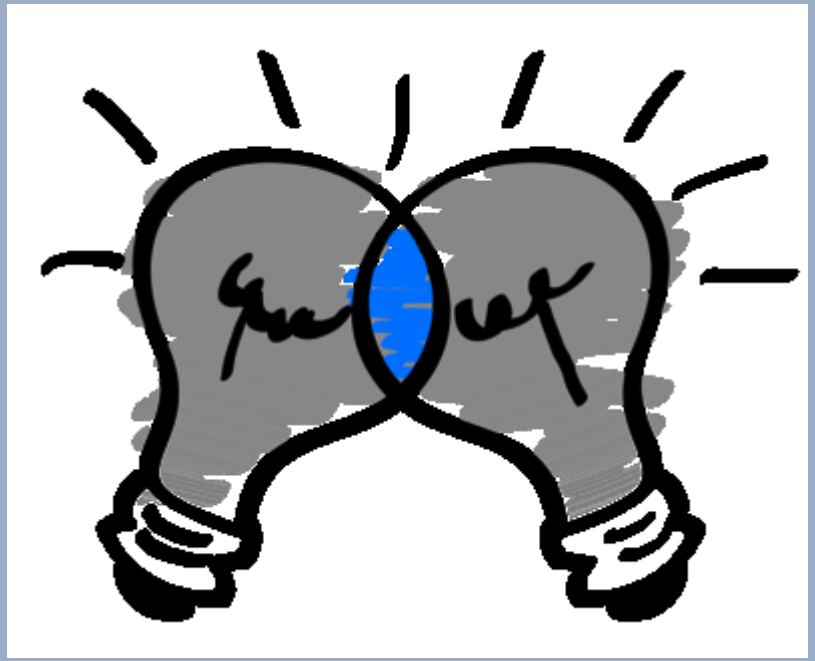


ENERGY MARKETS AND OPERATIONS

In North Dakota

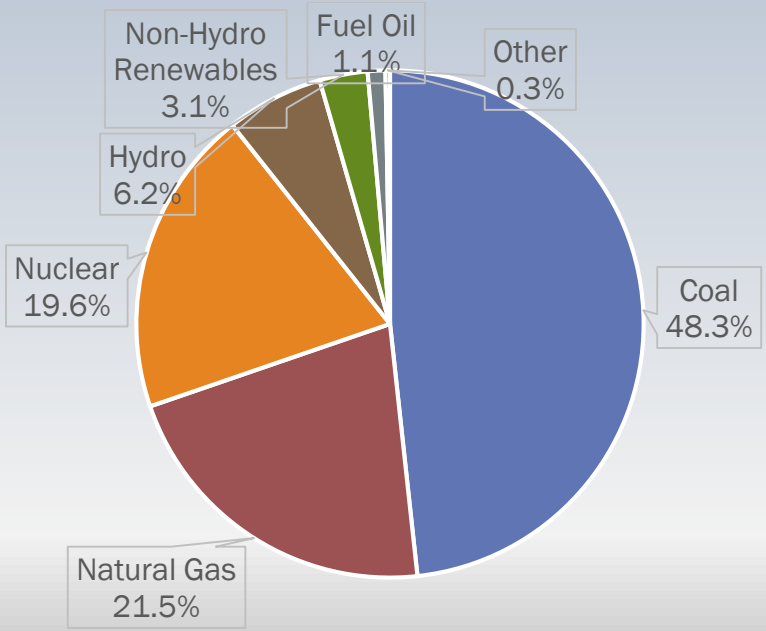
Jean Schafer, Senior Legislative Representative,
Basin Electric Power Cooperative

