MISO Overview and EPA Compliance Review

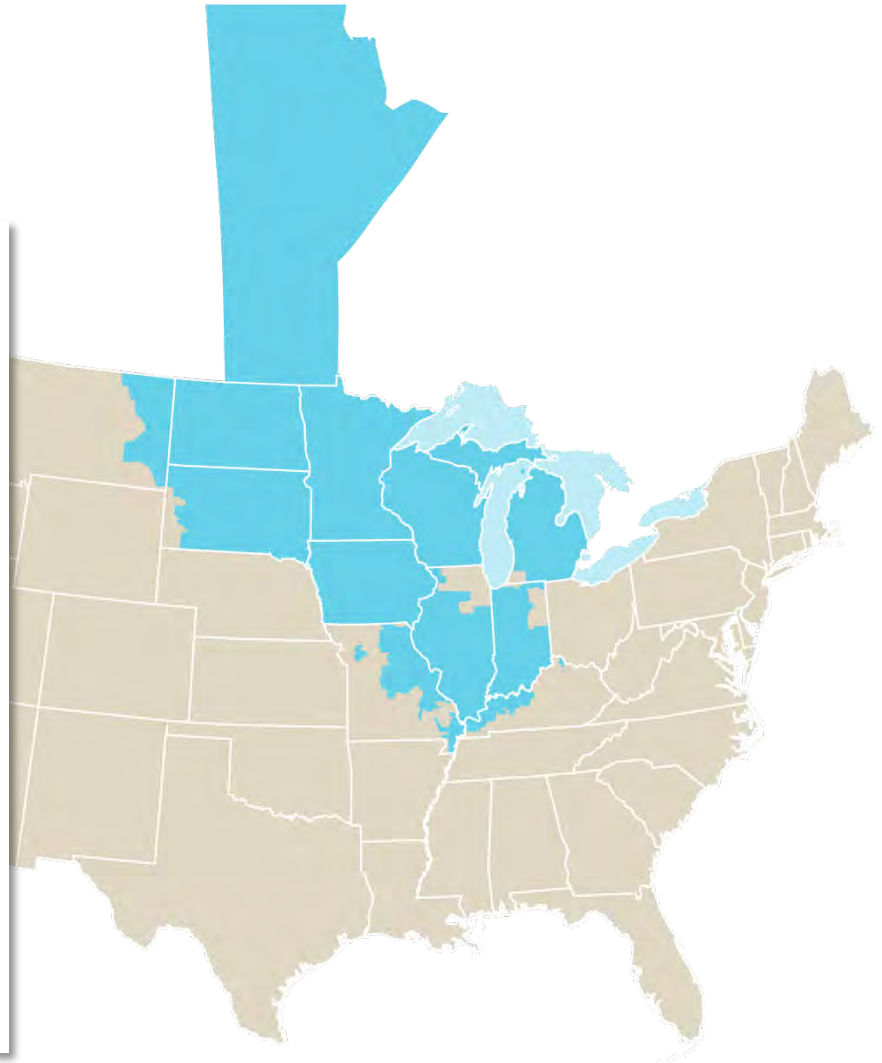
NASEO Midwest Region

July 19, 2012

MISO - Independent, Not-for-profit, RTO

Lower Costs, Greater Reliability

- Delivering lowest-cost energy
- Improving reliability
- Value-based regional transmission system planning
- 363 market participants serving 38.9 million people
- 11 states, 1 Canadian province



MISO Reliability Coordination Area, January 2012

https://www.midwestiso.org/Library/Repository/Communication%20Material/Corporate/Corporate%20Fact%20Sheet.pdf

Discussion overview –
Coordination of EPA compliance poses a reliability risk for MISO

