MISO Update

Missouri Public Service Commission

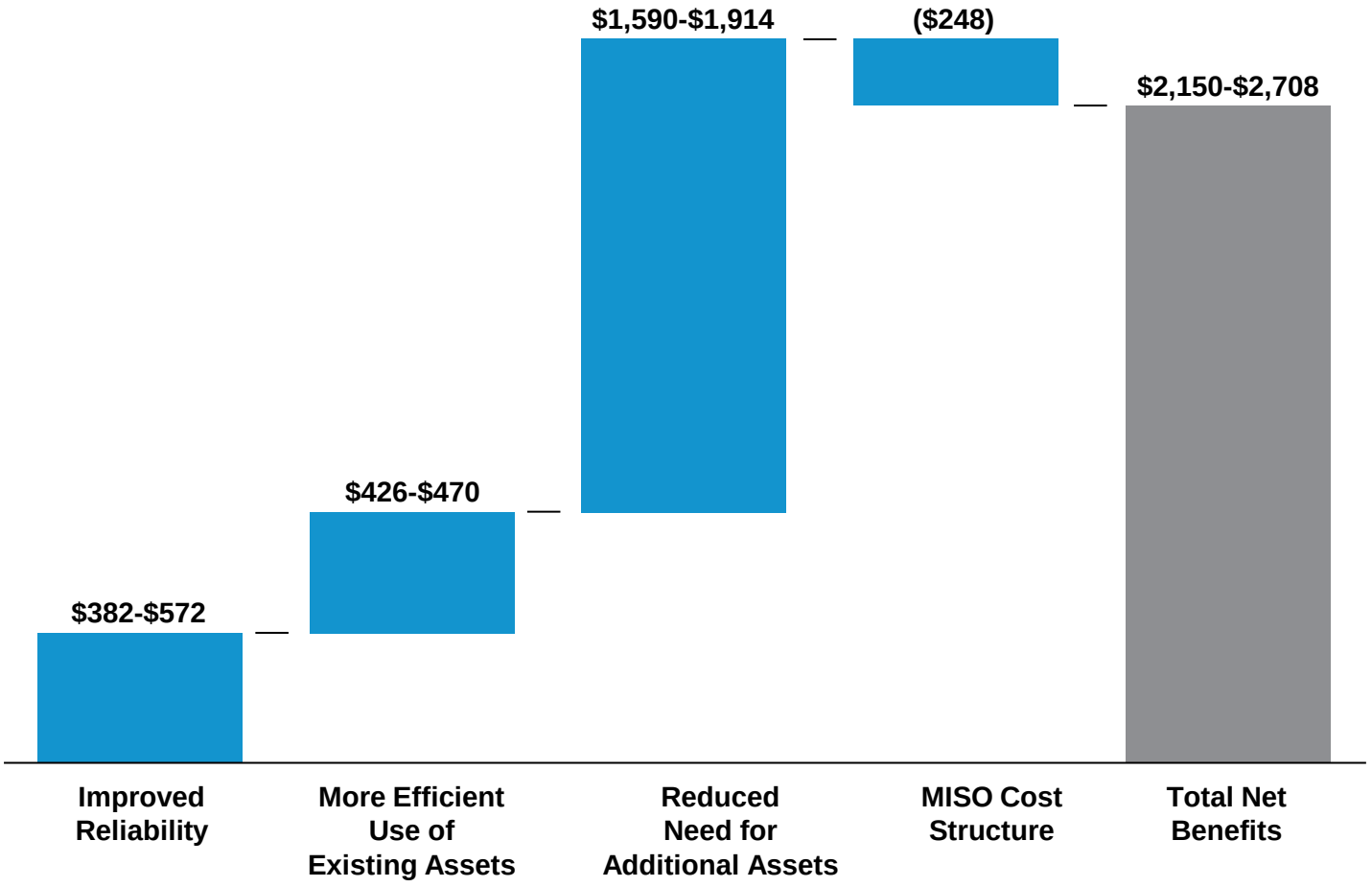
January 25, 2012

Discussion Overview

- 2011 Value Proposition: $2.2 - $2.7 billion in net delivered benefits
- Environmental regulations pose a serious threat to the deliverability of reliable, low-cost energy
  - Plant closings will reduce the reserve margins below reliable levels
  - Significant investment ($31 Billion) is required to retrofit or replace resources
  - Fuel mix change will increase price and price volatility
  - Outage of 61 GW of resources
- To mitigate these impacts three key actions are required
  - Revise existing tariff and procedures – retirement analysis; outage coordination
  - Construct sufficient transmission to allow delivery of available resources
  - Eliminate administrative / seams barriers to delivery of available resources

