



Transmission

Transporting Energy by Wire

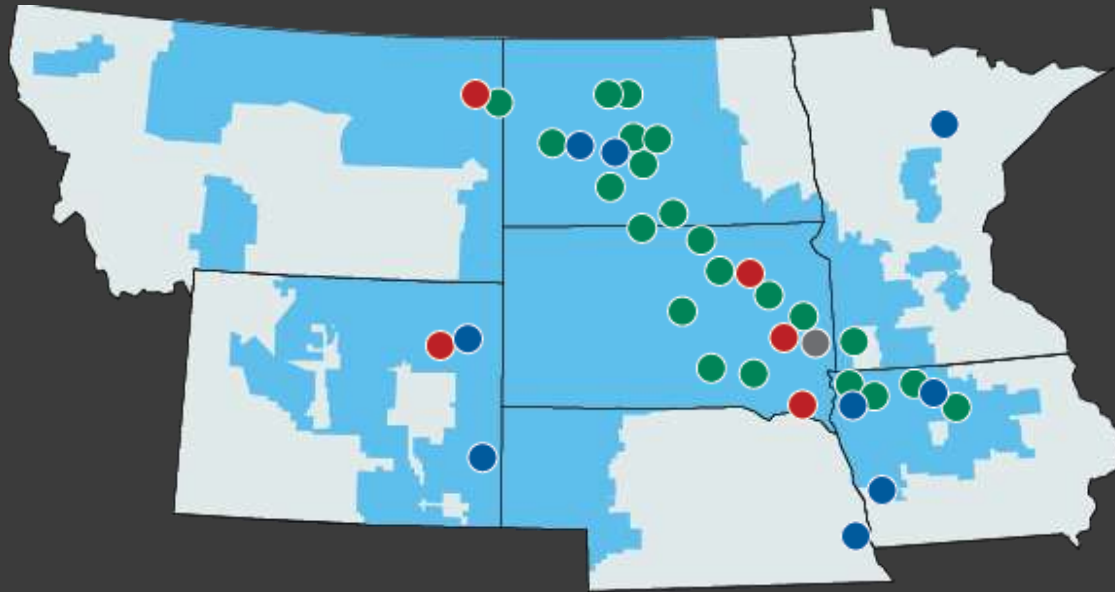
Matthew Stoltz

Basin Electric Power Cooperative



BASIN ELECTRIC POWER COOPERATIVE

A Touchstone Energy® Cooperative 



 **Membership Service Area**

 **Baseload Power**

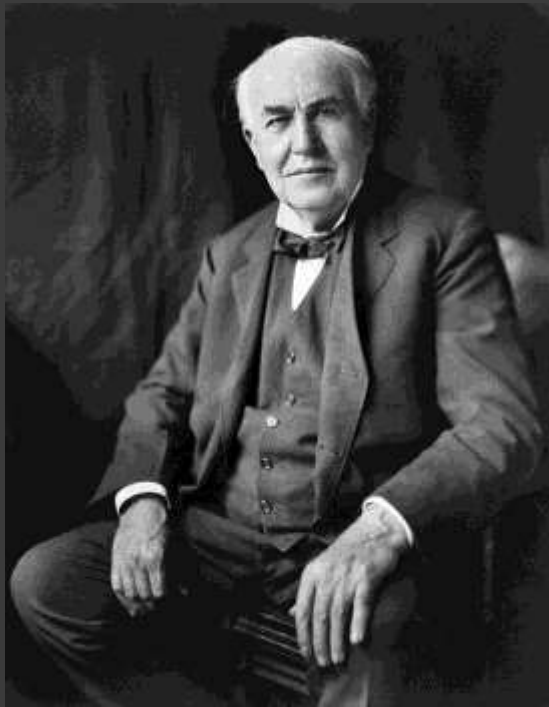
 **Peaking Power**

 **Renewable Power**

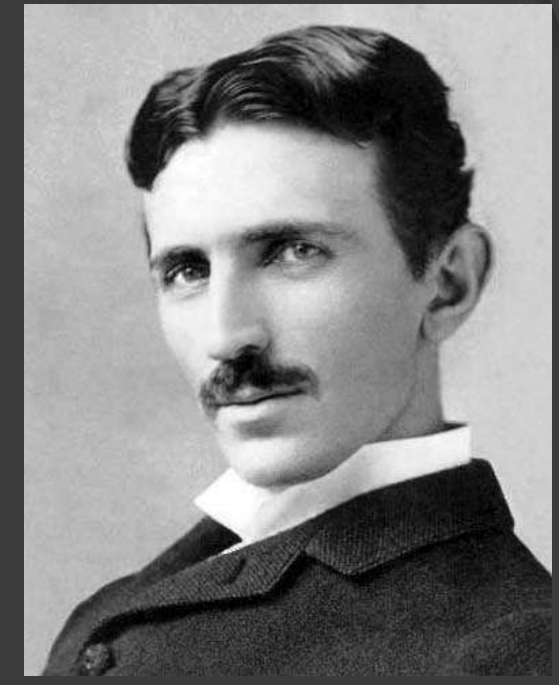
