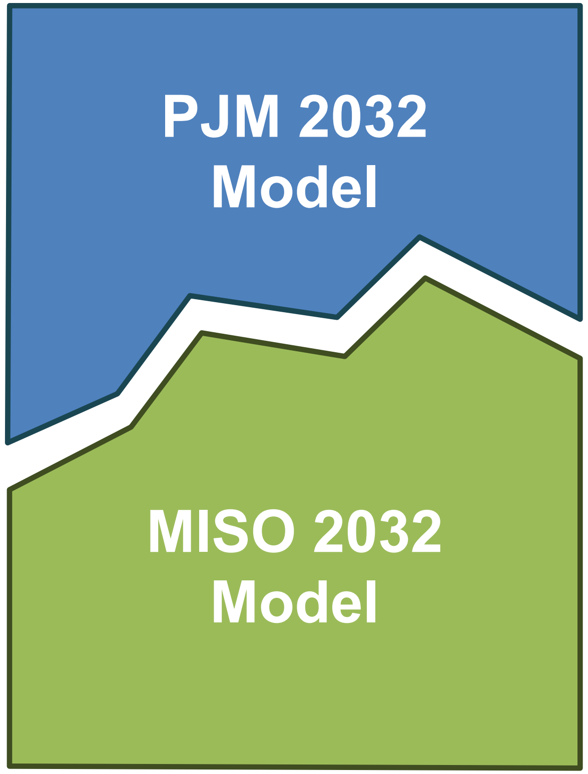
PJM/MISO Interregional Transfer Capability Study

Study Update/Executive Summary

- The MISO and PJM determined to use a blended model as a common basis for the transfer, reliability, and economic analyses
- The model used for the analyses is a first of its kind that combines plausible long-term assumptions for two major North-American RTOs, factoring the impact of federal and state policies
- This slide deck presents preliminary findings
- The RTOs will perform an impact analysis of the recently approved MISO Tranche 2.1 and present finalized results at the June IPSAC along with near- and longer-term pathways for implementation



Agenda and Preliminary Takeaways

Agenda

- MISO-PJM Blended Model Overview
- PJM-MISO ITCS Analyses
- Preliminary PJM-MISO Results Summary
- Next Steps

Preliminary Takeaways

- The RTOs have identified common transfer limitations
- Preliminary analyses (reliability, economic) suggests addressing these transfer limitations will provide multiple benefits and strong business case
- The RTOs will continue the study and present final results and pathways for implementation in June

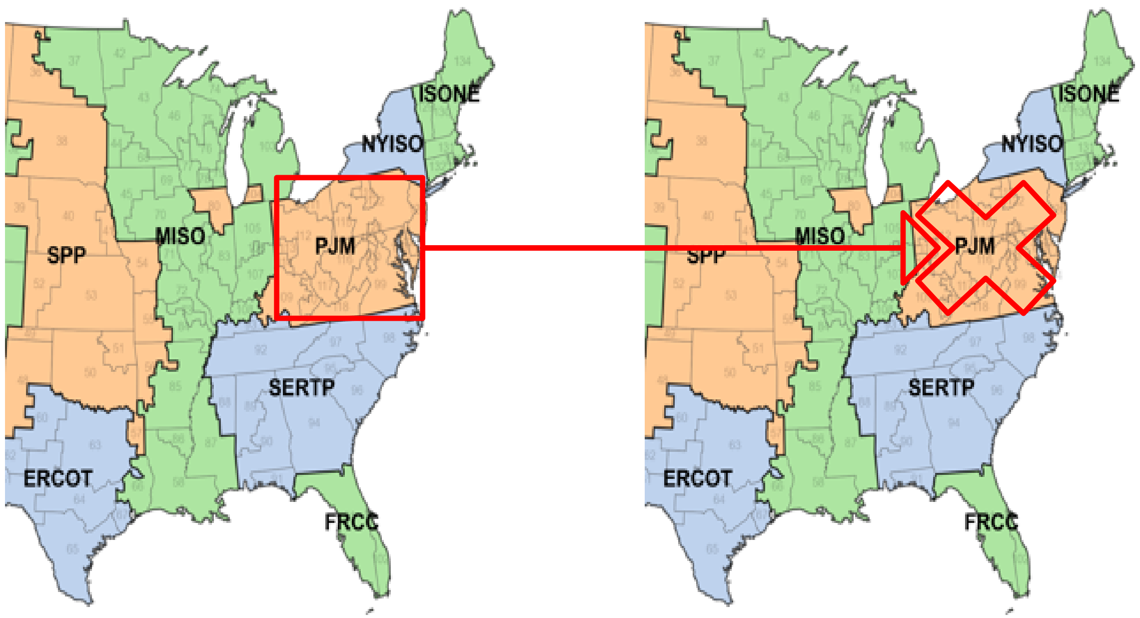
MISO-PJM Blended Model Overview

MISO-PJM Blended Models

- Two official models
  - PJM LTRTP Workshop Policy Study (WPS; 2032)[1]
  - MISO LRTP Future 2A (2032)[2]
- PJM removed the PJM system from the MISO 2032 model and replaced it with the PJM system from the WPS 2032 model keeping the rest of the official MISO LRTP model intact

PJM2032 Model

MISO 2032 Model



[1]PJM LTRTP WPS Model Overview – [October PJM TEAC Special Session – Order 1920 Presentation]
[2]MISO LRTP Future Series 1A Report – [MISO Series1A Futures Report]