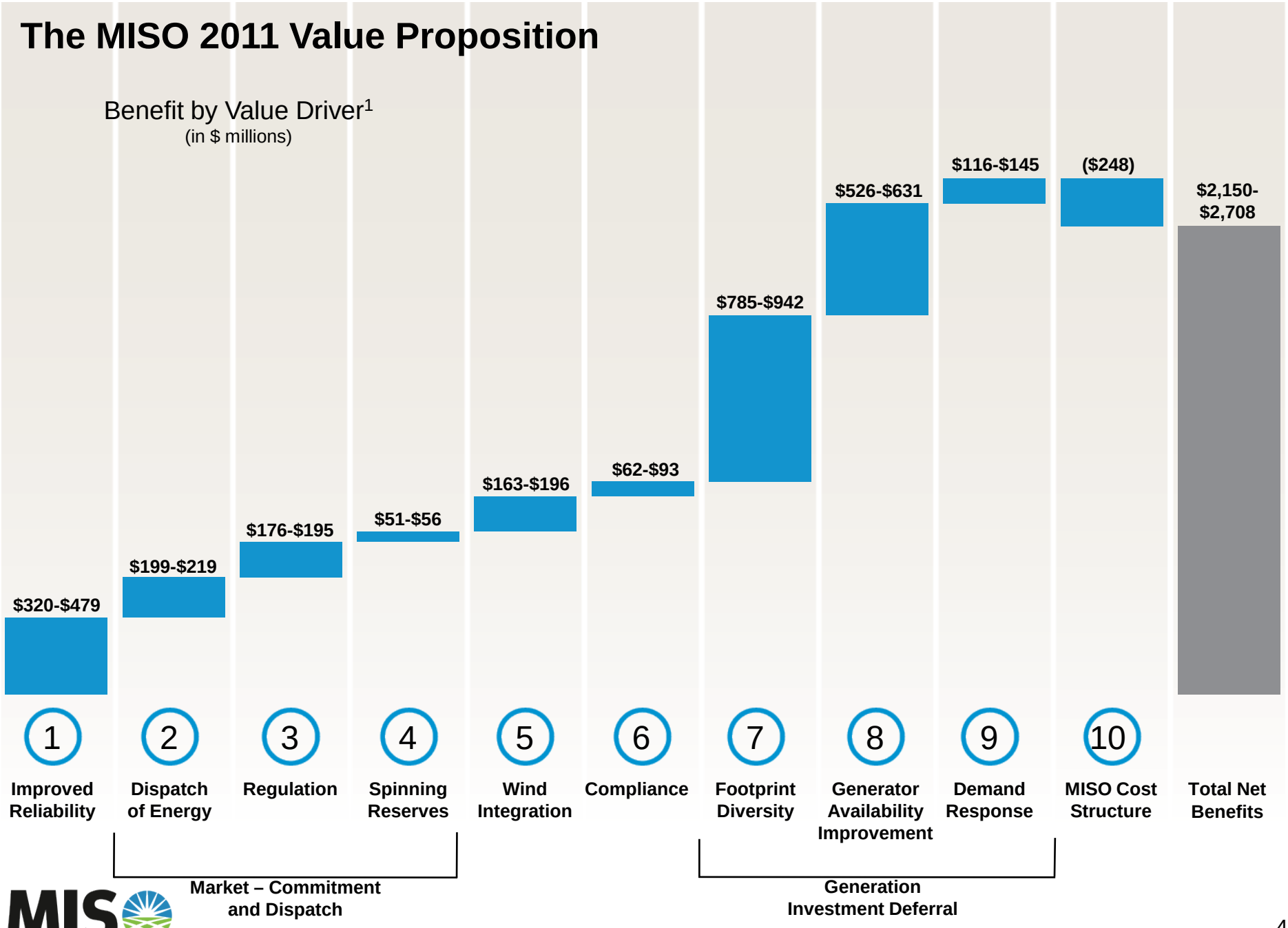
The MISO 2011 Value Proposition

Benefit by Value Driver[1]
(in $ millions)



[1]Figures shown reflect annual benefits and costs that can be expected in 2011

The MISO 2011 Value Proposition



