May 23, 2022

Ms. Lisa Felice
Michigan Public Service Commission
7109 W. Saginaw Hwy.
P. O. Box 30221
Lansing, MI 48909

Via E-Filing

RE: MPSC Case No. U-21090

Dear Ms. Felice:

The following is attached for paperless electronic filing:

Official Exhibits of Michigan Environmental Council, Natural Resources Defense Council, Sierra Club and Citizens Utility Board of Michigan (MEC-135 through MEC-137), and

Proof of Service.

Sincerely,

Christopher M. Bzdok
chris@envlaw.com

xc: Parties to Case No. U-21090

Michigan Public Service Commission

Capacity Demonstration Results

Planning Year 2025/26

Case No. U-21099

March 25, 2022

MPSC Staff

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LICENSING AND REGULATORY AFFAIRS
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Contents

Executive Summary

All Michigan load serving entities (LSE) required to file capacity demonstrations with the Michigan Public Service Commission (MPSC) for planning year 2025/26 pursuant to MCL 460.6w and the July 2, 2021 Commission Order in Case No. U-21099 have filed. Staff has audited the filings, contracts, and other materials and finds that all Michigan LSEs have satisfied the capacity demonstration requirements and have procured appropriate levels of resources for planning year 2025/26, with one exception. Spartan Renewable Energy, Inc. (Spartan) was deficient in their 2025-2026 capacity demonstration filing. It is Staff's understanding that another entity is considering picking up the load not demonstrated for, but at the time of the filing of this report, the process is still ongoing. This issue is discussed in more detail below.

Staff projects that the Midcontinent Independent System Operator, Inc. (MISO) Local Resource Zone (LRZ) 7, which consists of the lower peninsula of Michigan, excluding Indiana Michigan Power Company's (I&M) service territory in the southwest corner of the state will have sufficient resources to meet its local clearing requirement (LCR) for the 2022/23 prompt year as well as 2025/26 demonstration year based on the capacity demonstration filings and MISO publications at the time of this report. However, the margins for LRZ 7 with respect to its LCR are projected to be slim and small deviations to resources and/or requirements could leave LRZ 7 short of its LCR. For MISO LRZ 1 and LRZ 2 in Michigan's Upper Peninsula, Staff doesn't have comprehensive enough data to accurately project zonal capacity positions because the majority of these two zones are located in other states not subject to MCL 460.6w. Based on the most recent Organization of MISO States (OMS) Survey, both LRZ 1 and LRZ 2 are projected to have sufficient capacity in 2022 but will continue to tighten as we approach 2026.[1] Staff projects that the I&M service territory in Michigan, which is in PJM Interconnection LLC (PJM), will have sufficient levels of resources available to meet PJM's requirements.

[1] 2021 OMS-MISO Survey Results, June 11, 2021.

Background

On September 15, 2017, in Case No. U-18197, the Commission directed all Michigan LSEs to file capacity demonstrations annually pursuant to MCL 460.6w. This report outlines the results of the capacity demonstrations filed for planning year 2025/26 as directed by the Commission in Case No. U-21099 and represents the fifth annual capacity demonstration report. Prior year capacity demonstration reports can be found in the following dockets:

- 2021/22: Case No. U-18441
- 2022/23: Case No. U-20154
- 2023/24: Case No. U-20590
- 2024/25: Case No. U-20886
- 2025/26: Case No. U-21099

In Case No. U-21099, the Commission ordered[2] rate regulated electric utilities[3] to submit capacity demonstrations by December 1, 2021 for the 2025/26 planning year and Alternative Electric Suppliers (AES),[4] cooperatives (co-ops),[5] and municipal utilities[6] to submit capacity demonstrations in the same docket for the 2025/26 planning year, on or before February 9, 2022.

The purpose of these demonstrations is to ensure that each electric utility owns or has contractual rights to capacity sufficient to meet its capacity obligations as set by the MISO, PJM, or the Commission, as required by MCL 460.6w.

[2] July 2, 2021 MPSC Order in Case No. U-21099, accessed 03/3/2022.

