Colorado Long Range Transmission Planning Group 2008 Study Update

CEDA

January 22, 2009

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CLRTPG

- Colorado Coordinated Planning Group - CCPG
  - Eastern Wyoming and Colorado
- Colorado Long Range Transmission Planning Group – CLRTPG
  - CCPG Subcommittee

- CLRTPG purpose:
  - forum for electric load-serving entities (“LSE’s”) to jointly explore potential transmission projects and
  - jointly evaluate long-range transmission plans.

- 2018 Study LSE’s:
  - Black Hills Energy (BHE)
  - Colorado Springs Utilities (CSU)
  - Platte River Power Authority (PRPA)
  - Public Service Company of Colorado (PSCo)
  - Tri-State Generation and Transmission Association, Inc. (TSGT)
  - Western Area Power Administration, Rocky Mountain Region (WAPA)

CLRTPG 2018

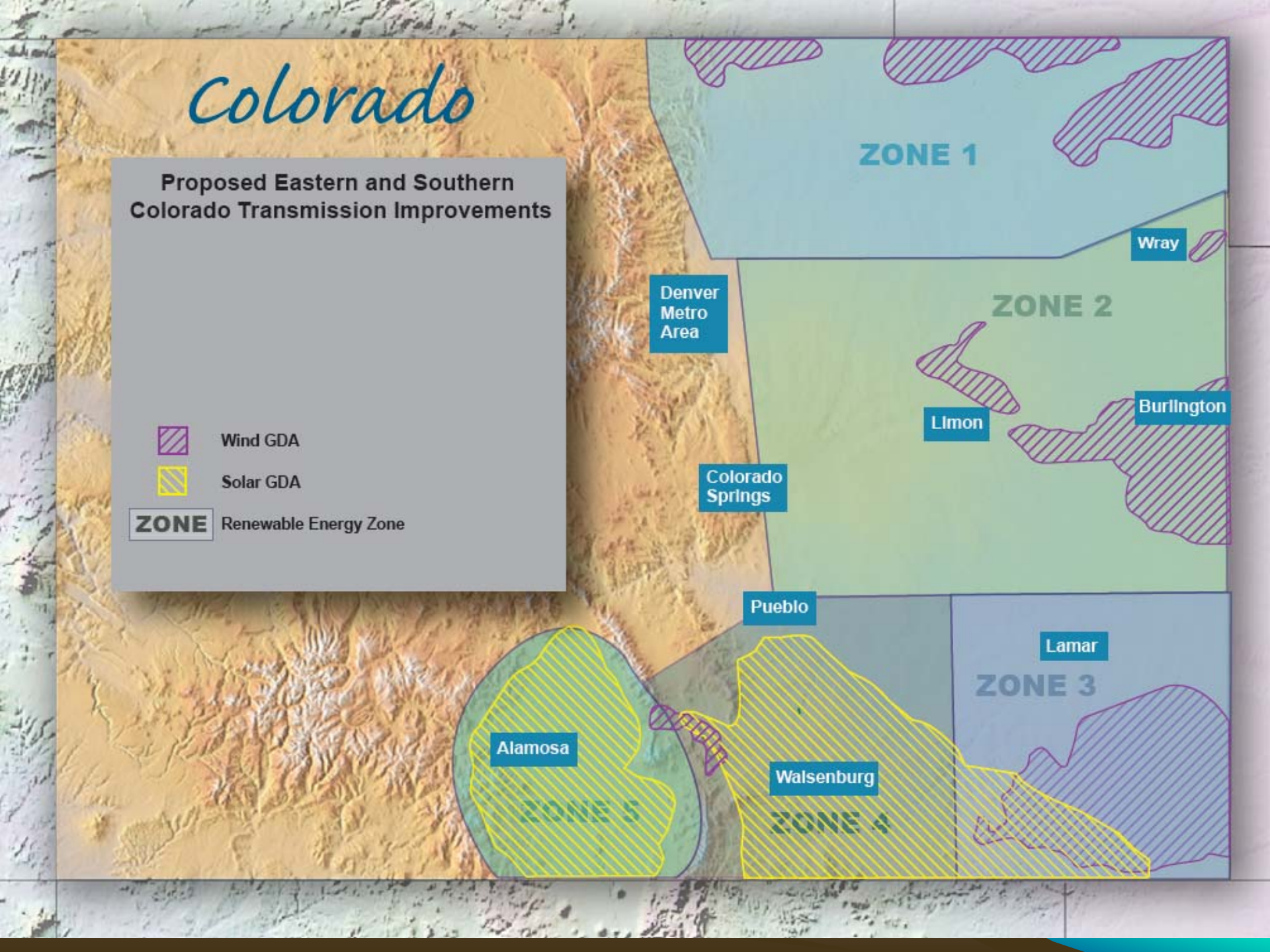
- Process Overview
- Similarities with SB 100 Study
- Review Scenario Results (A,B,C,D)

