Strawman Proposal

MTEP Futures

October 16, 2019

DRAFT

Introduction to this Document

The content in this document is meant to be used to facilitate discussions amongst MISO and its stakeholders and will be updated throughout the workshop/stakeholder process in developing the next set of MTEP Futures and processes.

Potential New Futures:

This strawman proposes three Futures; specifically the Industry Announced Plans, Advanced Fleet Change 2.0, and Fleet Electrification Futures.

Industry Announced Plans

The footprint will continue to develop in line with company announcements and plans, along with State mandates, goals, or preferences. This is applicable to both resource additions and retirements.

- Natural gas prices remain constant with little fluctuations
- No new coal units will be built due to cheaper/cleaner alternatives
- Renewable growth remains consistent
- Updated coal age-based retirement, i.e., EIA 46 years
- Wind and solar PV unit prices decrease due to technological innovation
- Growth for energy storage is progressive, based on current GI queue base assumptions
- Demand-side management programs will be included
- EV growth continues, modeled to a moderate adoption rate case

Advanced Fleet Change 2.0

Driven by a robust economy and changing federal, state, and local policies, there is an increase in energy demand and a reduction in power sector carbon emissions of 50 percent or more from current levels is enacted. Decreased costs, improved technology, and supportive policies drive high growth in renewable, hybrid, and storage resources. DER growth within the MISO footprint increases by 30 percent or more, relative to current levels.

- Coal age-based retirement is 36 years
- With more retirement of coal resources, the reliance on natural gas increases
- Natural gas prices increase due to high demand
- Solar PV and wind unit prices decrease due to technological advances
- EV V2G adoption allows for moderate peak and ramp shaving
- Energy increases 40 percent due to Electrification
- Demand-side management programs increase

OMS DER Survey:

https://cdn.misoenergy.org/20190924%20OMS%20DER%20Survey%20Results385416.pdf

Fleet Electrification

Driven by a booming economy, commercial and passenger vehicle fleets will have largely electrified. Changing federal, state, and local policies will support carbon emissions reduction of 80 percent or more from current levels, and a minimum of 50 percent of energy will be served by renewables. Investments in R&D and continuing innovation greatly improve storage technology capabilities and reduce costs.

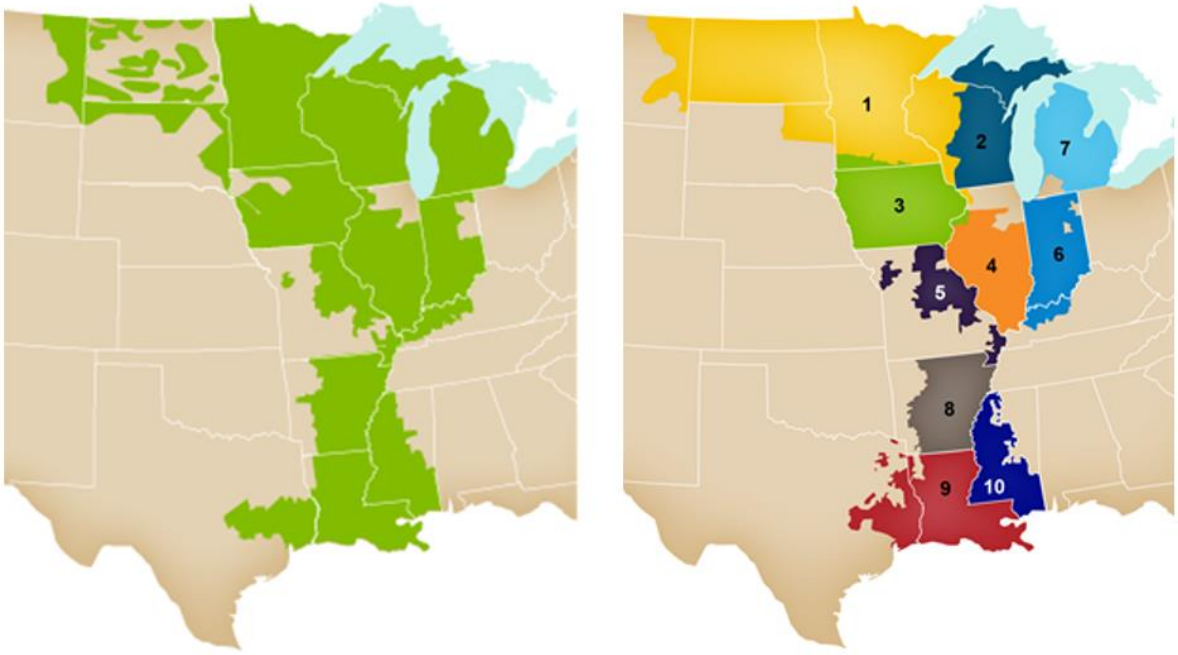
- Natural gas prices will be high due to large dependence on the resource
- Coal age-based retirement is 30 years
- Improved storage capabilities and EV V2G charging largely reduce peak and ramping demand
- 30 percent of energy served is sourced from DERs
- Energy increases 70 percent due to Deep Electrification
- R&D will encourage very high deployment of energy storage, greatly reducing its cost
- Wind costs per unit decrease due to R&D while solar PV prices are at a record low
- Hybrid renewable resources are able to provide excess benefits to the grid during off-peak hours
- High energy demand, decarbonization policies and investment, and new technology drive demand-side management programs

