IMM Discussion of MISO Futures and Long-Range Transmission Planning

Presented to:

Planning Advisory Committee

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MISO IMM

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Why is Planning a Market Monitoring Issue?

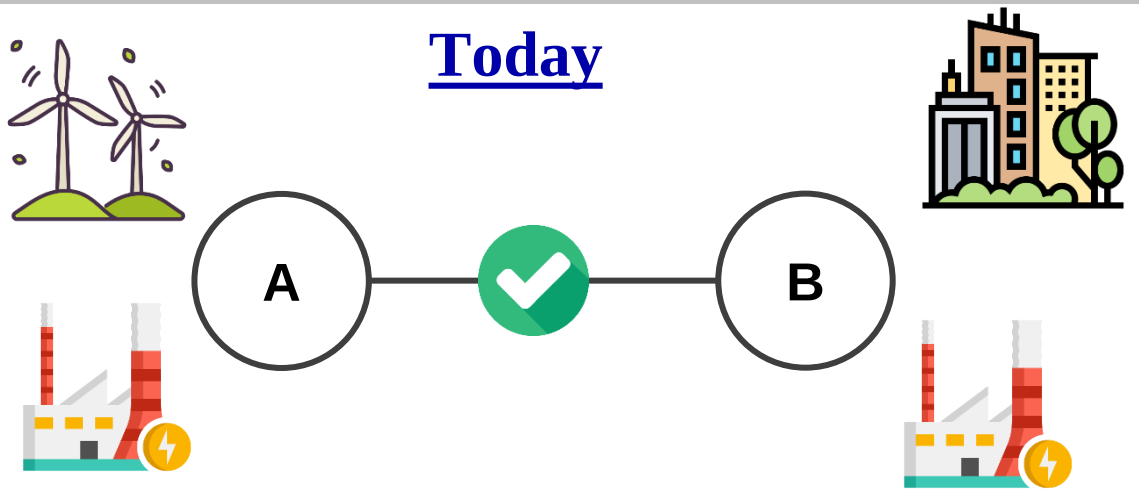
- The IMM is charged with identify issues that undermine the performance of the MISO markets.
  - ✓ Normally, transmission planning does not raise significant concerns.
- However, uneconomic out-of-market transmission investment can undermine the long-term performance of the MISO markets.
- Well-performing markets will facilitate investment in the lowest-cost resources and facilities to meet the system's needs.
  - ✓ Generation, storage and transmission can often solve the same congestion issues.
  - ✓ These solutions can "compete" only if transmission investment is subject to consistent economic criteria.
  - ✓ Over-building transmission affects resource investment and retirements by creating risk and uncertainty, as well as raising costs inefficiently.
- Addressing these issues is critical for MISO's LRTP given the likely magnitude of the new investments.

Introduction and Summary

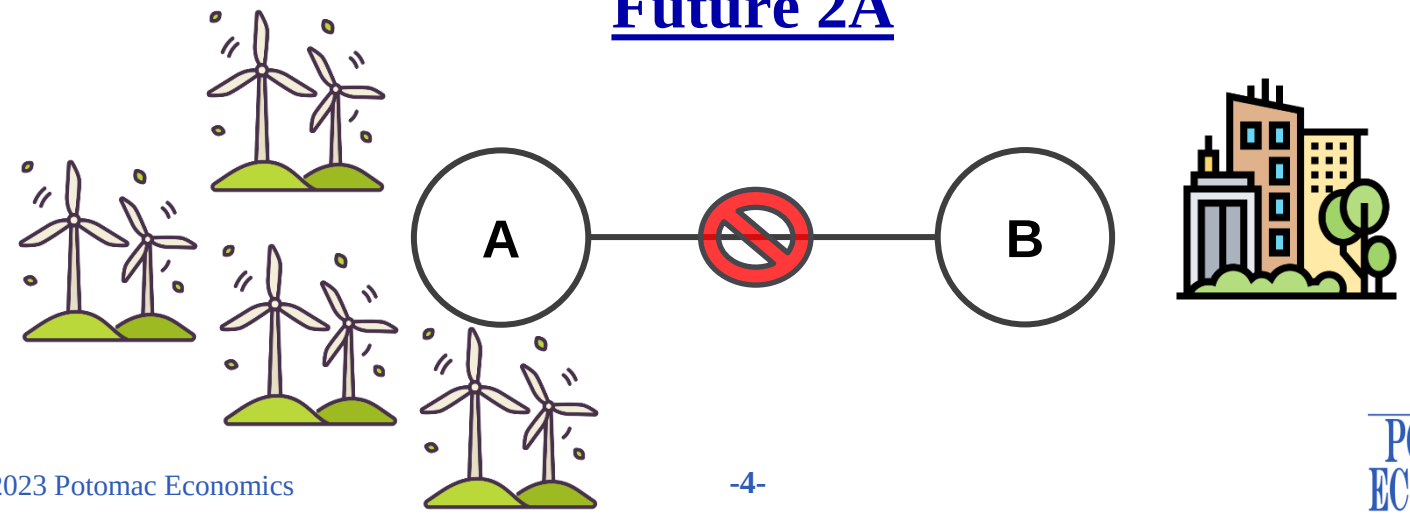
- The LRTP depends on two key analytic processes at MISO:
  - ✓ Quantifying the "Future" supply and demand (including their locations) MISO should plan for; and
  - ✓ Estimating the benefits and costs of the new transmission.
- In our review of MISO's results, we find that:
  - ✓ Future 2A is an extremely unlikely future because of several issues the assumptions and modeling that produced it.
    - – We do not believe it will provide a reasonable basis for identify transmission needs and beneficial transmission investments.
  - ✓ The benefit-cost analyses must be improved for Tranche 2 to avoid substantially overstating benefits.
- This presentation primarily addresses concerns with Future 2A.