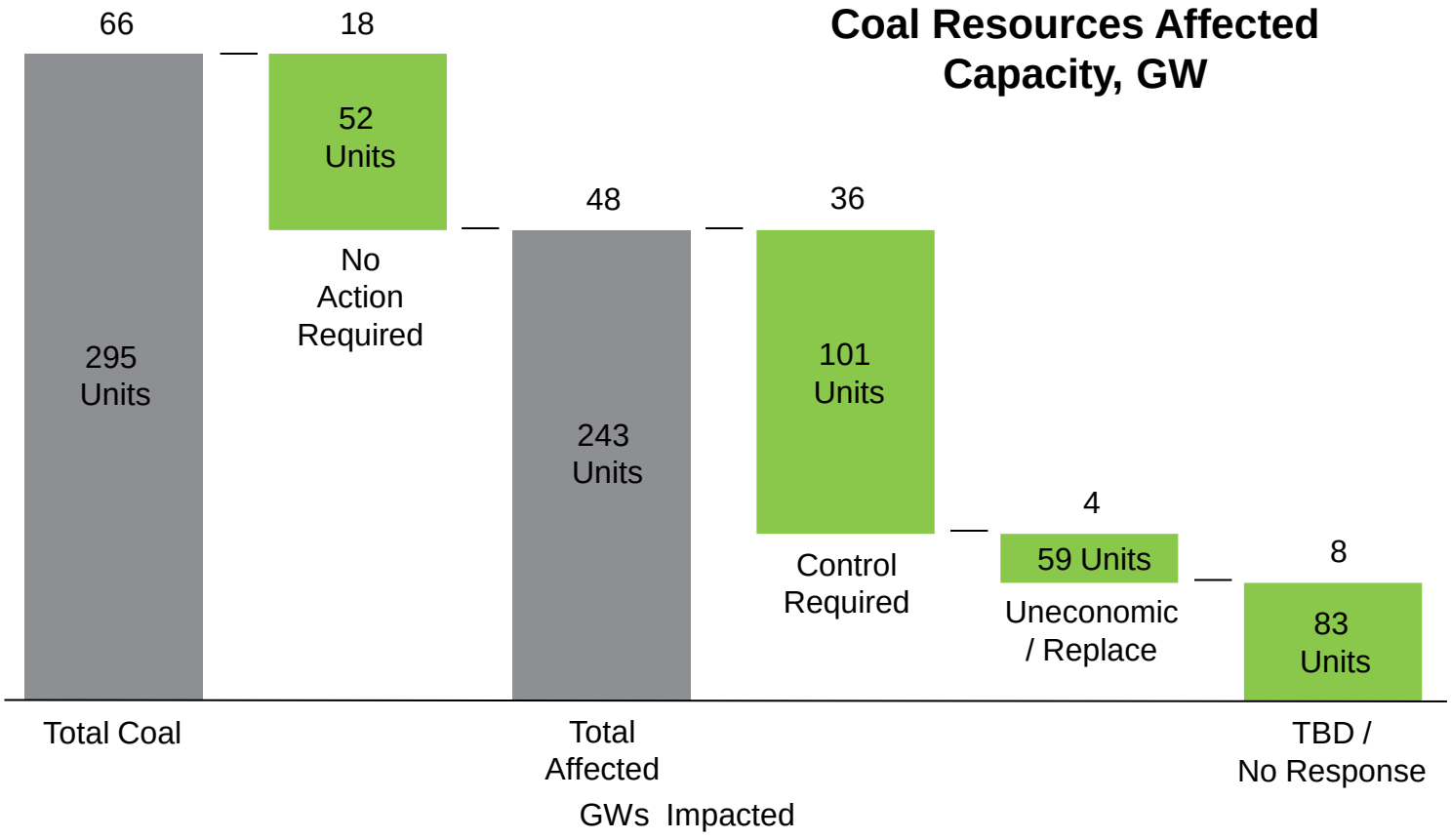
Challenges

- Compliance alternatives are under evaluation by generators
- Supply chain resources will be severely stressed to support demand
- Lack of firm gas deliverability will limit outage windows