OVERVIEW

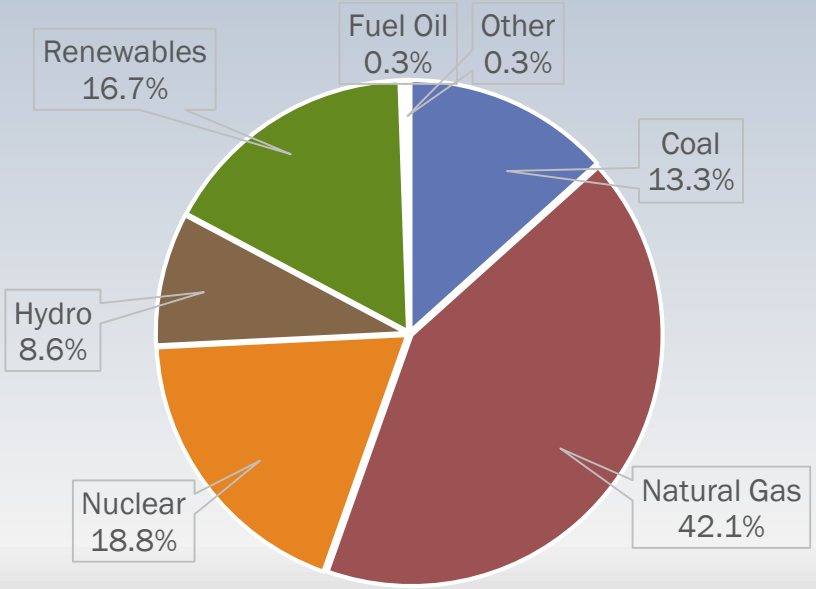
MIX OF RESOURCES

The mix of resources used to generate electricity is changing dramatically.....

2008 National Energy Resource Mix



2023 Net Generation, All Sectors *(May)*



Source: Department of Energy, Energy Information Administration

ATTRIBUTES OF GENERATION

AS A GENERAL RULE

- Coal and nuclear generation are 24/7 dispatchable and rampable power production
- 70-95% Capacity Factor

COAL

- Coal plants are less flexible than gas generation.
- It can take several hours, possibly days, to completely shut down and startup a coal plant.
  - If a coal plant is not price competitive it will normally reduce output to minimum levels instead of shutting down
  - At this point, they can potentially be selling power at a loss until the market price increases (loads increase or wind generation reduces)
  - Minimum operating levels for a coal plant vary
  - Many are 40 - 50% capacity
  - Occurring less frequent with Economic Dispatch

ATTRIBUTES OF GENERATION

AS A GENERAL RULE

- Natural gas generation can be used for:
  - Peaking
  - Intermediate
  - Baseload
  - 5-90% Capacity Factor (price and supply)

NATURAL GAS

- Natural gas can be a very low-cost fuel source - fluctuates
- Generally, natural gas can respond faster to load changes than coal-based generation
- Depending on the price of the fuel, natural gas generation can be dispatched before or after coal generation
- Natural gas has higher transportation interruption risks than coal

