

# Historical Transmission Congestion Study Northwest Power Pool Paths

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US DOE 2009 Congestion Workshop  
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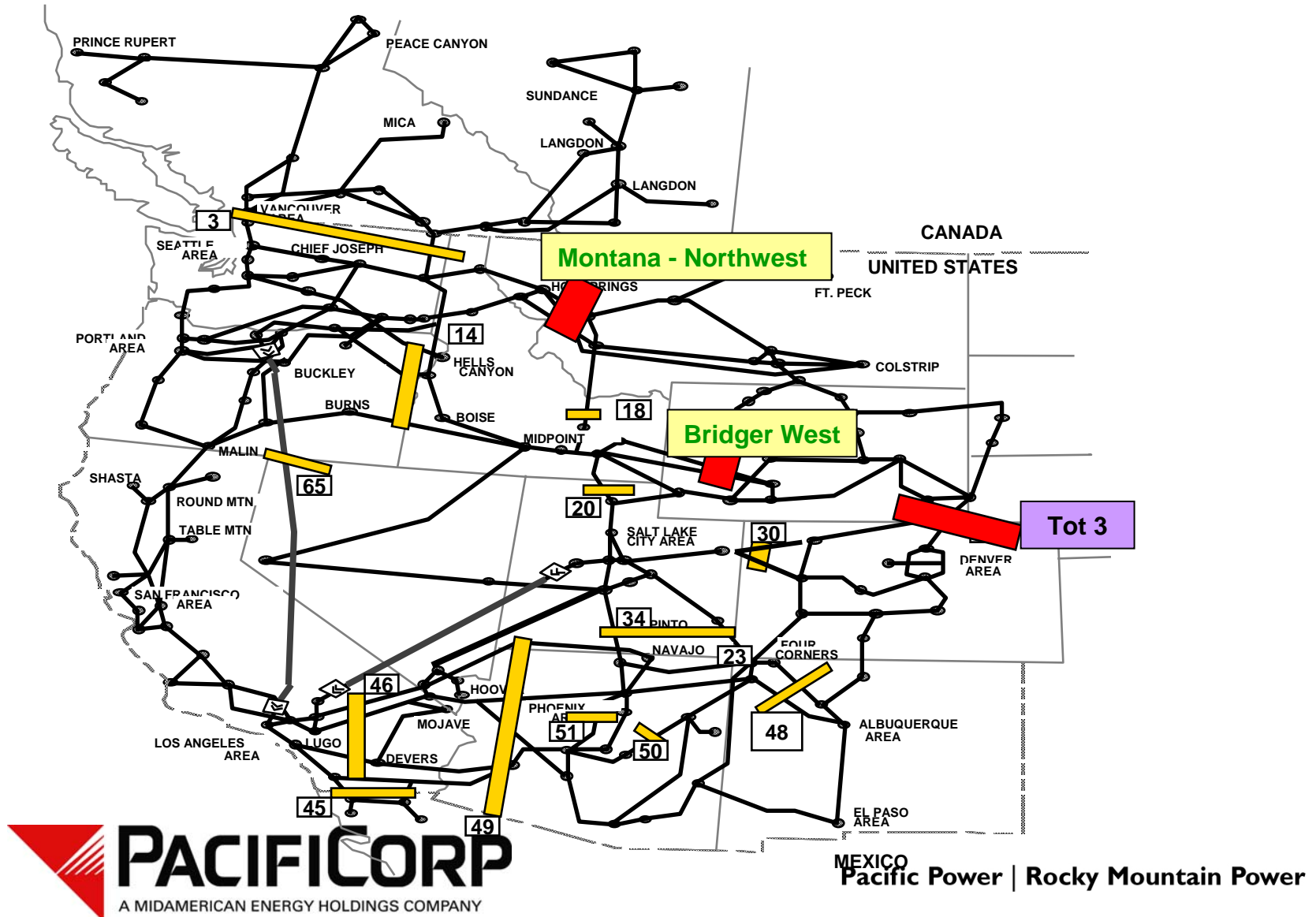
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## Transmission Use has elements that are Seen and Unseen