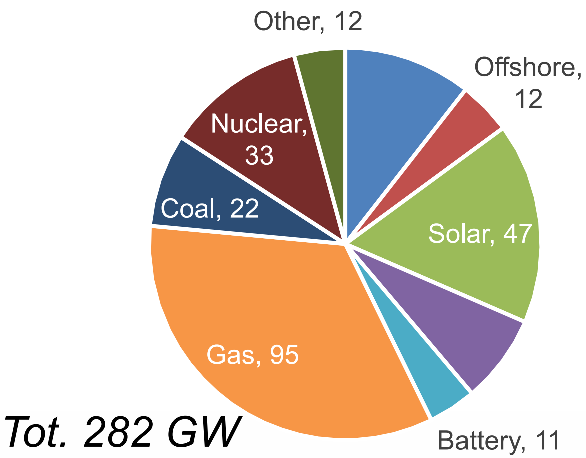
Model Blending Steps in PSS/E

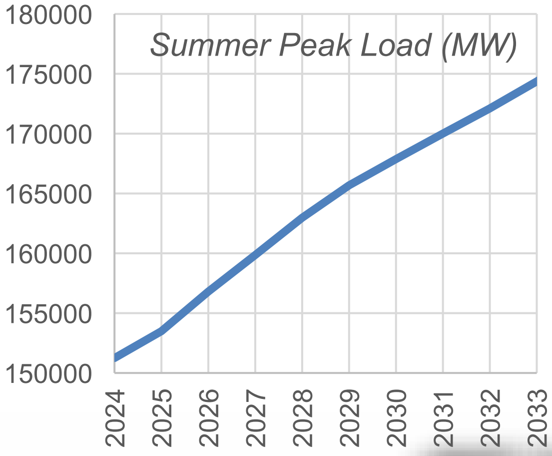
1. Scale the PJM generation in the PJM 2032 model so that the PJM interchange in the PJM 2032 model matches the PJM interchange in the MISO 2032 model
2. Extract all non-PJM areas from the PJM 2032 model and save the case as a raw data file
3. Extract all PJM areas from the MISO 2032 model
4. Merge the PJM areas from step 2 into the model from step 3
5. Make sure PJM tie lines are correct
6. Solve the power flow case

Blended Model Assumptions at a Glance

PJM Footprint:

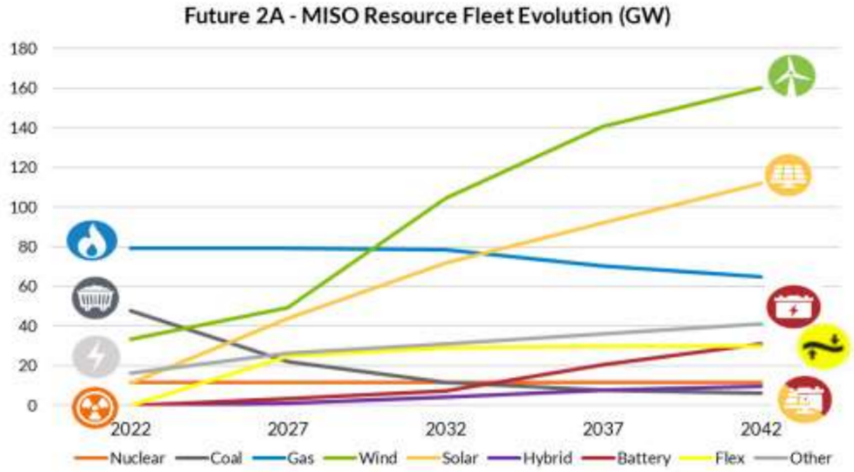
- PJM's 2024 Load Forecast
- PJM Independent State Agency Committee (ISAC) Policy Workbook
  - Policy-driven retirements (state & federal 25 GW)
  - New generation policies (98 GW renewable/ storage *added*, 7 GW of thermal based on queue)
- 2024 RTEP topology





MISO Footprint:

- MISO LRTP Future 2A 2032 (without Tranche 2.1 Solutions)
  - 93GW of additional renewable generation and 15.5GW of new thermals
  - 57 GW of retirements
  - Load Shapes, Peak Load, and Annual energy based on the modified 2019 Merged Load Forecast developed in the Series 1A F2A Futures
- Additio
  Series



PJM-MISO ITCS Analyses

Analysis Summary

	Reliability	Transfer	Economic	Extreme Cold Weather Scenarios[1]
Analyses:	• Summer Peak • Winter Peak • Light Load	• 5 Bi-directional transfers • 3 Informational NERC ITCS Transfers • PJM-MISO Classic Transfer *Transfers were analyzed using all three reliability cases	• 2032 Production Cost Analysis	• MISO – Winter Storm Uri • PJM – Winter Storm Elliot
Results Status:	Preliminary results posted with March 7th IPSAC Materials			To be posted with June Materials

Notes:
MISO's Board of Directors approved LRTP Tranche 2.1 December 12, 2024, MISO and PJM plan to perform analysis to evaluate implications of Tranche 2.1 on potential ITCS solutions.
Impact analysis of MISO LRTP Tranche 2.1 will be shared with final study results in June – staff has preliminarily annotated issues which are likely to be mitigated by Tranche 2.1 solutions using a combination of prior MISO analyses and PJM's preliminary No-harm analysis of the solutions.
[1]Extreme cold weather scenarios will be performed to evaluate the robustness of solutions