Opportunities

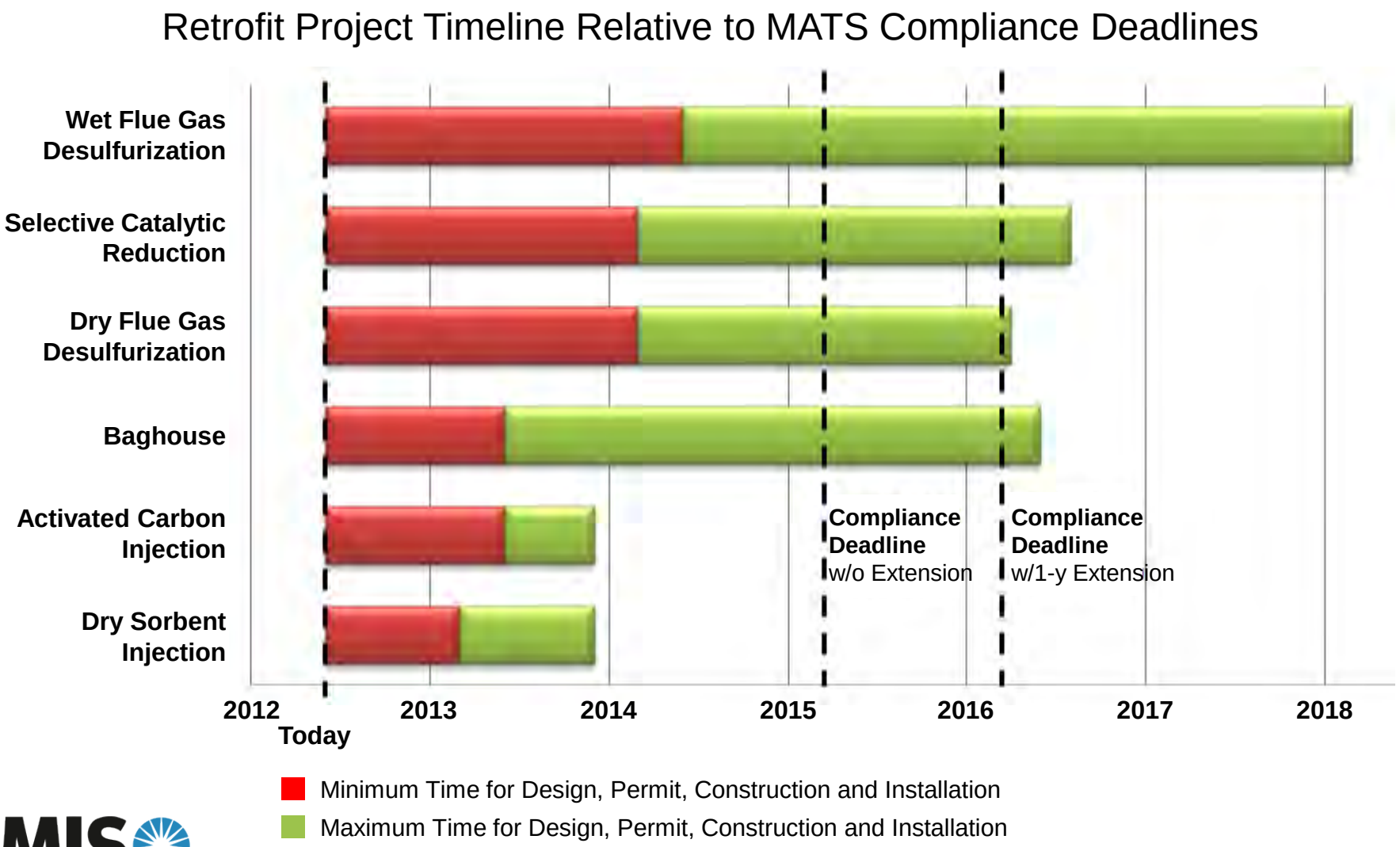
- Tariff changes are underway for outage coordination
- 6 GW of new resources will be required to maintain planning reserve margins
- Significant gas infrastructure investment is required to support increased gas utilization

MISO's recent survey indicates many EPA compliance decisions are under evaluation