[3] Alpena Power Company, Consumers Energy Company, DTE Electric Company, Indiana Michigan Power Company, Northern States Power Company-Wisconsin, Upper Michigan Energy Resources Corporation, Upper Peninsula Power Company, and Wisconsin Electric Power Company.

[4] AEP Energy Inc, Calpine Energy Solutions LLC f/k/a Noble Americas Energy Solutions LLC, CMS ERM Michigan LCC, Constellation NewEnergy Inc, Dillon Power LLC, Direct Energy Business LLC, Direct Energy Services, EDF Energy Services LLC, Eligo Energy MI, LLC., Energy Harbor LLC, Energy International Power Marketing Corporation, Energy Services Providers Inc., Engie Power & Gas f/k/a Plymouth Rock Energy LLC, , Interstate Gas Supply LLC, Just Energy Solutions Inc, Liberty Power Delaware LLC, MidAmerican Energy Services LLC, Nordic Energy Services LLC, Spartan Renewable Energy, Texas Retail Energy LLC, U.P. Power Marketing LLC, and Wolverine Power Marketing Cooperative Inc.

[5] Bayfield Electric Cooperative, Cloverland Electric Cooperative, Thumb Electric Cooperative, and Wolverine Power Supply Cooperative.

[6] City of Escanaba, City of Stephenson, City of Wakefield, Croswell Light and Power Department, Daggett Electric Department, Michigan Public Power Agency, Michigan South Central Power Agency, Newberry Water and Light Board, and WPPI Energy.

Pre-Demonstration Process

As with previous years, Staff offered LSEs the opportunity to meet with Staff to discuss the capacity demonstration requirements and review relevant materials prior to the final filing deadlines. A significant number of LSEs met with Staff remotely and clarified the process before filing reports in the docket. Staff found that the pre-filing consultations were helpful in resolving questions prior to filing. Staff will continue to offer pre-filing consultations each year to resolve potential issues prior to the filing deadlines.

Capacity Demonstration Filings

On or before December 1, 2021, capacity demonstration filings were received from Alpena Power Company, Consumers Energy Company, DTE Electric Company, Indiana Michigan Power Company, Northern States Power Company, Upper Michigan Energy Resources Corporation (UMERC), and Upper Peninsula Power Company (UPPCO). Many LSEs filed confidential information under seal as part of the electric utilities' filings. Staff reviewed this information and met with LSEs as needed.

On or before February 9, 2022, capacity demonstration filings were received from Bayfield Electric, Calpine Energy Solutions, LLC., City of Escanaba, City of Stephenson, City of Wakefield, Cloverland Electric, CMS ERM, Constellation New Energy Inc., Croswell Light and Power, Daggett Electric Department, Direct Energy Business, Energy Harbor, Michigan Public Power Agency, Michigan South Central Power Agency, Newberry Water and Light Board, Thumb Electric Cooperative, UP Power Marketing, Village of Union City, Wolverine Power Supply Cooperative, and WPPI Energy filed their capacity demonstrations before or on February 9, 2022. Just Energy Solutions Inc filed its capacity demonstration on February 10, 2022.

Leading up to the capacity demonstration filings, Staff had many conversations with LSEs discussing some of the difficulty procuring capacity for the 2025/2026 demonstration year. All LSEs were able to procure the necessary capacity to demonstrate compliance with the current planning year with the exception of Spartan Renewables, which is further discussed in the MISO LRZ 7 capacity resource changes section below.

Several AESs filed letters in Case No. U-21099 indicating that they are currently not serving customers in Michigan.[7] One of those non-serving AESs, Liberty Power Delaware LLC (Liberty), did not file such letter, as required by MCL 460.6w. Liberty is currently involved in a bankruptcy proceeding, but filed in the previous year's capacity demonstration in Case No. U-20886 indicating that it is serving no customers.

[7] AEP Energy Inc., Dillion Power LLC, Direct Energy Services, EDF Energy Services LLC, Energy International Power Marketing Corporation, Interstate Gas Supply LLC, Engie Power and Gas, MidAmerican Energy Services LLC, Nordic Energy Services LLC, and Texas Retail Energy LLC.