Nine Bi-directional Transfers

Transfer Short Name	Interface Name	Transfer Full Name	Transfer No.	Source	Sink
Michigan Exports To The South	Michigan Southern Interface	Michigan Exports To The South Over The Michigan Southern Interface	1a	LRZ7	LRZ6 & PJM West (minus ComEd)
Michigan Imports From The South		Michigan Imports From The South Over The Michigan Southern Interface	1b	LRZ6 & PJM West (minus ComEd)	LRZ7
Wisconsin Exports To Northern Illinois	Wisconsin Interface w/ Northern Illinois	Wisconsin Exports To Northern Illinois Over The Wisconsin Interface With Northern Illinois	2a	LRZ2	ComEd
Wisconsin Imports From Northern Illinois		Wisconsin Imports From Northern Illinois Over The Wisconsin Interface With Northern Illinois	2b	ComEd	LRZ2
Iowa & Southern Illinois Exports To Northern Illinois	Iowa/Illinois Interface w/ Northern Illinois	Iowa & Southern Illinois Exports To Northern Illinois Over The Iowa/Southern Illinois Interface With Northern Illinois	3a	LRZ3 & LRZ4	ComEd
Iowa & Southern Illinois Imports From Northern Illinois		Iowa & Southern Illinois Imports From Northern Illinois Over The Iowa/Southern Illinois Interface With Northern Illinois	3b	ComEd	LRZ3 & LRZ4
Indiana Exports To Northern Illinois	Indiana Interface w/ Northern Illinois	Indiana Exports To Northern Illinois Over The Indiana Interface With Northern Illinois	4a	LRZ6	ComEd
Indiana Imports From Northern Illinois		Indiana Imports From Northern Illinois Over The Indiana Interface With Northern Illinois	4b	ComEd	LRZ6
Indiana Exports To The East	Indiana Interface w/ Ohio & Kentucky	Indiana Exports To The East Over The Indiana Interface With Ohio	5a	LRZ6	PJM West (minus ComEd)
Indiana Imports From The East		Indiana Imports From The East Over The Indiana Interface With Ohio	5b	PJM West (minus ComEd)	LRZ6

Interfaces considered for transfer analysis

NERC ITCS Transfers Between MISO & PJM (see next slide)
E12: MISO West <-> PJM West
E16: MISO Central <-> PJM West
E22: MISO East <-> PJM West

General Transfers Between MISO & PJM
MISO Classic <-> PJM

NERC Transfer Maps

Interface E12: MISO West <-> PJM West

Interface E22: MISO East <-> PJM West

Interface E16: MISO Central <-> PJM West

Reliability Analysis

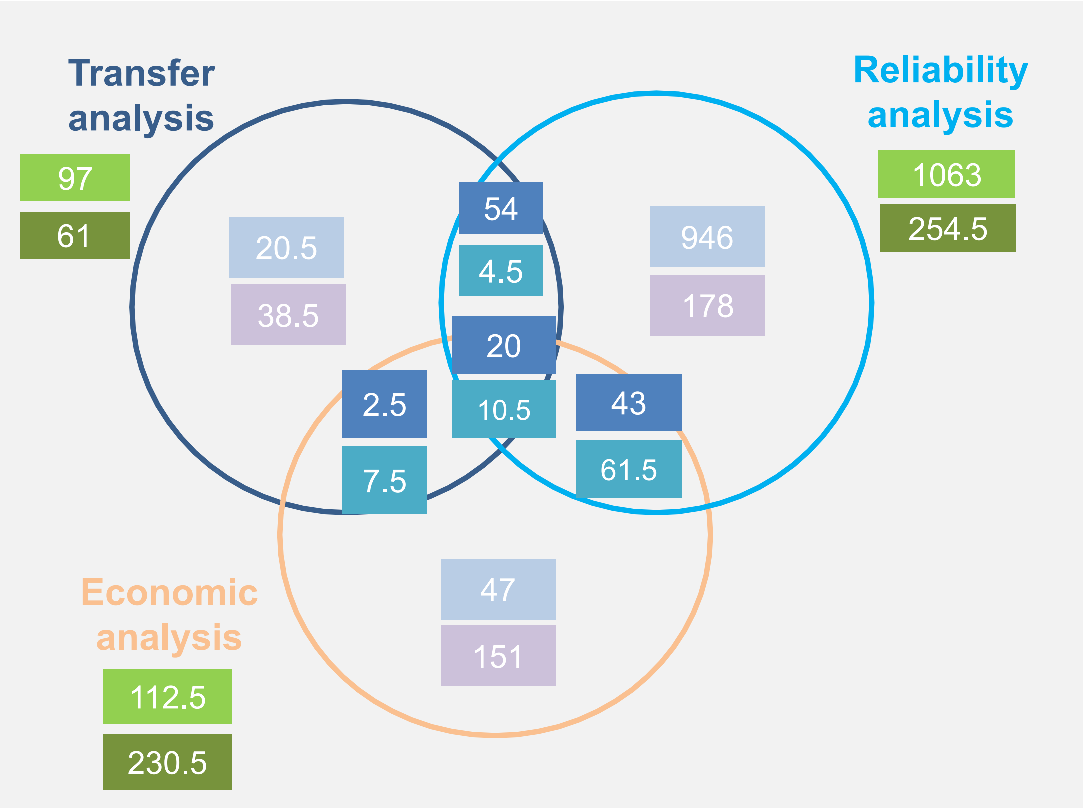
- MISO:
  - Focus on MISO Classic region (East/Central/West)
  - Reliability tests:
    - Single initiating (*N-1*) event contingency analysis
    - Summer Peak, Winter Peak, and Light Load
- PJM: near-full reliability analysis
  - Focus on PJM West
  - Reliability tests
    - Summer, Winter, and Light Load
    - *N*-1, *N*-2 (345*kV* and above), Generation Deliverability, Load Deliverability for ComEd