Moving from Today to Future 2A

Today



Future 2A



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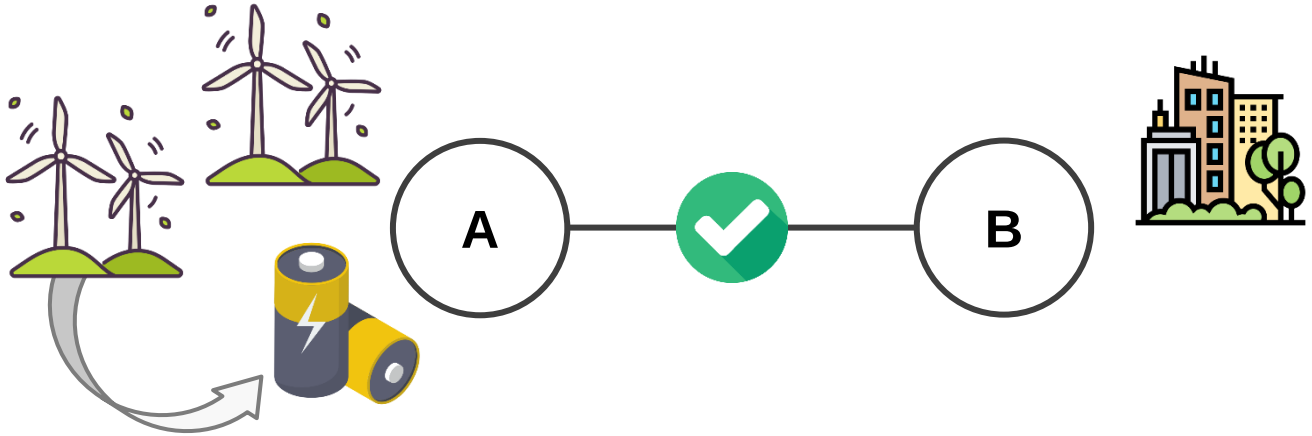
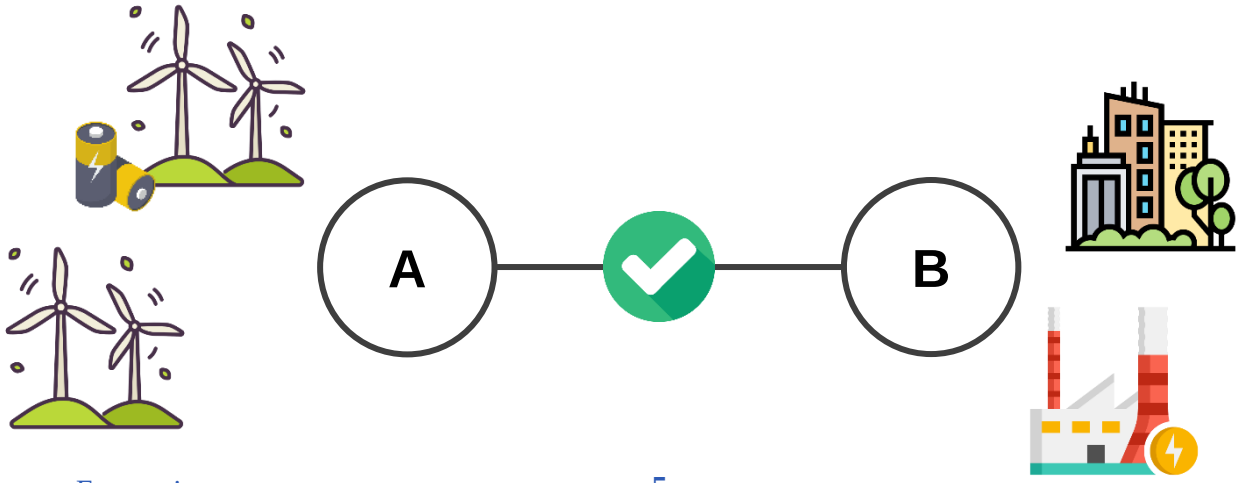
More Likely Futures





