



Western
Area Power
Administration

Transmission & Distribution Overview

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9/7/16



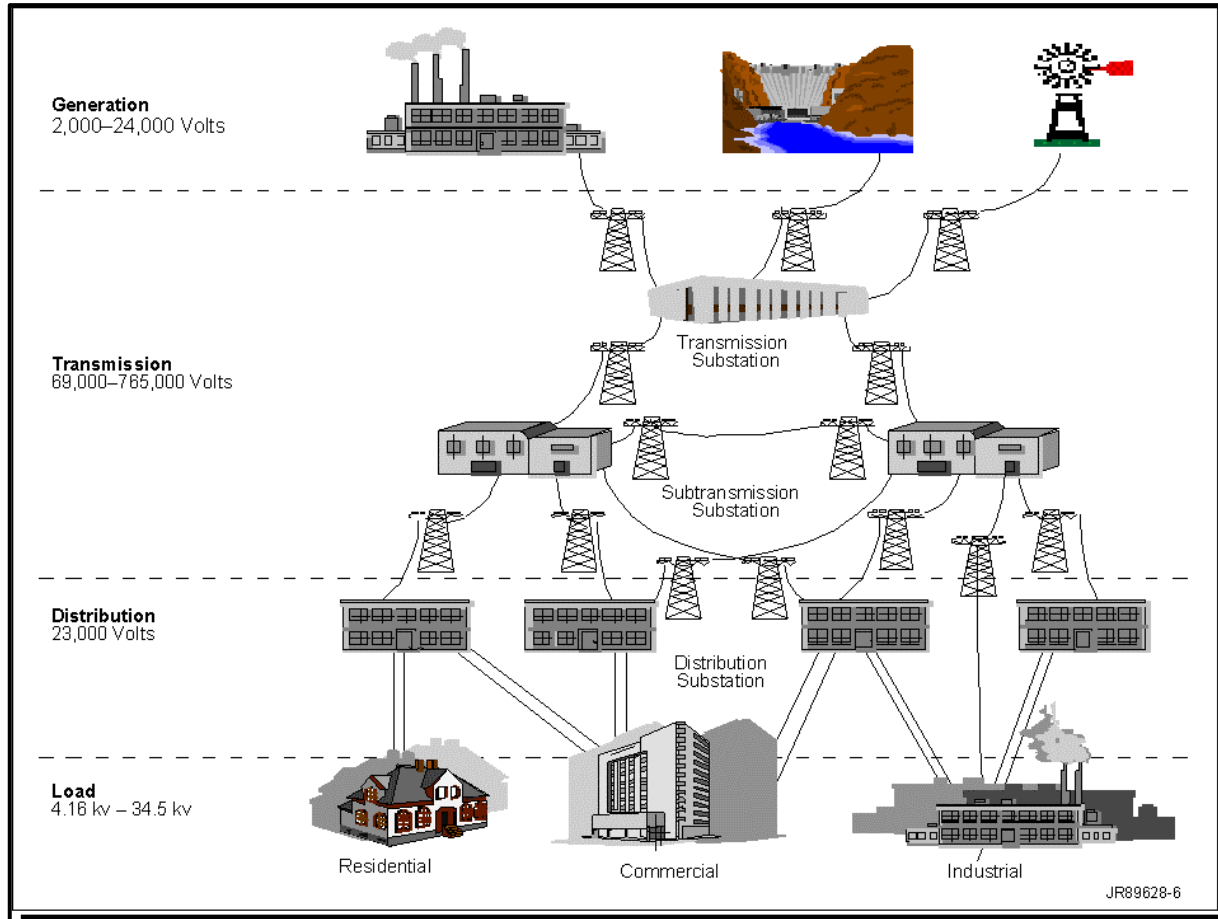