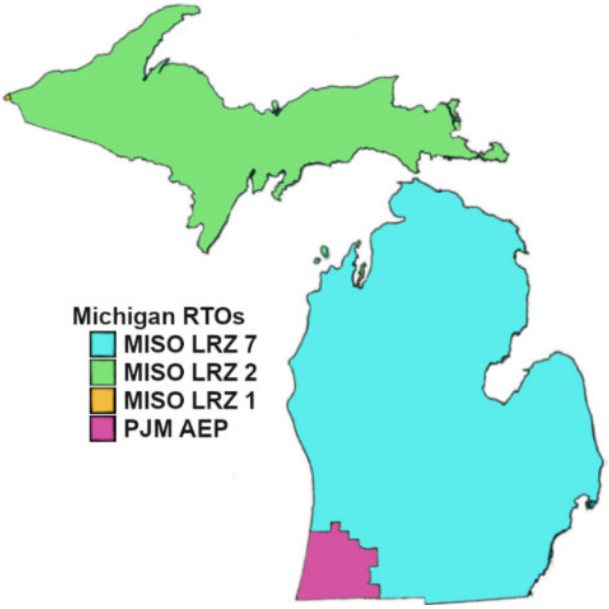
Staff conducted an audit for each capacity demonstration filing received and requested additional information from the LSEs when necessary. Staff has reviewed all contracts included in capacity demonstrations from AESs as well as most of the contracts from co-ops, electric utilities, and municipalities. In addition to the required compliance year (PY 2025/26), most demonstrations filed included updates for the 2022/23 planning year through the 2024/25 planning year. These updates are voluntary and were not provided by all LSEs[8].

Staff appreciates the efforts made by LSEs to provide updated capacity resource data for the prompt year and interim years, as it allows Staff to update zonal resource adequacy projections for the prompt year, interim years, as well as the compliance year.

Overview of Zonal Adequacy

Michigan contains load that spans two regional transmission operators (RTO): MISO and PJM. The majority of Michigan's load is located within MISO and is split between several LRZs. The exception is the Southwest corner of the Lower Peninsula which is located within the PJM RTO through I&M's service territory. PJM and MISO have different resource adequacy constructs and capacity obligations. The different RTO regions in Michigan are illustrated in Figure 1.

Figure 1: RTO Zonal Regions in Michigan



[8] The required demonstrations for planning years 2023/2024 and 2024/25 were made in the 2020 capacity demonstration (Case No. U-20590) and the 2021 capacity demonstration (Case No. U-20886).

MISO Resource Adequacy

Michigan LSEs serve load in MISO Local Resource Zones 1, 2, and 7. MISO's capacity construct is for the upcoming year (prompt year) only. LSEs must demonstrate sufficient resources to meet its current prompt year requirement four years forward to be in compliance with MCL 460.6w.

MISO establishes capacity obligations for all LSEs based on peak load forecasts and a planning reserve margin percentage necessary to meet the North American Electric Reliability Corporation's (NERC) Loss of Load Expectation (LOLE) standard of 1 day in 10 years. LSEs within MISO can meet their capacity requirements either through a Fixed Resource Adequacy Plan (FRAP) or through the Planning Resource Auction (PRA). The PRA is a residual market for LSEs that choose not to use the FRAP or do not have enough capacity resources, either owned or purchased bilaterally, to satisfy their capacity obligations, and thus need to purchase additional resources.

Within MISOs resource adequacy construct, the Planning Reserve Margin Requirement (PRMR) and the LCR must be satisfied to meet the LOLE. The PRMR is determined through LOLE modeling based on the coincident MISO peak forecast and resources adjusted as necessary to meet the standard. PRMR resources are not location specific, i.e. they can come from outside an LSE's zone. Individual LSEs are responsible for their own share of the zone's PRMR. The ability to use imports to meet PRMR makes it likely all zones will meet this requirement. Failure to meet PRMR would only occur if there were not enough resources available within all of MISO's footprint.

