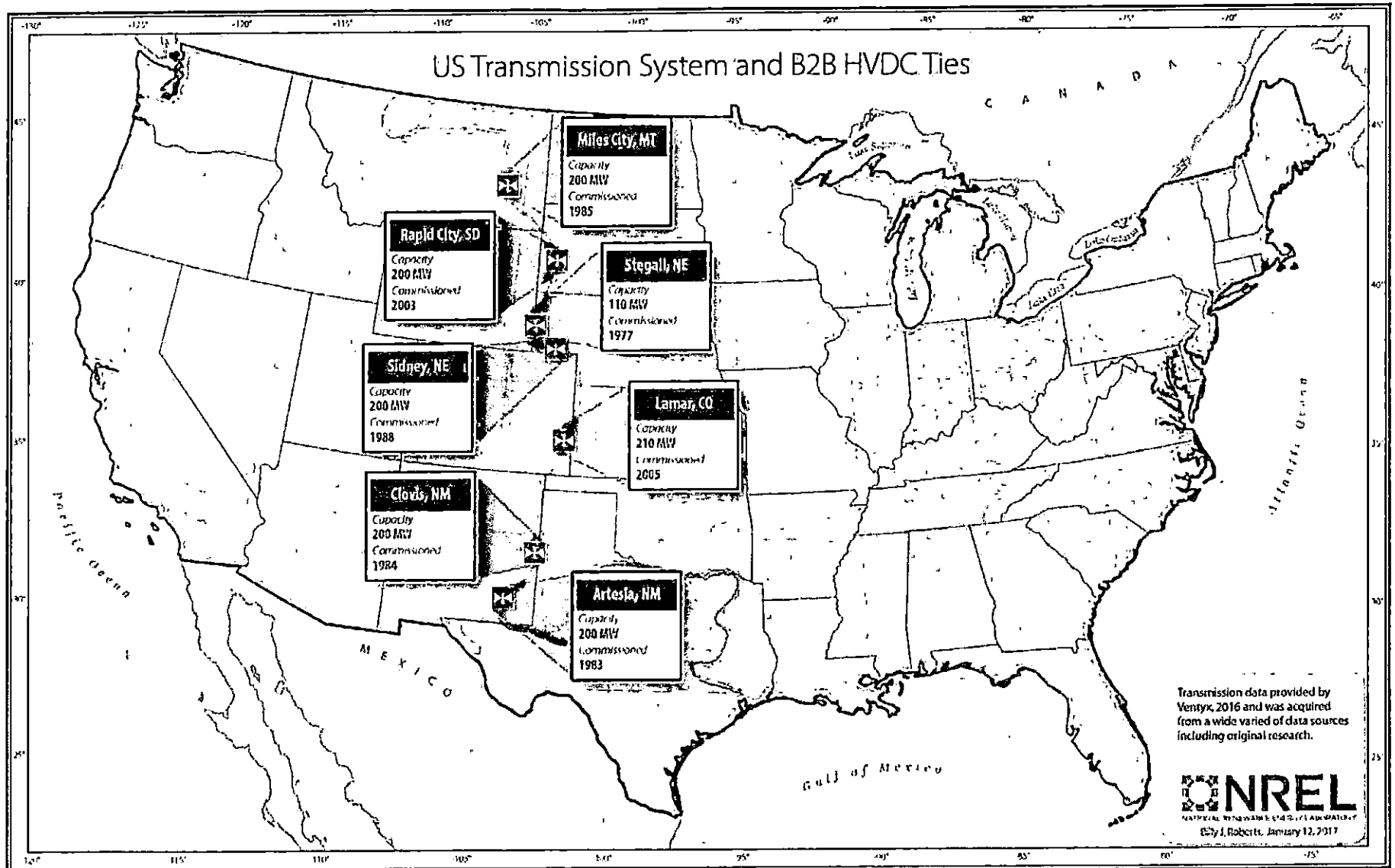


Handouts from Commissioner Frances Koncilja For Informational Purposes Only

