

MARKET MECHANICS

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NORTH AMERICAN INDEPENDENT SYSTEM OPERATORS (ISO) AND REGIONAL TRANSMISSION ORGANIZATIONS (RTO)



WHAT IS A WHOLESALE ENERGY MARKET?

Sellers/ Producers

- Utilities
- Municipals
- Independent Power Producers
- Generators
- Power Marketers

Buyers/ Consumers

- Utilities
- Municipals
- Load Serving Entities
- Power Marketers

Locational Prices

- Driven by supply and demand at defined locations

Products

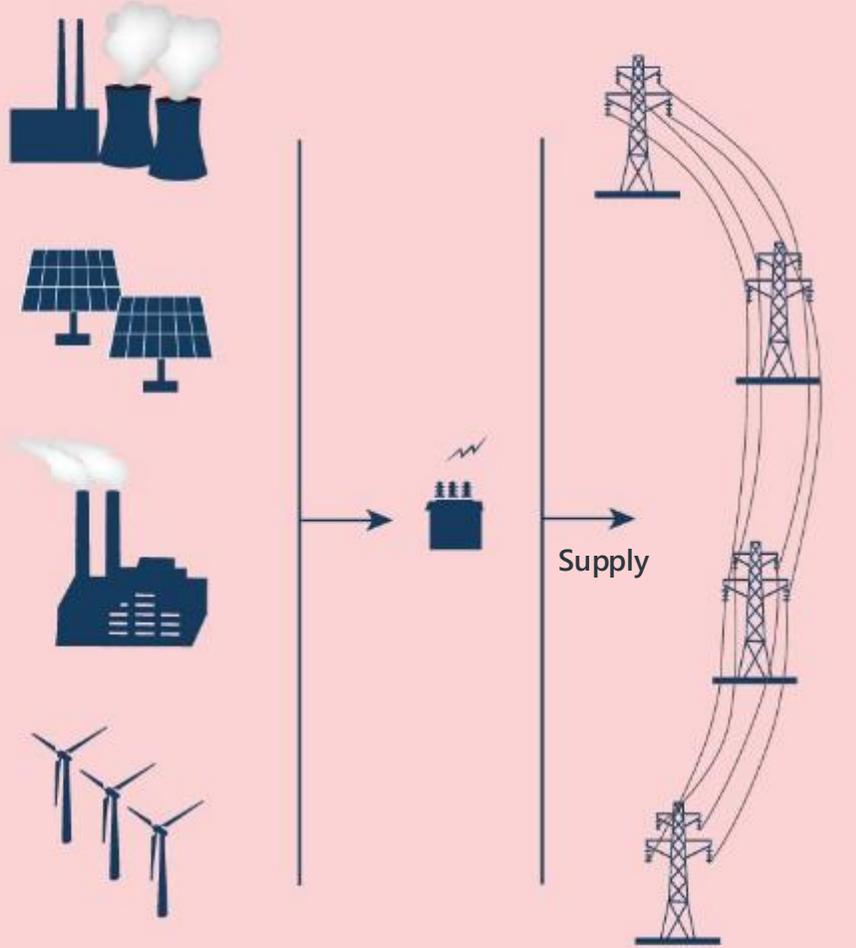
- Energy
- Operating Reserves
- Congestion Rights