The LCR is the minimum capacity for a zone required to be located within the zone to meet the LOLE standard, while accounting for the LRZ's ability to import. The LCR is for the zone as a whole, as opposed to a requirement for individual LSEs. There is no LCR requirement applicable to individual LSEs in Michigan pursuant to MCL 460.6w at this time. The LCR is determined by performing a LOLE analysis on each zone individually to determine the Local Reliability Requirement (LRR), or the resources a zone would need to meet the loss-of-load standard if it were separated from MISO. Separately, an import study is performed to determine the Zonal Import Ability (ZIA) for each zone. For LRZ 7, the ZIA is currently (and historically) equal to the capacity import limit (CIL) and the terms are often treated synonymously. The ZIA is then subtracted from the LRR to determine the LCR.

If an LRZ doesn't have enough resources to meet its LCR or PRMR, the PRA clearing price would be set at the Cost of New Entry (CONE) for that year. CONE changes from year to year but for reference, PY 2022/2023 CONE is $93,770 MW-year ($256.90 MW-day). The PRA clearing price being set at CONE would have economic ramifications and would provide a signal to stakeholders with responsibilities regarding resource adequacy within the zone. However, it is important to note that MISO's resource adequacy construct is based on probabilistic determinations and failure to meet the requirements of the resource adequacy construct would not mean that the LRZ in question will experience a loss of load event. It simply means the probability of such a loss of load event would exceed the generally accepted criteria that govern the resource adequacy planning process.

The compliance year capacity obligations (PY 2025/26) that are demonstrated for in this case are based off an LSE's prompt year (PY 2022/23) requirement. Changes to load, resources, and MISO procedures in the upcoming years can lead to discrepancies between an LRZ having sufficient capacity to meet its four-year forward Michigan requirements and not having enough capacity to meet MISOs requirements when the prompt year arrives.

MISO – Local Resource Zone 7

Figure 2 shows current and historical MISO capacity requirements for LRZ 7. This data is taken from the respective annual MISO LOLE Study Reports.

Figure 2: Annual MISO LOLE Report Data LRZ 7

Planning Year	Source	LRR[9]	CIL[10]	LCR (ZRCs)[11]
2013/14	MISO 2013 LOLE Report	25,305	4,576	20,729
2014/15	MISO 2014 LOLE Report	24,815	3,884	20,931
2015/16	MISO 2015 LOLE Report	24,710	3,813	20,897
2016/17	MISO 2016 LOLE Report	24,715	3,813	21,309
2017/18	MISO 2017 LOLE Report	24,654	3,320	21,334
2018/19	MISO 2018 LOLE Report	24,545	3,785	20,760
2019/20	MISO 2019 LOLE Report	24,845	3,211	21,634
2020/21	MISO 2020 LOLE Report	25,370	3,200	22,170
2021/22	MISO 2021 LOLE Report	25,054	4,888	20,166
2022/23	MISO 2022 LOLE Report	24,115	3,749	20,366

The decrease in CIL in the current planning year is due to increased retirements and suspensions in LRZ 7 (MISO estimates of 5,207 MW of retirement and suspensions in LRZ 7 and adjacent Load Balancing Authorities), retirements in PJM, and changes to MTEP modeling for Area Interchange and MISO/PJM seams dispatch.

These numbers typically change slightly between the LOLE Study and the PRA, primarily due to updated load forecasting used in the PRA, but can be used to see how the capacity requirements have changed over time. Changes in these requirements can have economic and reliability impacts and will continue to be monitored.

[9] **Local Reliability Requirement**. Representative of the resources required for LRZ 7 to meet the LOLE standard when modeled as an island (no imports). MISO Loss of Load Expectation Study Report, Table 6-1: LRZ Local Reliability Requirements.

[10] **Capacity Import Limit**. Equal to the Zonal Input Limit (ZIA) in LRZ 7. Representative of the ability of an LRZ to import capacity from areas outside of that LRZ. MISO Loss of Load Expectation Study Report, Table 1-1: Initial Planning Resource Auction Deliverables.