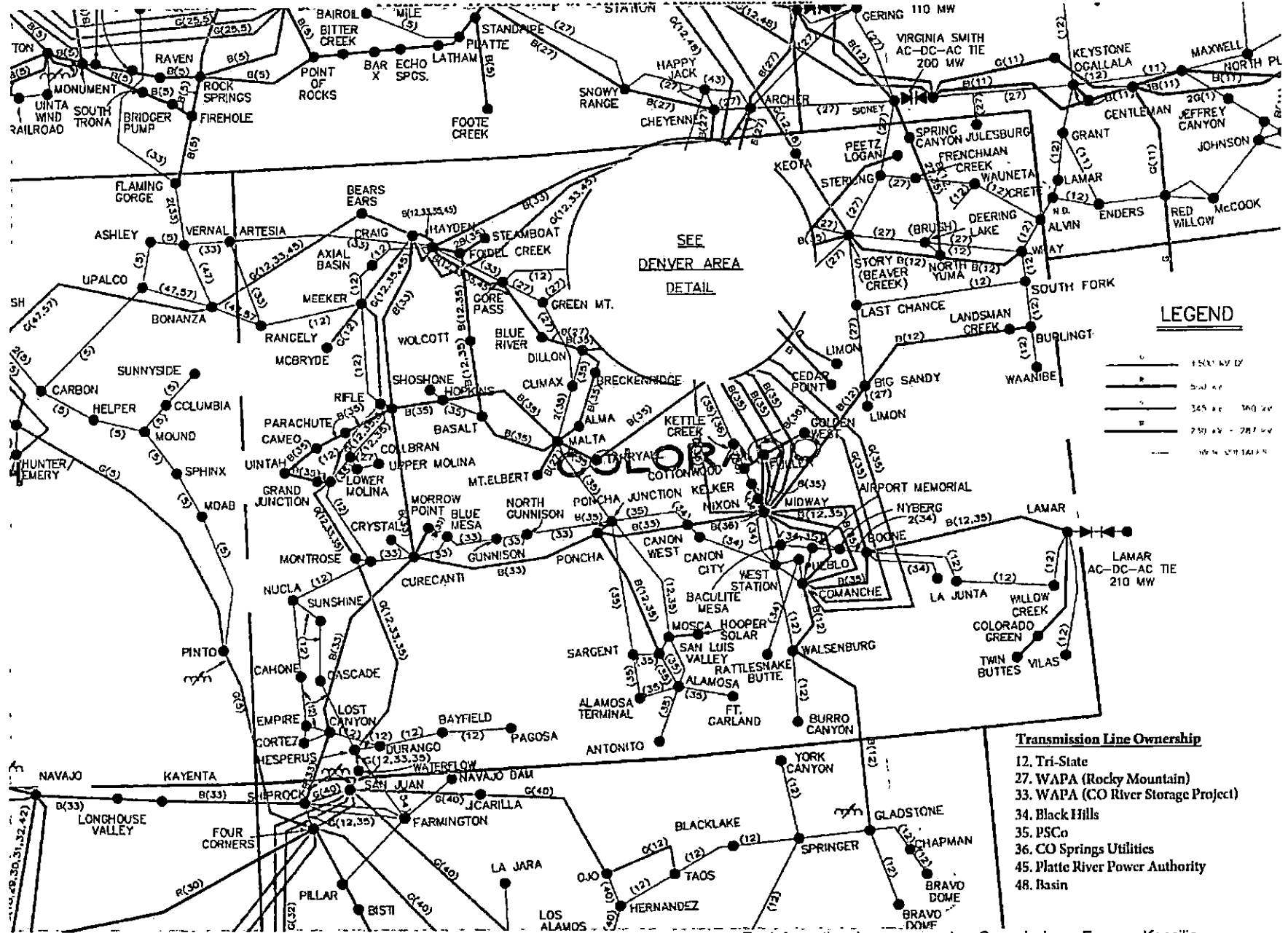
Energy Legislation Review Interim Study Committee
July 29, 2019