[1]Figures shown reflect annual benefits and costs that can be expected in 2011

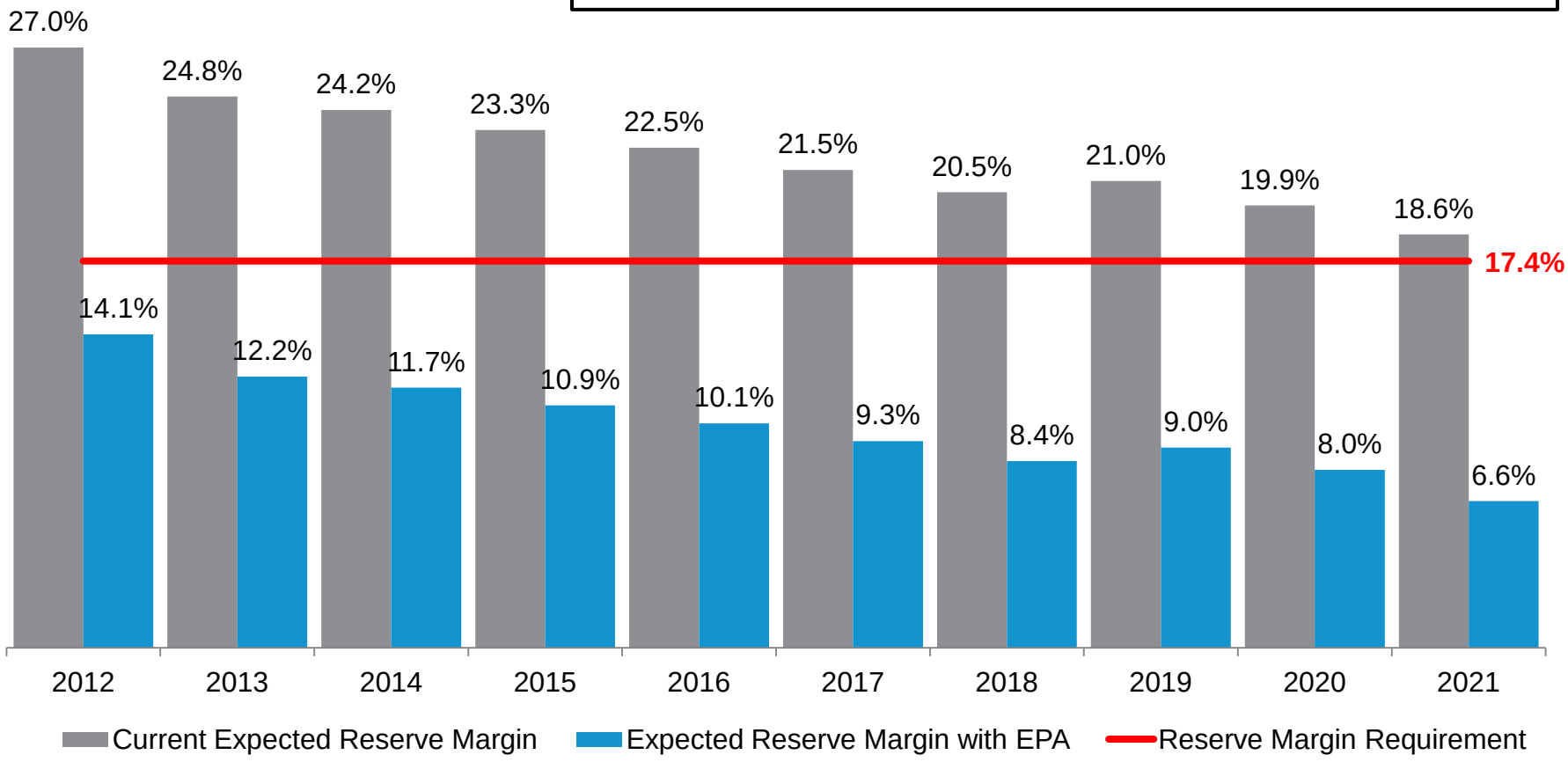
EPA Regulations –
MISO has conducted an in-depth study of the regional impacts