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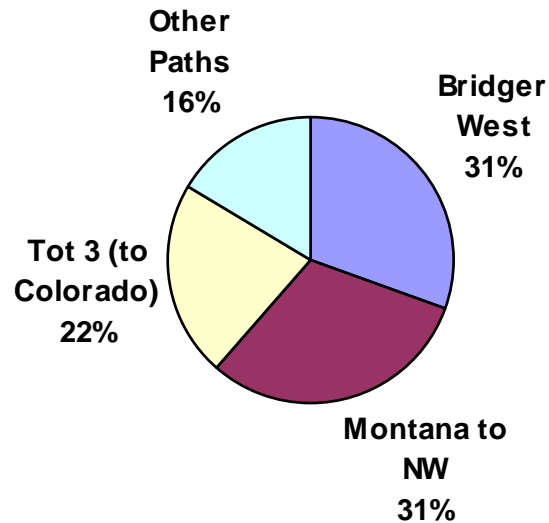
- **Seen (with work)**
  - ▶ Firm Rights
  - ▶ Schedules (some)
  - ▶ Flow
- **Unseen (may be impossible to spot)**
  - ▶ Internal Network Use (usually)
  - ▶ Use as Option (Both NT and PtP)
    - Seasonal Needs
    - Weather Driven Changes
      - » High/Low Water
      - » Hot/Cold temps
    - Access to market to buy and sell energy
    - Fuel Hedge
    - Access to Contingency Reserves
    - Replacement Reserves
      - » Only Scheduled the hour after outage on
  - ▶ Emergency Purchases
    - Seldom used (we hope)
  - ▶ Operational Reserves
    - Seldom flow
    - may not be scheduled (from own network resources internal to own system)