Economic Event File Assumptions

- MISO’s LRTP Series1A F2A events
- Subset of 2024 PJM Market Efficiency monitored flowgates (115kV and above near the seam, 230kV+ in the rest of PJM WEST, 345kV+ in PJM East and PJM South)
- Subset of PJM Generation Deliverability critical flowgates (115kV and above near the seam, 230kV+ in the rest of PJM WEST, 345kV+ in PJM East and PJM South)
- MISO-PJM Tie Lines
- PJM Interfaces modified consistent with PJM assumptions

Preliminary PJM-MISO ITCS Results

Summary count of issues by analysis area and footprint



PJM / MISO	Reflects **total** issues by RTO under Reliability, Transfer, and Economic categories
PJM / MISO	Reflects **unique** issues by RTO under only Reliability, Transfer, and Economic categories
PJM / MISO	Reflects **unique** issues by RTO under overlapping Reliability, Transfer, and Economic categories

Notes:

Individual RTO footprint results from the joint study reflect analysis on the blended model

Issue counts represent RTO lines and tie-lines; tie lines are counted with 0.5 weight to avoid double counting at regional level.

Top Transfer Limits PJM (Preliminary)

Area	RTO	Facility Name	kV	Total Transfers Impacted ●: >10 ■: 4-10 ▲: 1-3	Facility Loading From Reliability Study ●: >150% ■: 100% - 150% ▲: <100%	Facility Loading Sensitivity With Tranche 2*	Annual Congestion ($) ●: > $1M ■: $100k - $1M ▲: < $100k
AEP/DEI	Tie Line	[AEP] Eugene–[DEI] Cayuga 345 kV tie line	345	●	●	↓	■
AEP/DEO&K	PJM	[AEP] Tanners Creek–[DEO&K] Miami Fort 345 kV	345	■	■	↓	■
CE/CE	PJM	[CE] Quad Cities–[CE] Sterling Steel 345 kV	345	■	■	↓	●
ITCT/ATSI	Tie Line	[ITCT] Monroe–[ATSI] Lallendorf 345 kV tie line	345	■	▲	↑	●
CE/CE	PJM	[CE] Garden Plain–[CE] NW Steel & Wire Tap; B 138 kV	138	■	●	-	▲
AEP/AEP	PJM	[AEP] Desoto–[AEP] Fall Creek 345 kV	345	■	▲	↓	▲
AEP/AEP	PJM	[AEP] Maliszewski–[AEP] Vassell 765 kV	765	■	■	↑	▲
AEP/IPL	Tie Line	[AEP] Fall Creek–[IPL] Sunnyside 345 kV tie line	345	■	■	↓	▲
AEP/CE	PJM	[AEP] Olive–[CE] Green Acres 345 kV	345	■	■	↑	▲
CE/CE	PJM	[CE] Goodings Grove; B–[CE] Lockport; B 345 kV	345	■	■	↓	▲
CE/CE	PJM	[CE] Nelson; B–[CE] Lee County 345 kV	345	■	■	↓	▲
CE/WEC	Tie Line	[CE] Zion; R-[WEC] Pleasant Prairie 345 kV tie line	345	■	■	↓	■
AEP/AEP	PJM	[AEP] Marysville765 kV Reactor (to Sorenson)	765	▲	■	↑	▲
AEP/AEP	PJM	[AEP] East Lima-[AEP] Fostoria Central 345 kV	345	▲	●	↓	■
CE/NIPS	Tie Line	[CE] Crete-[NIPS] St. John 345 kV tie line	345	▲	■	↓	●

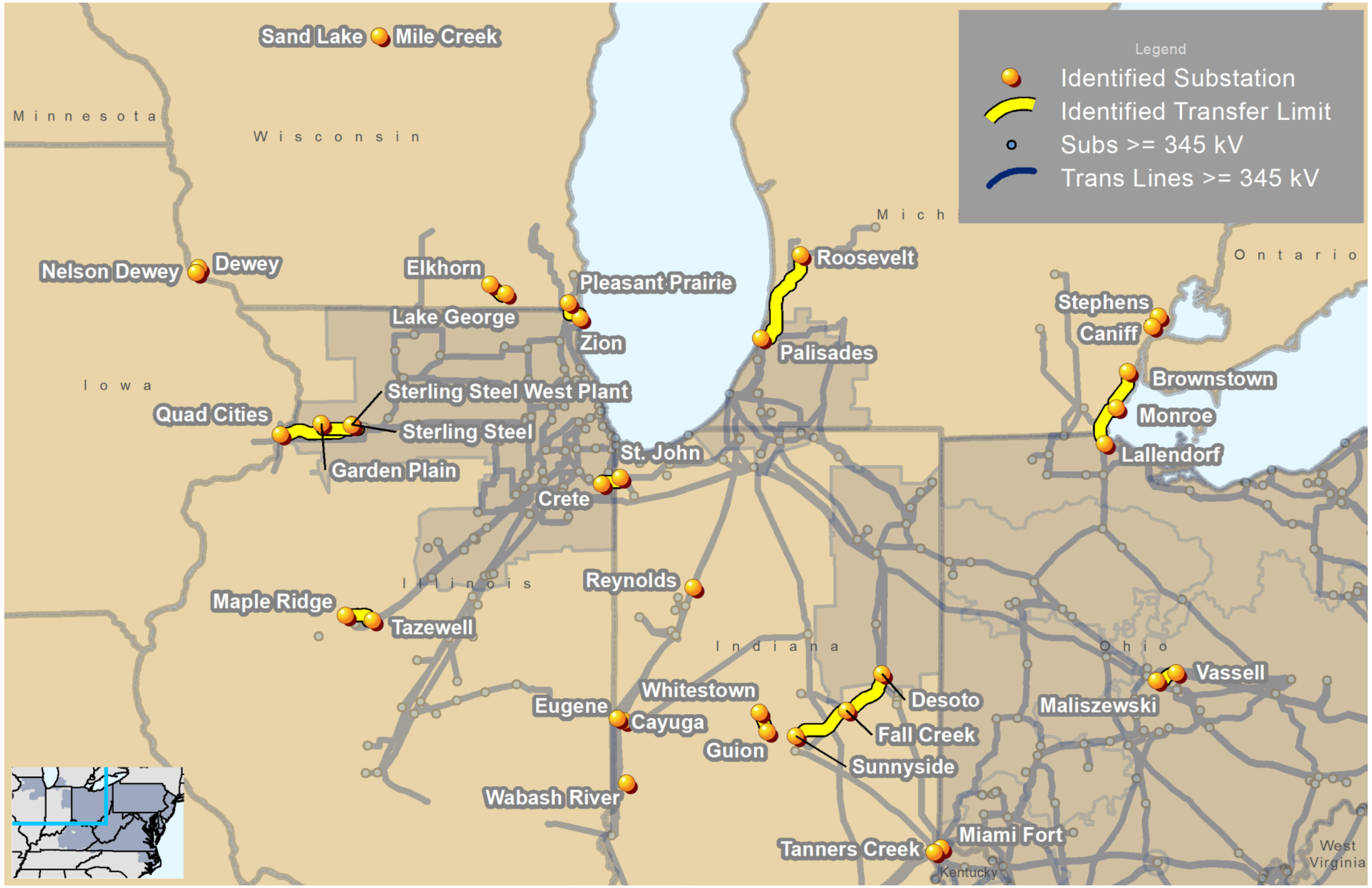
* A facility loading increase generally corresponds to a lower transfer limit and more transfers impacted
Summarized preliminary results represent limits or violations on monitored facilities for NERC P0 or P1 events. Additional contingencies such as NERC P2 and P7 will be evaluated to ensure resolving an identified issue is a robust solut