2018 Overview

- Multiple open and transparent stakeholder meetings
  - 2018 Loads and Resources
    - Load – 13035 MW
    - New Resource Need – **1165 MW**
  - Resource Plans and Renewable Portfolio Standards
  - Injection Locations and Scenarios
  - Limited Study Scope – Power Flow of Bulk System
- Investor Owned Utilities, Federal Power, Municipals, Cooperatives, Colorado Governor Energy Office, CPUC, Wind, Solar, and Environmental Industry Members and Advocacy Groups, and individual “interested” people

Similarities with SB 100 Study

- CLRTPG -2018 / SB 100 – 2015
- LSE's
- Stakeholders
- Meetings
- Results - Complementary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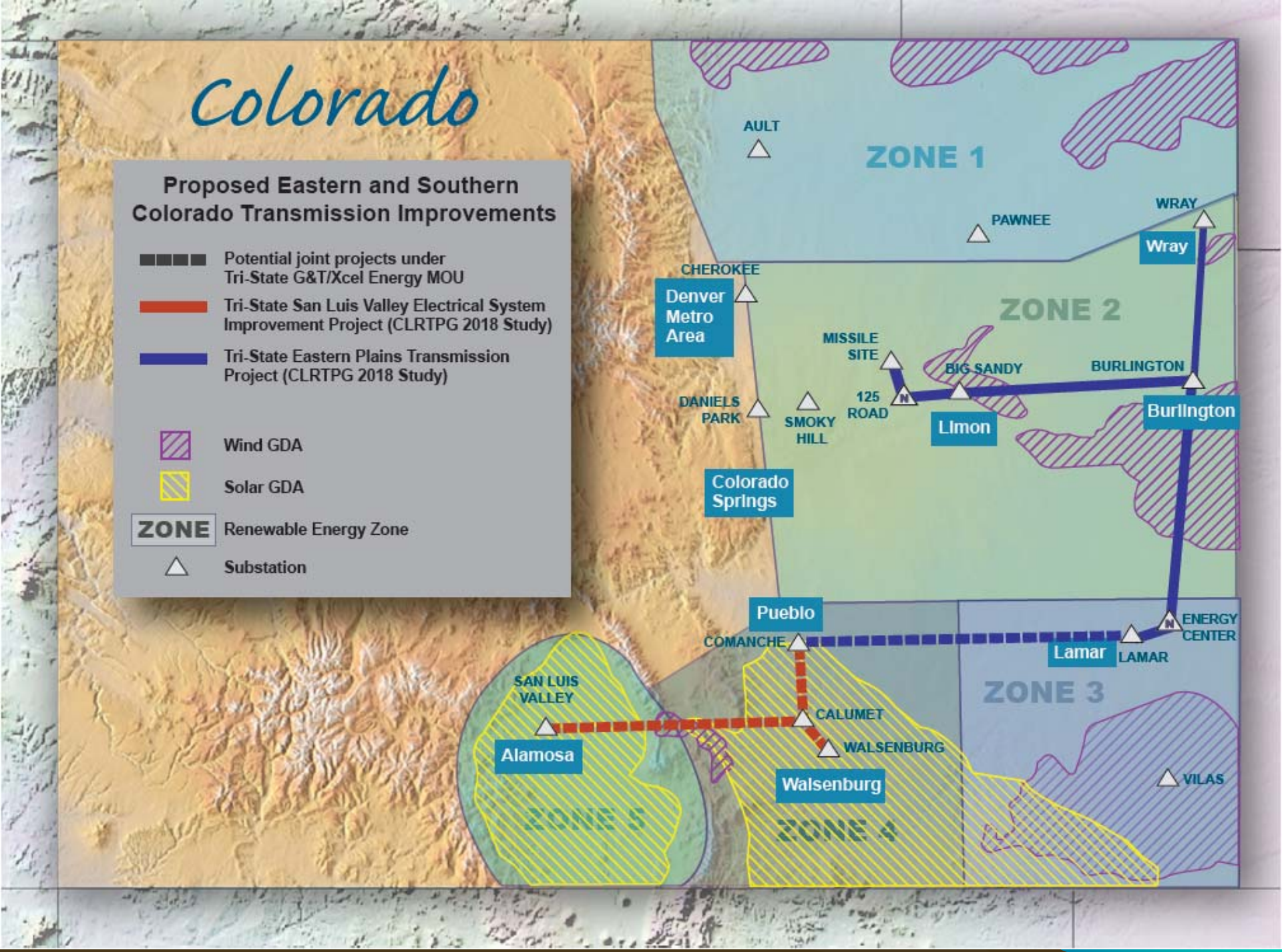
Proposed Eastern and Southern Colorado Transmission Improvements
Wind GDA
Solar GDA
ZONE