ATTRIBUTES OF GENERATION

AS A GENERAL RULE

- Wind and solar are intermittent power with annual capacity factors of 10-50%

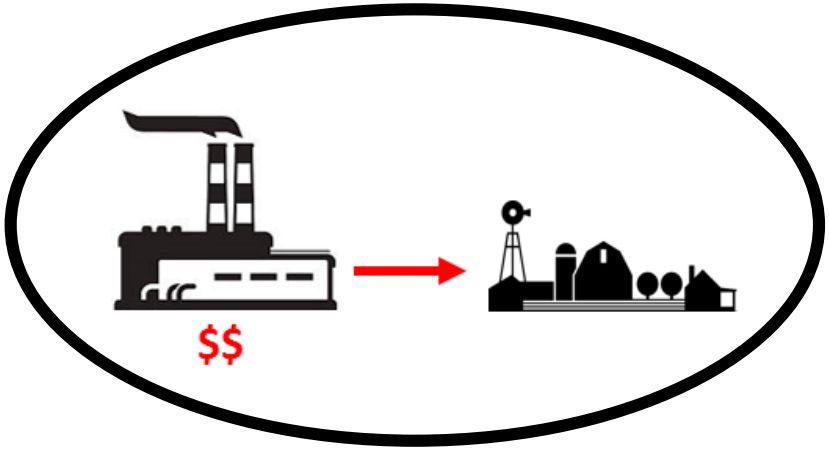
WIND

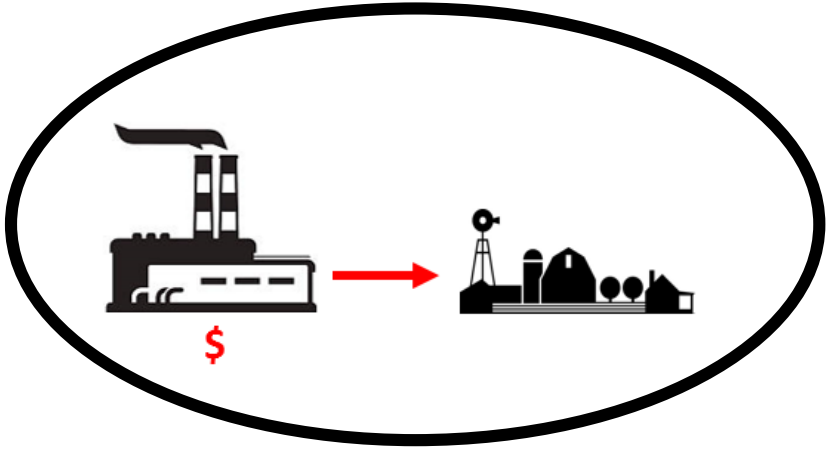
- Wind projects can offer low rates (to developers or utilities)
  - Excellent wind resources in the Midwest
  - Use Production tax credits (PTCs)
    - Wind owners benefit for 10 years
    - All Federal taxpayers fund PTCs
- Wind facilities lifespan are 20-30 years
  - Repowering of projects is starting to occur
- Wind has zero variable (fuel) costs and normally priced into the market at zero, or below all other generation costs
  - In general, wind is dispatched when it runs
  - Possible for negative pricing due to “take or pay provisions”

EVOLUTIONS OF THE ELECTRIC GRID

IN THE BEGINNING: SELF SERVE

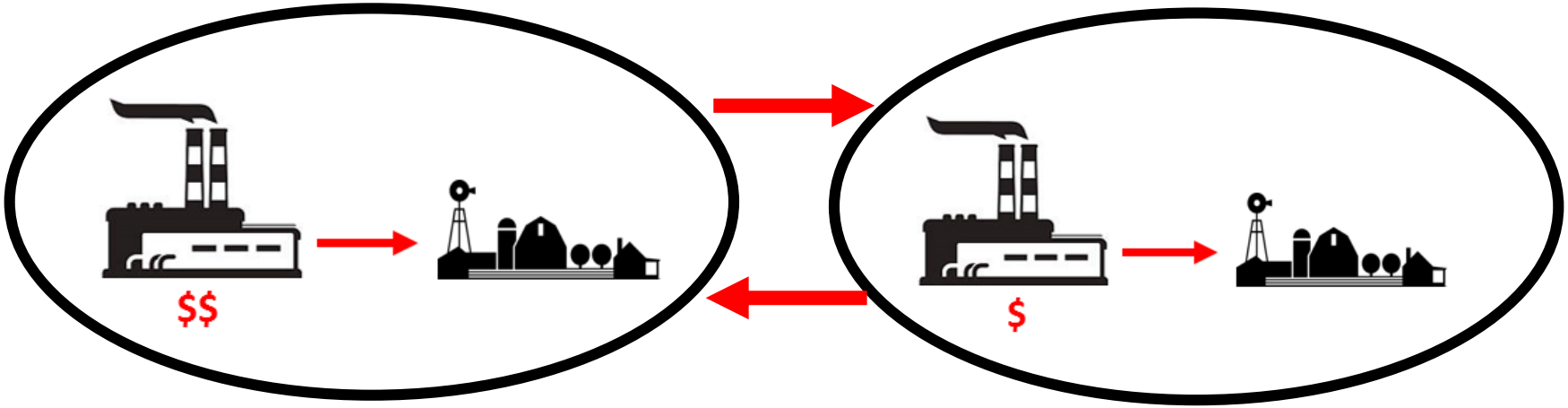
Each utility system served its own geography, and generated to meet its own load as if it were an island