[11] **Local Clearing Requirement**. Representative of the minimum resources that must be located within a specific zone for that zone to meet the reliability standard. The difference between the LRR and the CIL.

Figure 3 shows a historical comparison between the PRMR and LCR for LRZ 7 from PRA Results as future projections from Preliminary PRA results and Staff estimates.

Figure 3: MISO LRZ 7 LCR & PRMR Comparison

Year	PRMR[12]	LCR	ECIL[13]	Source
PY 2013/14	22,702	21,055	1,647	PRA Results 2013
PY 2014/15	22,998	21,293	1,705	PRA Results 2014
PY 2015/16	22,679	21,442	1,237	PRA Results 2015
PY 2016/17	22,406	20,851	1,555	PRA Results 2016
PY 2017/18	22,295	21,109	1,186	PRA Results 2017
PY 2018/19	22,121	20,628	1,493	PRA Results 2018
PY 2019/20	21,976	21,812	164	PRA Results 2019
PY 2020/21	21,945	21,851	94	PRA Results 2020
PY 2021/22	21,459	19,710	1,749	PRA Results 2021
PY 2022/23	21,886	21,230	656	Preliminary PRA Results 2022
PY 2023/24	21,913	20,856	1,057	MPSC Staff Projection
PY 2024/25	21,941	20,482	1,459	MPSC Staff Projection
PY 2025/26	21,968	20,108	1,860	MPSC Staff Projection

The difference between a zone's PRMR and its LCR is sometimes referred to as Effective Capacity Import Limit (ECIL). The ECIL is not a MISO defined term and is not representative of a physical import limitation. To meet the loss of load standard and avoid the auction clearing price being set at CONE, a zone must have enough resources located within the zone to meet its LCR even if the LCR exceeds the PRMR.

Figure 4 the shows a comparison of LRZ 7 aggregated resources and MISO resource adequacy requirement projections for the next 4 years. These numbers represent Staff's current projection based on the capacity demonstration filings and MISO publications at the time of this report although, the information is subject to change for all years, including PY 2022/23. Unless otherwise noted resources and resource requirements in this report are in Unforced Capacity (UCAP) Megawatts (MW), equal to Zonal Resource Credits (ZRCs).

[12] **Planning Reserve Margin Requirement**.
[13] **Effective Capacity Import Limit**. The difference between a zone's PRMR and LCR.

Figure 4: U-21099 Results - LRZ 7 Capacity Position (ZRCs)

Line #		PY 2022/23	PY 2023/24	PY 2024/25	PY 2025/26
1	Planning Reserve Margin Requirements (PRMR)	21,886	21,913	21,941	21,968
2	Local Reliability Requirement (LRR)	24,979	24,605	24,231	23,857
3	Capacity Import Limit (CIL)	3,749	3,749	3,749	3,749
4	Zonal Import Ability (ZIA)	3,749	3,749	3,749	3,749
5	Local Clearing Requirement (LCR)	21,230	20,856	20,482	20,108
6	Total Owned	16,806	15,650	16,127	15,576
7	Total PPA Contracts	2,230	2,628	2,826	2,965
8	Total ZRC Contracts	790	847	560	348
9	Total Qualified Demand Response	1,445	1,570	1,591	1,593
10	Total Resources (sum of Lines 6-9)	21,271	21,809	22,218	21,596
(1) PY 2022 PRMR from Preliminary PRA Data. PY 2025 PRMR calculated using the peak demand forecast from the 2022-23 LOLE Study Report and multiplying by the coincidence factor (97%) and reserve margin (113.6%). PY 2023 & PY 2024 calculated through interpolating PY 2022 & PY 2025.					
(2) PY 2022 LRR from Preliminary PRA Data. PY 2025 LRR from the 2022-23 LOLE Study Report. PY 2023 & PY 2024 calculated through interpolating PY 2022 & PY 2025.					
(3) PY 2022 CIL from the 2020-21 LOLE Study Report, held constant at prompt year value per MISO recommendation.					
(4) PY 2022 ZIA from the MISO Preliminary PRA data, held constant at prompt year value per MISO recommendation					
(5) LRR-ZIA=LCR					
(6-10) Zone 7 resources included in capacity demonstrations sorted by resource type.					