- Study considered four regulations:
  - Cross State Air Pollution Rule
  - Mercury and Air Toxics Standards
  - Clean Water Act
  - Coal Combustion Residuals
- 348 Generation Units / 76.5 GW are affected
- 13 GW of capacity is identified as “at risk” with 3 GW likely to retire
  - Capital investment in excess of $31B required to retrofit and/or replace units
  - Wholesale energy prices will increase $1 - $5 / MWh
  - 10 GW of new resources required by 2016 to maintain planning reserve margin

Outage coordination is the most significant short-term challenge

Expected retirements would immediately put MISO region below estimated resource margin requirements

- **Simultaneous outages required to retrofit or replace 61 GW**
- **$1 - $5 per MWh energy cost increase; $31B capital cost**



MISO generation retirement process is not designed to accommodate significant short-term retirements

Existing process for generator retirements

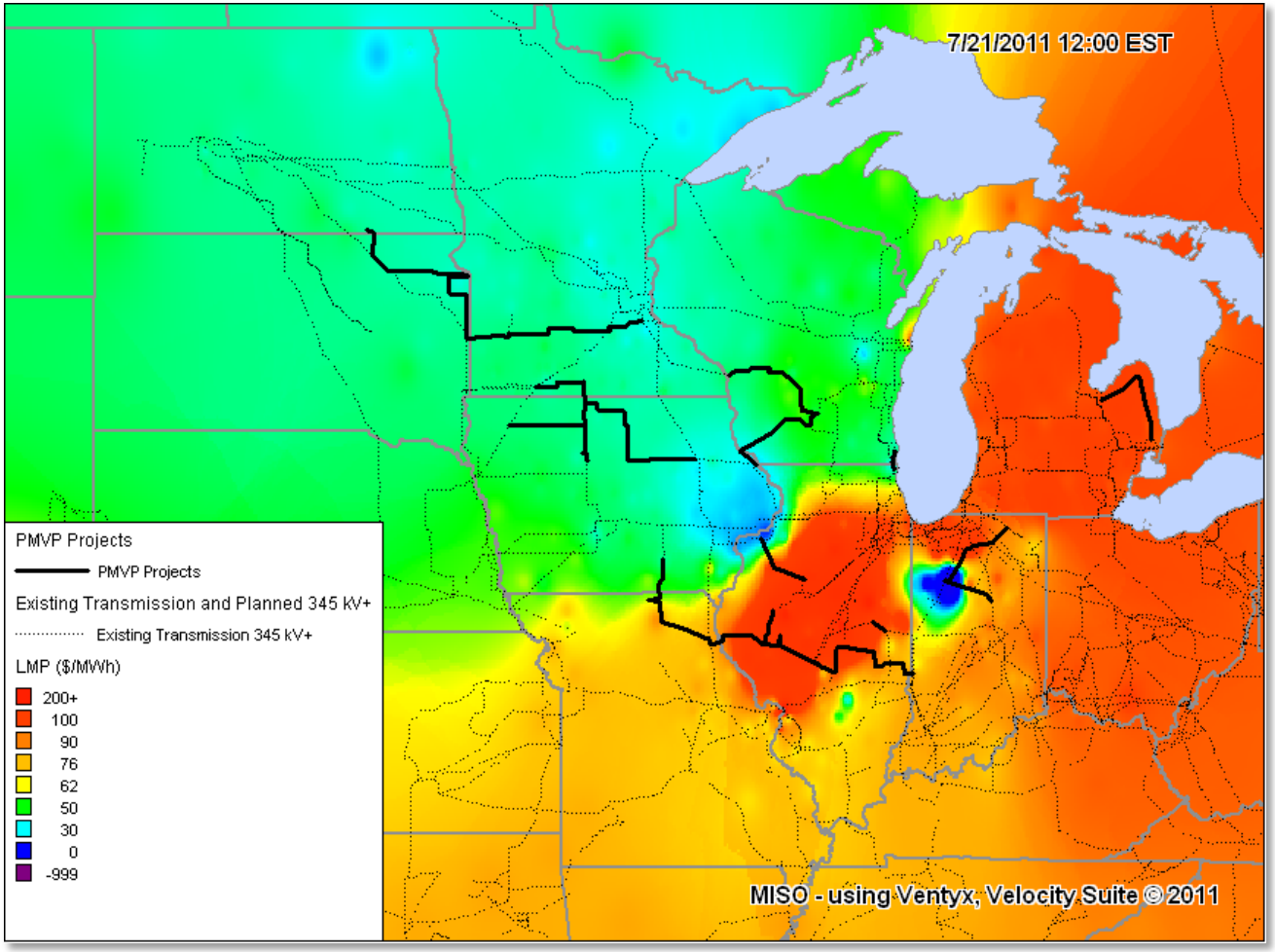
- Owner must notify MISO of intent to retire/mothball
- MISO evaluates potential for reliability impacts; local reliability issues, not resource adequacy issues
- If reliability issues are identified
  - MISO attempts to solve with transmission

    OR
  - MISO designates unit(s) as a System Support Resource (SSR) and MISO tariff compensates unit to stay on line

Mitigation actions under consideration with stakeholders

- Work with membership to collect current compliance plans
- Make tariff revisions
  - Clarify exclusion of generator investment costs from recoverable costs
  - Address resource adequacy reliability impacts of high volume retirements/suspensions
  - Clarify studies that can be performed and unit obligations to abide by decisions
- Refine scenario analysis to understand planning implications