DC Ties Connecting Eastern and Western Interconnections

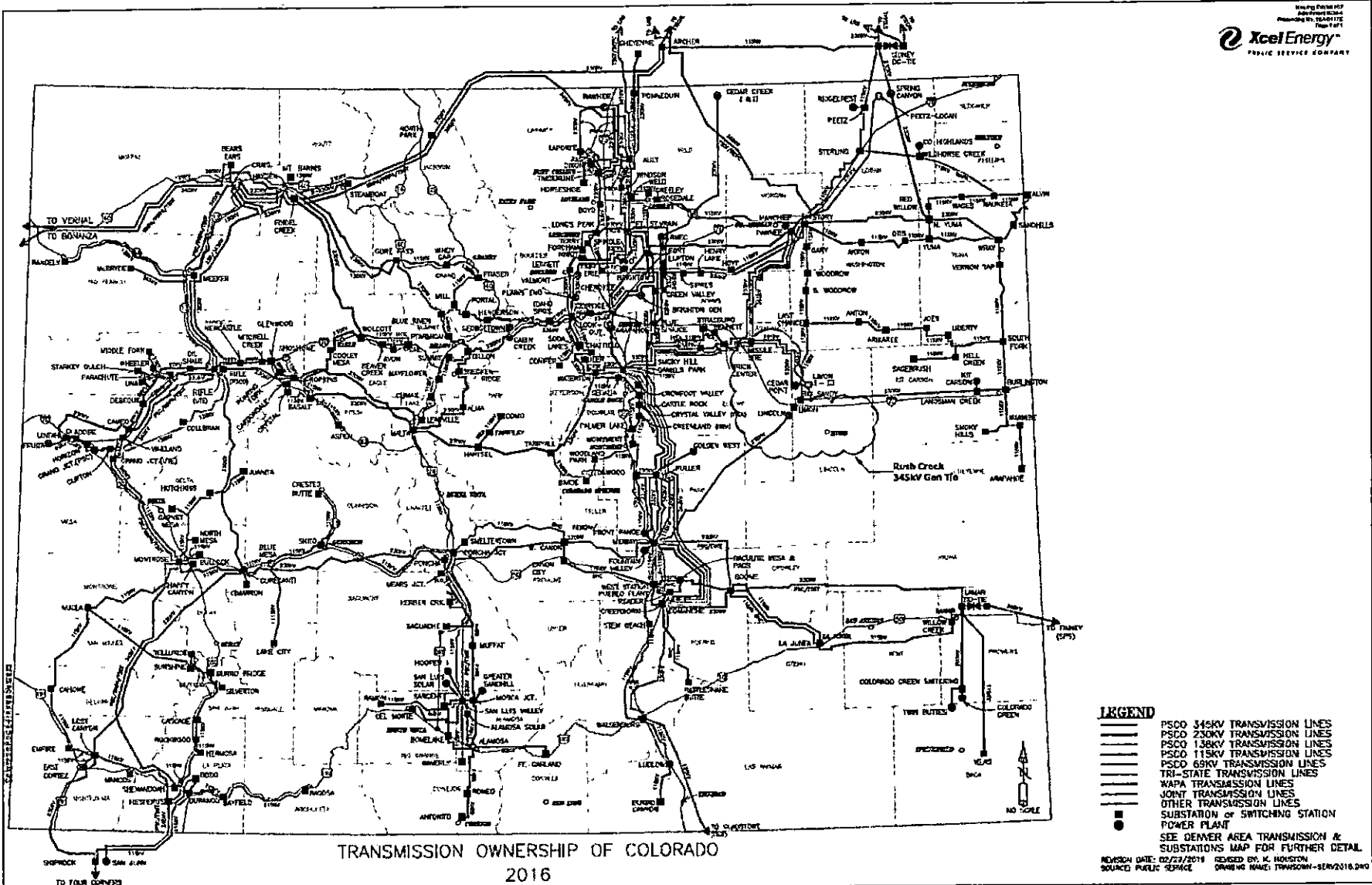


<https://www.nrel.gov/analysis/assets/images/map-analysis-us-hvdc-ties-1450w.jpg>