# Major Transmission Paths out of Montana and Wyoming

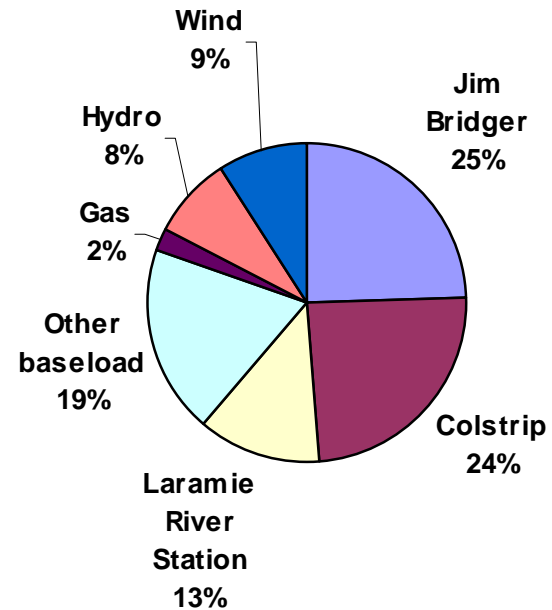


# Montana & Wyoming Paths compared to Resources

Transmission out of region  
About 7200 MW Total



Existing Resources in region  
About 8700 MW Total



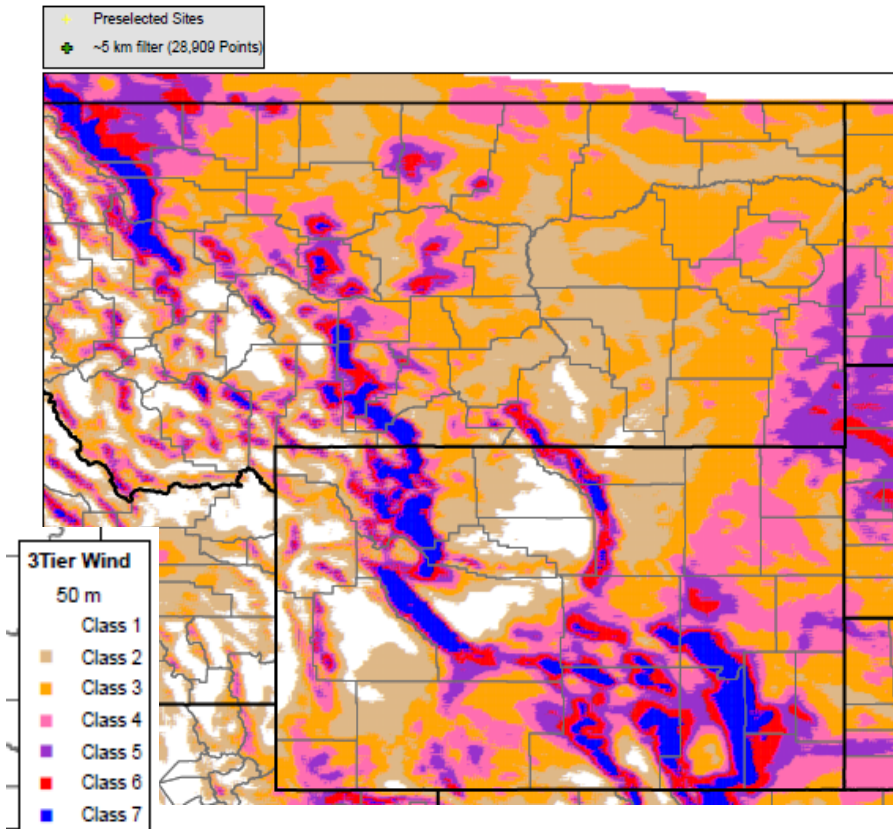
**Current System is fully utilized - New Resources need new transmission**



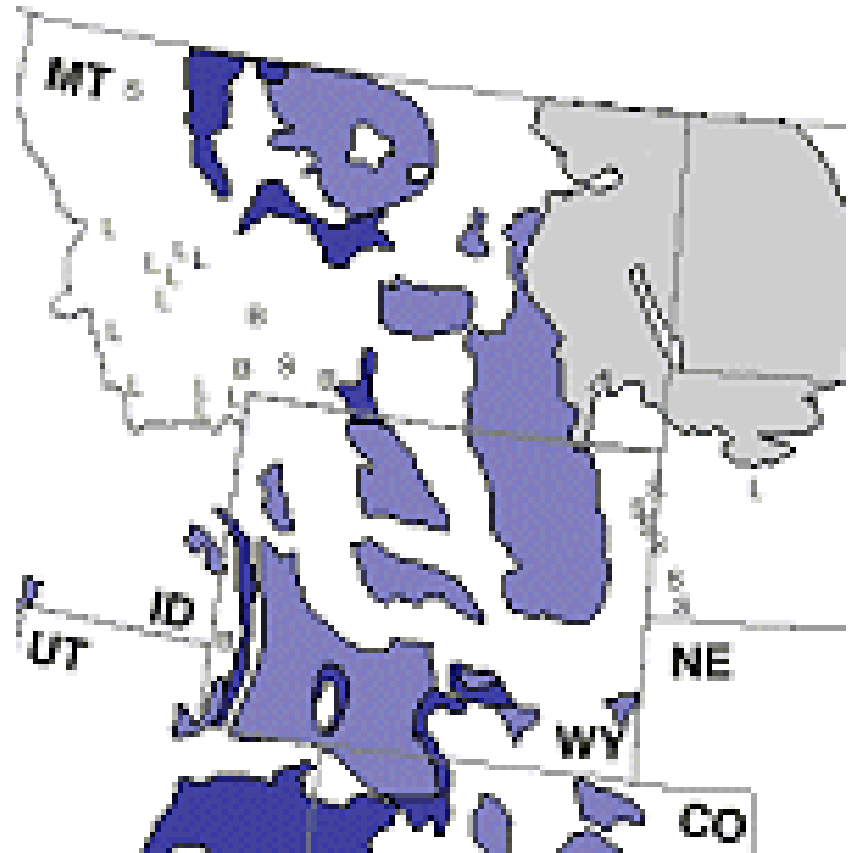
# Montana & Wyoming Resource Potential is Huge, but how to move?