EGEAS Study Area

MISO Footprint

The proposed study area for the retooled MTEP Futures continues to study the MISO footprint as a single footprint and introduces a concept that would also study each Local Resource Zone (LRZ).

Under this new concept, MISO would continue to plan the footprint to meet the MISO-wide Planning Reserve Margin (PRM) while also ensuring that each LRZ would not be overly reliant on imported capacity by recognizing each zone's Capacity Import Limit (CIL), i.e. each LRZ's respective ability to import capacity to the zone. This would ensure that each LRZ has enough resources within it and allow MISO to apply LRZ specific assumptions to the different types of resources offered in the EGEAS analysis. For example, LRZs located in the southern portion of MISO could see higher capacity factors for solar than LRZs in located in the northern or central portion of the MISO footprint.

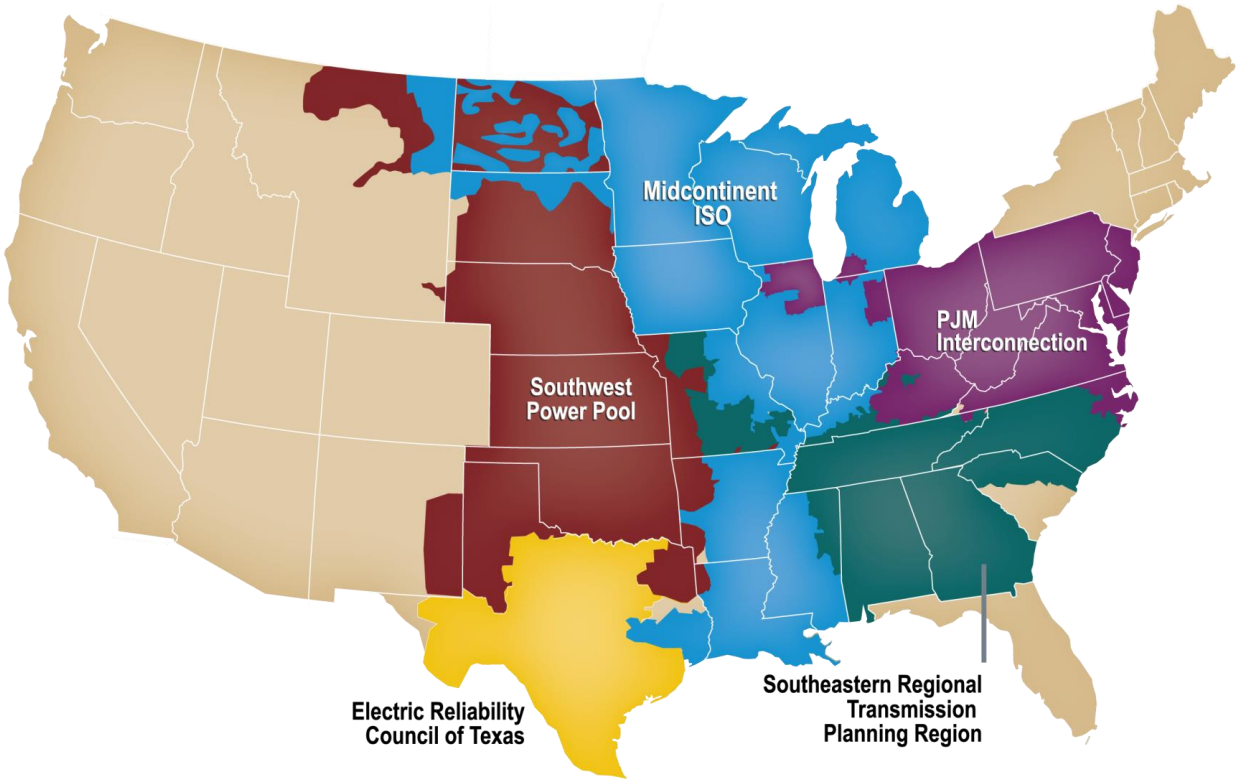


Because of this new concept, MISO would perform 11 sets of EGEAS analyses on each of the MTEP Futures (1 EGEAS analysis on the MISO footprint + 10 EGEAS analyses for each of the 10 MISO LRZs = 11 total EGEAS analyses per MTEP Future).

