



MISO 2019 VALUE PROPOSITION

INTRODUCTION

The 2019 Value Proposition study shows that MISO provided between **\$3.2 billion** and **\$4 billion** in regional benefits driven by enhanced reliability, more efficient use of the region's existing assets and a reduced need for new assets.

The Value Proposition quantifies the value MISO provides to the region, including the entire set of MISO market participants and their customers.

This study breaks MISO's business model into recognized categories of benefits and calculates a range of value for each category.

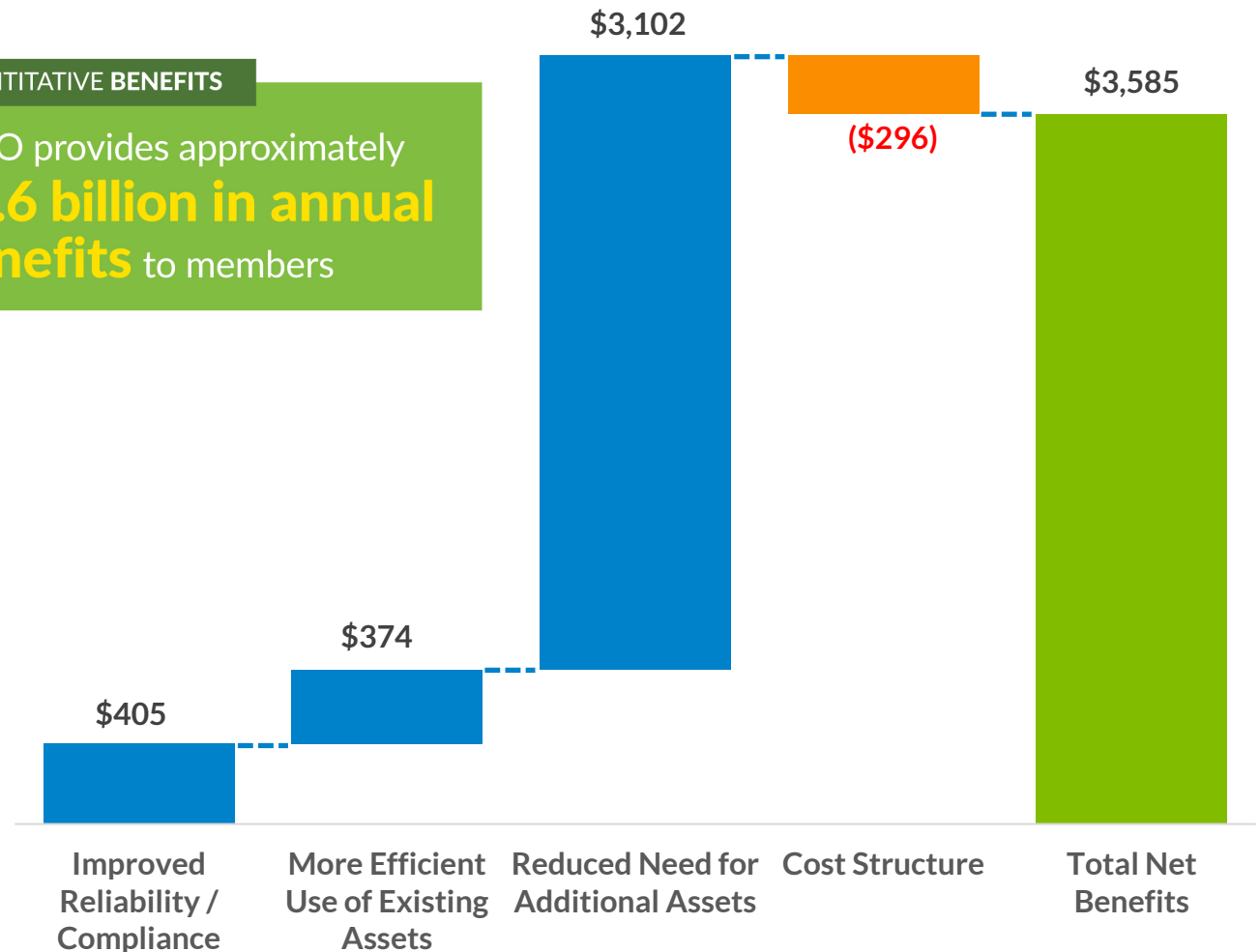
Since 2009, MISO has documented over \$26 billion in benefits

Cumulative Benefits
(\$ millions)
\$26,866



QUANTITATIVE BENEFITS
MISO provides approximately **\$3.6 billion in annual benefits** to members