Source - [http://wind.nrel.gov/public/WWIS/maps/nequad\\_wind.pdf](http://wind.nrel.gov/public/WWIS/maps/nequad_wind.pdf)  
<http://www.eia.doe.gov/cneaf/coal/reserves/chapter1.html#fig1>

## Montana & Wyoming Wind sites



## Montana & Wyoming Coal Fields



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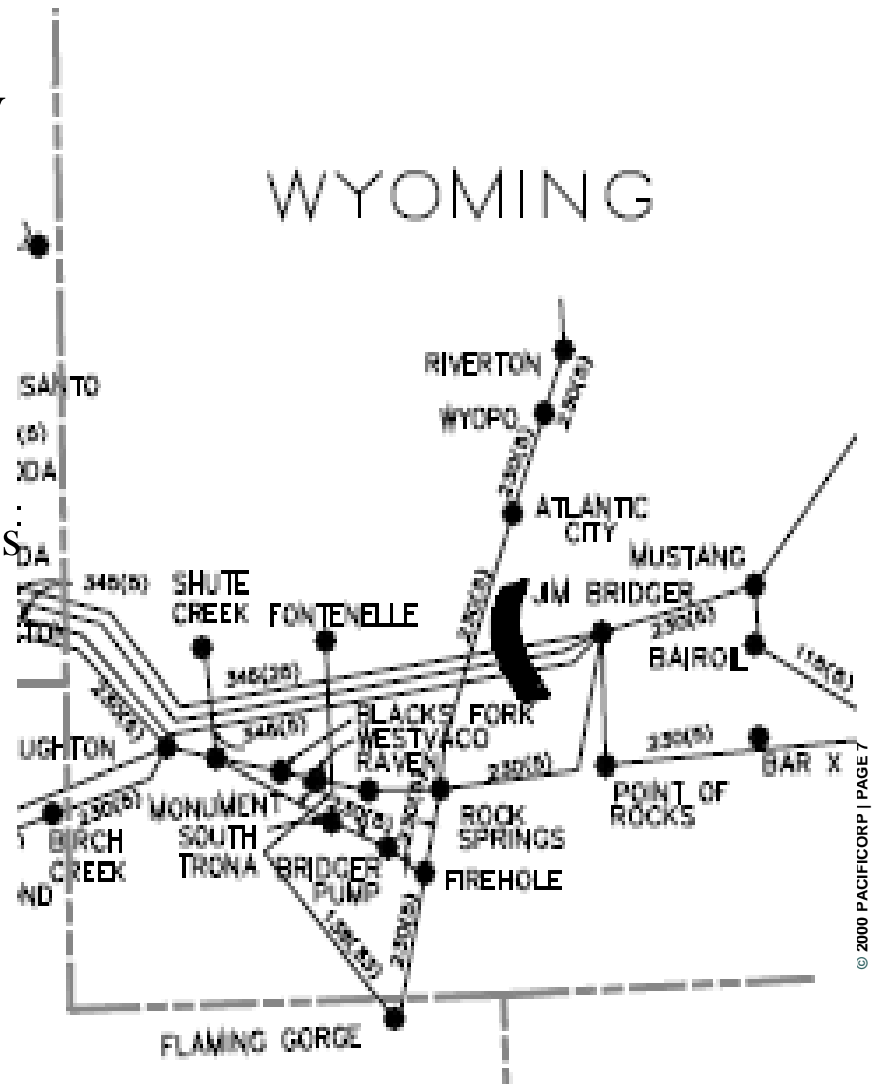
## Montana to the Northwest - WECC Path 8