Prompt Year (PY 2022/23)

For the prompt year (PY 2022/23), based on preliminary PRA data, Staff expects LRZ 7's PRMR to be 21,886 ZRCs and the LCR to be 21,230 ZRCs. The total LRZ 7 resources included in demonstration filings for the prompt year is 21,271 ZRCs, which exceeds the anticipated LCR by 41 ZRCs. Staff is also aware of additional capacity resources in Zone 7 that were not included in capacity demonstration filings. These undemonstrated resources include supply and demand side resources that are not owned or under contract by an LSE. Staff conservatively estimates an additional 165 ZRCs from undemonstrated resources. Based on the demonstrated resources and projected undemonstrated resources, Staff anticipates LRZ 7 will exceed its LCR by approximately 200 ZRCs for the 2022/23 planning year. Preliminary PRA data shows an even greater margin between resources and LCR.

Compliance Year (PY 2025/26)

Staff used the 2022/23 LOLE study report to project requirements for future planning years. These requirements are based on the best available information and are subject to change. The projected PRMR for LRZ 7 for the compliance year (PY 2025/26) is 21,968 ZRCs. Staff determined this number by taking the forecasted peak demand for LRZ 7 in PY 2025/26 (21,003 MW) and accounting for LRZ 7's coincidence factor of 97.39% and the MISO reserve margin of 7.4%. The projected 2025/26 PRMR is fairly consistent with the prompt year PRMR. Using the LOLE Study Report LRR for PY 2025/26 of 23,857 ZRCs and assuming the ZIA remains constant at 3,749, results in a projected LCR of 20,108 ZRCs for LRZ 7 in PY 2025/26.

Based on the resources included in the capacity demonstration filings for PY 2025/26 (21,596 MW) Staff projects LRZ 7 to have a surplus of resources compared to the projected LCR. It is important to note that these projections are subject to change. A few examples of things that could change include; load forecasts, resource availability and performance, and MISO policies and practices.

Interim Years (PY 2023/24 & PY 2024/25)

Figure 4 also includes data and projections for the interim years, PY 2023/24 & PY 2024/25. This information is derived using the same methodology as described for the compliance year, interpolating as necessary because the LOLE Study Report didn't provide specific LRZ analysis for the interim years. Comparing those projected requirements to the demonstrated and undemonstrated resources in LRZ 7, results in a capacity surplus for both years compared to the projected LCRs. This information is based on the best information currently available to Staff, but includes several assumptions and, again, is subject to change. Similar to the compliance year, likely changes include; new forecasts, unknown resource additions or subtractions, changes in generator performance, increased or decreased zonal import ability and/or changes to MISO requirements.

MISO Zonal Capacity

Based on Staff's analysis of LSE filings in this docket, when only demonstrated generation resources physically located within LRZ 7 are considered, there is an expected shortfall of approximately 600 ZRCs in the 2022/23 planning year with respect to the PRMR. This shortfall can be made up by importing resources from other MISO Zones. The estimated shortfall is well within the capacity import limit, and the MISO region is expected to have enough resources available for import to make up for this shortfall. The resources within the MISO North and Central regions compared to those regions aggregate PRMR has been tightening in recent years. MISO South has surplus capacity but there is a constraint (1,900 MW or 3,000 MW depending on flow direction) applied to capacity transfers from MISO South to MISO Central/North and vice versa[14]. The Final Preliminary PRA Data for PY

[14] MISO Revised SRIC/SREC Posting, Planning Year 2022-2023, March 3, 2022.

2022/23[15] shows a shortfall between the total ZRCs (converted from confirmed UCAP) and the total PRMR for MISO Zones 1-7 (MISO North and MISO Central) of nearly 4,200 ZRCs. Staff expects enough additional resources to be confirmed plus some external resources not in the MISO North and Central regions transfer constraint to allow Zones 1-7 to meet its respective PRMRs. Should this not occur, all of MISO Zones 1-7 would be short capacity (even though each zone could meet its LCR) and the auction would clear at CONE for each zone. This would be the first time this has occurred within MISO.