SPP's Reliability Objectives

1:
Energy
supplied to
grid must
equal
energy
demands

2:
Transmission
system must
be operated
within safe,
reliable
limits

WHOLESALE ENERGY AND TRANSMISSION

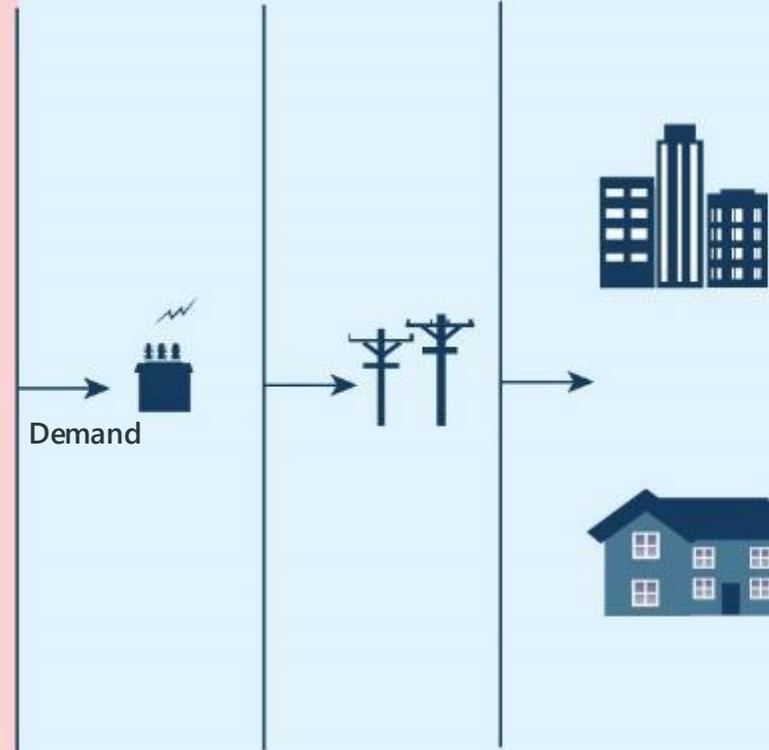


Power plant
generates
electricity

Transformer
steps up
voltage for
transmission

Transmission lines
carry electricity long
distances

RETAIL ENERGY AND DISTRIBUTION



Neighborhood
transformer
steps down
voltage

Distribution
lines carry
electricity to
homes and
businesses

Transformers on
poles step down
electricity before
it enters houses

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INTEGRATED MARKETPLACE OVERVIEW

Key Components

Day-Ahead (DA) Market

Real-Time Balancing Market (RTBM)

Transmission Congestion Rights (TCR) Market

Products

Energy

Operating Reserve (Regulation Up, Regulation Down, Spinning, Supplemental)

Congestion Rights

MARKETPLACE BENEFITS

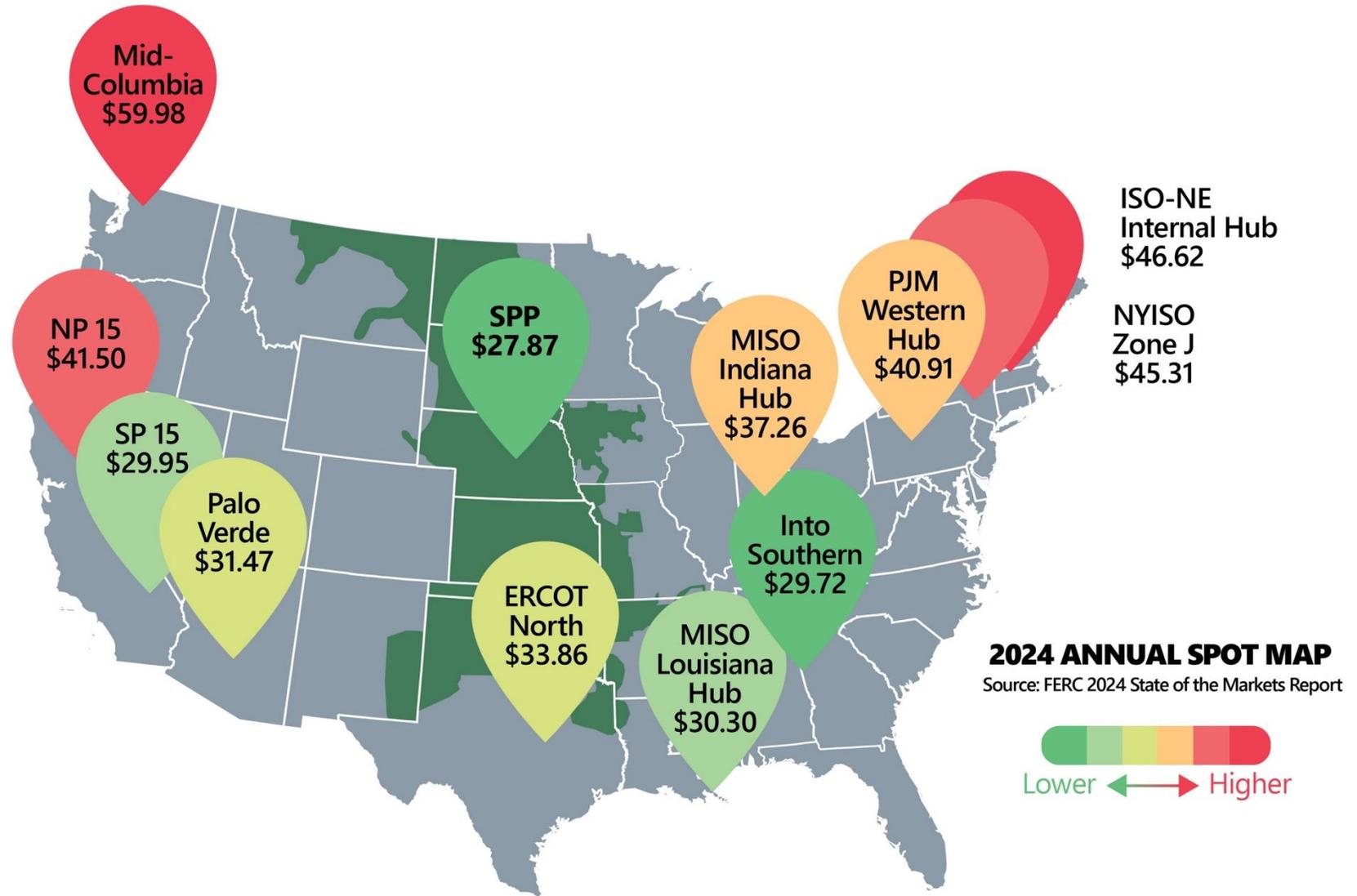
- **\$10.19 billion** in cumulative benefits as of January 2024
- **\$2.5 billion** annual savings as of January 2025
- **\$27.87/MWh** Lowest average wholesale electricity cost in nation*
- **\$30.3 billion** in total marketplace transactions