Renewable Energy Zone
ZONE 1
Wray
Denver Metro Area
ZONE 2
Burlington
Limon
Colorado Springs
Pueblo
Lamar
ZONE 3
Alamosa
ZONE 5
Walsenburg
ZONE 4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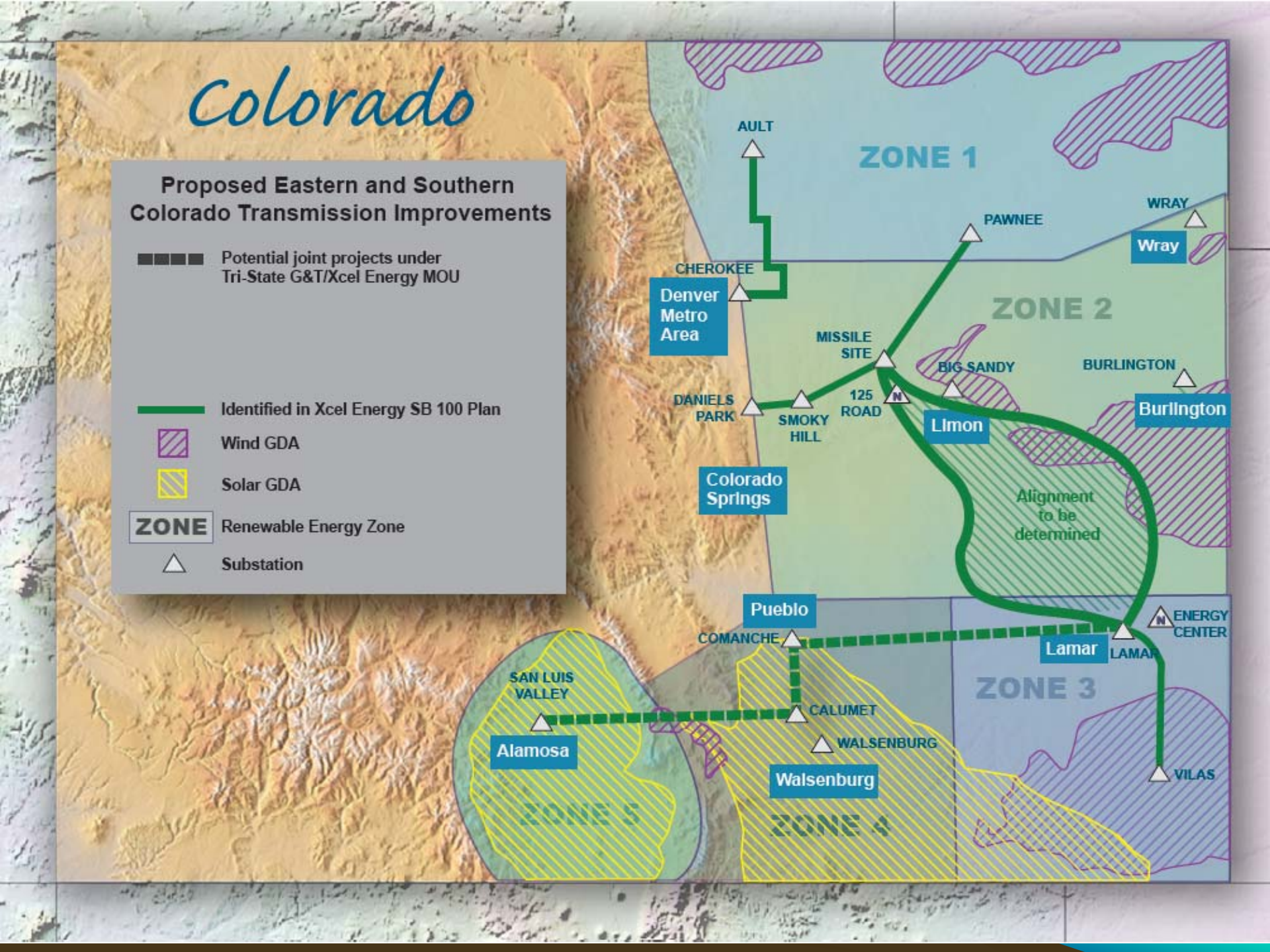
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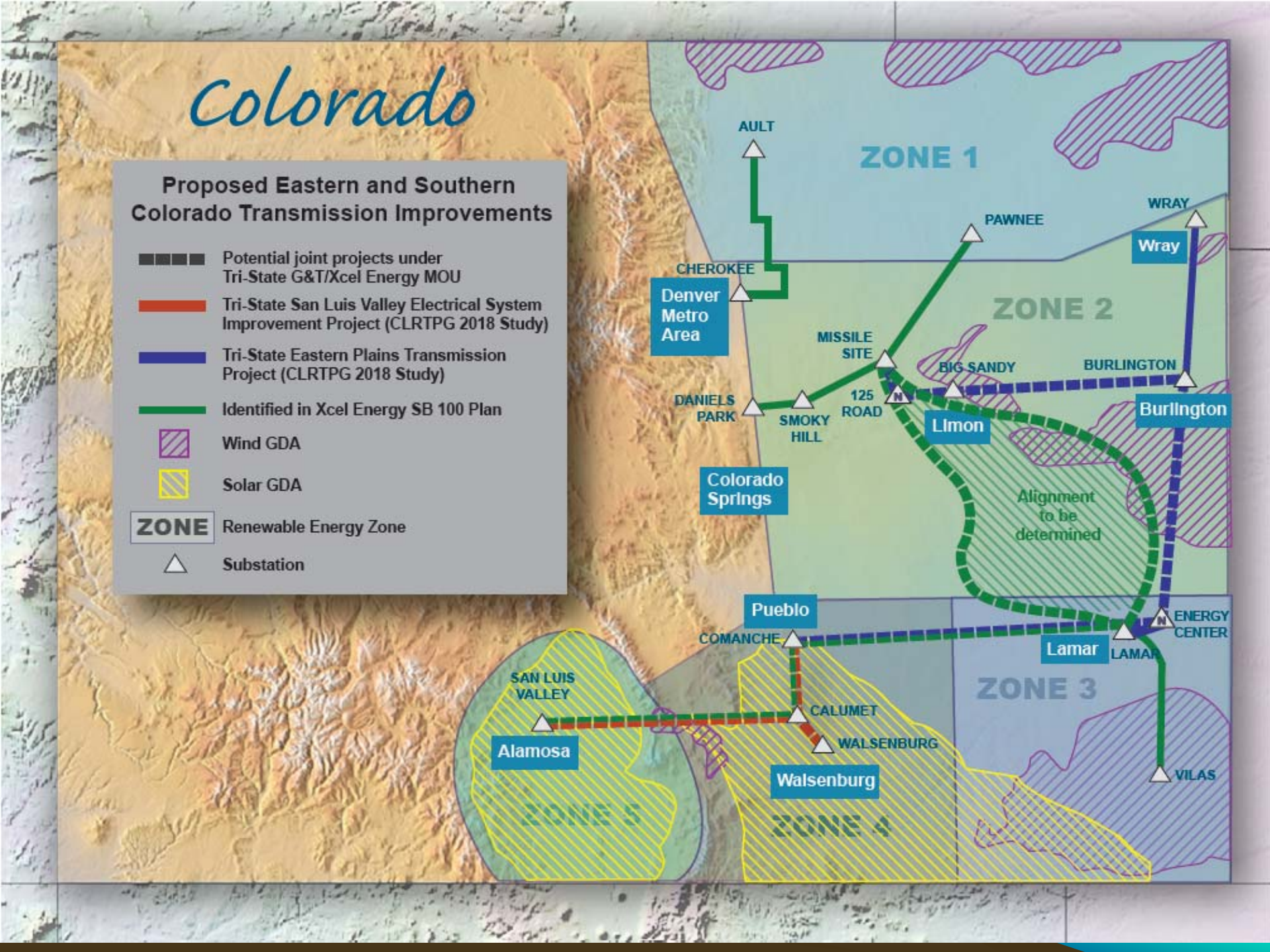
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4 Scenarios – A,B,C,D

