transmission Planning

- TPL-001, -002, -003, -004
 - Ensure system is adequate to meet present and future needs
 - Demonstrate through assessment
 - Planning for near and long term
 - Cover all demand levels over range of forecast demands
 - Include existing and planned facilities
 - Ensure adequate reactive resources

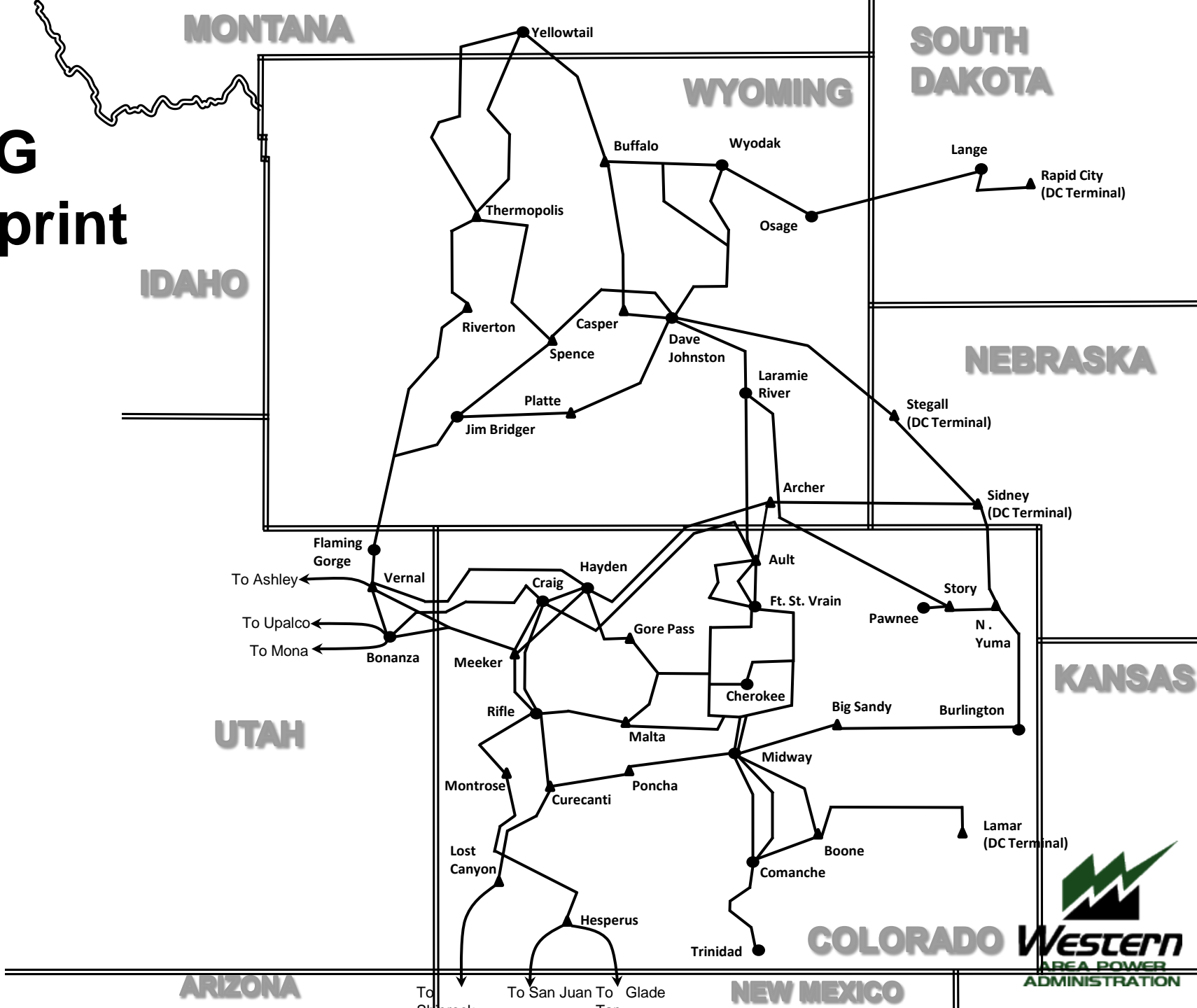
CCPG

➤ Colorado Coordinated Planning Group

▪ Eight Member Utilities

- Basin Electric Power Cooperative
- Black Hills Corporation
- Colorado Springs Utilities
- PacifiCorp
- Platte River Power Authority
- Public Service Company of Colorado (Xcel Energy)
- Tri-State Generation & Transmission Assoc.
- Western Area Power Administration-RMR

CCPG Footprint



MONTANA

WYOMING

SOUTH DAKOTA

IDAHO

NEBRASKA

UTAH

KANSAS

ARIZONA

NEW MEXICO

COLORADO WESTERN
AREA POWER
ADMINISTRATION

2010 NERC/WECC Compliance Report

- Performed Annually
- Area Studied
 - Colorado
 - Wyoming
 - Western Nebraska
 - Western South Dakota