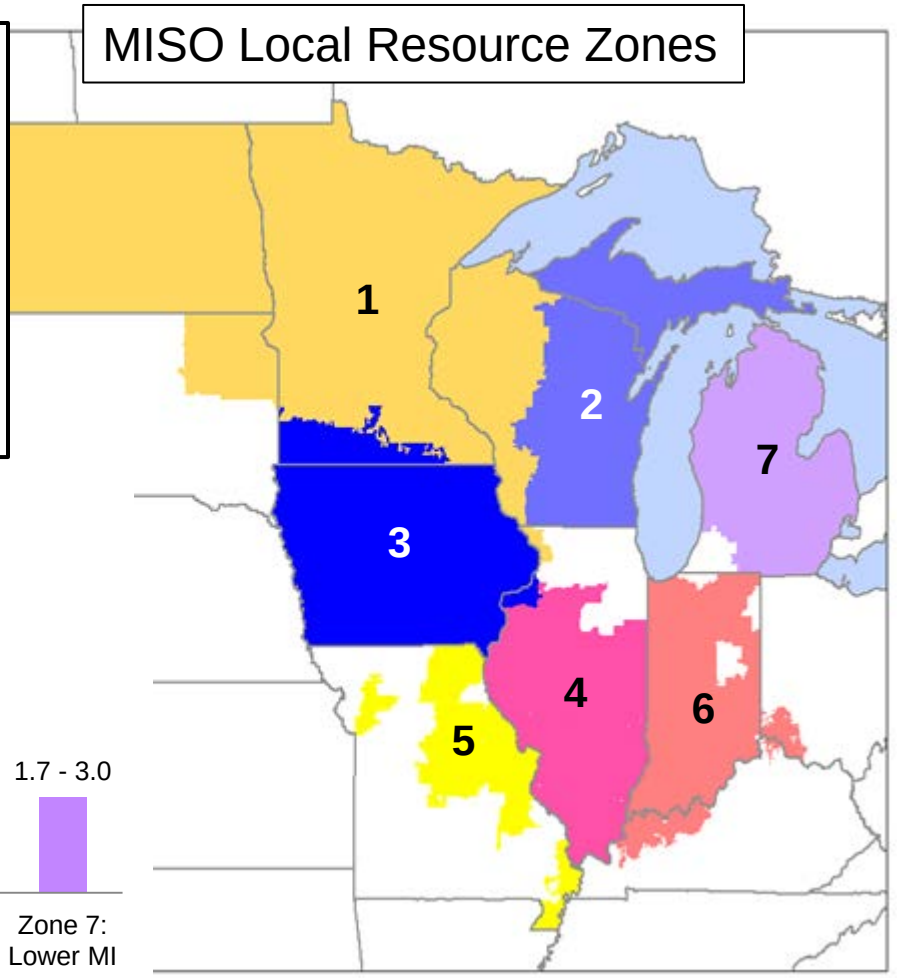
The elements of the Multi-Value Project (MVP) portfolio work together with existing lines to relieve constraints, enabling the efficient delivery of low cost energy throughout the region



The MISO Board approved the Multi-Value Project portfolio on December 8, 2011

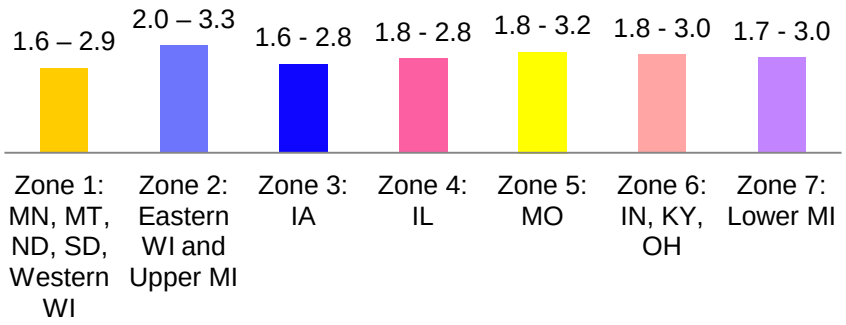
Multi-Value Project Portfolio

- **Total net benefit of $6.7 to $32.8 billion over a 20 – 40 year life**
- **Provides annual value of $1.3 B vs. cost of $0.6 B**
- **Total portfolio construction cost of $5.2 billion**
- **17 elements in the MVP portfolio**
- **Resolves 650 elemental reliability issues**