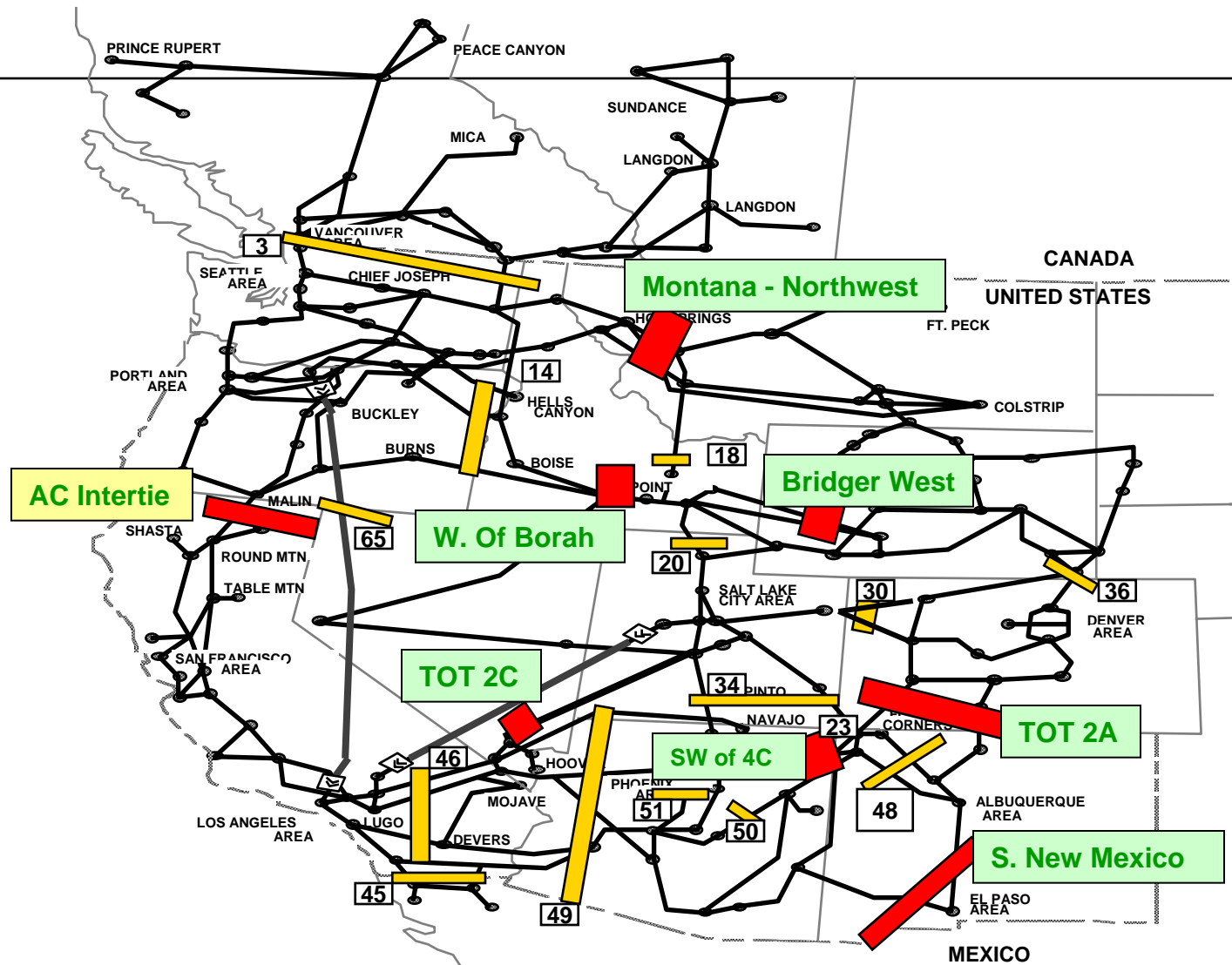
- East to West limit is rated at 2200 MW
- Two 500 kV lines built for Colstrip with seven lower voltage elements and a remedial action scheme
- Low Loads in Eastern Montana
- 2500 MW Thermal
- 300 MW Hydro
- 150 MW Wind and Growing fast
- Major Wind, Coal and Lignite additions are possible to the east



## Bridger West - WECC path 19

- East to West limit is rated at 2200 MW
- Three 345 kV lines and a remedial action scheme
- Tied to the Jim Bridger Plant – 2120 MW of mine-mouth coal
- Over 600 MW Wind (and growing) and 1000 MW Coal are on PacifiCorp's system to the east
- Major Wind and Coal additions are possible to the east