Purpose

- Evaluate the steady state post-contingency response of the Integrated System
- Evaluate transient and voltage stability
- Identify problem areas due to system load growth
- Meet NERC/WECC Transmission Planning Standards

Study Procedure

- Cases Examined
 - 2014 Light Autumn
 - 2015 Heavy Summer
 - 2020 Heavy Summer

- System Intact Criteria
 - 100% Continuous Rating Loading
 - 0.95 p.u. – 1.05 p.u. Voltage

- Contingency Analysis Criteria
 - 100% Continuous/Emergency Rating Loading
 - 0.90 p.u. – 1.10 p.u. Voltage

Results

- 2014 Light Autumn
 - Rockport –Nunn and Rockport-Owl Creek 115 kV lines
 - Overload upon Ault 230 kV Bus Outage

Results (cont'd)

➤ 2015 Heavy Summer

- Stegall 100 MVA 230/115 kV Transformer
 - Overload upon outage of Stegall 167 MVA 230/115 kV Transformer
- Bridgeport, Gering, McGrew Wildcat and Emigrant
 - Low voltage for Stegall 115 kV Bus Outage

Results (cont'd)

➤ 2020 Heavy Summer

- Stegall 100 MVA 230/115 kV Transformer
 - Overload upon outage of Stegall 167 MVA 230/115 kV Transformer
- Midway 100 MVA 230/115 kV Transformer
 - Overload for double outage of Nixon-Front Range and Nixon-Midway 230 kV lines

Results (cont'd)

- 2020 Heavy Summer
 - Bridgeport, Gering, McGrew Wildcat, Emigrant, Greenwood, and Dalton
 - Low voltage for Stegall 115 kV Bus Outage
 - Gering, McGrew Wildcat, Emigrant, Torrington, and Lyman
 - Low voltage for Stegall 230 kV Bus Outage

Results (cont'd)

- 2020 Heavy Summer
 - Kiowa Ck, Orchard, Prospect Vly, Wiggins, Barlow, Excel, and Ft Morgan E, S, N, and W
 - Low voltage for Beaver Creek 115 kV Bus Outage

Questions

Any Questions or Comments?



Review of 2010 Transmission Planning Study Scope and Process

Jonathan Fidrych
Transmission Planner

December 8, 2010

Purpose

- Evaluate the steady state load serving capability of the integrated system.
- Identify problem areas due to system load growth.
- Allows for inclusion of necessary projects in capital improvement plan.
- Ensure that system development keeps pace with load growth in order to continue serving preference power customers.

Study Procedure

- Cases Examined
 - Summer Peak 2015
 - Light Summer 2015
 - Summer Peak 2020
- Criteria
 - System Intact
 - 0.95 p.u. – 1.05 p.u. Voltage
 - 100% Continuous Rating Loading
 - Contingency
 - 0.90 p.u. – 1.10 p.u. Voltage
 - 100% Continuous Rating or Emergency Limit
- Contingency Analysis
 - Monitored Integrated System And Adjacent Area

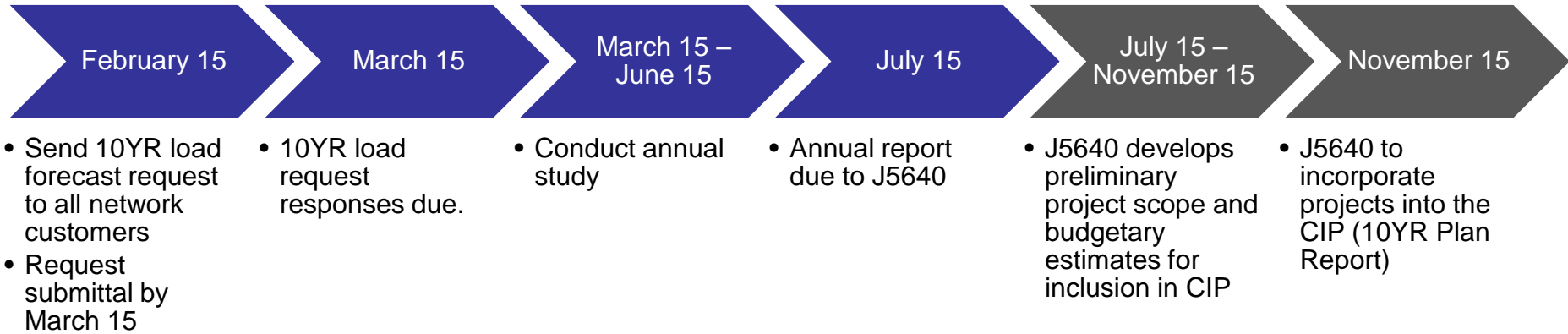
Study Procedure

- TOT 3 (Path 36)
 - Archer to Ault 230 kV
 - Laramie River to Ault 345 kV
 - Laramie River to Story 345 kV
 - Cheyenne to Ponnequin 115 kV
 - Sidney to Sterling 115 kV
 - Sidney to Spring Canyon 230 kV
 - Cheyenne to Ault 230 kV