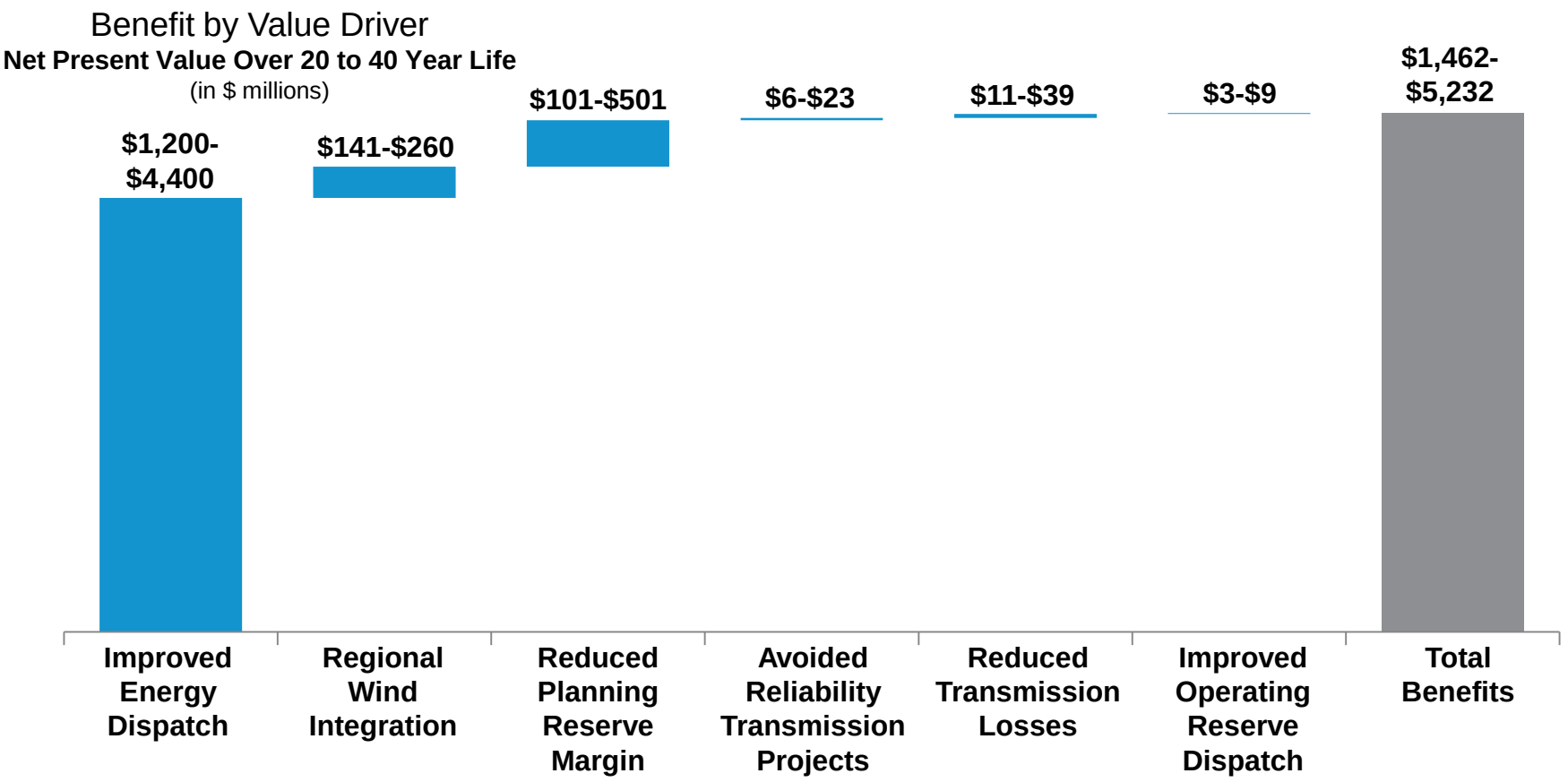


Benefit/Cost Ratio Ranges

Local Resource Zones



Multi-Value Projects - Benefits to Missouri



Projects will also create thousands of jobs for Missouri

- 1,600 – 3,800 direct (construction) jobs
- 2,700 – 7,000 total jobs including construction, supplier and other downstream opportunities