Top Transfer Limits MISO (Preliminary)

Area	RTO	Facility Name	kV	Total Transfers Impacted ●: >10 ■: 4-10 ▲: 1-3	Facility Loading From Reliability Study ●: >150% ■: 100% - 150% ▲: <100%	Facility Loading Sensitivity With Tranche 2*	Annual Congestion ($) ●: > $1M ■: $100k - $1M ▲: < $100k
AEP/DEI	Tie Line	[AEP] Eugene–[DEI] Cayuga 345 kV tie line	345	●	■	↓	■
DEI	MISO	[DEI] Cayuga Sub–[DEI] Cayuga 345 kV	345	●	●	↓	●
AMIL	MISO	[AMIL] Maple Ridge–[AMIL] Tazewell 345 kV	345	■	▲	-	▲
ITCT	MISO	[ITCT] Monroe–[ITCT] Brownstown 345 kV	345	■	▲	-	▲
AEP/IPL	Tie Line	[AEP] Fall Creek–[IPL] Sunnyside 345 kV tie line	345	■	■	↓	▲
METC	MISO	[METC] Palisades–[METC] Roosevelt 345 kV	345	▲	■	↓	▲
CE/WEC	Tie Line	[CE] Zion–[WEC] Pleasant Prairie 345 kV tie line	345	▲	▲	↓	■
NIPS	MISO	[NIPS] Reynolds 345/138 kV transformer No. 2	345/138	▲	■	↓	●
DEI/IPL	MISO	[DEI] Whitestown–[IPL] Guion 345 kV	345	▲	●	↓	●
FE/ITCT	Tie Line	[ITCT] Monroe–[ATSI] Lallendorf 345 kV tie line	345	▲	●	↑	▲
ITCT	MISO	[ITCT] Stephens–[ITCT] Caniff 345 kV	345	▲	▲	-	▲
ALTE	MISO	[ALTE] Mile Creek–[ALTE] Sand Lake 138 kV	138	▲	■	↓	▲
NIPS/CE	Tie Line	[CE] Crete–[NIPS] St John 345 kV tie line	345	▲	▲	↓	▲
ALTE	MISO	[ALTE] Nelson Dewey 161/138 kV transformer No. 1	161/138	▲	▲	↓	●
DEI	MISO	[DEI] Wabash River 345/230 kV transformer No. 1	345/230	▲	●	↓	●
ALTE	MISO	[ALTE] Elkhorn–[ALTE] Lake George 138 kV	138	▲	▲	↓	▲

* A facility loading increase generally corresponds to a lower transfer limit and more transfers impacted
Summarized preliminary results represent limits or violations on monitored facilities for NERC P0 or P1 events. Additional contingencies such as NERC P2 and P7 will be evaluated to ensure resolving an identified issue is a robust solut

Top Transfer Limits PJM, MISO, and Tie Lines (Preliminary)



Summarized preliminary results represent limits or violations on monitored facilities for NERC P0 or P1 events. Additional contingencies such as NERC P2 and P7 will be evaluated to ensure resolving an identified issue is a robust solutio

Overlapping Reliability, Transfer, and Economic Issues
(Center of the Venn Diagram on Slide 15)

Overlapping PJM Issues (1 of 2 - Preliminary)