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Capacity Expansion in MISO's Futures

Existing Resources

Planned Resources

Key Assumptions:
1. High Intermittent Accreditation (Solar > 40% in 2030, Wind = 17%)
2. MISO-Wide Carbon Targets

Planning Model

Reliability Needs

EGEAS

Intermittent Renewables

PROMOD Model

Energy Inadequacy

Assumed "Flex" Resources

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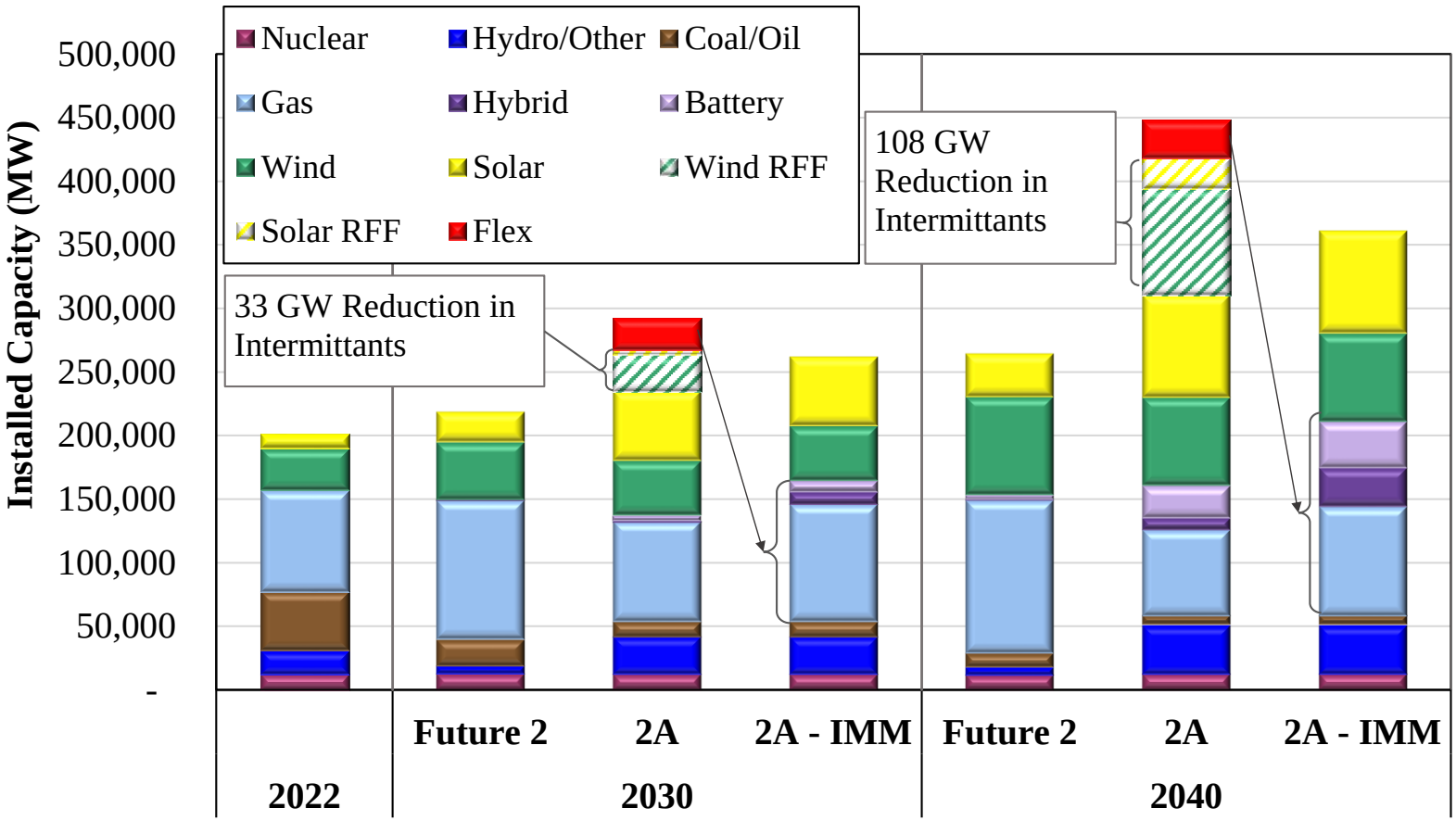
Observations on the EGEAS Results