2019 Benefit by Value Driver (\$ millions)

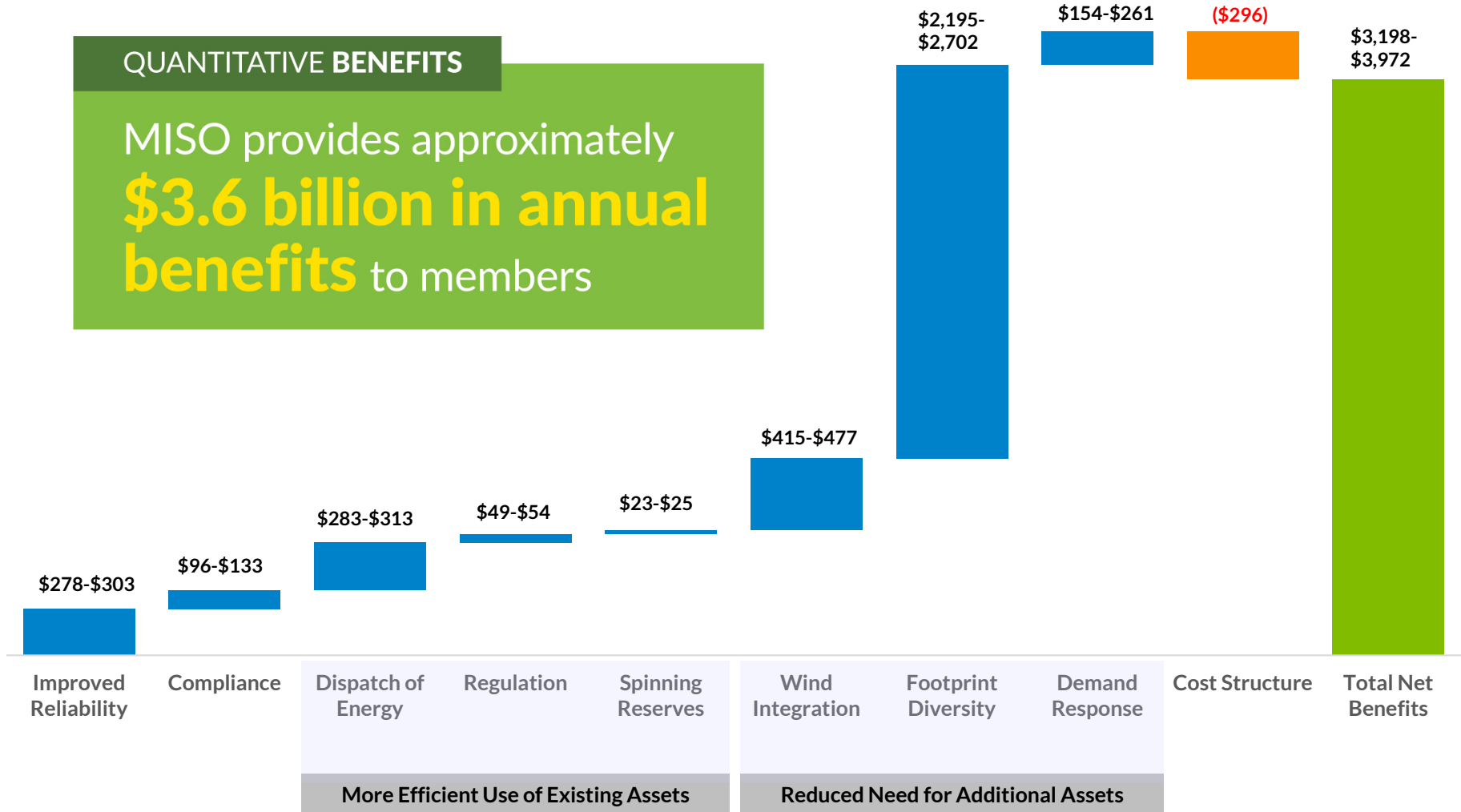


MISO 2019 Value Proposition

Benefit by Value Driver (\$ millions)