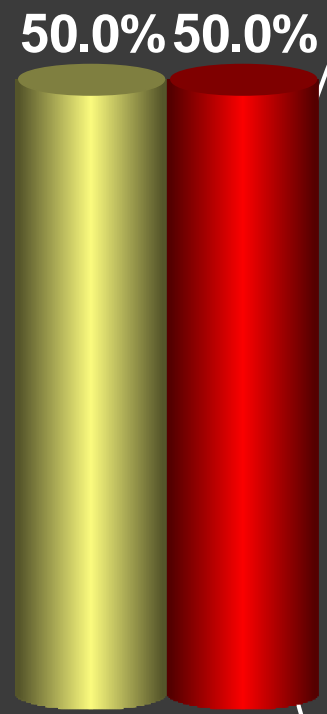
 **Under Construction**

- **Generation = 5000MW (700MW Wind)**
- **2.8 Million Consumers**
- **134 Member Cooperatives**
- **2000 Miles of Transmission**

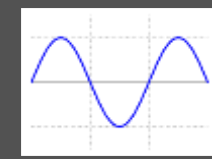
Question: Who is the father of the today's electric transmission system?



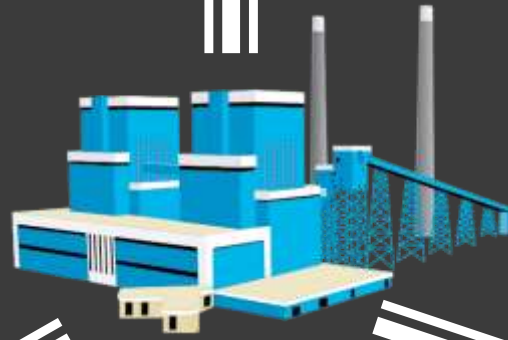
1. Thomas Edison
Direct Current "DC"