A. Colorado resources suggested by Utility resource planners
   - Meets or exceeds Colorado's Renewable Portfolio Standard
   - "Stressed" from South to North

B. Displace some northern CO resource with WY
   - Injected into CO via the proposed Wyoming-Colorado Intertie Project
   - "Stressed" North to South

C. ~2.75% of the capacity in Colorado's Wind GDA's
   - "Stressed" East to West

D. ~2000 MW from Colorado's Central Solar Power GDA's

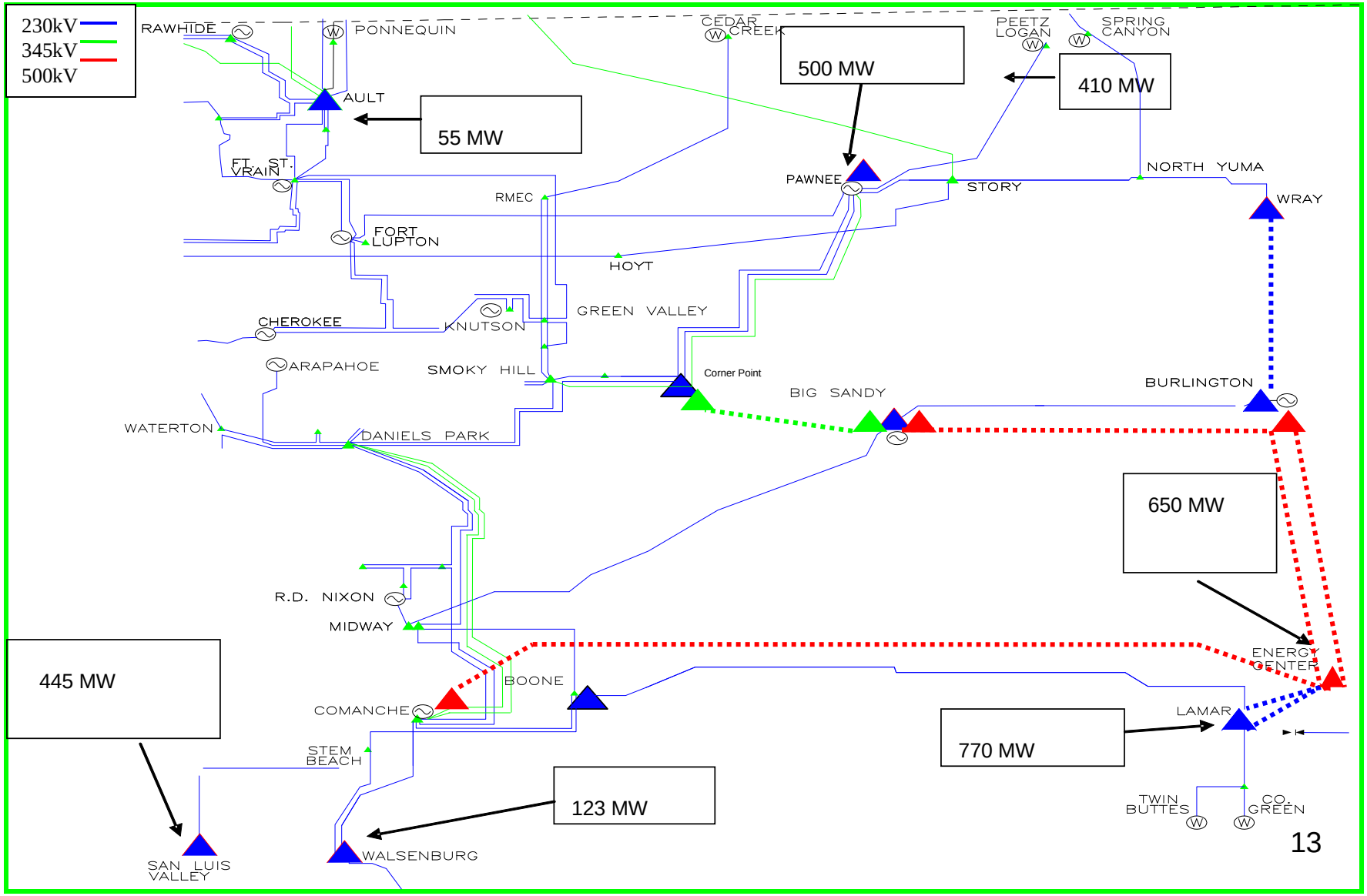
Scenario A

Scenario A

NEW resources

ERZ	Injection Location	Area	Injection Amount (MW)
Zone 1	Ault	73	73
Zone 1	Pawnee	70	500
Zone 1	Peetz	70	410
Zone 3	EC	70	650
Zone 3	Lamar	70	770
Zone 4	SLV	70	445
Zone 4	Walsenburg	70	123
TOTAL			2953

Scenario A (500 kV) - 2953 MW New Injections



Scenario A – Topology Summary

- Lamar area to:
  - Burlington 500kV (345kV)
  - Big Sandy 500kV (345kV)
  - Comanche 500kV (345kV)
- Big Sandy – Corner Point 345kV (230kV)
- Burlington - Wray 230kV