QUANTITATIVE BENEFITS

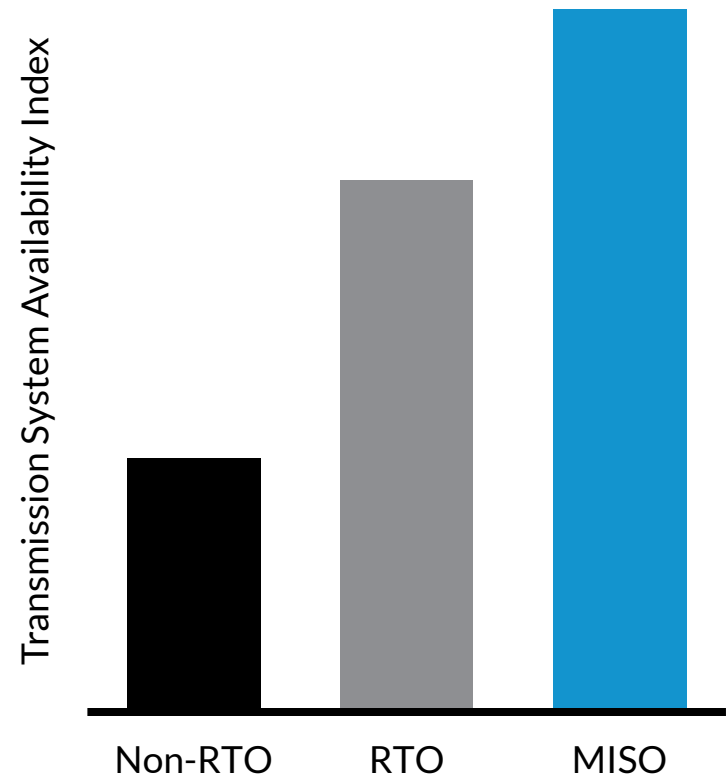
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IMPROVED RELIABILITY \$278 – \$303 Million

MISO's broad regional view and state-of-the art reliability tools enable improved reliability as measured by transmission system availability.

- MISO exceeds industry standards in the following categories, improving reliability:
 - System monitoring and visualization
 - Congestion management
 - Backup capabilities
 - Operator training
 - Performance monitoring
 - Procedure updates
- Transmission System Availability Index is used to evaluate the value of improved reliability



COMPLIANCE \$96 – \$133 Million

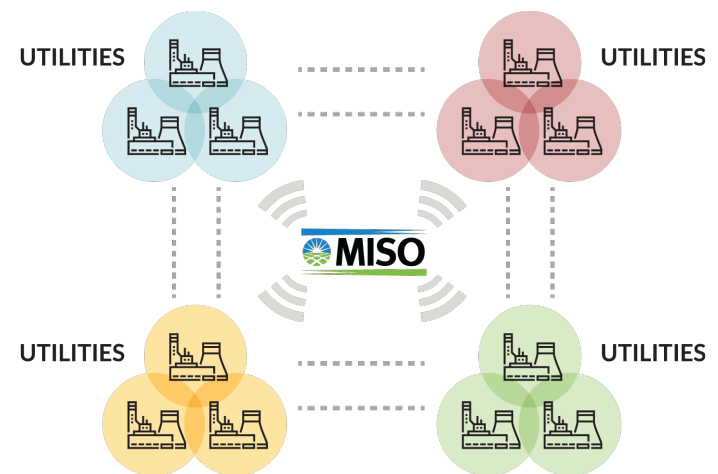
With MISO, FERC and NERC compliance responsibilities have been consolidated and member responsibilities have decreased.

- MISO adds quantitative and qualitative value by performing the following compliance activities on behalf of its members:
 - Standards development
 - NERC compliance
 - Tariff compliance
 - System Planning compliance
 - Operations compliance
- Internal MISO analyses of full-time equivalent (FTE) personnel savings are used to calculate the value of compliance.

DISPATCH OF ENERGY \$283 – \$313 Million

MISO's Real-Time and Day-Ahead energy markets use security constrained unit commitment and centralized economic dispatch to optimize the use of all resources within the region based on bids and offers by market participants.

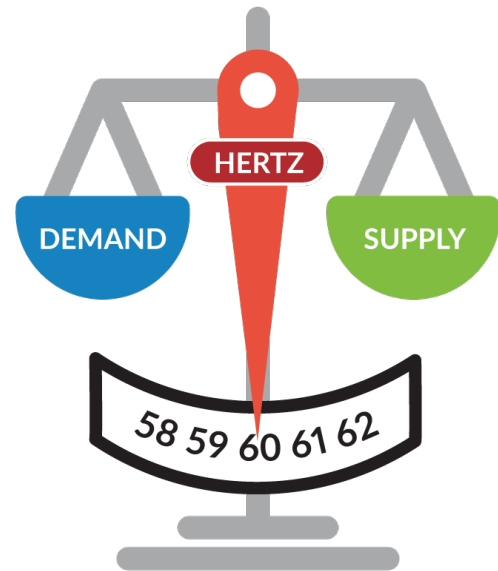
- Before MISO, the region operated as a decentralized, bilateral market.
- Now, the Day-Ahead/Real-Time market processes are used to minimize total production costs.
- Primary purpose of Day-Ahead Market is to clear and schedule sufficient supply to satisfy cleared demand, using the most economic generation resources.
- Real-Time Market dispatches generation resources to meet actual demand rather than bid demand.
- Real-Time dispatch is also based on economics and dynamic congestion management.