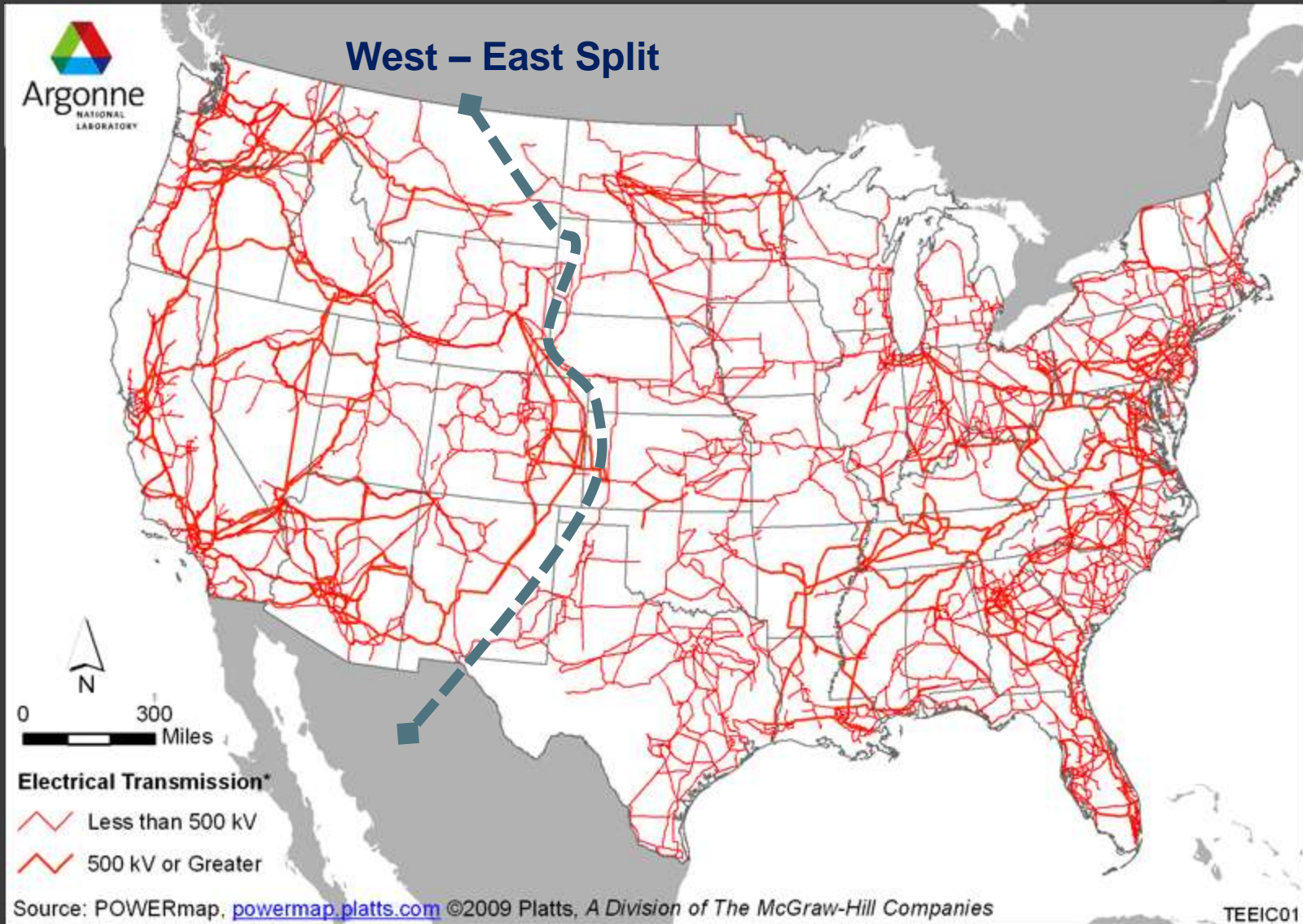
2. Nikola Tesla
Alternating Current "AC"



Growing the Transmission Grid



The High Voltage “Grid”