From 2017 WECC Map of Principle Transmission Lines



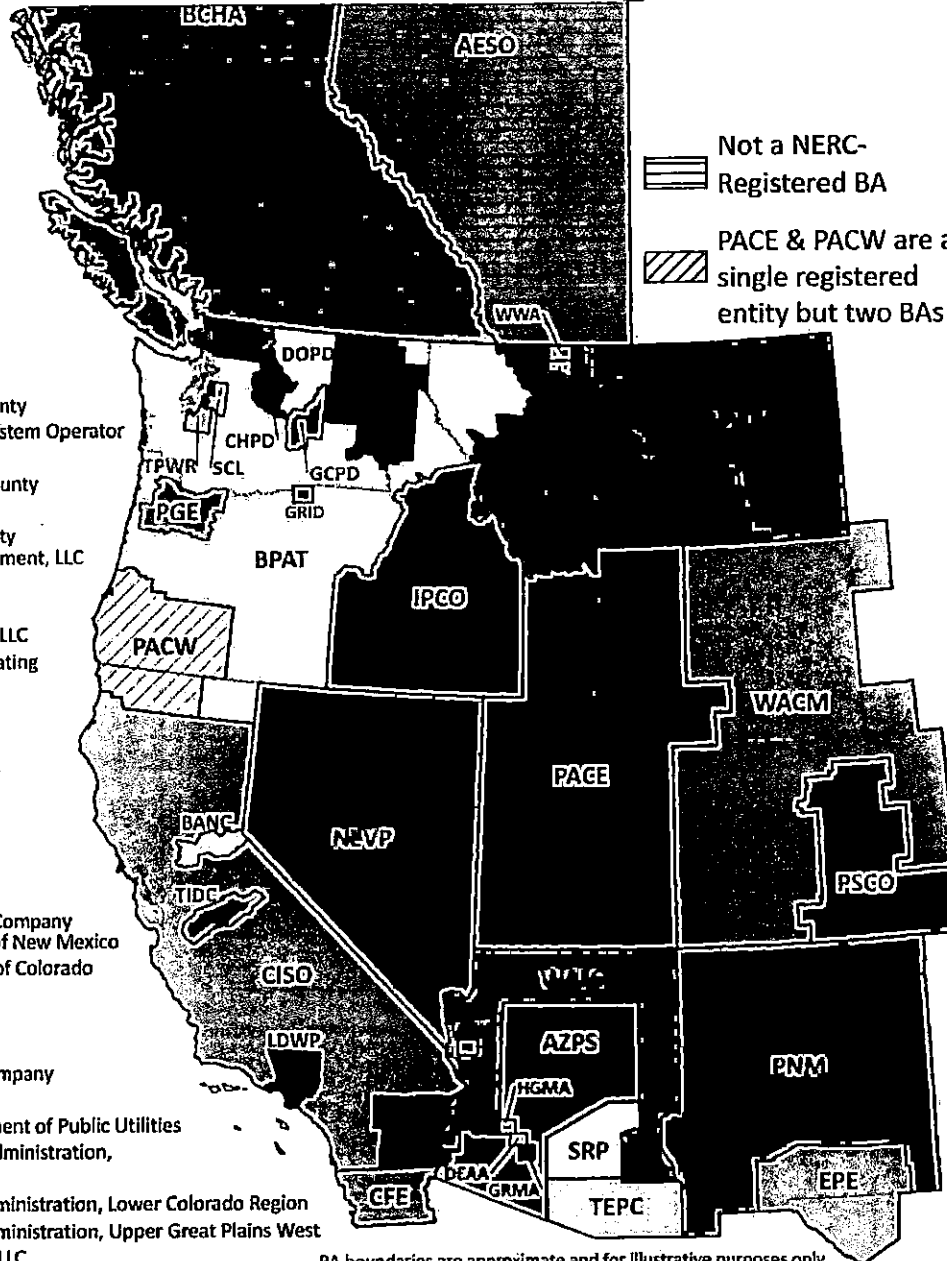
Colorado Transmission System



Western Interconnection Balancing Authorities

January 5, 2017

- AESO - Alberta Electric System Operator
- AVA - Avista Corporation
- AZPS - Arizona Public Service Company
- BANC - Balancing Authority of Northern California
- BCHA - British Columbia Hydro Authority
- BPAT - Bonneville Power Administration-Transmission
- CFE - Comision Federal de Electricidad
- CHPD - PUD No. 1 of Chelan County
- CISO - California Independent System Operator
- DEAA - Arlington Valley, LLC
- DOPD - PUD No. 1 of Douglas County
- EPE - El Paso Electric Company
- GCPD - PUD No. 2 of Grant County
- GRID - Gridforce Energy Management, LLC
- GRIF - Griffith Energy, LLC
- GRMA - Gila River Power, LP
- GWA - NaturEner Power Watch, LLC
- HGMA - New Harquahala Generating Company, LLC
- IID - Imperial Irrigation District
- IPCO - Idaho Power Company
- LDWP - Los Angeles Department of Water and Power
- NEVP - Nevada Power Company
- NWMT - NorthWestern Energy
- PACE - PacifiCorp East
- PACW - PacifiCorp West
- PGE - Portland General Electric Company
- PNM - Public Service Company of New Mexico
- PSCO - Public Service Company of Colorado
- PSEI - Puget Sound Energy
- SCL - Seattle City Light
- SRP - Salt River Project
- TEPC - Tucson Electric Power Company
- TIDC - Turlock Irrigation District
- TPWR - City of Tacoma, Department of Public Utilities
- WACM - Western Area Power Administration, Colorado-Missouri Region
- WALC - Western Area Power Administration, Lower Colorado Region
- WAUW - Wester Area Power Administration, Upper Great Plains West
- WWA - NaturEner Wind Watch, LLC



BA boundaries are approximate and for illustrative purposes only

Balancing Authority Area: For compliance with NERC reliability standards, an area comprising a collection of generation, transmission, and loads within metered boundaries for which a responsible entity (defined by NERC to be a **balancing authority**) integrates resource plans for that area ahead of time, maintains the area's load-resource balance, and supports the area's interconnection frequency in real time.