* FERC 2024 State of the Markets Report (March 20, 2025)

2024 ANNUAL AVERAGE SPOT PRICES

In 2024, SPP's average wholesale market prices remained the lowest of any organized market in the U.S.

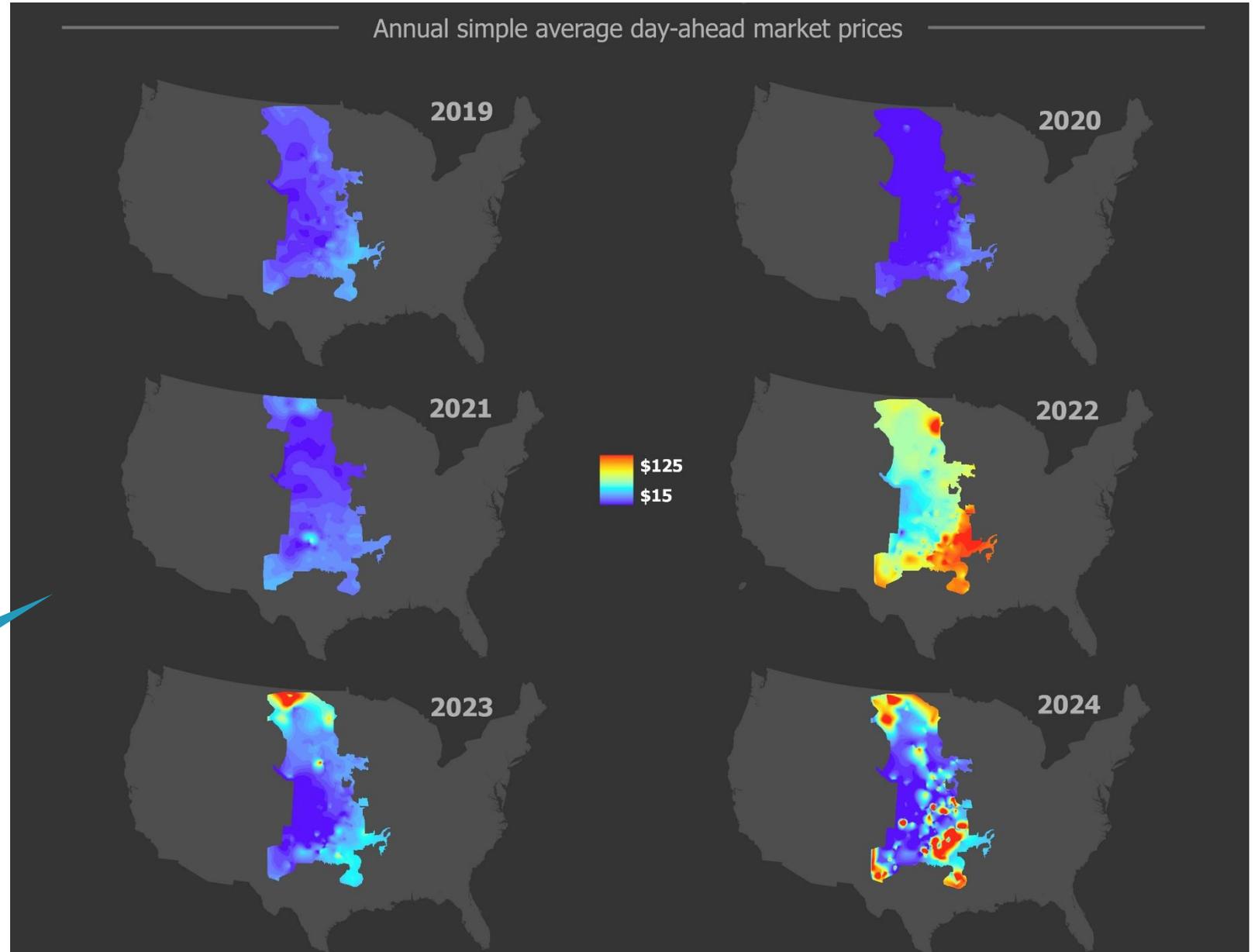
Adapted from FERC's 2024 State of the Markets Report. Sources: Nodal prices from ABB Velocity Suite. ISO hub prices from SNL's Day-Ahead On-Peak Prices data. Mid-Columbia, Palo Verde, and Into Southern prices from SNL's S&P Global Market Intelligence Day-Ahead—Annual OnPeak Prices data.