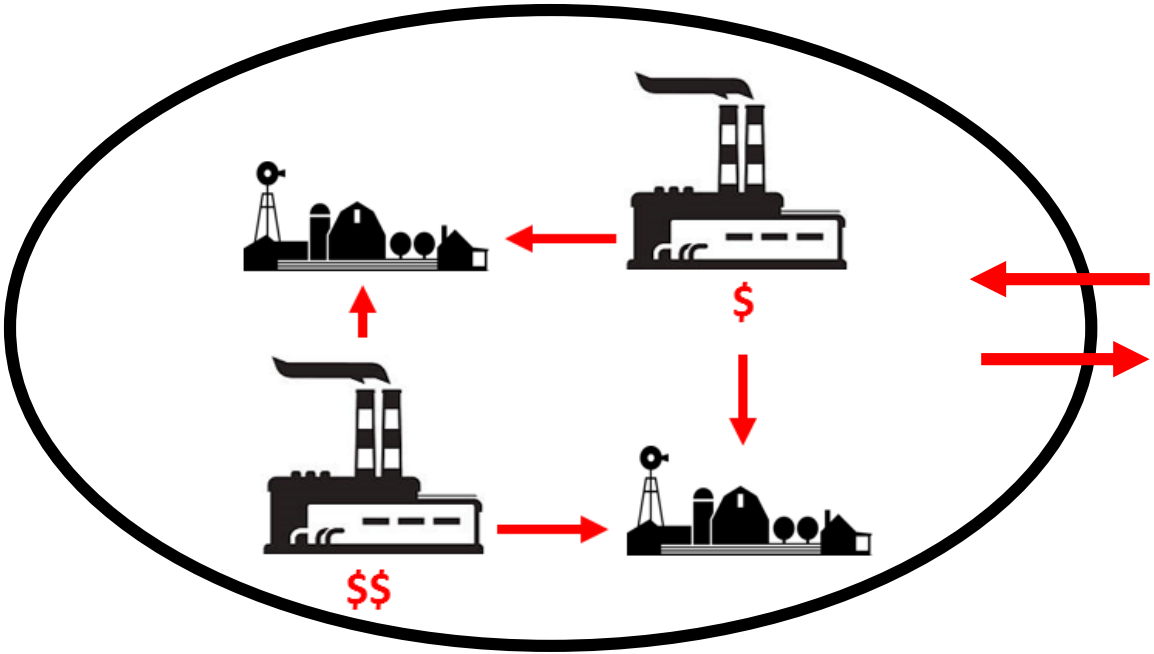
GRID EVOLUTION: BILATERALS

Utilities began bilaterally exchanging power to reduce cost and enhance reliability, but still operated as separate utilities



POWER “POOLS” FORMED

Utilities entered into power-pooling agreements to operate as one system for maximum cost savings and reliability = Regional Transmission Organizations