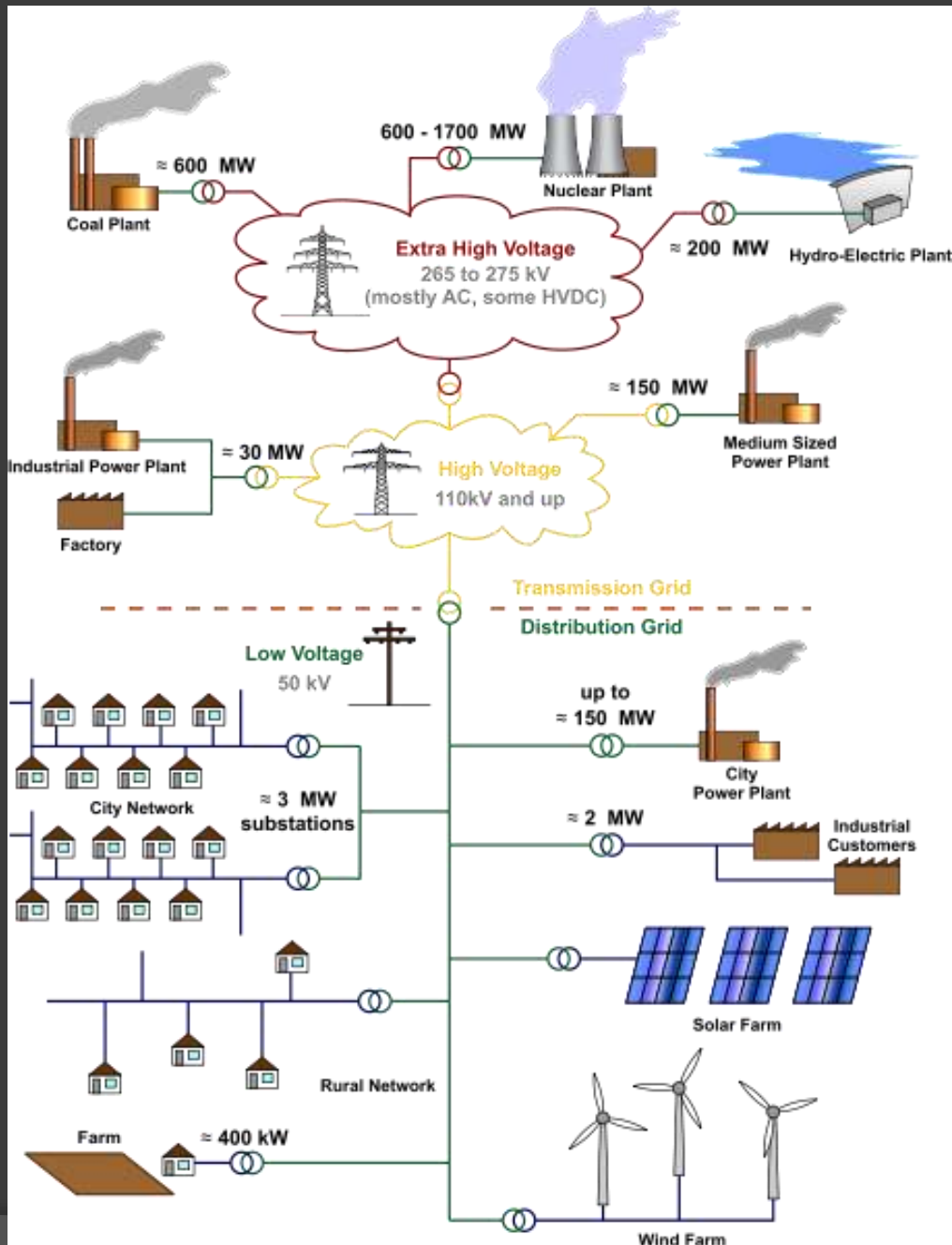
Economies of Scale



345,000 Volts



120 Volts



Transmission

Distribution



Powering the Upper Midwest...