- TOT 5 (Path 39)
 - Hayden to Archer 230 kV
 - Craig to Ault 345 kV
 - Gore Pass to Blue River 230 kV
 - Hayden to Gore Pass 138 kV
 - Gore Pass 230/138 kV XFMR
 - Gunnison to Poncha 115 kV
 - Curecanti to Poncha 230 kV
 - Basalt to Malta 230 kV
 - Basalt to Hopkins 115 kV
 - Rifle to Hopkins 230 kV

	TOT 3	TOT 5
2015 LS	1060 MW	690 MW
	1630 MW	940 MW
2015 HS	1850 MW	1040 MW
2020 HS	1850 MW	1015 MW

Study Timeline



Load Forecast Data Example

TOWN OR BUS NAME	Bus Number	Bus Name (as in case)	Company Meter Name	Western Meter Name	2009 Summer	2009-10 Winter	2010 Summer
AAAA	#####	ABCD			5,100.00	0.00	5,300.00
BBBB	#####	BCDE			420.68	333.45	443.62
CCCC	#####	CDEF			2,000.00	2,000.00	2,000.00
DDDD	#####	DEFG			13,546.96	1,728.65	10,265.67
EEEE	#####	EFGH			4,378.65	5,246.94	4,425.21

2010 Study Results

PTI INTERACTIVE POWER SYSTEM SIMULATOR--PSS/E

AC CONTINGENCY REPORT FOR 4 AC CONTINGENCY CALCULATION RUNS

CONTINGENCY CASE MONITORED BRANCHES LOADED ABOVE 100.0% OF RATING SET A - WORST CASE VIOLATIONS
THRESHOLD FOR THE COUNT OF CONTINGENCIES CAUSING OVERLOADING IS 100.0% OF RATING SET A

X--- MONITORED ELEMENT ----X	X---LABEL--X	2015LS CATB Lo	2015LS CATB Hi	2015HS CATB	2020HS CATB
73021 BGEORGE 69.000 73022 BGEORGE 115.00 1	LV_XFM				105.5% 53MVA (1x)
73021 BGEORGE 69.000 73068 GLENDLTP 69.000 1	LV_XFM			133.8% 38MVA (1x)	201.7% 47MVA (1x)
73068 GLENDLTP 69.000 73082 HEART MT 69.000 1	LV_XFM			111.2% 32MVA (1x)	168.1% 38MVA (1x)
73122 LOVELL 69.000 73123 LOVELL 115.00 1	BGGXFM				122.2% 61MVA (1x)
73150 PEETZ 115.00 73179 SIDNEY 115.00 1	SGC-NYU2			101.9% 110MVA (1x)	
73150 PEETZ 115.00 73191 STERLING 115.00 1	SGC-NYU2			102.9% 108MVA (2x)	111.8% 116MVA (2x)
73179 SIDNEY 115.00 73180 SIDNEY 230.00 1	SGC-NYU2			101.3% 206MVA (2x)	103.4% 210MVA (2x)
73189 STEGALL 115.00 73190 STEGALL 230.00 1	SGXF2			115.8% 116MVA (1x)	126.9% 127MVA (1x)

Results

➤ 2015 LS

- No thermal overloads were observed.
- Known low voltage issues were observed at Gering, Wildcat, and Emigrant Substations.
 - UVLS for Outages at the Stegall Bus
 - Load Shedding approx 24-29 MW in order to bring voltages back within acceptable emergency levels.

Results

➤ 2015 HS

- Lovell – Big George 69 kV
 - Study Outcome
 - Loss of Lovell 69/115 kV Transformer
 - » Big George – Heart Mtn. 69 kV Overloads
 - » Big George 69/115 kV Transformer Overloads
 - Loss of Big George 69/115 kV Transformer
 - » Lovell 69/115 kV Transformer Overloads
 - Ideas for addressing overloads
 - Install Parallel Transformers at Lovell and Big George
 - » Minimizes need for rebuilding lines
 - » Prevents thermal violations for N-1
 - String Second Circuit from Big George to Heart Mountain operating at 115 kV on existing double circuit structures
- Sidney – Sterling 115 kV
 - Built: August 1950
 - Caused by Spring Canyon to North Yuma 230 kV contingency
 - Ideas for addressing overload
 - Rebuild Sidney – Peetz – Sterling
 - » Build at 230 kV spacing with 1272 kcmil conductor operate at 115 kV

Results

➤ 2020 HS

- Lovell – Big George 69 kV
- Sidney – Sterling 115 kV
- Marys Lake Transformer
 - Thermal relay will trip transformer out-of-service if it surpasses a set rating. Allows for service to be provided from Granby 138 kV bus.