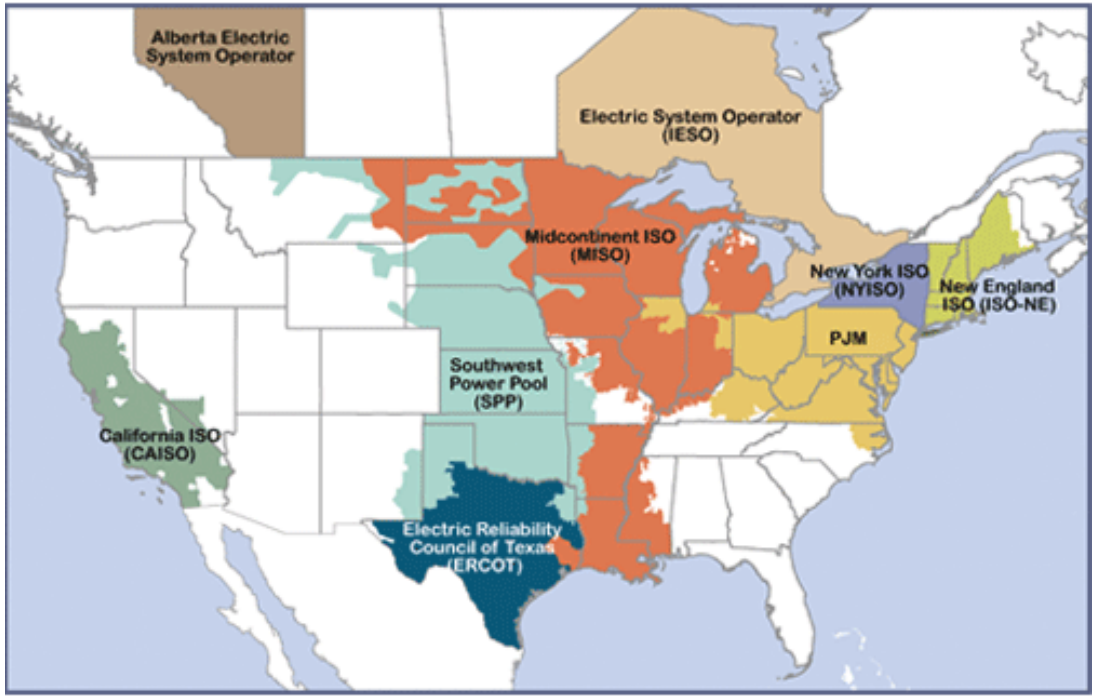


THE GRID TODAY

RTO and ISO markets are the dominant form of energy dispatch - 7 RTO's across US

Why? As the grid evolved it was clear that less, capital intensive generation would be required

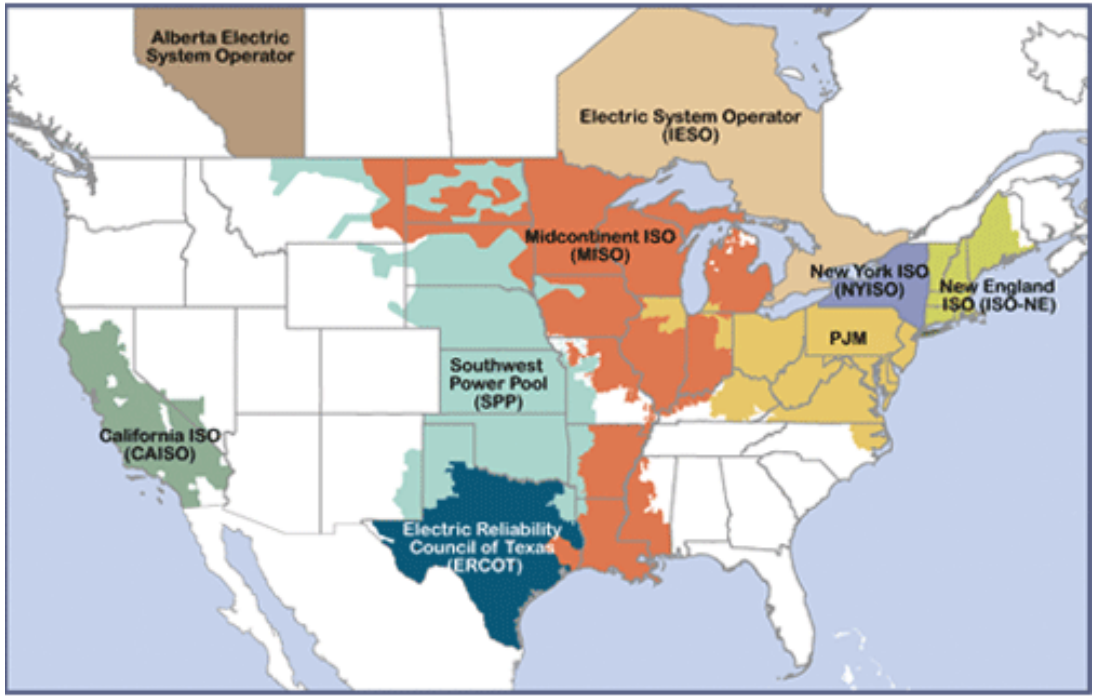
Bottom line, an RTO can serve the loads more cost effectively vs. stand alone utilities.