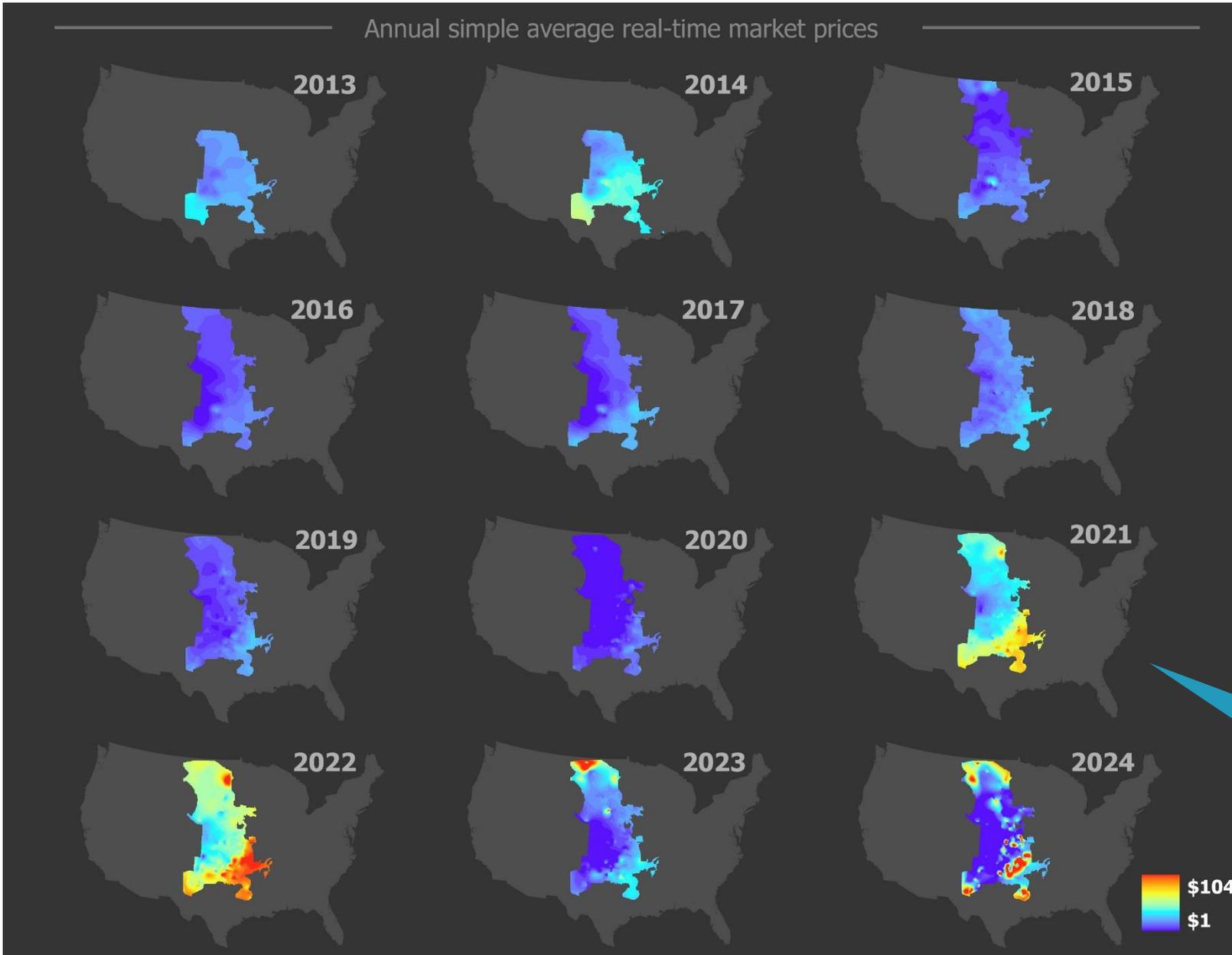
AVERAGE DAY-AHEAD MARKET PRICES: 2019-2024