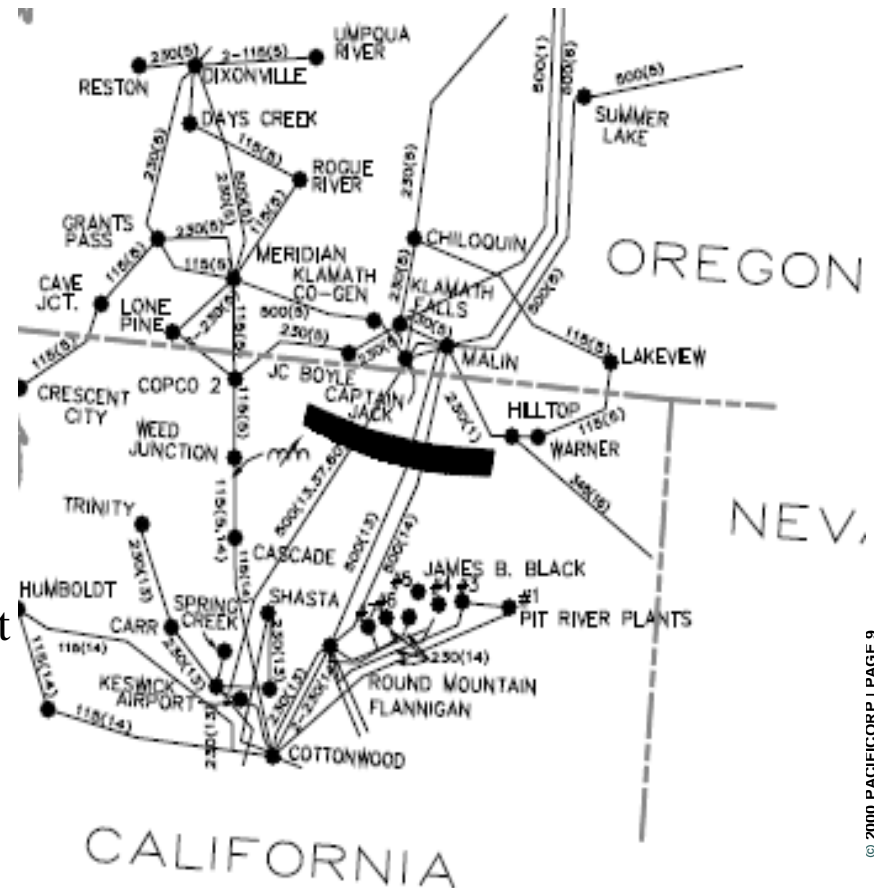


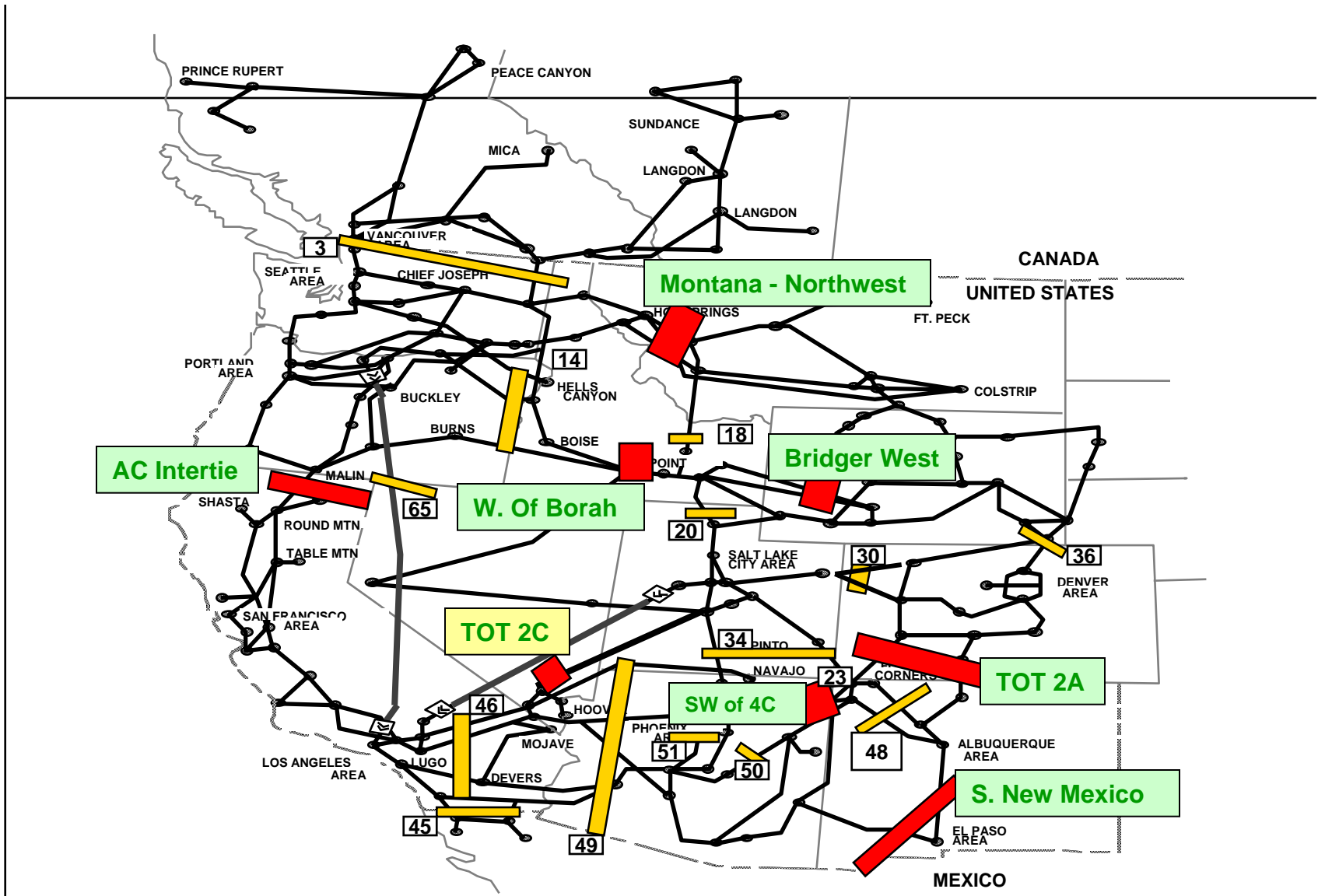




## AC Intertie – COI or WECC path 66

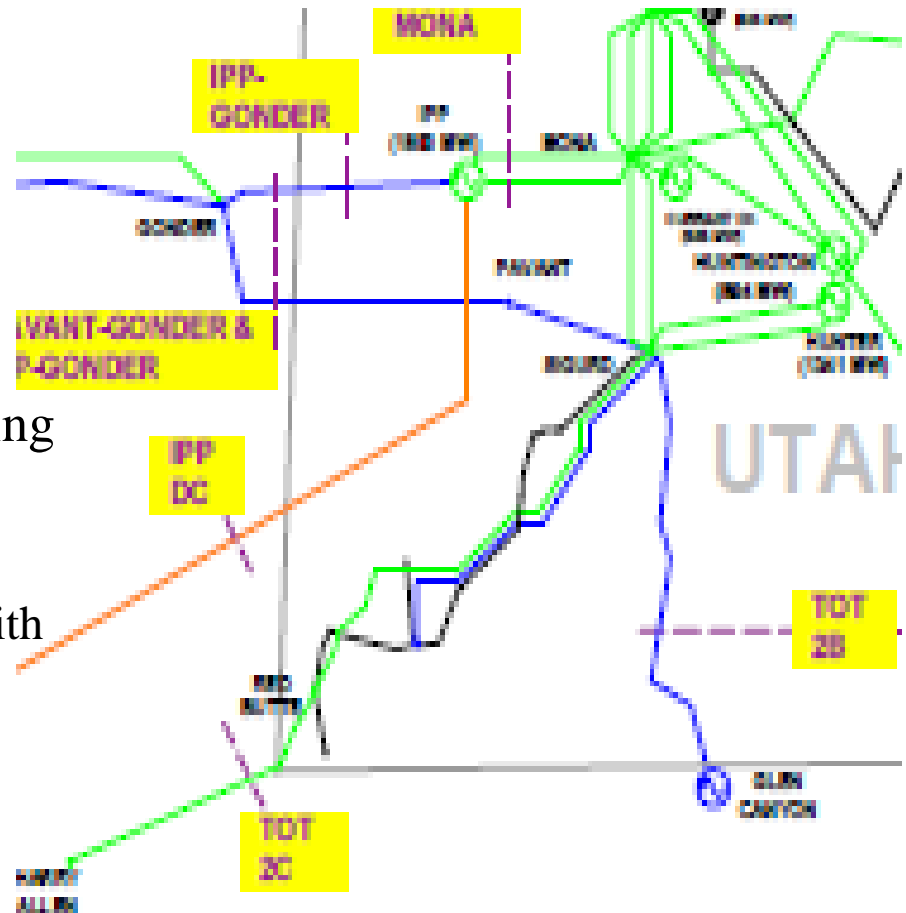
- North to South 4800 MW
- South to North 3675 MW
- Three 500 kV lines and a remedial action scheme
- Seasonal Exchanges
  - ▶ California Summer while Northwest Winter Peaking
  - ▶ California was thermal and built for summer peak loads
  - ▶ Northwest was hydro based and built for annual energy
- Became a market hub
  - ▶ Option for Economy Energy
  - ▶ Option for Emergency Energy





