

North Region Economic Transfer Study

Feb 2020

Background

With the increasing levels of renewable generation in the MISO North region, system operation limits are expected to become a major bottleneck to deliver energy from the northwestern generation to load centers in MISO across the Minnesota-Wisconsin interface. Stakeholders have expressed interest in analysis to examine reliability (thermal and voltage stability) driven transfer limitations.

There are two existing voltage stability interfaces between Minnesota and Wisconsin: Minnesota Wisconsin Export (MWEX) and Arrowhead-Stone Lake (AHD-SLK). The system operation limits of the MWEX and AHD-SLK interfaces were established to protect the system from voltage violations and instability. The MWEX interface is the summation of the flows on the AS King -Eau Claire 345-kV line and the Arrowhead 230-kV phase shifter.

As a part of MTEP20, MISO will perform an informational study to evaluate projected economic impacts of MWEX, AHD-SLK, and any other identified reliability limitations in MISO's North region. Findings will be used to improve modeling of these interfaces and other such reliability limitations and to inform future studies.

The study will also help in understanding how non-thermal constraints affect production cost analysis. In addition, it will identify areas of improvement to better align economic planning analyses with congestion observed in real-time. Furthermore, a repeatable process is needed, which could be applied in other parts of MISO and help achieve a consistent and well-defined approach for future initiatives.

Goals of Study

- Identify future system operation limitations, including those pertaining to MWEX and AHD-SLK interfaces, in the North region from both a reliability and economic perspective.
- Evaluate the impact of existing and new system operation limitations on the future grid
- Identify process and planning solution options that will inform future transmission planning initiatives

Study Process

This study will be conducted as a part of MTEP20 and will be organized as follows:

1. Reliability and Economic Model Development

Develop three scenarios with different renewable penetration levels in MTEP reliability and economic models.

- Current: Announced retirements and newly signed GIAs
- GI forecasted: All active generators in GI queue
- 40% renewable penetration: Consistent with Renewable Integration Impact Assessment

Sensitivity cases: Evaluate particular conditions that could have significant impact on operational limitations

2. Reliability Assessment

- Run reliability study to establish the non-thermal operating limits the economic study.
- Run voltage stability analysis to determine limitation of MWEX and AHD-SLK interfaces or new limited elements in adjacent area associated with changing generation sources, using the power flow cases developed in phase I.
- Identify network upgrades that would address voltage stability issues of MWEX and AHD-SLK interfaces or new constraints in each of the defined scenarios, enabling higher unconstrained transfer levels.
- Identify the maximum transfer level on MWEX and AHD-SLK interfaces before and after the network upgrade for phase III economic analysis.

3. Economic Assessment of Transmission solutions

- Incorporate non-thermal limits identified in reliability assessment, and determine the economic value of the network upgrade required to increase the non-thermal limits to enable higher transfer levels.
- Identify the remaining congestion associated with the MWEX interface, propose and evaluate incremental solutions to address any remaining congestion.

4. Document and present final findings and study report to stakeholders

- Findings will be used to inform future transmission planning initiatives
- Final study report will be presented at September PAC

Schedule/Timeline

This targeted study will utilize the MTEP20 planning process timeline. A high level schedule is provided below.

Task	Expected Completion
Scope Development	Jan 2020 – Feb 2020
Reliability and Economic Assessment	Mar 2020 – Aug 2020
Present Study Results and Findings	Aug 2020 – Sept 2020

Stakeholder Interaction

Introduce the study in PAC. Leverage the existing meeting forums (PAC/Central and West SPM/TSTF as needed).

Primary stakeholder responsibilities are:

- Providing feedback on study scope, models and development of sensitivities
- Reviewing and providing solution ideas
- Providing feedback on study results and draft reports.