The method of reconciling the resource expansion between the 10 LRZ Local Clearing Requirement (LCR) analyses and the MISO PRM analysis will need to be discussed further and developed in upcoming workshops.

External Areas

From an external-to-MISO perspective, this strawman proposes that the planned resource expansions of PJM and SPP be incorporated into the retooled MTEP Futures and the remaining areas of the Eastern Interconnection would be represented by the PowerBase data modelling provided by ABB, unless other external areas request and provide modeling information to be included in the MTEP Futures.



Generation Resources

This strawman proposes several new resources for the retooled MTEP Futures in addition to various modifications to resources previously offered in the EGEAS analysis of past MTEP Futures.

New Resources	Updated Resources
Hybrid – Solar + Storage	Utility-Scale Solar
Hybrid – Solar + Wind	Utility-Scale Wind
Hybrid – Solar + Wind + Storage	Storage – Lithium Battery (4hr)
Storage – Lithium Battery (2hr)	Natural Gas – Combined Cycle
Storage – Lithium Battery (6hr)	Natural Gas – Combustion Turbine
Distributed Solar Commercial	Coal
Distributed Solar Residential	Nuclear

In addition to the new and updated resources, this strawman proposes to customize some of these resources for different LRZs (e.g. LRZs 1 & 3 could have cheaper and higher capacity factors for utility-scale wind when compared to LRZ 9). These LRZ specific assumptions will be discussed in the sections below under each resource type.

Utility-Scale Solar

With respect to utility-scale solar, this strawman proposes different solar resource assumptions based upon geographic region, such as by LRZ or more simply, by MISO sub-region (e.g. North/Central/South sub-regions).

In addition, this strawman proposes the creation of assumptions around the sizing of the plant's convertor and/or overpaneling the plant site.

Lastly, should the strawman assume deviations to the utility-scale solar based upon seasonality of solar potential? (i.e. is the 50 percent capacity credit reasonable with respect to winter/summer variation)

Utility-Scale Wind

This strawman proposes to add an age-based retirement assumption for utility-scale wind along with assumptions for repowering a wind resources. Currently, wind units are being retired between 20 and 25 years, while repowerments may occur once a unit reaches 15 years of age. Repowerments are heavily influenced by Production Tax Credits (PTC) and decarbonization policies.

Storage – Lithium Battery (2hr)

The specifics for modeling the 2 hr Lithium Battery units will need to be discussed further and developed in upcoming workshops.

Storage – Lithium Battery (4hr)

The specifics for modeling the 4 hr Lithium Battery units will need to be discussed further and developed in upcoming workshops.

Storage – Lithium Battery (6hr)

The specifics for modeling the 6 hr Lithium Battery units will need to be discussed further and developed in upcoming workshops.

Hybrid – Solar + Storage

The specifics for modeling hybrid units will need to be discussed further and developed in upcoming workshops.

Hybrid – Solar + Wind

The specifics for modeling hybrid units will need to be discussed further and developed in upcoming workshops.

Hybrid – Solar + Wind + Storage

The specifics for modeling hybrid units will need to be discussed further and developed in upcoming workshops.

Natural Gas – Combined Cycle

The specifics for modeling combined cycle natural gas units will need to be discussed further and developed in upcoming workshops.

Natural Gas – Combustion Turbine

The specifics for modeling combustion turbine units will need to be discussed further and developed in upcoming workshops.

Coal

The retirement age of coal units progressively decrease in every Future. It is assumed that with changing policies and emission standards, coal usage will decline. The retirement age modeled in the three Futures respectively are: 46, 36, and 30 years. In doing so, complete coal retirement is able to be modeled within the Fleet Electrification Future.

Nuclear

This strawman assumes that the relicensing and retirement of nuclear units will be dependent upon company announcements, age, and operational costs.

Distributed Solar – Commercial

The specifics for modeling commercial distributed solar will need to be discussed further and developed in upcoming workshops.

Distributed Solar – Residential

The specifics for modeling residential distributed solar will need to be discussed further and developed in upcoming workshops.

Load and Load-Modifications

This strawman proposes several new resources for the retooled MTEP Futures in addition to various modifications to resources previously offered in the EGEAS analysis of past MTEP Futures.

Demand and Energy Forecast

This strawman proposes to utilize the 'Merged Energy Demand and Energy' process to develop the demand and energy forecasts. In addition, MISO proposes to reuse the 'Merged Energy Demand and Energy' forecast developed in 2019 for the next MTEP futures.

Load-Shape

MISO is still evaluating options to update the load-shape used in the MTEP futures and economic studies. The 2012 shape was picked as it aligns with wind and solar shapes that were also based on 2012 data. The 2012 wind and solar shapes are currently the most up-to-date shapes available.

Siting

Although this version of the strawman does not propose any siting enhancements, MISO is open to and expects that there will be changes to the siting process. These potential changes will be discussed and fleshed out in upcoming workshops.