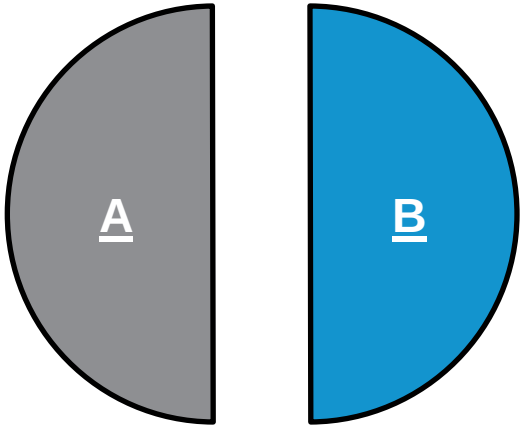
Capacity Deliverability Overview

"AS IS"

Within RTO

Methodology:

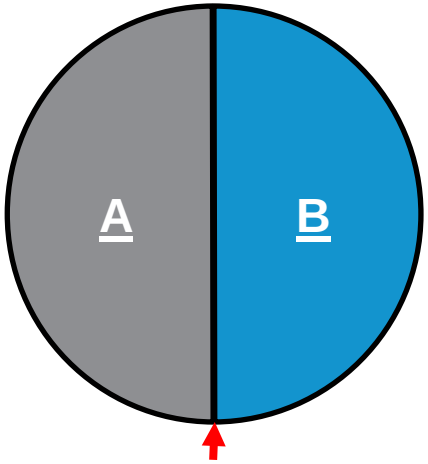
- Simultaneous Deliverability



All resources within a single RTO (A or B) loaded at the same time

Between RTOs

- Incremental Deliverability



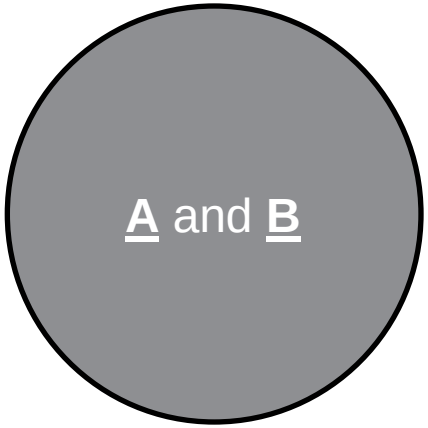
All resources in "A" loaded then incrementally review those in "B"

"SHOULD BE"

Within RTO

Between RTOs

- Simultaneous Deliverability



All resources within AND between RTOs (A and B) loaded at the same time

Preliminary analysis indicates an additional 4,000 – 6,000 MW of capacity transfer capability

- **Reliability** – removal of administrative barriers will provide additional flexibility to deal with required outages
- **Market Efficiency** – common methodologies will allow for the utilization of assets and price convergence at the seam (estimated value - $1.5B per year)
- **Price Transparency** – price transparency and convergence will assist policymakers and stakeholders as decisions are evaluated

- **Next Steps**
  - FERC technical conference to review the issue
  - MISO and PJM to work towards resolution

Entergy Integration –
Full Entergy integration expected by December 2013

- All required regulatory approvals should be in place by Q3 2012
- Market training is underway with Entergy and affected parties
- Technical integration is proceeding on schedule
- MISO exploring assumption of Entergy Independent Coordinator of Transmission role from SPP in November 2012
- Memorandum of Understanding is in place to ensure cost recovery

Conclusion

- MISO worked with OMS to deliver significant value in 2011: $2.2 - $2.7 billion
- Environmental regulations are going to have a significant impact on the MISO region and its consumers
  - Reduced reserve margin levels
  - Significant ($31B) capital investment
  - Increased energy costs ($1-$5 per MWh) and volatility
- EPA compliance will require coordinated efforts
  - Outage of 61 GW of resources
  - Multi-Value Projects will reduce the price and reliability impacts
  - Resource deliverability can help ease the transition into EPA compliance
  - To take advantage of resource deliverability, federal regulators should direct regional transmission organizations to eliminate artificial interregional barriers to all resources