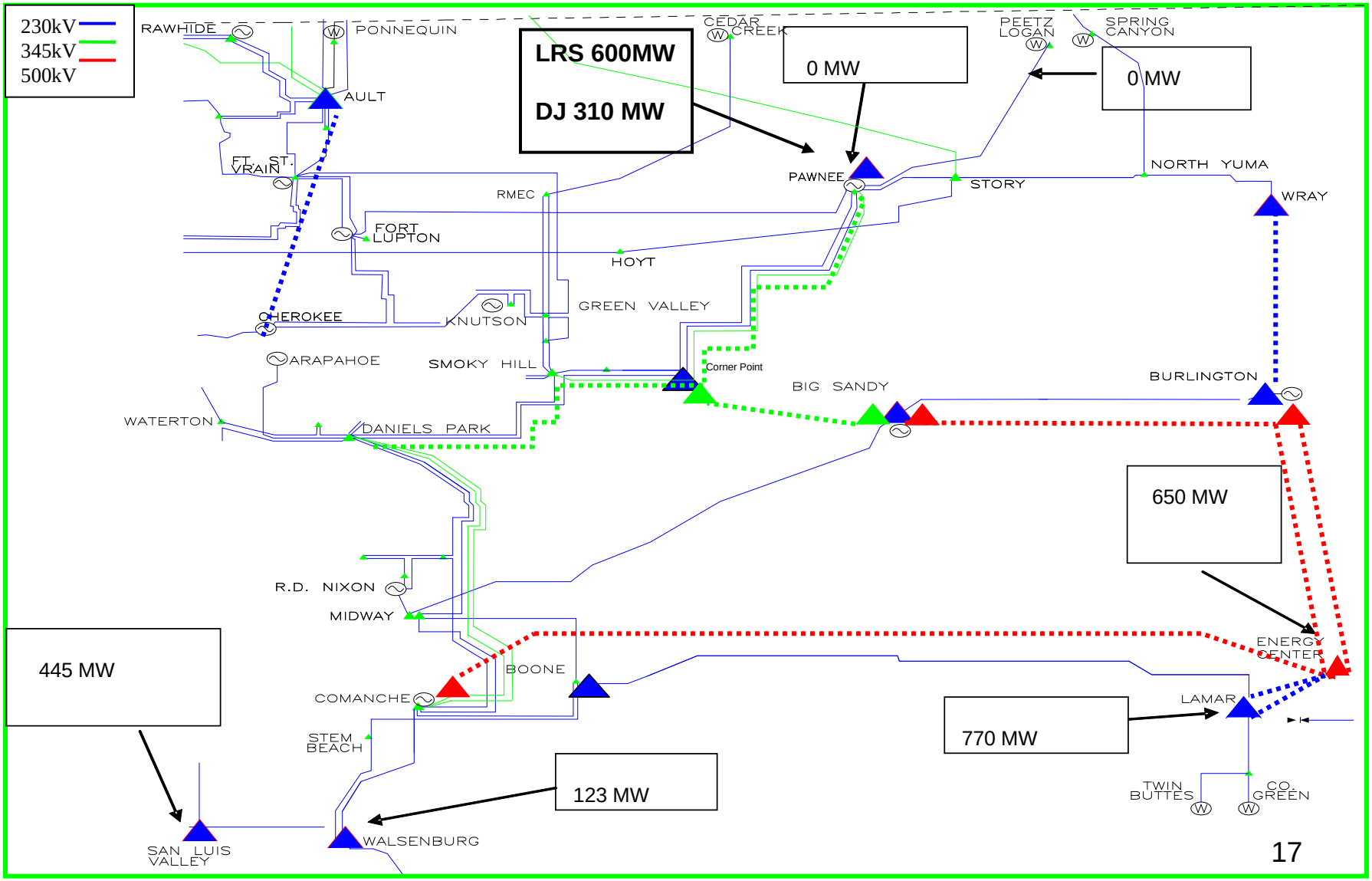
Scenario B

Scenario B

NEW resources

ERZ	Injection Location	Area	Injection Amount (MW)
Zone W1	Laramie River Station	73	600
Zone W2	Dave Johnston	73	310
Zone 1	Ault	73	55
Zone 1	Pawnee	70	0
Zone 1	Peetz	70	0
Zone 3	EC	70	650
Zone 3	Lamar	70	770
Zone 4	SLV	70	445
Zone 4	Walsenburg	70	123
TOTAL			2953

Scenario B – 2953 MW New Injections



Scenario B – Topology Summary

- Second Pawnee - Smoky Hill 345kV
- Smoky Hill - Daniels Park 345kV
- Big Sandy – Corner Point 345kV (230 kV) - confirmed