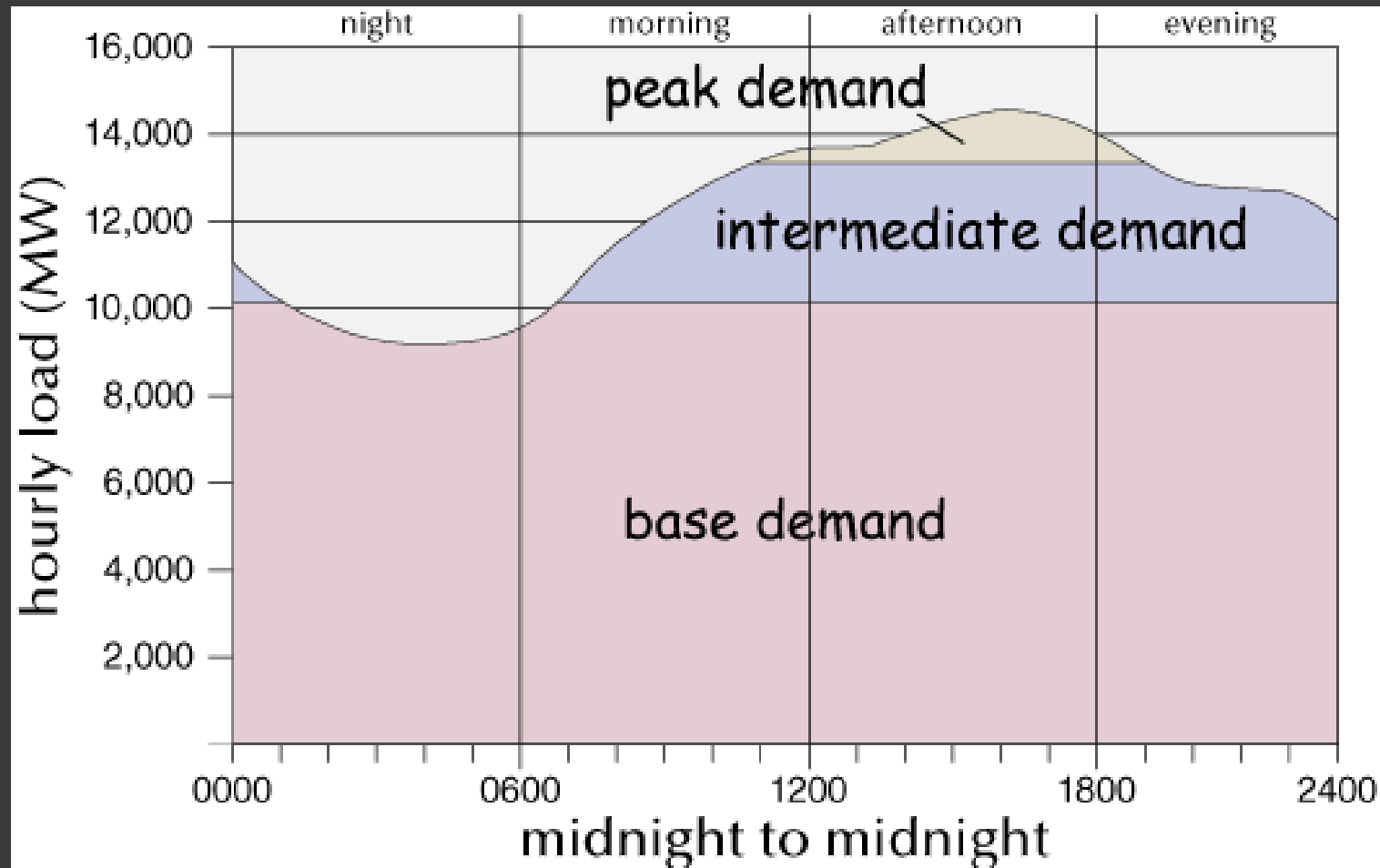
Missouri River Dams



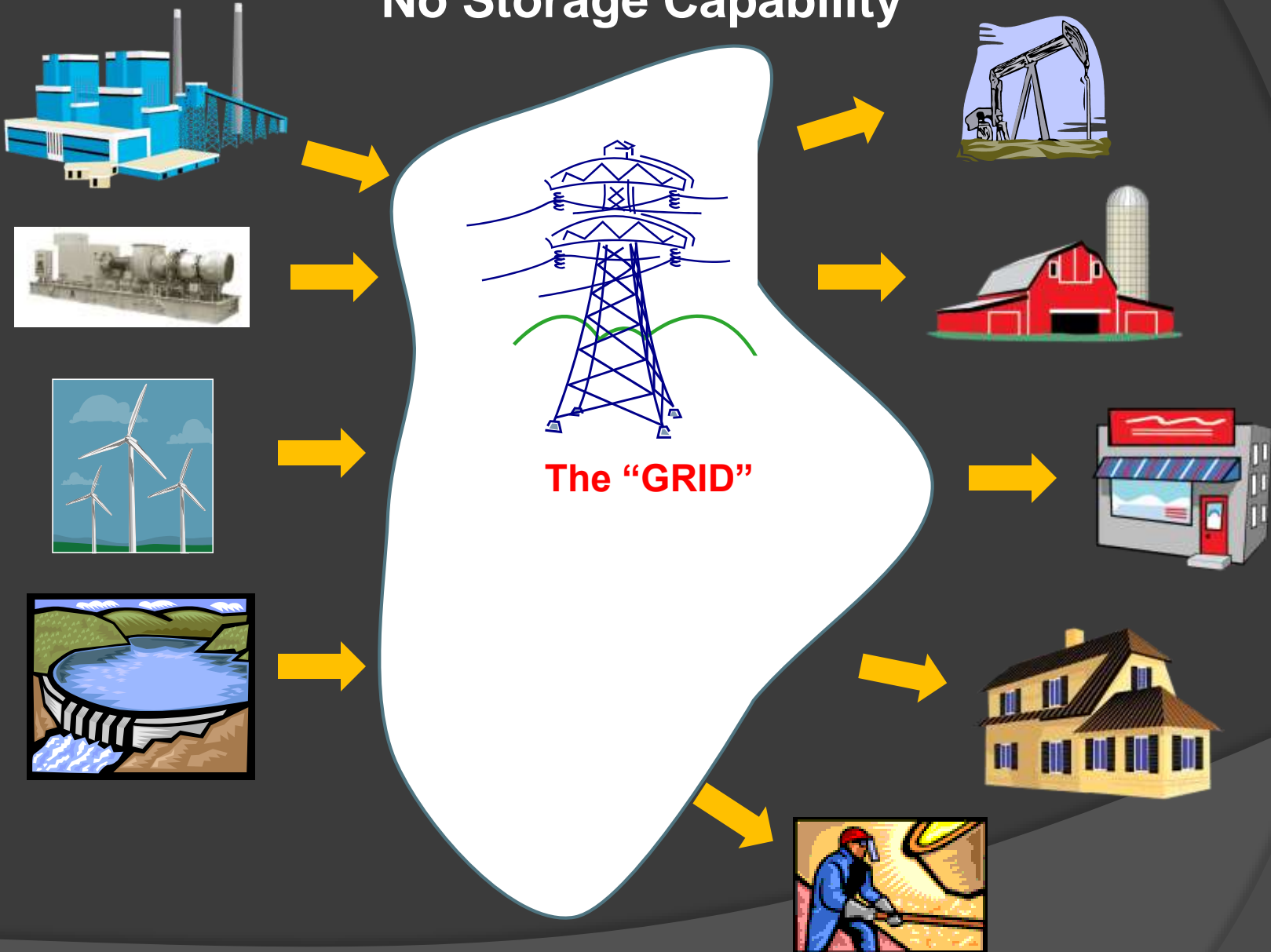
Lignite Power Plants



Typical Daily Electricity Demand By Hour



Generation = Demand No Storage Capability



The Grid

⦿ Pro's

- Reliable
- Redundant
- Accessible
- Access To Markets Nationwide

⦿ Con's

- Everyone Is Connected – Problems Can Cascade
- Remote Congestion Can Limit Local Schedules

Regulation:

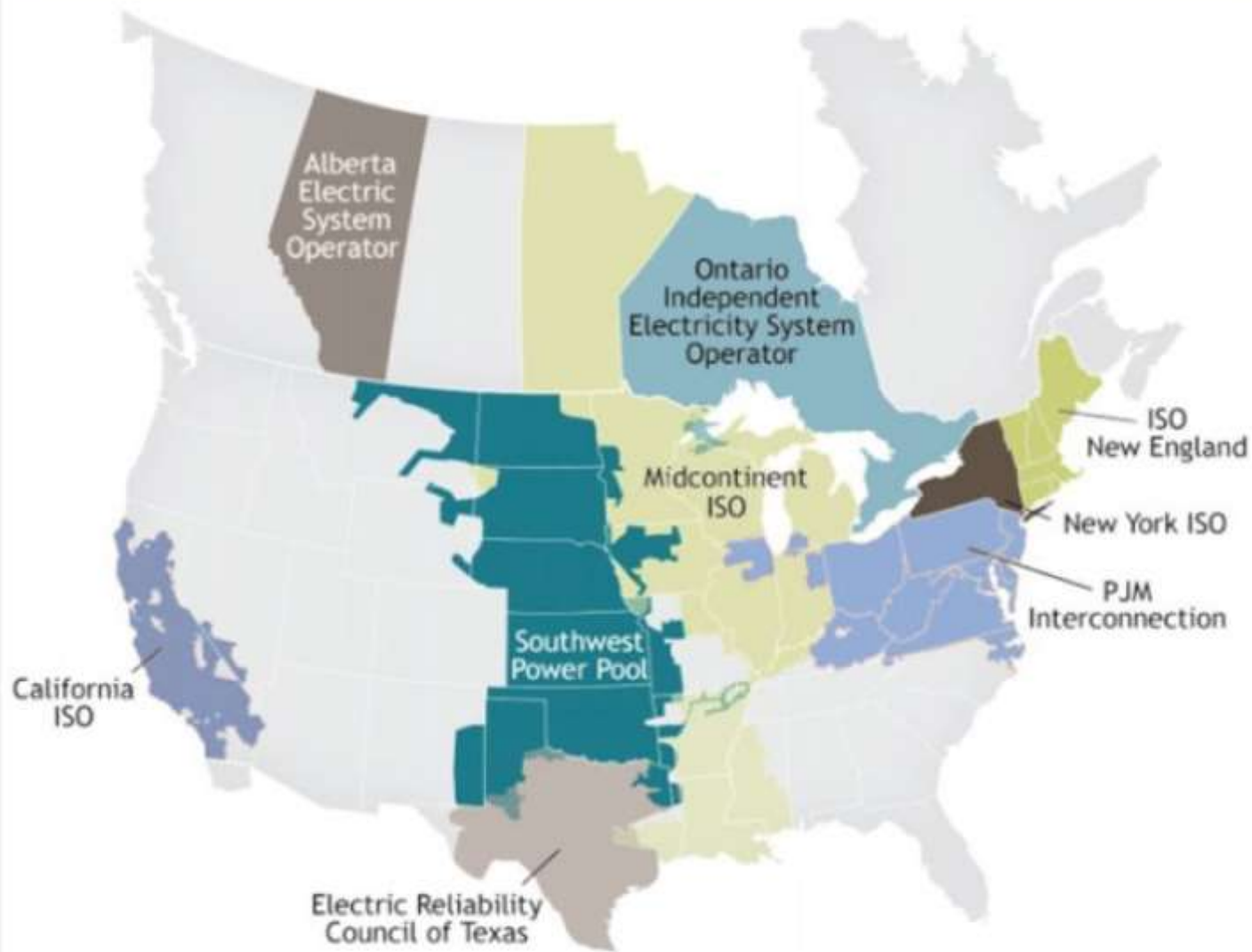


FERC: Regulates Interstate Electricity Transmission
State Public Service Commissions: Regulate Internal State Transmission