SPP's markets have helped lower region-wide wholesale electricity prices

Winter Storm Uri in February 2021 significantly impacted market prices and skewed data for that year.



Annual simple average real-time market prices



AVERAGE REAL-TIME MARKET PRICES: 2013-2024

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Winter Storm Uri in February 2021 significantly impacted market prices and skewed data for that year.

PRODUCTS SUMMARY

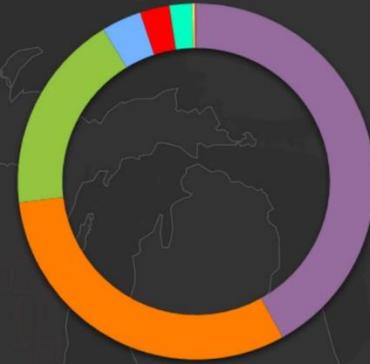
Energy					
Regulation Up	Regulation Down	Regulating Reserve	Constant incremental increases & decreases to regulate generation & manage ACE	Anytime ACE moves outside specific limits	Operating Reserve
Ramp Up	Ramp Down	Uncertainty	Reserved for future when extra flexibility is needed to regulate generation & manage ACE	Wind fluctuations	
Spinning	Supplemental	Contingency Reserve	Reserved for possible, but unpredictable event, and generation increase is needed quickly to regulate generation & manage ACE	Loss of online generator <200MW	

Congestion Rights



Distribution Of Generation

Generation Mix



- Natural Gas
- Coal
- Wind
- Hydro
- Nuclear
- Fuel Oil
- Solar
- Other

MW Max

- ≤ 66
- ≤ 193
- ≤ 405
- ≤ 872
- ≤ 2213

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Date Exported 1/31/2025 1 inch equals 182 miles



PRICING – LOCATIONAL MARGINAL PRICE (LMP)

ENERGY

Marginal Energy Component (MEC)