Tribal Renewable Energy Workshop

National Renewable Energy Laboratory

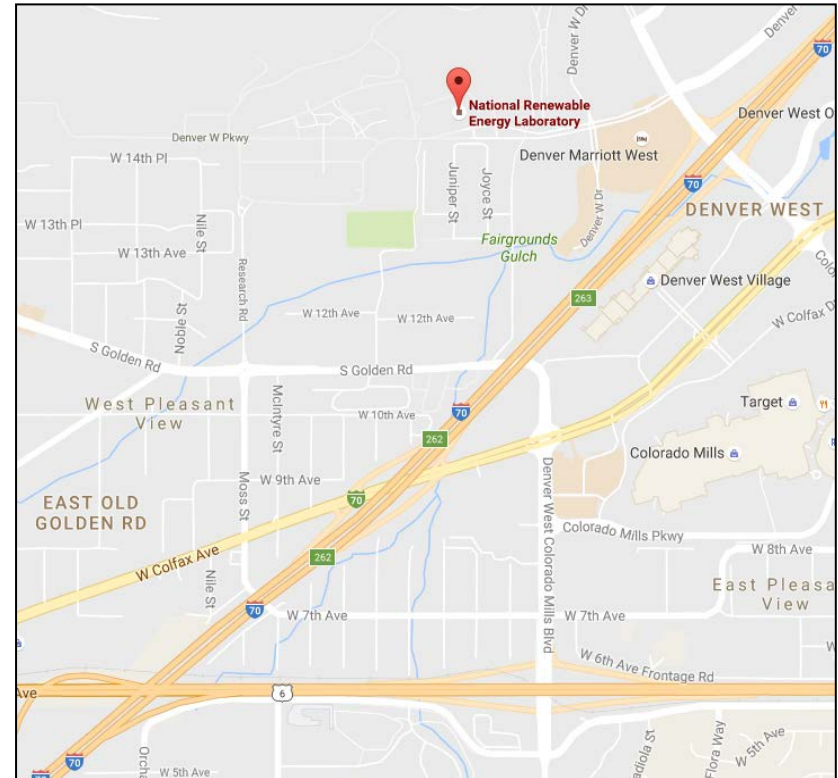
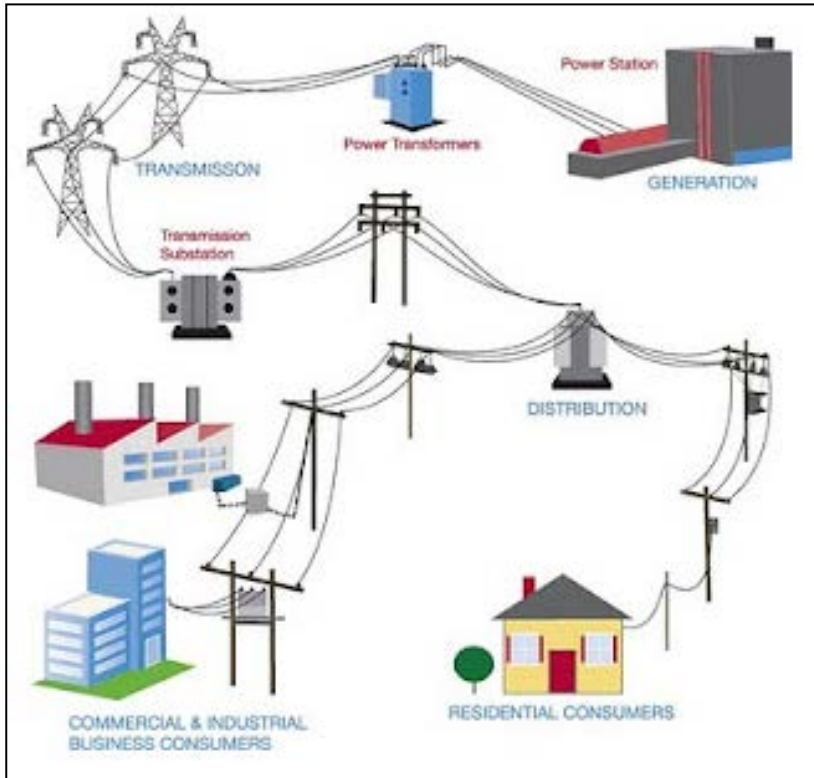
Golden, CO