Area	RTO	Facility Name	kV	Total Transfers Impacted ● : >10 ■ : 4-10 ▲ : 1-3	Facility Loading From Reliability Study ● : >150% ■ : 100% - 150% ▲ : <100%	Annual Congestion ($) ● : > $1M ■ : $100k - $1M ▲ : < $100k
CE	PJM	[CE] Quad Cities – [CE] Sterling Steel 345 kV	345	■	■	●
CE	PJM	[CE] Cordova – [CE] Nelson 345 kV	345	■	■	●
AMIL/CE	Tie Line	[AMIL] Tazewell – [CE] Powerton (R) 345 kV Tie Line	345	■	■	●
AEP	PJM	[AEP] Benton Harbor – [AEP] Segreto 345 kV	345	■	●	●
CE/WEC	Tie Line	[CE] Zion EC – [WEC] Pleasant Prairie 345 kV Tie Line	345	■	■	■
AEP	PJM	[AEP] East Lima – [AEP] Fostoria Central 345 kV	345	▲	●	■
AEP/DEO&K	PJM	[AEP] Tanner Creek – [DEO&K] Miami Fort 345 kV	345	■	■	■
AEP/DEI	Tie Line	[AEP] Eugene – [DEI] Cayuga Sub 345 kV Tie Line	345	●	●	■
AEP/NIPS	Tie Line	[AEP] Meadow – [NIPS] Reynolds 345 kV Tie Line	345	■	●	▲
CE/ALTW	Tie Line	[CE] Garden Plain – [ALTW] Albany 138 kV Tie Line	138	■	●	●
CE	PJM	[CE] Electric Junction – [CE] Lombard 345 kV	345	▲	■	■
CE/WEC	Tie Line	[CE] Zion; R – [WEC] Pleasant Prairie 345 kV tie line	345	■	■	■
CE/AMIL	Tie Line	[CE] Powerton – [AMIL] Towerline 138kV Tie Line	138	■	■	●

* A facility loading increase generally corresponds to a lower transfer limit and more transfers impacted

Summarized preliminary results represent limits or violations on monitored facilities for NERC P0 or P1 events. Additional contingencies such as NERC P2 and P7 will be evaluated to ensure resolving an identified issue is a robust sol

Overlapping PJM Issues continued (2 of 2 - Preliminary)

Area	RTO	Facility Name	kV	Total Transfers Impacted ● : >10 ■ : 4-10 ▲ : 1-3	Facility Loading From Reliability Study ● : >150% ■ : 100% - 150% ▲ : <100%	Annual Congestion ($) ● : > $1M ■ : $100k - $1M ▲ : < $100k
ATSI/AEP	PJM	[ASTI] Fremont – [AEP] Fremont 138 kV	138	▲	●	■
CE	PJM	[CE] Byron – [CE] Lee Co Ec 345 kV	345	■	■	■
AEP	PJM	[AEP] Desoto – [AEP] Loasantville 345 kV	345	■	■	●
CE	PJM	[CE] Electric Junction – [CE] Nelson 345 kV	345	■	■	●
AEP/NIPS	Tie Line	[AEP] Dumont – [NIPS] Stillwell 345 kV Tie Line	345	■	■	●
METC/ATSI	Tie Line	[METC] Morocco – [ATSI] Allen Jct 345 kV Tie Line	345	■	■	▲
CE	PJM	[CE] Dresden – [CE] Mulberry 345 kV	345	▲	■	●
AEP/AMIL	Tie Line	[AEP] Sullivan – [AMIL] Snyder 345 kV Tie Line	345	■	■	●
CE/MEC	Tie Line	[CE] Quad – [MEC] Cordova 345 kV Tie Line	345	▲	■	●
AEP	PJM	[AEP] Fremont – [AEP] Fremont 138 kV	138	▲	●	●
CE	PJM	[CE] Haumesser – [CE] Dekalb 138 kV	138	▲	■	●
CE/NIPS	Tie Line	[CE] Crete – [NIPS] St John 345 kV tie line	345	▲	■	●
AEP/OVEC	PJM	[AEP] SPORN – [OVEC] Kyger Creek 345 kV	345	▲	■	■

Overlapping MISO Issues (Preliminary)

Area	RTO	Facility Name	kV	Total Transfers Impacted ● : >10 ■ : 4-10 ▲ : 1-3	Facility Loading From Reliability Study ● : >150% ■ : 100% - 150% ▲ : <100%	Annual Congestion ($) ● : > $1M ■ : $100k - $1M ▲ : < $100k
DEI	MISO	[DEI] Cayuga Sub–[DEI] Cayuga 345 kV	345	●	●	●
AEP/DEI	Tie Line	[AEP] Eugene–[DEI] Cayuga 345 kV tie line	345	●	■	■
DEI/IPL	MISO	[DEI] Whitestown–[IPL] Guion 345 kV	345	▲	●	●
DEI	MISO	[DEI] Wabash River 345/230 kV transformer No. 1	345/230	▲	●	●
ALTE	MISO	[ALTE] Albany– [ALTE] Bass Creek 138 kV	138	▲	■	●
ALTE/WEC	MISO	[ALTE] North Lake Geneva-[WEC] North lake Geneva Tap 138 kV	138	▲	●	●
DEI	MISO	[DEI] Cayuga– [DEI] Nucor 345 kV	345	▲	■	●
ALTW	MISO	[ALTW] Hazelton–[ALTW] Arnold 345 kV	345	▲	■	●
ALTW/MEC	MISO	[ALTW] Morgan Valley–[MEC] Tiffin 345 kV	345	▲	■	●
ALTE	MISO	[ALTE] Bristol-[ALTE] Elkhorn 138 kV	138	▲	●	●
ALTE	MISO	[ALTE] North Monroe-[ALTE] Albany 138 kV	138	▲	■	●

Study Next Steps

Next Steps:

- Tranche 2.1 Impact Analysis
- June, discuss updated results and pathways for near-term and long-term actions:
  - Use existing processes as appropriate
    - MISO Transmission Owner Solutions/Alternatives Window
    - PJM Market Efficiency and Reliability Windows
    - TMEP
  - Pursue JOA revisions to enhance interregional planning processes

Key Dates & Links:

- Preliminary results workbook to be shared with the IPSAC Presentation ahead of the March 7th IPSAC
- ITCS presentation to IPSAC on June 25th

Appendix:
Additional Transfer Limits (Limits 2 and 3)

Additional Transfer Limits PJM and Tie Lines (Limits 2-3)

Area	RTO	Facility Name	kV	Total Transfers Impacted ● : >10 □ : 4-10 ▲ : 1-3	Facility Loading From Reliability Study ● : >150% □ :100% - 150% ▲ : <100%	Facility Loading Sensitivity With Tranche 2*	Annual Congestion ($) ● : > $1M □ : $100k - $1M ▲ : < $100k
AEP/AEP	PJM	[AEP] Benton Harbor –[AEP] Segreto 345 kV	345	□	●	↓	●
AMIL/CE	Tie Line	[AMIL] Tazewell –[CE] Powerton (R) 345 kV Tie Line	345	□	□	↓	●
CE/CE	PJM	[CE] Cordova Energy Center –[CE] Nelson (B) 345 kV	345	□	□	↓	●
AEP/AEP	PJM	[AEP] Marysville –[AEP] Marysville Line Shunt Reactor (To Maliszewski) 765 kV	765	□	□	↑	▲
CE/ALTW	Tie Line	[CE] Garden Plain –[ALTW] Albany 138 KV Bus Low Side of Albany XFMR T91 161/ 138 kV Tie Line	138	□	●	-	●
CE/WEC	Tie Line	[CE] Zion EC –[WEC] Pleasant Prairie 345 kV Tie Line	345	□	□	↑	□
AP/AP	PJM	[AP] Harrison –[AP] Pruntytown 500 kV	500	▲	□	↑	▲
METC/ATSI	Tie Line	[METC] Morocco –[ATSI] Allen Jct 345 kV Tie Line	345	▲	□	↑	▲
AEP/AEP	PJM	[AEP] Thomson –[AEP] Kenzie Creek 345 kV	345	▲	□	↓	▲
AEP/NIPS	Tie Line	[AEP] Meadow Lake –[NIPS] Reynolds 345 kV Tie Line	345	□	●	↓	▲
AMIL/AEP	Tie Line	[AMIL] Bunsonville 345 kV Bus 1 –[AEP] Eugene 345 kV Tie Line	345	□	□	↓	▲
CE/CE	PJM	[CE] Lee County –[CE] Byron (B) 345 kV	345	□	□	↓	□
AEP/AEP	PJM	[AEP] Marysville Line Shunt Reactor (To Maliszewski) –[AEP] Maliszewski 765 kV	765	□	□	↑	▲
AMIL/CE	Tie Line	[AMIL] Austin 345 kV Bus –[CE] Kincaid 345 kV Tie Line	345	▲	▲	↓	▲
AEP/AEP	PJM	[AEP] Cook –[AEP] Olive 345 kV	345	▲	□	↑	▲
CE/CE	PJM	[CE] E Frankfort (B) –[CE] Goodings (B) 345 kV	345	▲	□	↑	▲
AEP/AEP	PJM	[AEP] Muskingum River –[AEP] Lamping 345 kV	345	▲	●	↓	▲
CE/ALTW	Tie Line	[CE] Quad Cities busses 1,3, & 11 – [ALTW] Rock Creek 345 KV Bus No. 1 + Bus No. 2 345 kV Tie Line	345	▲	▲	↑	▲

* A facility loading increase generally corresponds to a lower transfer limit and more transfers impacted

Summarized preliminary results represent limits or violations on monitored facilities for NERC P0 or P1 events. Additional contingencies such as NERC P2 and P7 will be evaluated to ensure resolving an identified issue is a robust solut