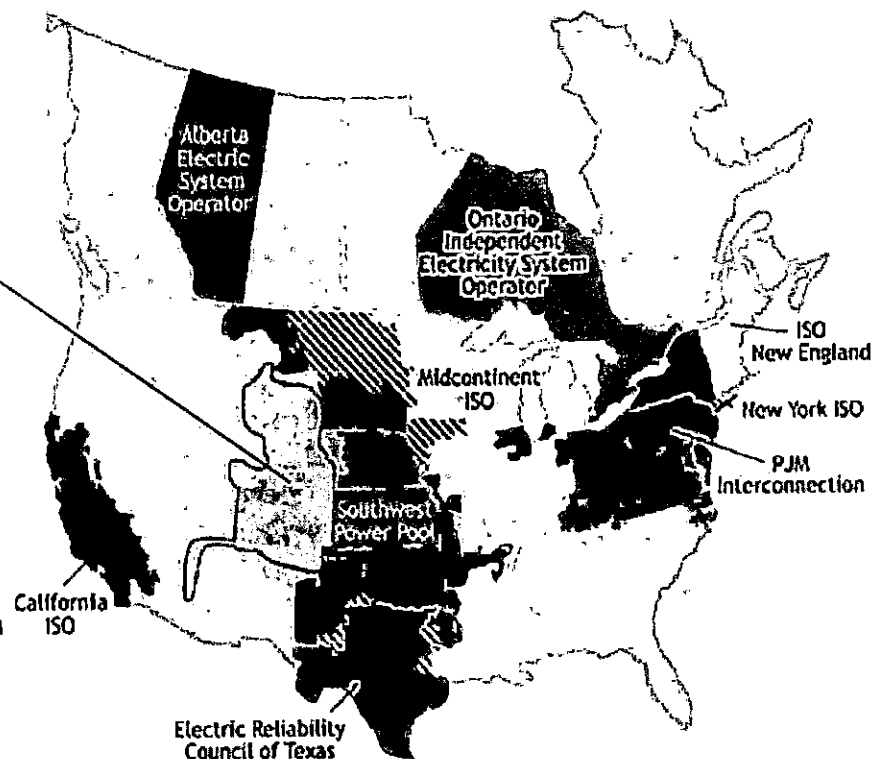
https://www.wecc.biz/Administrative/Balancing_Authorities_JAN17.pdf

Regional Transmission Organizations

RTOs provide retail customer benefits by minimizing transmission “pancake” rates, and providing the opportunity for lower energy costs through the regional scheduling and dispatch of generation resources.

Mountain West Transmission Group (MWTG)

- **Black Hills Energy**
 - Black Hills South Dakota Electric
 - Black Hills Wyoming Electric
 - Black Hills Colorado Electric
- **Basin Electric Power Cooperative**
- **Colorado Springs Utilities**
- **Platte River Power Authority** (serves Estes Park, Fort Collins, Longmont, and Loveland, Colorado)
- **Public Service Company of Colorado**
- **Tri-State Generation and Transmission Association**
- **Western Area Power Administration**
 - Colorado River Storage Project
 - Loveland Area Project



Mountain West Transmission Group

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Organized Wholesale Market Constructs - Definitions

Term	From SB19-236 (Article 2.3)	From DOE-funded Markets Project (Utah)
Energy Imbalance Market (EIM)	A real-time bulk power trading market that provides a means for participating electric utilities to purchase and sell unscheduled energy across a geographic region	<ul style="list-style-type: none"> ✓ Centrally optimized real-time dispatch – <i>Day-ahead unit commitment not optimized across market participants</i> ✓ Individual transmission tariffs ✓ Limited transmission dedicated to market ✓ Balancing Authority Area (BAA) boundaries and associated reliability obligations retained ✓ Retain operational control of transmission
Day-ahead Market	(Not included)	<ul style="list-style-type: none"> ✓ Centrally optimized real-time and day-ahead energy market ✓ Individual transmission tariffs ✓ Limited transmission dedicated to market (other transactions must explicitly pay for transmission) ✓ BAA boundaries and associated reliability obligations retained ✓ Retain operational control of transmission
Regional Transmission Organization (RTO)	An independent electric transmission operator that provides wholesale transmission services to more than one provider of electric service within a geographic region by pooling together a number of transmission assets into a single electricity transmission market from which participating electric utilities may purchase wholesale transmission services.	<ul style="list-style-type: none"> ✓ Centrally optimized real-time and day-ahead energy market ✓ Joint transmission tariff for participants in a given footprint ✓ Transmission used up to reliability limit ✓ BAA boundaries and reliability obligations consolidated ✓ Joint transmission planning and cost allocation ✓ Transfer of operational control of transmission