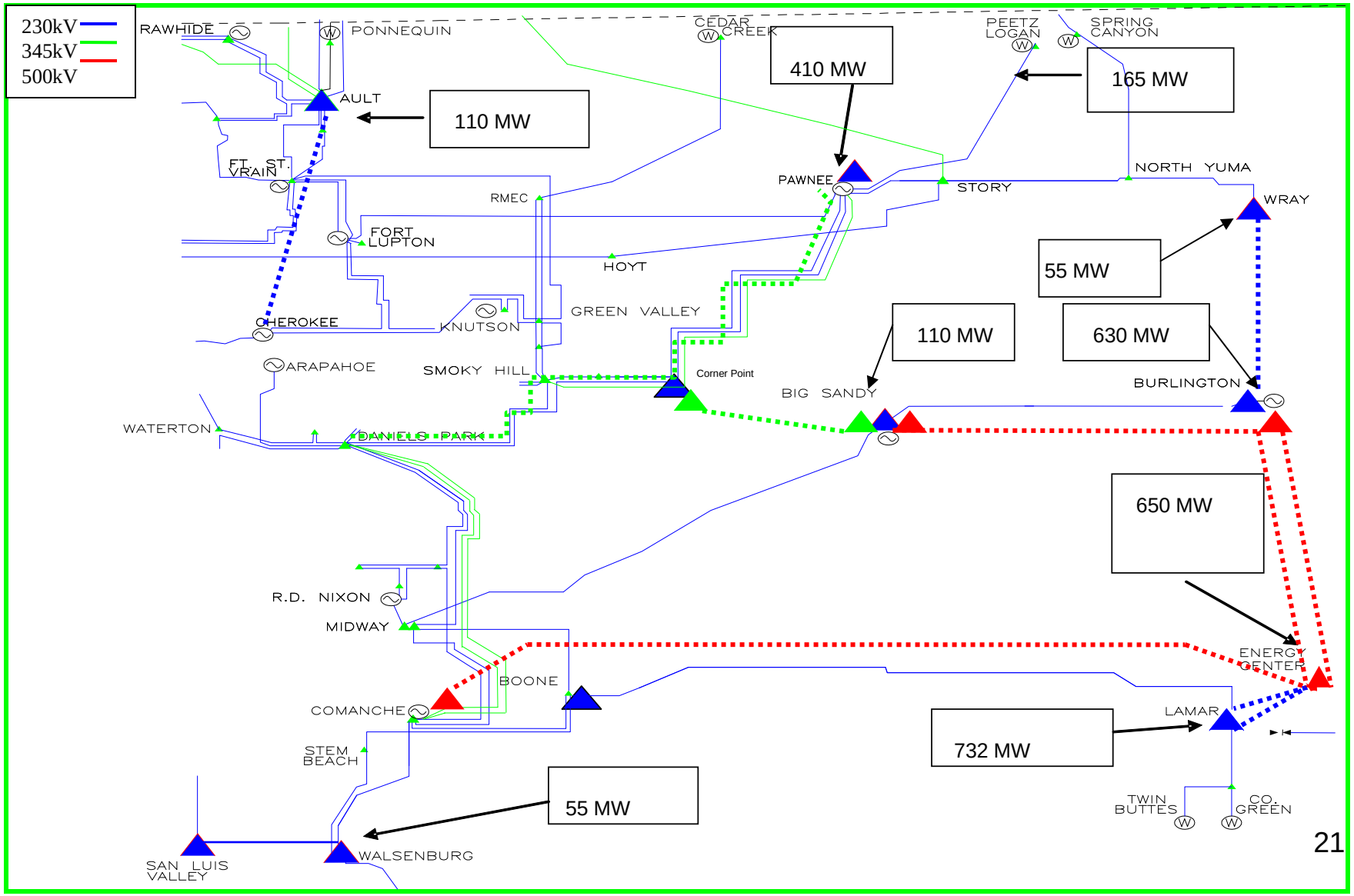
Scenario C

Resource Locations

Scenario	Ault	Peetz	Pawnee	Wray	Burlington	Lamar	Big Sandy	Walsenburg	SLV	Pueblo	LRS	DJ	TOTAL
A													2953
B													2953
Scaled C	110	165	410	55	630	1380	110	55	0	0	0	0	2915

- Uniformly apply scale factor to arrive at 2915 MW total
- ~ 2.75% of Each GDA

Scenario C - 2915 MW New Injections



Scenario C – Topology Summary

- No New Bulk Electric System Additions Required
- Underlying System Issues Not in the Scope of This Study