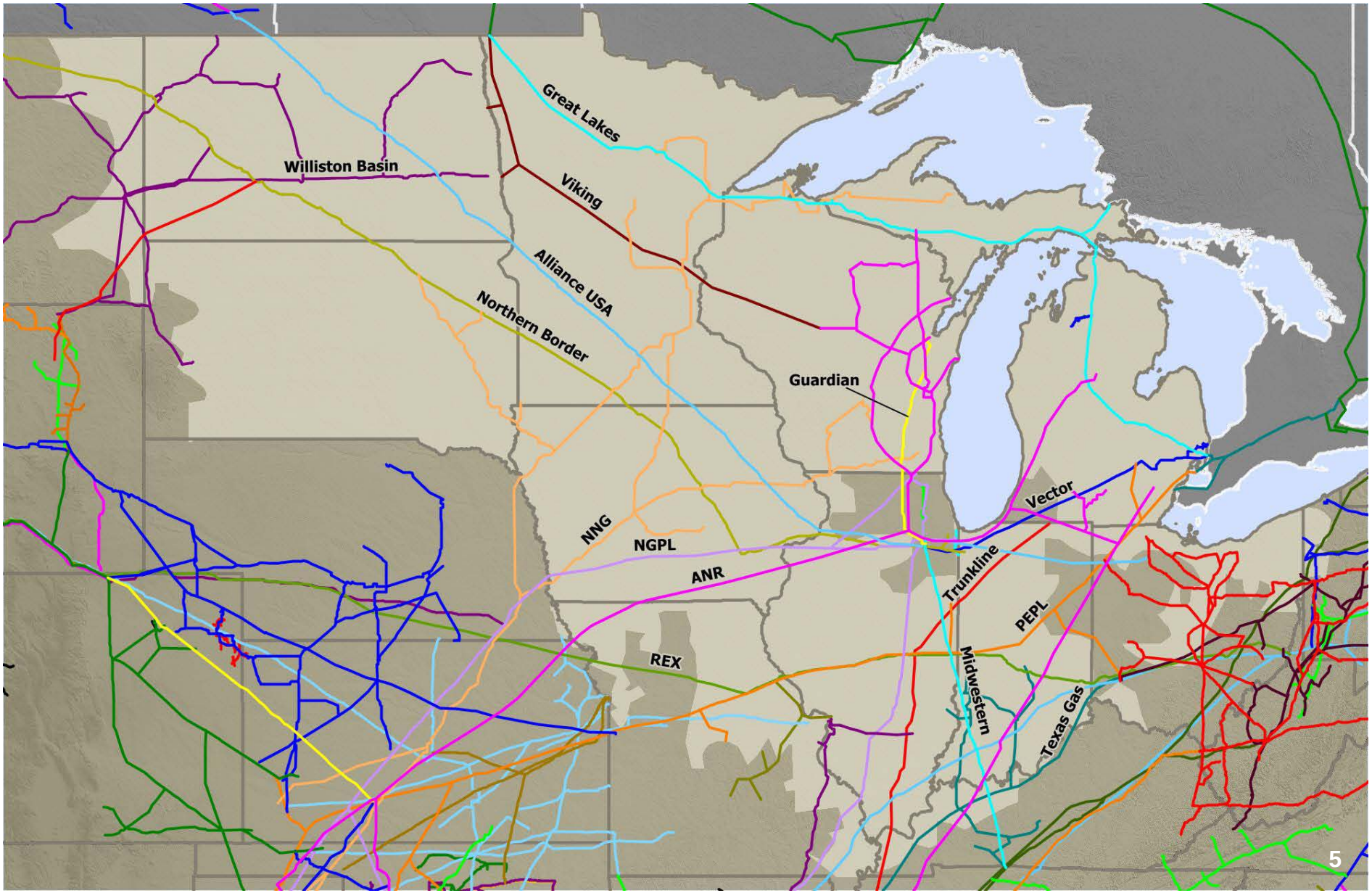


Q2 Survey Results (06/2012)	**66**	**18**	**48**	**36**	**4**	**8**
MISO Study (10/2011)	**66**	**9**	**57**	**44**	**13**	**-**

Supply chain analysis suggests that if decisions are not made soon, options become limited