CONGESTION

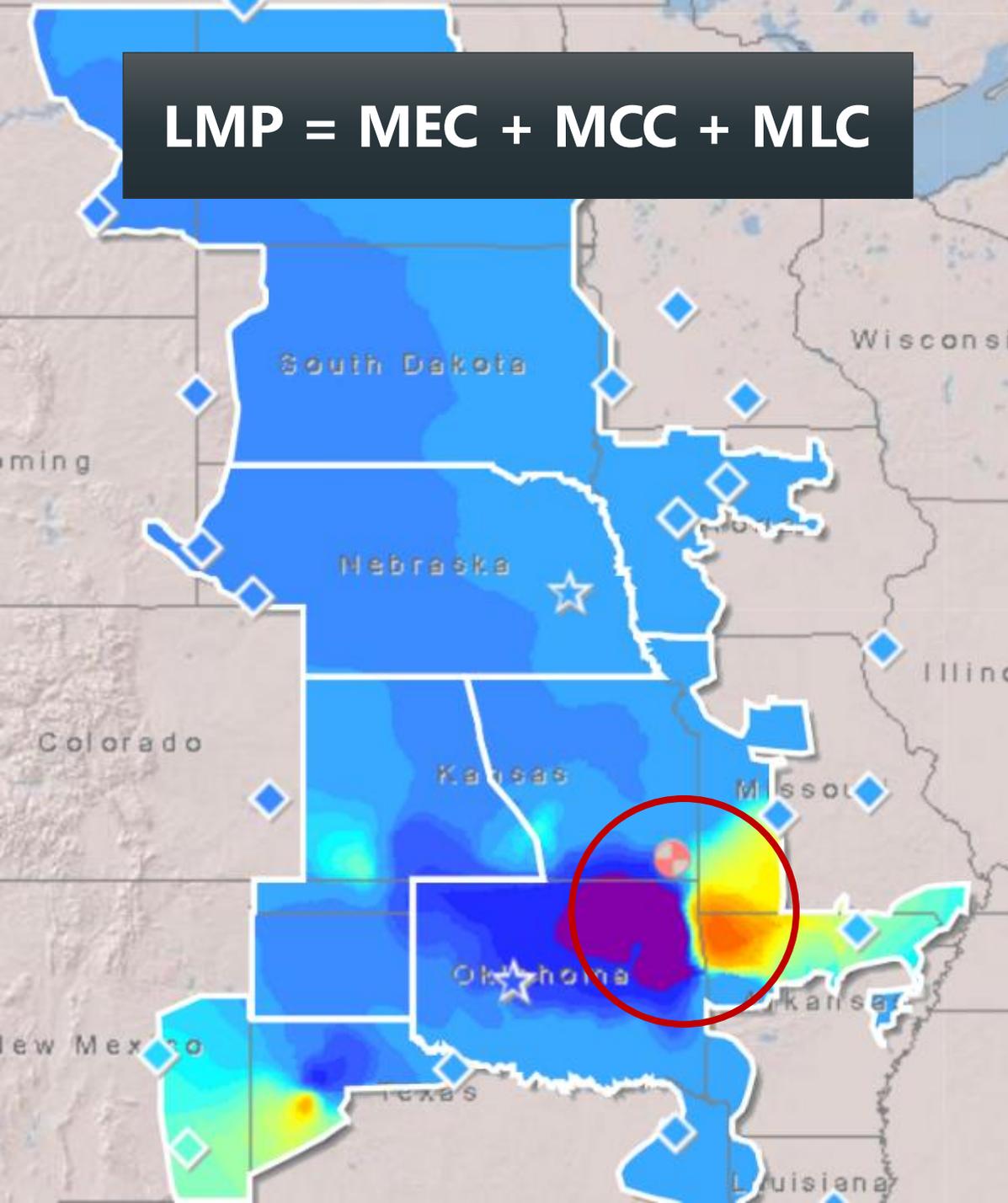
Marginal Congestion Component (MCC)

LOSSES

Marginal Loss Component (MLC)

Locational Marginal Price (LMP)

$$\text{LMP} = \text{MEC} + \text{MCC} + \text{MLC}$$



PRICING – LMP (CONT'D.)

Why differ
by time and
location?