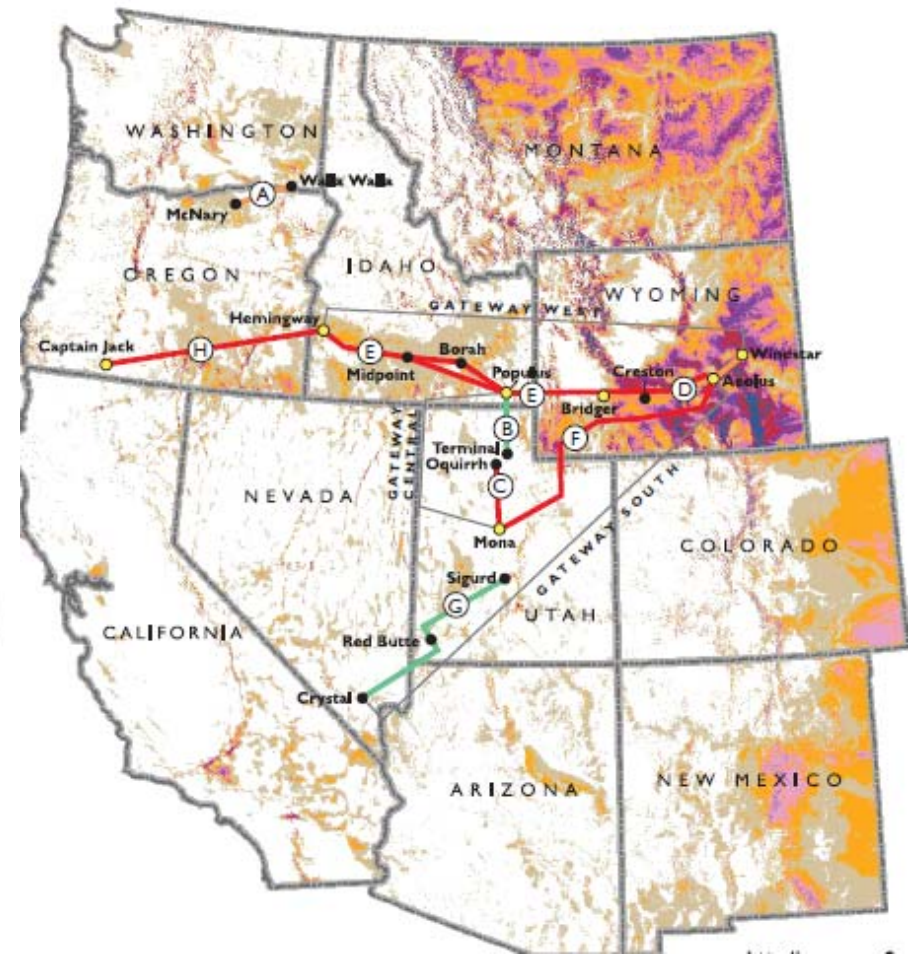
## Tot 2C - WECC path 35

- North to South 300 MW
- South to North 300 MW
- Single 345 kV line
  - ▶ Long line (Sigurd-Harry Allen is about 250 miles)
  - ▶ Load Service in the middle
- Economy and Peaking Power Trading
  - ▶ Direction depends on Season and Time of Day
  - ▶ Utah Generation – Largely Coal with some gas fired
  - ▶ Nevada Generation – Largely Gas fired, but also Hydro and Coal



# PacifiCorp's Energy Gateway Project

<http://www.oasis.pacificorp.com/oasis/ppw/energygateway.html>



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