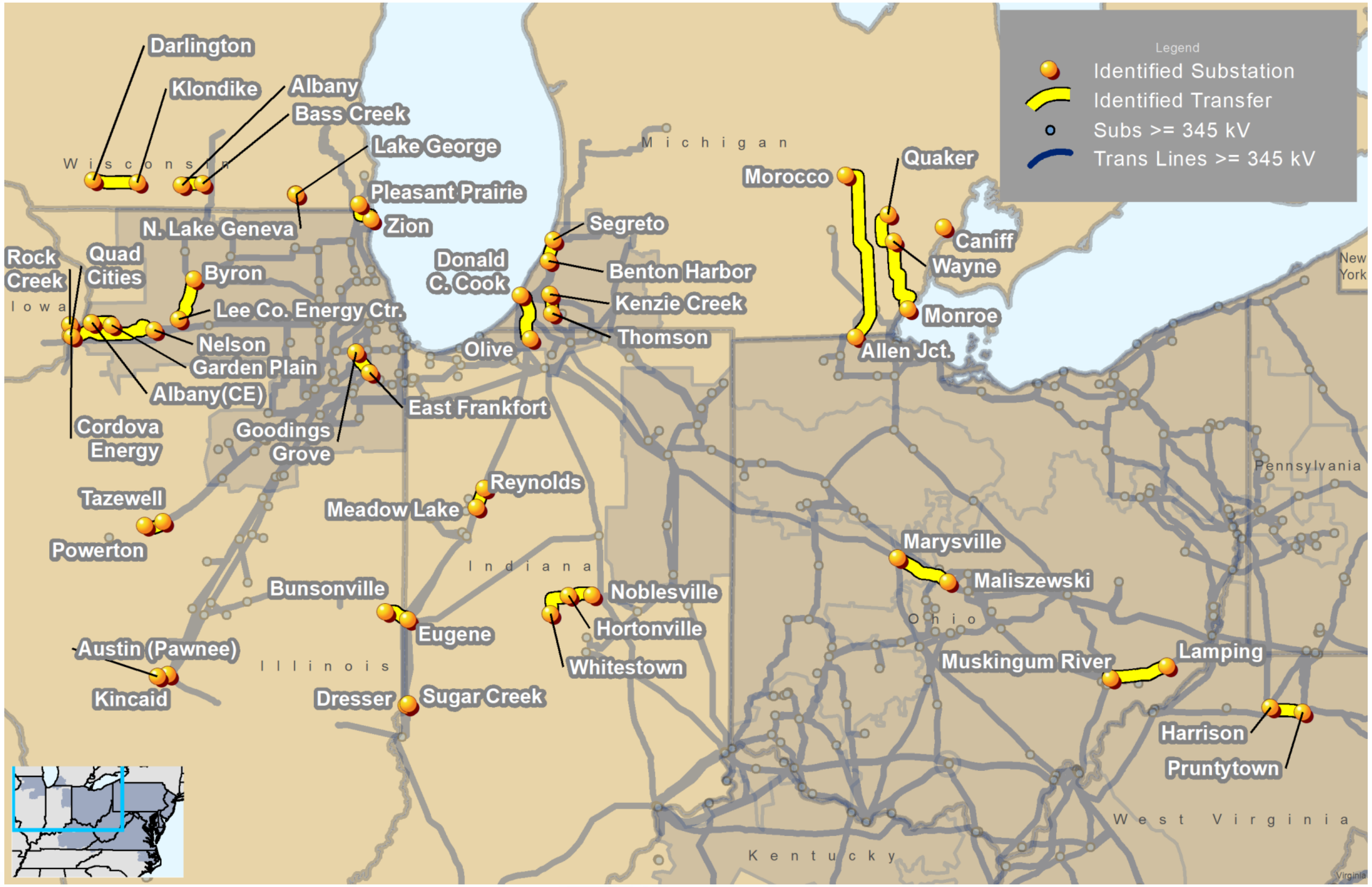
Additional Transfer Limits MISO and Tie Lines (Limits 2-3)

Area	RTO	Facility Name	kV	Total Transfers Impacted ●: >10 ■: 4-10 ▲: 1-3	Facility Loading From Reliability Study ●: >150% ■: 100% - 150% ▲: <100%	Facility Loading Sensitivity With Tranche 2*	Annual Congestion ($) ●: > $1M ■: $100k - $1M ▲: < $100k
ITCT	MISO	[ITCT] Monroe –[ITCT] Wayne 345 kV	345	■	▲	-	▲
DEI	MISO	[DEI] Whitestown –[DEI] Hortonville 345 kV	345	■	▲	↓	▲
CE/ALTW	Tie Line	[CE]Garden Plain –[ALTW]Albany 138 kV Bus Low Side of Albany Xfmr T91 161/ 138 kV Tie Line	138	■	▲	↓	●
CE/WEC	Tie Line	[CE] Zion EC –[WEC] Pleasant Prairie 345 kV Tie Line	345	■	▲	↓	■
AEP/NIPS	Tie Line	[AEP] Meadow Lake – [NIPS] Reynolds 1 345 kV Tie Line	345	■	▲	-	■
AEP/NIPS	Tie Line	[AEP] Meadow Lake –[NIPS] Reynolds 2 345 kV Tie Line	345	■	■	-	▲
DEI	MISO	[DEI] Hortonville –[DEI] Noblesville 345 kV	345	■	▲	↓	●
ITCT	MISO	[ITCT] Caniff XFMR	345/120	▲	▲	-	▲
CE/AMIL	Tie Line	[CE] Austin 345 kV Bus –[AMIL] Kincaid 345 kV Tie Line	345	▲	▲	↓	▲
CE/AMIL	Tie Line	[AMIL] Tazewell –[CE] Powerton (R) 345 kV Tie Line	345	■	▲	↓	▲
DEI	MISO	[DEI] Sugar Creek –[DEI] Dresser 345 kV	345	■	▲	↓	▲
FE/METC	Tie Line	[METC] Morocco –[ATSI] Allen Jct 345 kV Tie Line	345	▲	▲	↑	▲
ITCT	MISO	[ITCT] Wayne –[ITCT] Quaker Tap 345 kV	345	▲	▲	-	▲
CE/ALTW	Tie Line	[CE] Quad City –[ALTW] Rock Creek 345 kV Tie Line	345	▲	▲	↑	▲
AEP/AMIL	Tie Line	[AEP] Bunsonville –[AMIL] Eugene 345 kV Tie Line	345	■	▲	↓	▲
ALTW	MISO	[ALTW] Albany XFMR	161/138	■	▲	-	▲
ALTE	MISO	[ALTE] Darlington –[ALTE] Klondike 138 kV	138	▲	▲	↓	▲
ALTE	MISO	[ALTE] Albany –[ALTE] Bass Creek 138 kV	138	▲	■	↓	●
ALTE/WEC	MISO	[ALTE] Lake George –[WEC] North Lake Geneve 138 kV	138	▲	●	↓	●

* A facility loading increase generally corresponds to a lower transfer limit and more transfers impacted

Summarized preliminary results represent limits or violations on monitored facilities for NERC P0 or P1 events. Additional contingencies such as NERC P2 and P7 will be evaluated to ensure resolving an identified issue is a robust soluti

Additional Transfer Limits MISO and Tie Lines (Limits 2-3)



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