PRICING – LMP SCENARIO

Load to Serve

125 MW @ \$35/MWh

110 MW @ \$40/MWh

TOTAL LOAD: 235 MW

Marginal Unit – Set up to provide next increment of Energy

Resource Offers

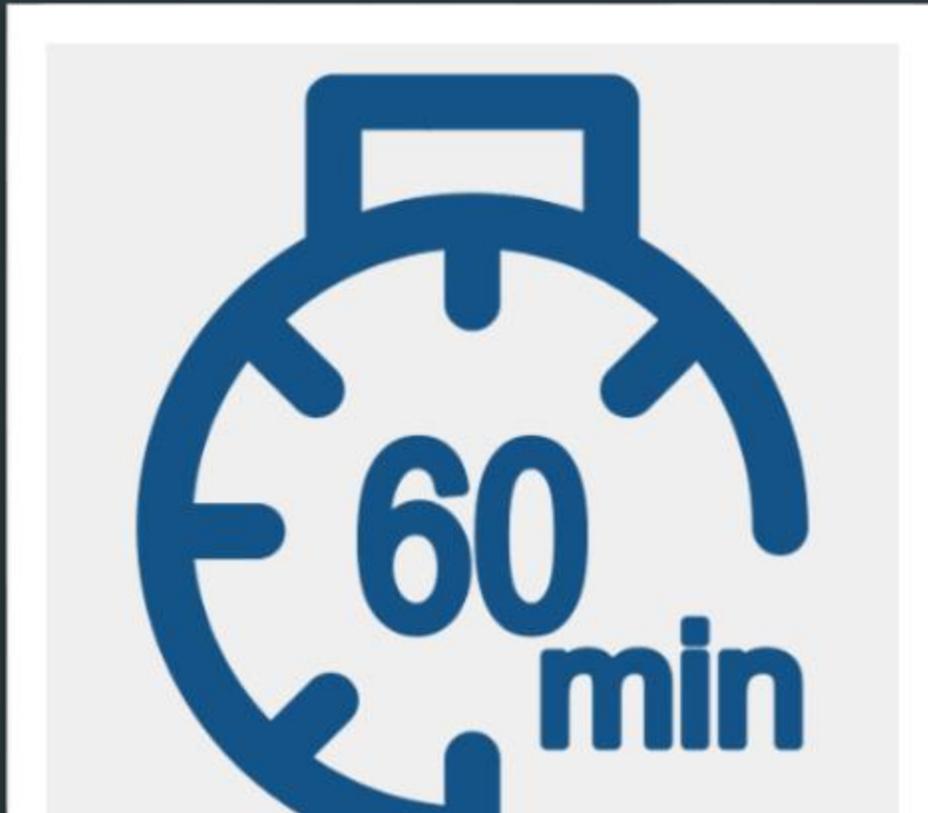
Gen 1: 100 MW @ \$10/MWh

Gen 2: 70 MW @ \$35/MWh

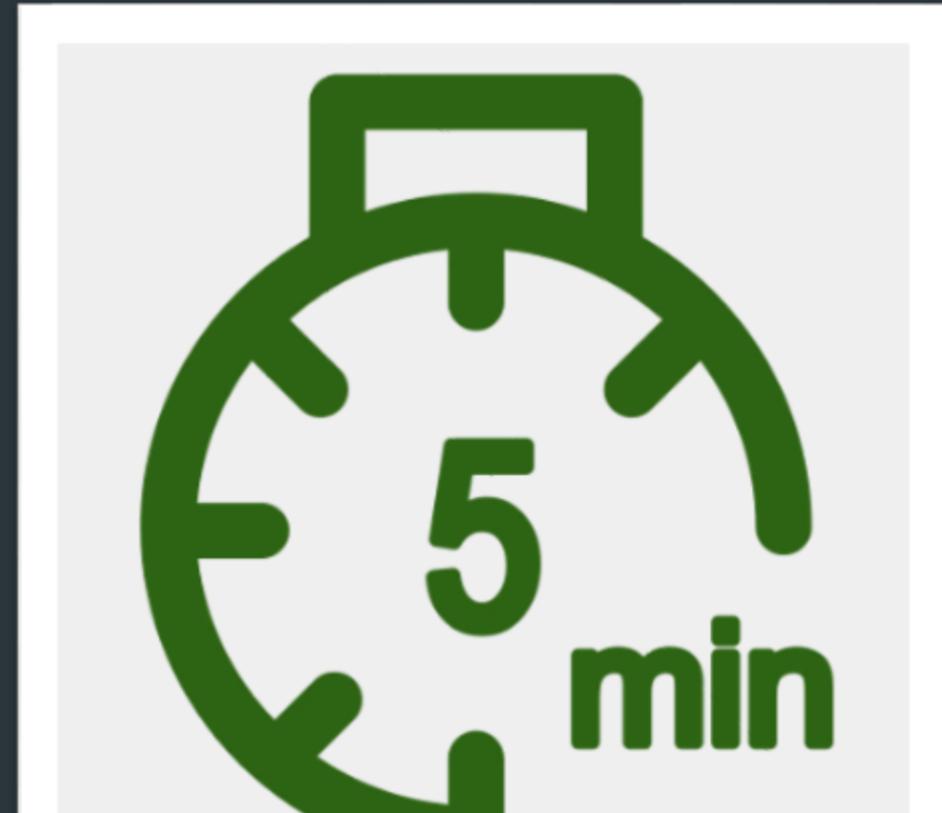
Gen 3: 50 MW @ \$20/MWh

Gen 4: 50 MW @ \$15/MWh

PRICING – DAY-AHEAD AND REAL-TIME LMP



Day-Ahead (DA)
Market



Real-Time Balancing
Market (RTBM)

WHAT QUESTIONS DO YOU HAVE?