- Prior to 2032, EGEAS only builds intermittent wind and solar (and a tiny amount of DR/Other).
  - ✓ Small amounts of batteries and hybrid resources are built after 2032.
  - ✓ With the exception of a small amount in 2038, no gas resources are built by EGEAS even though almost 23GW are "planned".
- These results are consistent with:
  - ✓ Accreditation assumptions that overstate the value of intermittent renewables and understate the value of gas, hybrid, and batteries.
  - ✓ Failure to recognize the value of gas, hybrid and battery resources in satisfy energy adequacy needs (reflected in energy and AS pricing).
  - ✓ Battery modeling that substantially reduces its apparent profitability.
  - ✓ The application of aggressive and market-wide carbon constraints.
- We address these issues by displacing the RFF intermittent resources with the dispatchable resources (gas, hybrid, batteries) needed to satisfy MISO's resource and energy adequacy needs.

Anticipated Transition in Resource Mix



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Carbon Constraints in MISO's Planning

- We believe the carbon constraint modeled by MISO are not reasonable because they do not recognize that:
  - ✓ All carbon targets limited to individual states or utilities.
  - ✓ Most of the carbon objectives target zero net carbon by 2050 and do not require aggressive reductions in the near to mid-term.
  - ✓ Over half of MISO's states have no carbon plan.
  - ✓ Many of the others have carbon goals announced by the Governors, but with no required legislation.
  - ✓ Some utilities in states with no carbon plan have announced company plans, but this does not prohibit merchant generators from building extremely profitable gas resources in these states.
- In the near-term, gas resources are likely to be the most economic resources to provide MISO's resource and energy adequacy needs.
  - ✓ Market incentives will likely cause such resources to retire more slowly than MISO assumes more to be built than EGEAS selected.

The Future 2A-IMM Case: Energy Adequacy and Carbon Emissions

- We are not able to calculate the carbon emission and energy adequacy implications of the IMM case, but are confident that it will not violate the requirements in either area.
- Carbon Emissions
  - ✓ The natural gas resources we assume will be built or maintained will be located in states with no carbon plan and/or in years well before 2050 (when most plans target net zero).
  - ✓ Therefore, such resources cannot interfere with the carbon goals.
- Energy Adequacy
  - ✓ The IMM case adds sufficient dispatchable resources to replace MISO's "flex" resources plus the expected energy from the displaced intermittent wind resources.
  - ✓ This results in the IMM case showing almost 2 GW more dispatchable resources in 2030 and 20 GW more by 2040.

Conclusions

- Given the importance of Future 2A, we recommend it not be used as the base case for Tranche 2.
- A reasonable and quick improvement to Future 2A to address many of the concerns we outline is to:
  - ✓ Delete the intermittent RFF resources since the assumed Flex resources will more than satisfy the same resource adequacy needs.
  - ✓ Evaluate the energy adequacy of this case and add incremental flex resources as needed (likely a very small amount).
- These changes would help ensure that the transmission needs and benefits reflect a more likely evolution of the MISO system.
- Although these changes will not expand the penetration of batteries or hybrid resources, the opportunity for batteries to mitigate transmission needs can be evaluated in the benefit analysis.