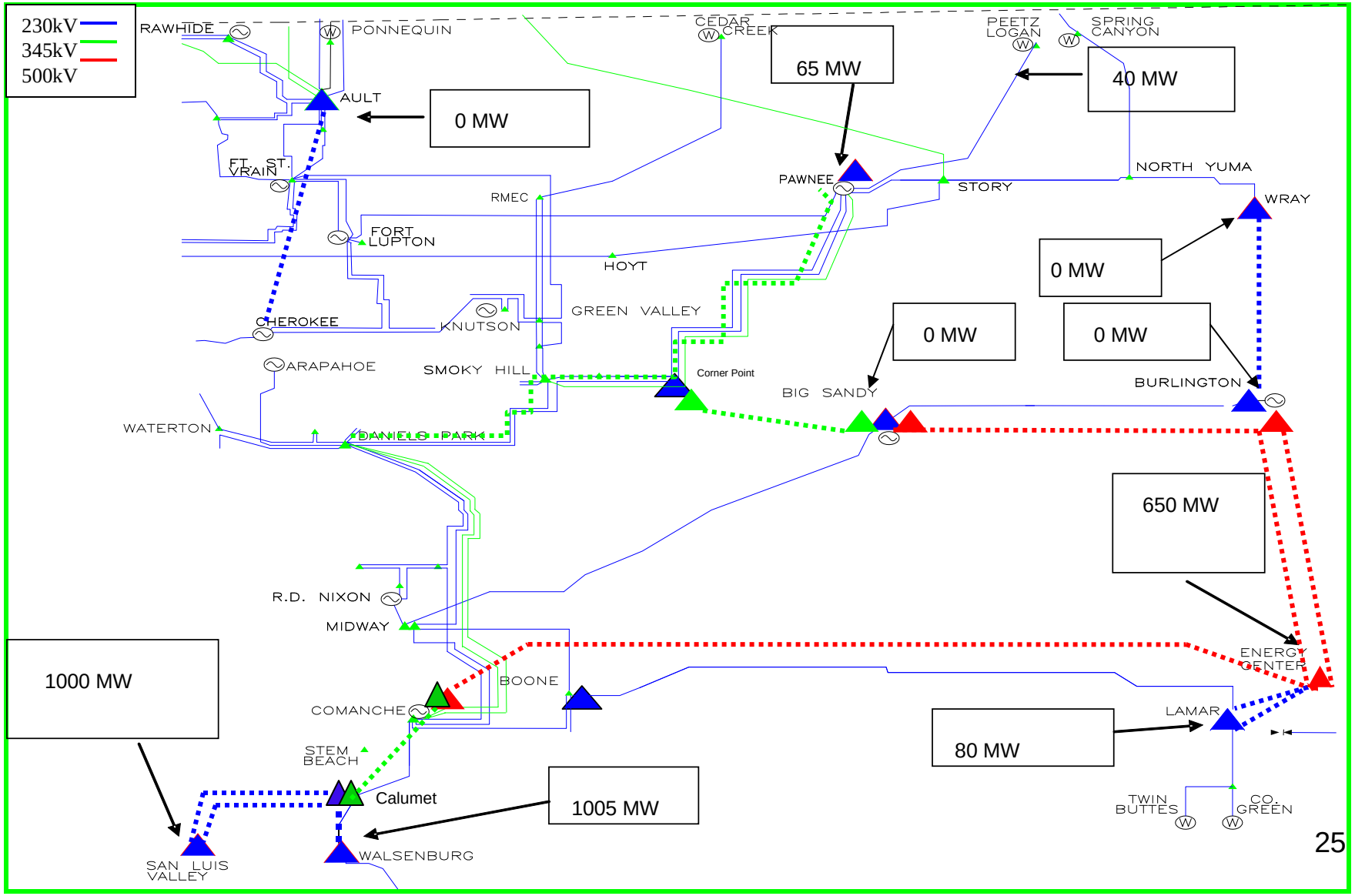
Scenario D

Scenario D

NEW resources

ERZ	Injection Location	Area	Injection Amount (MW)
Zone 1	Ault	73	0
Zone 1	Pawnee	70	65
Zone 1	Peetz	70	40
Zone 1	Wray	73	0
Zone 2	Burlington	73	0
Zone 2	Big Sandy	73	0
Zone 2	Corner Point	70	0
Zone 3	Lamar	70	770
Zone 4	SLV	70	1000
Zone 4	Walsenburg	70	1005
TOTAL			2840

Scenario D - 2940 MW New Injections



Scenario D – Topology Summary

- SLV-Calumet – Double Circuit 230 kV
- Calumet – Comanche – 345 kV
- Calumet – Walsenburg – 230 kV
- Underlying System Issues Not in the Scope of This Study

Summary

NEW LINE SEGMENT	VOLTAGE LEVEL (KV)	ESTIMATED COST ($M)
EC-BURLINGTON	500/345	70
EC-BURLINGTON-BIG SANDY-RD 125-MISSILE	500/345	160
EC-COMANCHE	500/345	80
PAWNEE-DAN PARK-SMOKY	345	65
SLV-CALUMET	230	115
CALUMET-COMANCHE	345	65
CALUMET-WALSENBURG	230	10
TOTAL		**565**

Questions or Comments?