RTO FUNCTIONS

Transmission services - shared facilities and cost allocations are socialized

Wholesale Power Markets - generation can be sold or purchased or both



MARKET OPERATIONS

ELECTRICITY MARKETS

- All Basin Electric generation units belong to organized markets (RTOs)
  - Southwest Power Pool (SPP) - Primary
- Utilities give control of generation dispatch and transmission to SPP or MISO – “air traffic control”
- Utilities still own, operate and maintain generation and transmission facilities - Vertical Integration

ELECTRICITY MARKETS

- Utilities bid **generation** and **load** into the market
- Two separate transactions occur in organized markets
  - Selling generation into the market and buying power from the market
  - Utilities buy power based on the market clearing price
  - Only bid in the variable cost of power (Fuel price)
  - Lowest priced generation runs first
  - Fixed costs (resources conversion, labor, mortgage, taxes, etc.) must be recovered from utility ratepayers or in the contracts for Independent Power Producers
- The billings for the power and transmission are handled by the market operators

MARKET COMMITMENT OF GENERATION

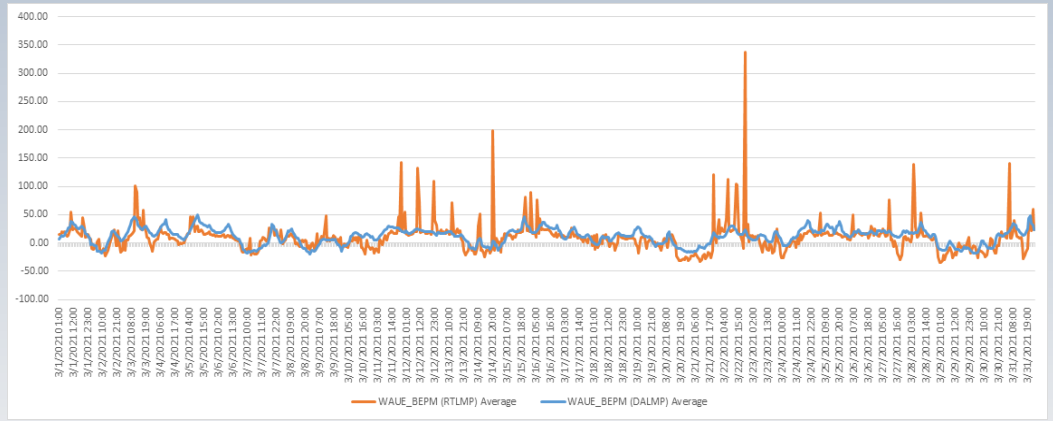
MAJOR PRICE DRIVERS

Day Ahead

- Types of Generation in the Market
- Levels of Load in the Market
- Natural Gas Prices
- Weather

Real Time

- Changes in wind levels
- Changes in load due to weather
- Resources tripping
- Congestion
- Lines tripping

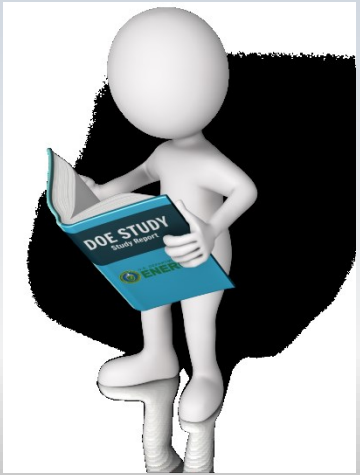


BASIN ELECTRIC POWER COOPERATIVE
A Touchstone Energy® Cooperative

UTILITY CONCERNS

COAL PLANT IMPACTS

- Coal plants main pressure comes from:
  - Production costs increasing
  - If Natural Gas Prices are low
  - Government Subsidized Renewable Energy Credits (PTCs/ITCs)
  - Cost of environmental regulations