REGULATION \$49 – \$54 Million

With the regulation market, the MISO region moved to a centralized regulation target rather than several non-coordinated regulation targets, which significantly reduced the amount of regulation required.

- Prior to the launch of MISO's Regulation Market, each Balancing Authority (BA) maintained regulation within its area. This often resulted in the BAs within MISO's footprint working "against" each other – some regulating up while others were regulating down.
- In addition to creating one centralized regulation target, MISO's regulation market also changed the pricing mechanism for regulation (moving from Tariff pricing to market pricing).
- Capacity from low-cost generation units previously held to meet regulation requirements is now available for energy dispatch.



SPINNING RESERVES \$23 – \$25 Million

Starting with the formation of the Contingency Reserve Sharing Group (CRSG) and continuing with the implementation of the Spinning Reserves Market, the total spinning reserves requirement declined, freeing low-cost capacity to meet energy market needs.

- Prior to the CRSG, each Balancing Authority (BA) determined its spinning reserve requirement based on its individual (or Reserve Sharing Group) standards.
- The CRSG improved this by creating standards from which BAs determined their requirements.
- With the Spinning Reserves market, MISO determines the spinning reserve requirement based on CRSG requirements.
- The Spinning Reserve Market also changed the pricing mechanism for spinning reserves by moving from Tariff pricing to market pricing.



WIND INTEGRATION \$415 – \$477 Million

MISO's regional planning enables more economic placement of wind resources, reducing the overall capacity needed to meet required wind energy output.

Local Design



Combination Design

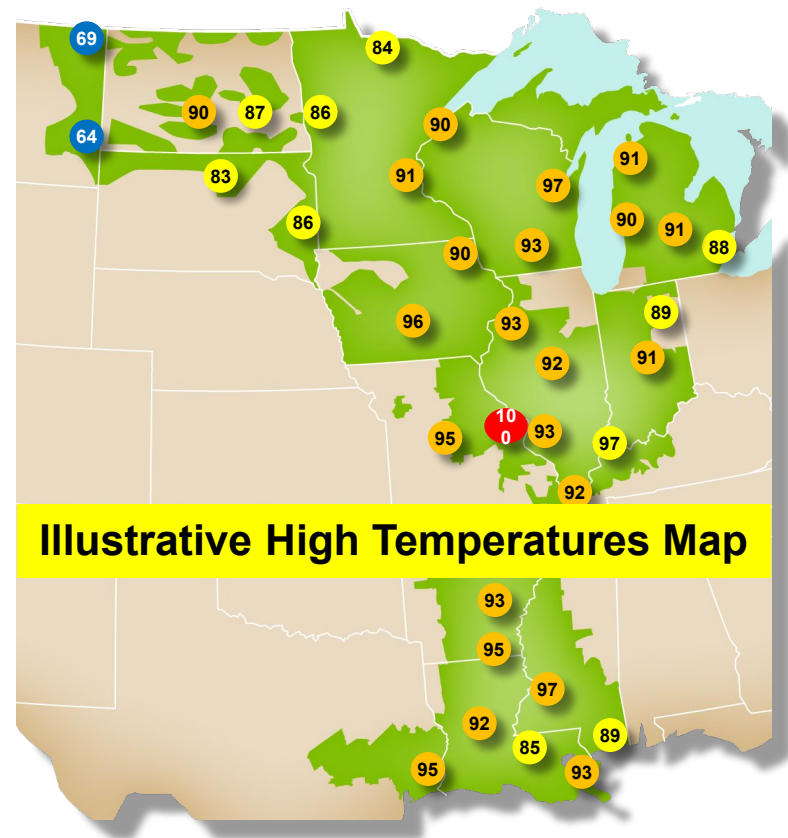


ILLUSTRATIVE

FOOTPRINT DIVERSITY \$2,195 – \$2,702 Million

Prior to MISO, LSEs maintained reserves based on their monthly peak load forecasts. Due to MISO's broad footprint, LSEs now maintain reserves based on their load at the time of the MISO system-wide peak, creating significant savings.