Major Pipelines in MISO Region

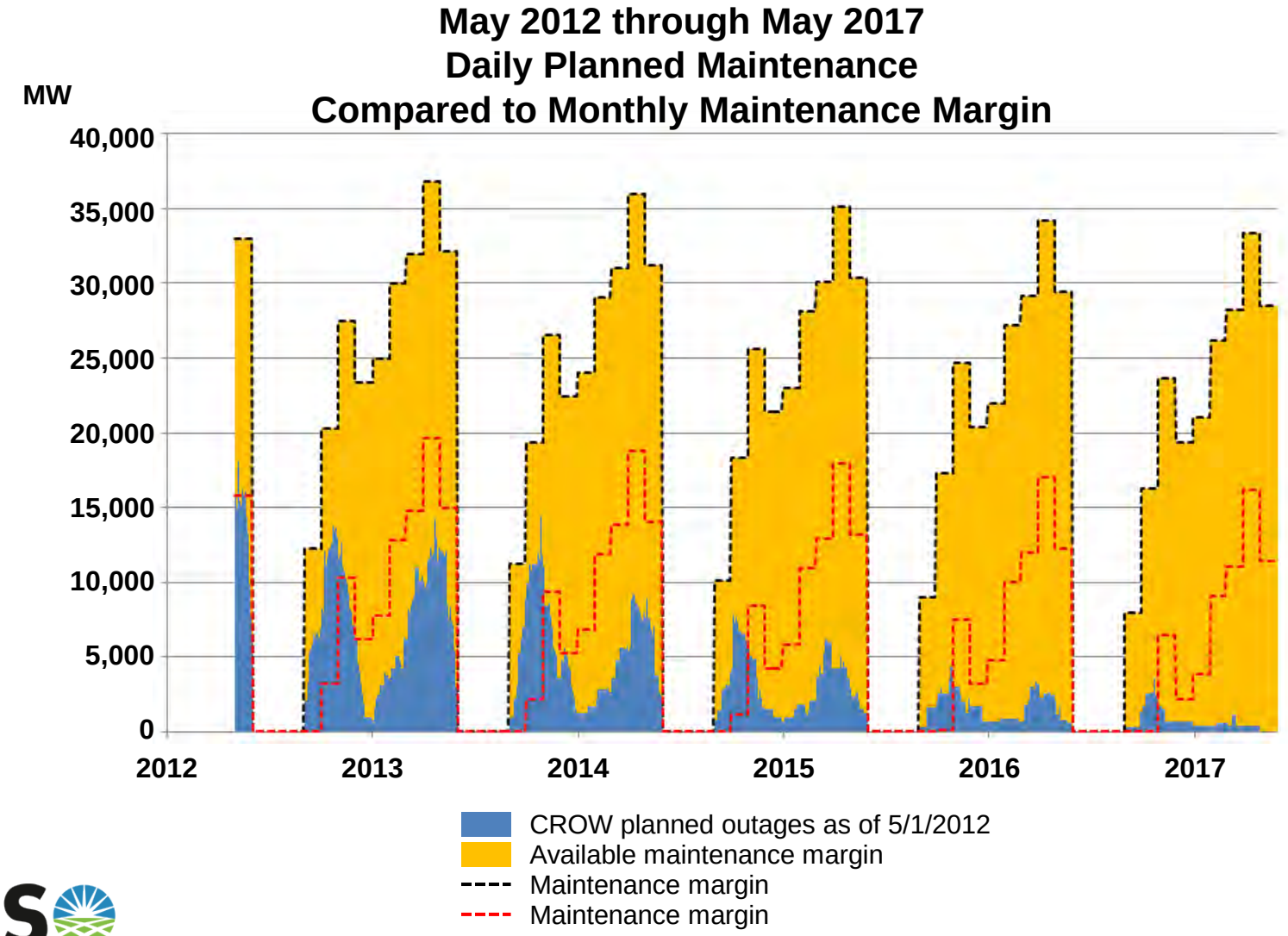


MISO Gas and Electric Infrastructure Interdependency Analysis results

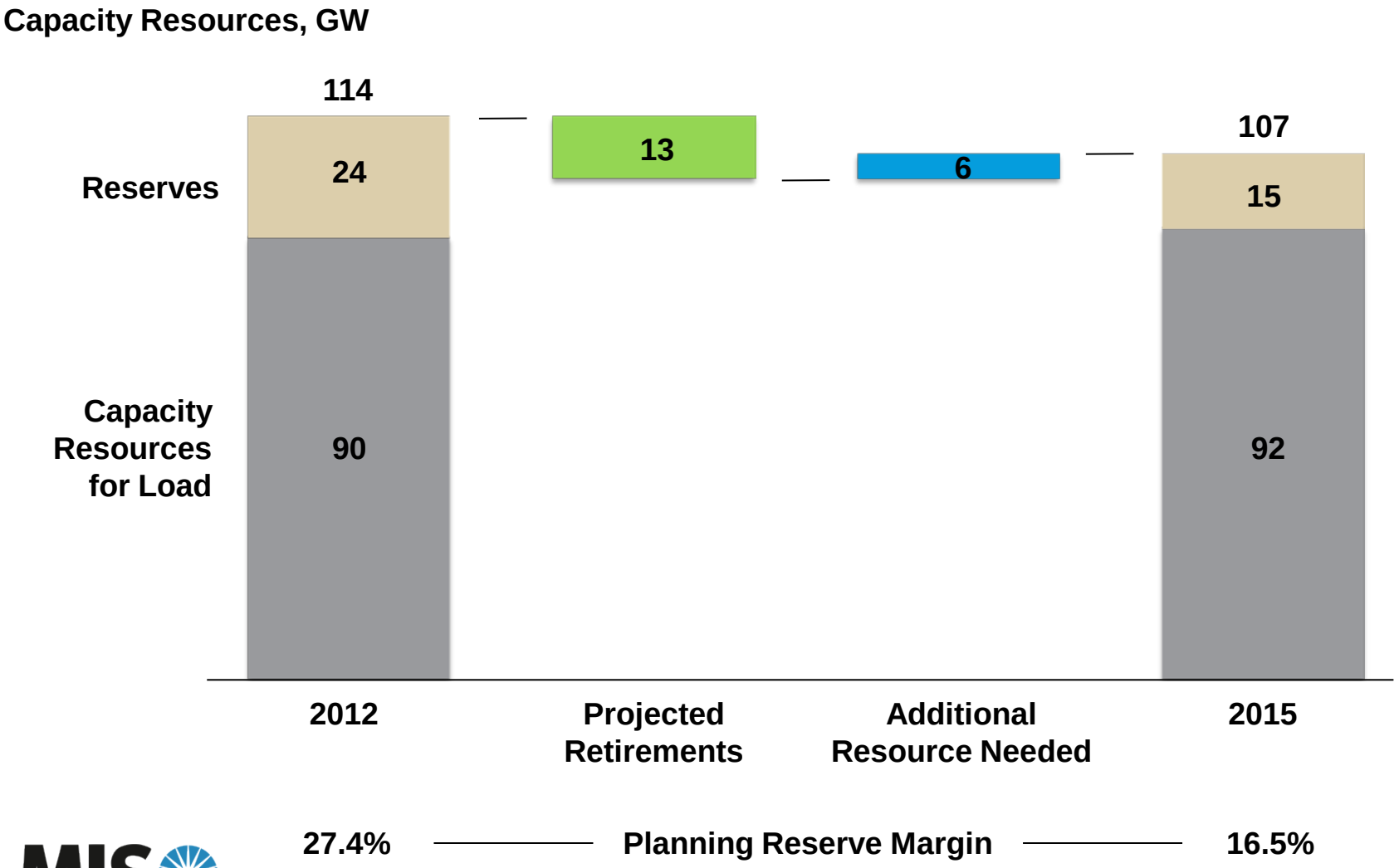
- Gas supply is not expected to be an issue
- Mainline transportation is the constraint
  - Back-cast evaluation reveals numerous “insufficient gas days” throughout the system
  - GADS data records multiple force majeure outages related to gas delivery
- Additional gas pipeline infrastructure is needed within the MISO footprint
  - Main line development needed

    (approx. $2 billion in investments needed)
  - Lateral pipelines and compressor additions to get supply to new gas-fired facilities (approx. $1 billion in investments needed)
- Regional coordination will produce a more efficient solution
- Timing for development of new infrastructure will be an issue

Current maintenance plans will depend on gas fleet resource availability



6 GW of resource capacity may be needed by 2015 to maintain an appropriate planning reserve margin



Improved gas / electric coordination would greatly enhance the risk management associated with generation

- Increased reliance on gas generation will require substantial investment in gas infrastructure – mirroring electric transmission investments that have begun
- There is no “gas planner” Regional Gas Transportation organizations that mirror electric RTOs
- Gas supply and delivery infrastructure is not a network and no new locations of gas supply were contemplated when the infrastructure was designed and built
- Gas storage will be required to manage the risk of pipeline interruption