The Electric Grid

The
“Wires”
Piece



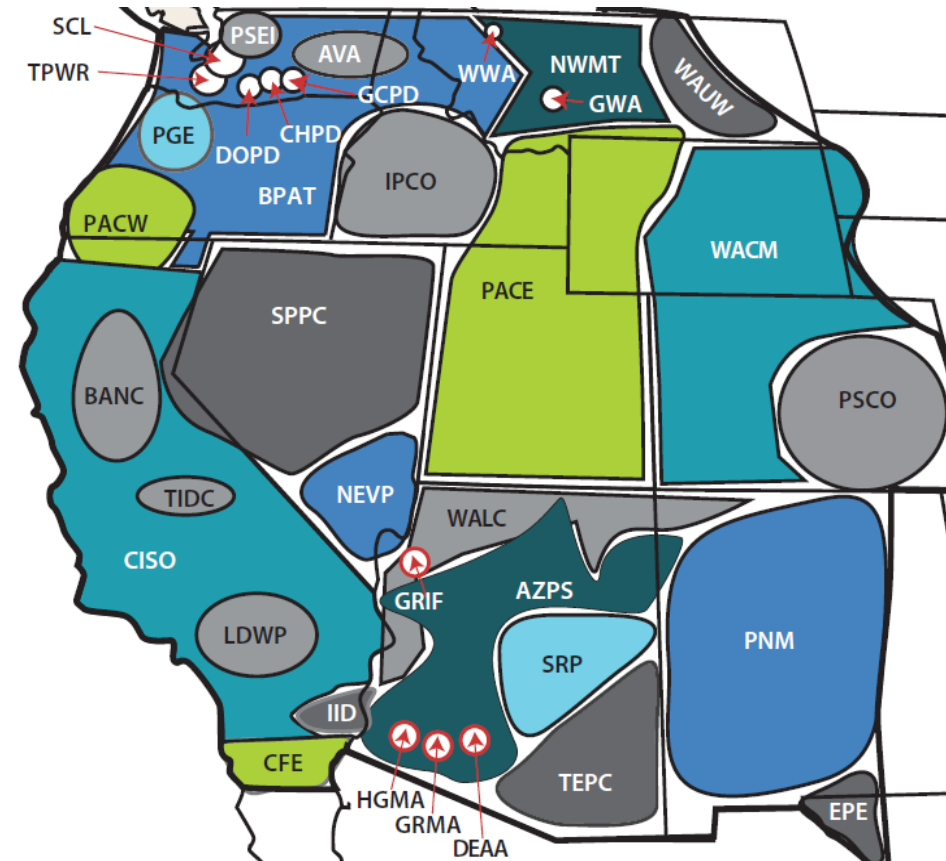
Electric Grid is similar to our roadways



*The high voltage transmission system is like our interstate highway system, while
The distribution system is like our city streets.*



Transmission Operators in the West



Open Access Same-Time Information System (OASIS)

- Website (storefront) for Transmission Service Providers use to make services available to potential customers.
- Transmission customers can check availability of transmission between various Points of Receipt and Delivery on the system and then reserve transmission service.



Types of Transmission Service

Point-to-Point (P2P)

- An exact Point of Receipt (POR) and Point of Delivery (POD) must be identified
- Take or pay service
- Intended for 3rd party sales or wheeling
- Resale capability, Rollover rights
- Term of agreement and service is one year or more

Network Integration Transmission Service (NITS)

- Purpose to serve load, Invoice on load peak
- Customer must designate network resources/loads
- No 3rd party sales
- Ability to use non-designated resources



Types of Transmission Service (Cont.)

Large Generator Interconnection (WAPA)

- Customer submits request with \$10K deposit
- Feasibility Study - \$10K Deposit
- System Impact Study (stability, power flow, and short-circuit analyses) - \$50K Deposit
- Facilities Study – Determines the facilities and modifications necessary to complete the interconnection, cost of facilities, and time required to complete the interconnection. - \$100K Deposit
- Customer elects one of two study timelines
 - 90 Calendar Days with +/- 20% accuracy in cost estimate
 - 180 Calendar Days with +/- 10% accuracy in cost estimate



Transmission Offerings (WAPA) Yearly P2P from Mead to PPK

OATI

Reservations Sys Data Offerings Resale NITS/NLS Reductions Data Company Home Help Options Logout Austin DSWM 09-07 0

Ancillary Offerings Security Deals Reports Schedules Notices User Upload CSV Bulletin Auction

Transmission Offering Summary for: WALC

TP: WALC Incr: YEARLY Peri: ALL POR: MEAD230 Path: W/WALC/SYSTRANS/MEAD230-PNPKWALC230/P01

Sell: ALL Class: FIRM Win: ALL POD: PNPKWALC230 Daylight Savings: Show Active Data:

Ref: Type: POINT_TO_POINT Sub: ALL Time: Active Next month Enter

New Posting User Range Columns Hourly Summary Save Query

ATC/TTC Monitor Spreadsheet Download CSV

Selected time range: 2016-10-01 00:00 MS to 2016-10-31 23:59 MS

Posting Ref	Path	Start Time ↓	Stop Time	Capacity	Nerc Priority	Offer Price	Increment	Type	Class
737055120	W/WALC/SYSTRANS/MEAD230-PNPKWALC230/P01	2015-11-01 00:00:00 MS	2016-11-01 00:00:00 MS	0	7	16080.0000	YEARLY	POINT_TO_POINT	FIRM
737055193	W/WALC/SYSTRANS/MEAD230-PNPKWALC230/P01	2015-12-01 00:00:00 MS	2016-12-01 00:00:00 MS	0	7	16080.0000	YEARLY	POINT_TO_POINT	FIRM
736836048	W/WALC/SYSTRANS/MEAD230-PNPKWALC230/P01	2016-01-01 00:00:00 MS	2017-01-01 00:00:00 MS	0	7	16080.0000	YEARLY	POINT_TO_POINT	FIRM
737055480	W/WALC/SYSTRANS/MEAD230-PNPKWALC230/P01	2016-01-01 00:00:00 MS	2017-01-01 00:00:00 MS	0	7	16080.0000	YEARLY	POINT_TO_POINT	FIRM
737055689	W/WALC/SYSTRANS/MEAD230-PNPKWALC230/P01	2016-02-01 00:00:00 MS	2017-02-01 00:00:00 MS	0	7	16080.0000	YEARLY	POINT_TO_POINT	FIRM
737055809	W/WALC/SYSTRANS/MEAD230-PNPKWALC230/P01	2016-03-01 00:00:00 MS	2017-03-01 00:00:00 MS	0	7	16080.0000	YEARLY	POINT_TO_POINT	FIRM
737056020	W/WALC/SYSTRANS/MEAD230-PNPKWALC230/P01	2016-04-01 00:00:00 MS	2017-04-01 00:00:00 MS	0	7	16080.0000	YEARLY	POINT_TO_POINT	FIRM
737056279	W/WALC/SYSTRANS/MEAD230-PNPKWALC230/P01	2016-05-01 00:00:00 MS	2017-05-01 00:00:00 MS	0	7	16080.0000	YEARLY	POINT_TO_POINT	FIRM
737056518	W/WALC/SYSTRANS/MEAD230-PNPKWALC230/P01	2016-06-01 00:00:00 MS	2017-06-01 00:00:00 MS	0	7	16080.0000	YEARLY	POINT_TO_POINT	FIRM
737056679	W/WALC/SYSTRANS/MEAD230-PNPKWALC230/P01	2016-07-01 00:00:00 MS	2017-07-01 00:00:00 MS	51	7	16080.0000	YEARLY	POINT_TO_POINT	FIRM
737057030	W/WALC/SYSTRANS/MEAD230-PNPKWALC230/P01	2016-08-01 00:00:00 MS	2017-08-01 00:00:00 MS	46	7	16080.0000	YEARLY	POINT_TO_POINT	FIRM
737057203	W/WALC/SYSTRANS/MEAD230-PNPKWALC230/P01	2016-09-01 00:00:00 MS	2017-09-01 00:00:00 MS	15	7	16080.0000	YEARLY	POINT_TO_POINT	FIRM
737057425	W/WALC/SYSTRANS/MEAD230-PNPKWALC230/P01	2016-10-01 00:00:00 MS	2017-10-01 00:00:00 MS	26	7	16080.0000	YEARLY	POINT_TO_POINT	FIRM



Delivery Cost Example

20MW wheel Mead>PPK

\$321,600 P2P Transmission (\$16,080/Yr X 20MW)

\$ 35,478 Losses (3% of MWs Scheduled)

\$ 8,342 Ancillary Services

\$365,420 Total Delivery Cost

20MWs X 24hr X 365Days = 175,200 Annual Prod (100% CF)

175,200 X 27% = 47,304 Annual Prod (27% CF)

\$365,420 / 47,304 = \$7.72/MWh



Questions?

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