Other Market Constructs defined in SB19-236. Joint Tariff: A tariff that contains only joint rates, which are rates that apply for transmission service over the lines or routes of two or more transmission providers, made by an agreement between the transmission providers. Power Pool: A system of trading wholesale electricity that determines which generating sets or plants are called to meet demand for power at any particular time and sets the price of power for that period.

Market Activities Timeline

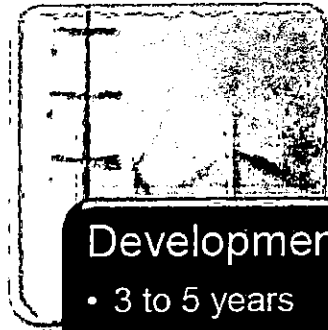
Timeframe	Activity	Description
First approved in 2000 Last revised Jun 10, 2013	Business Trading Rules Approved by CO PUC	Provides guidelines for resource management and cost assignment in connection with PSCo's purchase and sale of short-term electric energy (i.e., bilateral wholesale market transactions).
FERC approved Feb 18, 2016 CO PUC order Nov 30, 2016 Began operating Jun 1, 2017	Joint Dispatch Agreement (JDA)	Operated by PSCo, similar to an EIM, but only for certain generation within the PSCo BA. Participants include: PSCo, Black Hills and Platte River Power Authority.
Discussion started 2014 PSCo dropped out in 2018	MWTG	Effort by CO/WY utilities (Basin Electric, Black Hills, CO Springs Utilities, Platte River Power Authority, PSCo, Tri-State G&T, WAPA) to join the Southwest Power Pool
2019	Expansion of JDA	Colorado Springs Utilities joined the PSCo Balancing Authority Area and will be participating in the JDA
2019 Proposals (for implementation in 2021)	EIM/EIS Proposals from CAISO and SPP	CAISO would operate an EIM for the PSCo BA (and possibly others) that functions like the Western EIM. SPP would offer an Energy Imbalance Service to interested utilities in WECC (separate from SPP).
2022? (Under evaluation for feasibility)	Enhanced Day-Ahead Market (EDAM)	CAISO proposal to enable day-ahead unit commitment and dispatch for EIM participants. Would not encompass transfer of operational control or any planning (e.g., transmission planning) responsibilities.

Transmission Timeframe



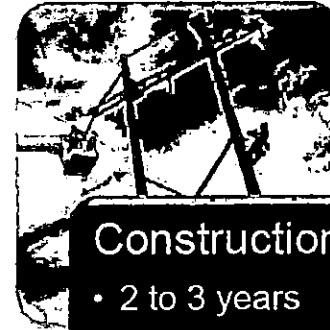
Planning

• 1 to 2 years



Development

• 3 to 5 years



Construction

• 2 to 3 years

It takes 7 to 10 years to plan, develop and construct



TransWest Express LLC - *(partial timeline)*

Proposed 730 mile 500 kV transmission line from Wyoming to Southern Utah

- **2005:** *The TWE Project was initiated by Arizona Public Service Company*
- **2007:** *Regional Planning Project Review conducted in accordance with Western Electricity Coordinating Council planning procedures*
- **2007-2008:** *Four public meetings were held in WY, UT, NV and AZ*
- **2008:** *TransWest Express LLC was formed – wholly owned by The Anschutz Corporation – and acquired the development rights to the TWE Project from APS, National Grid and the Wyoming Infrastructure Authority*
- **2010:** *WAPA joined as equity partner*
- **2011-2014:** *Multiple studies confirmed economic benefits of connecting Wyoming wind to desert southwest.*
- **2016-2017:** *BLM issued EIS (approving 60% of TWE project route) and WAPA/Forest Service/Bureau of Reclamations issues Records of Decision, completing federal environmental analysis*
- **2018-2019:** *Finalizing design and obtaining County permits. Wyoming approved state permit*

Adapted from <http://www.transwestexpress.net/about/timeline.shtml>