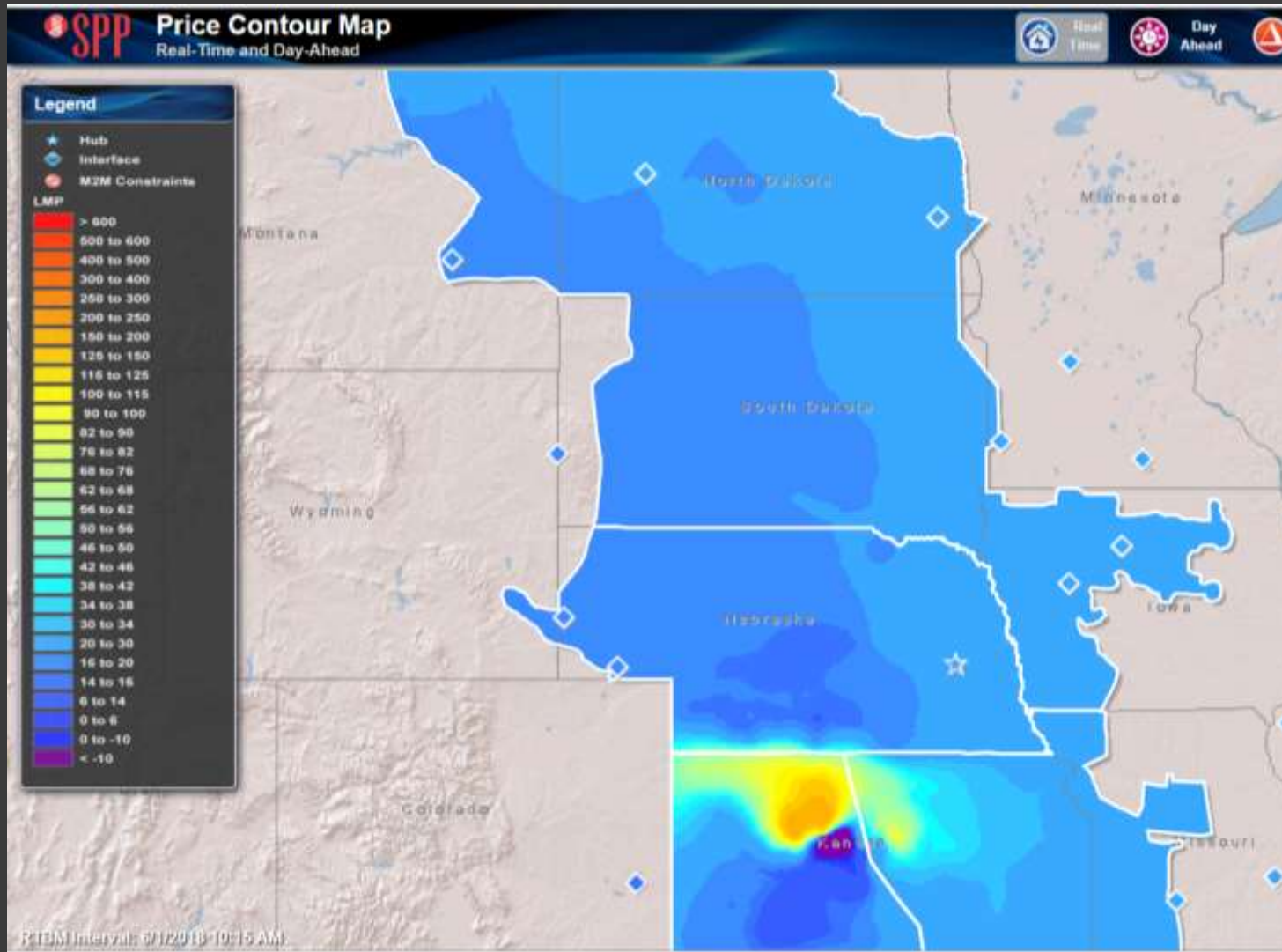
NERC: Sets Mandatory Reliability Standards

Energy Markets



(Source: Southwest Power Pool)

Locational Marginal Prices - SPP.org



Expanding The Grid

- \$125,000 per mile for 60,000 Volt lines
- \$250,000 per mile for 115,000 Volt lines
- \$500,000 per mile for 230,000 Volt lines
- \$1,500,000 per mile for 345,000 Volt lines

- Transmission is ~7% of Average Electric Bill

MISO CAPX 2020



Basin Completed

AVS-Neset 345KV Transmission Line

200 Miles Long, In Service 2015-2017





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