- Regional rather than localized use of the electrical system allows more efficient and effective operation of generation assets while reducing the planning reserve margin needed for reliability.
- An annual revenue requirement is used to calculate an annualized avoided-cost benefit. The annual revenue requirement is estimated based on an annual charge rate that includes rate of return, property tax rate, insurance cost rate, fixed O&M and depreciation. EGEAS software calculates the annual charge rate.



DEMAND RESPONSE \$154 – \$261 Million

Demand response defers additional generation investment. MISO's transparent price information helps market participants make informed market investment decisions related to existing and new load-reducing resources.

- MISO recognizes and compensates four types of demand response:
 - Demand Response Resource Type I (Energy /Capacity)
 - Demand Response Resource Type II (Energy / Capacity)
 - Demand Response as a Load Modifying Resource (Capacity)
 - Emergency Demand Response (Energy during Emergencies)
- An annual revenue requirement is used to calculate an annualized avoided-cost benefit for the capacity deferred due to MISO-facilitated incremental Demand Response.

COST STRUCTURE **\$296 Million**

MISO's administrative costs have remained relatively flat, representing a small percentage of overall benefits.



QUALITATIVE BENEFITS

1 Price/Informational Transparency

Price and data transparency in the MISO market provides a host of benefits that improve market efficiencies, investment decisions and system reliability.

2 Planning Coordination

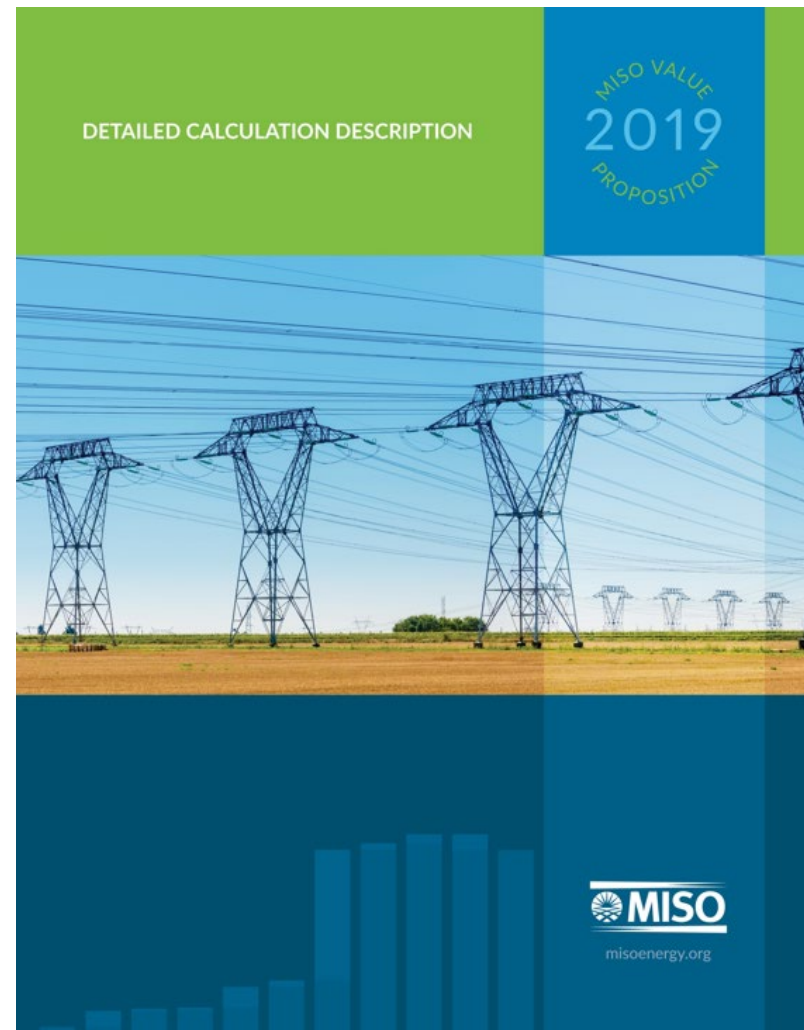
MISO's transmission planning process is focused on minimizing total cost of delivered power to consumers.

3 Seams Management

MISO adds value by managing the seams around its footprint. Seams management includes interchange transactions, market flows & allocations and the market-to-market process.

ADDITIONAL INFORMATION

- The Value Proposition is posted on misoenergy.org > About MISO > MISO Strategy and Value Proposition.
- Please see the Detailed Calculation Description whitepaper for more details.





Questions?