CONCERNS…

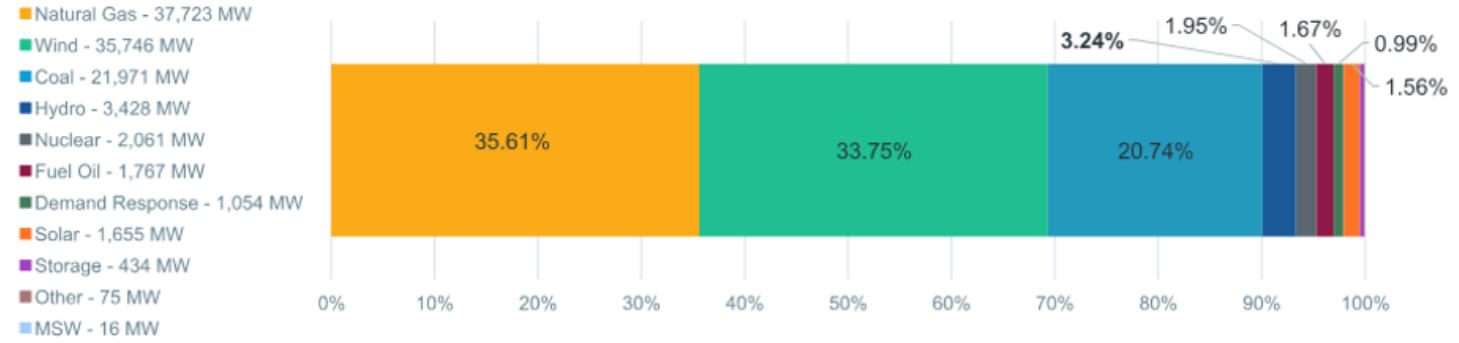
- PTCs have driven investment in wind generation – ending 2027
  - Credits continued to be extended each year – OBBBA ends them
- Government subsidized wind energy has lowered wholesale power prices, which is good for consumers
- BUT the low prices make coal plants uneconomic at times, where they must run and lose money waiting for loads to increase or renewable energy to reduce

FUEL ASSURANCE POLICIES

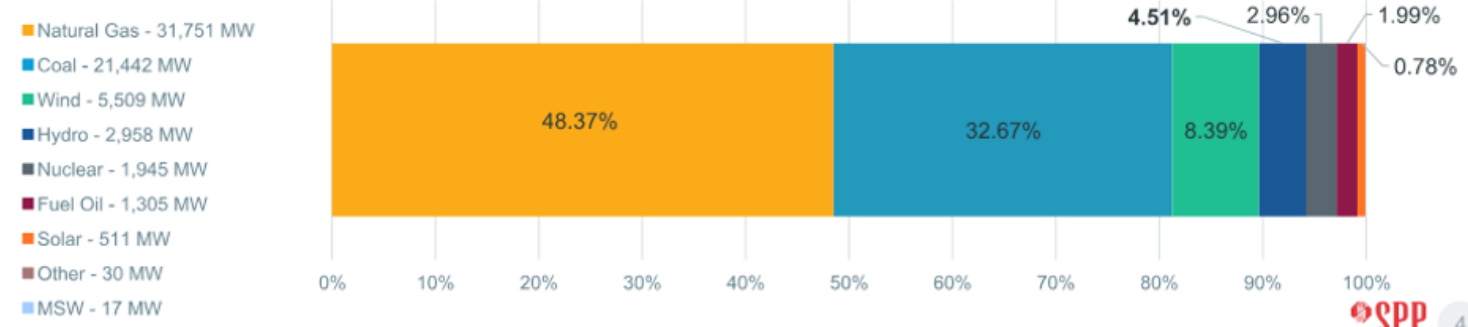
- Generators, like baseload coal/nuclear are not being adequately compensated for the services, such as 24/7 operation and backup for renewables – voltage control, spinning reserves
- RTO fuel assurance policies are shifting to allow more diverse market-based incentives – accredited capacity
- Performance Based Accreditation (PBA) Benefits
    - Values – conventional resources that are reliable and available to perform when needed most
    - Incents – underperforming resources to improve
    - Ensures – appropriate accredited capacity (ACAP) value to calculate Planning Reserve Margin (PRM)

FUEL ASSURANCE POLICIES

NAMEPLATE GENERATING CAPACITY – 105,927 MW *(As of August 2025)*



ACCREDITED GENERATING CAPACITY – 65,639 MW *(As of Summer 2025)*



SPP

TRANSMISSION - WHY THE SUDDEN PROBLEM?

- Cost impacts of transmission capacity for new generation and load
- Increased Independent Power Producers online
- Interconnect transmission mitigation costs have been rising
- Transmission planners are out of options to stretch the grid further without major costs
- They are not picking on wind or any other resource-all will go through a similar modeling program to assess system impacts
- Transmission takes 8-10 years to get in place - $2M/mile of HV line
- SPP recent approval of nearly $8B+ in projects to meet growing needs

BASIN ELECTRIC POWER COOPERATIVE
A Touchstone Energy® Cooperative

QUESTIONS??