Transmission & Distribution Overview

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Tribal Renewable Energy Workshop

National Renewable Energy Laboratory
Golden, CO
The Electric Grid

The "Wires" Piece

- **Generation**: 2,000–24,000 Volts
- **Transmission**: 69,000–765,000 Volts
- **Distribution**: 23,000 Volts
- **Load**: 4.16 kV – 34.5 kV

- Residential
- Commercial
- Industrial
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
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
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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