Solar Supply Chain Delays

This tightening of resources within MISO is largely driven by generation retirements and slower than expected project development for replacement resources, predominantly solar. This is attributable to current solar supply chain issues. Solar resources continue to increase within the MISO region, as approximately 1 GW of solar resources are currently online and an additional 10 GW of new solar have executed interconnection agreements.[16] One complicating factor discussed in more detail below is that nearly 80% of the MISO renewable resources are currently in the northwest region of MISO. In February 2018, the Trump Administration imposed a 30% tariff on crystalline silicon cells and modules. Currently, 80% of all polysilicon (a necessary component of solar panels) comes from China with 50% of that from the Xinjiang province.[17] The allegations of forced labor practices within the Xinjiang province have prevented solar panels containing Xinjiang polysilicon from coming to the States regardless of the tariffs. To compound these supply chain issues, COVID-19 resulted in a significant decline in manufacturing and the cancellation of shipments by sea. The shipping industry is only recently recovering from this impact.[18] Staff conversations with utilities indicate these, along with local permitting obstacles, are causing several delays in the commercial operation dates of solar resources in Michigan.

[15] MISO Final Preliminary PRA Data, Planning Year 2022-2023, March 21, 2022.
[16] MISO Renewable Integration Impact Assessment, February 2021.
[17] Solar Market Grapples with Supply Chain Issues, Solar World Power, January 4, 2022.
[18] *Id.*

Capacity Resource Changes

In addition to expected variation in each generating unit's unforced capacity from year to year, there were a few other noteworthy issues this year as compared to last year's report.

Spartan Renewables

Due to pending changes within MISO LRZ 7, such as the potential sale of resources and announced retirement of coal fired units, many AESs have reported a tightening of resources in the zone which made procuring needed capacity more difficult than prior years. Spartan Renewables expects to not renew a contract with a 9.4 MW customer in 2025, and it was unable to procure the capacity with its supplier to meet that load. Pursuant to MCL 460.6w, if an electric provider cannot demonstrate capacity by the time of the filing, and another supplier has not provided an affidavit with the capacity to demonstrate for that load, the original supplier would be responsible for the load. This is the first time Staff has encountered an electric provider that is unable to demonstrate adequately for their forward year obligations. While Spartan Renewables did not demonstrate for the load prior to filing, Staff has learned that another supplier anticipates covering Spartan's load later in the year. It is Staff's expectation that Spartan and the new supplier will make supplemental filings later this year to show that the load has been covered. Based on this understanding, Staff does not recommend that the Commission open a show-cause docket at this time but could make this recommendation later if warranted.

Ludington Upgrades

Consumers Energy Company and DTE Electric Company plan to continue upgrades to the Ludington Pumped Storage facility to help support intermittent resources and provide a price hedge against variable market energy prices. The units began undergoing a maintenance overhaul upgrade in 2015, one unit at a time. As of the filing of DTE's Integrated Resource Plan (IRP) in Case No. U-20471, four of the unit upgrades had been completed. A fifth was completed in May 2019. According to DTE's IRP, the $800 million upgrade project to replace each of the six-unit turbines in the facility is on schedule to be completed in 2020.[19] Work began on Ludington 3, the last unit to be upgraded, in April of 2019 and is expected to be completed in 2022.

[19] MPSC Case No. U-20471, Direct Testimony of Laura J. Mikulan, Exhibit A-3, p. 287, March 29, 2019.

Increased Utility Demand Response Programs

Three LRZ 7 LSEs disclosed in their respective capacity demonstration filings new or increasing DR programs for their retail customers. 142 MW of new or increased DR programs were reported by these LSEs in LRZ 7 for the prompt planning year.

Demand Response Aggregation

Pursuant to the September 15, 2017 Order in Case No. U-18369, the Commission affirmed that AESs may offer DR programs to their customers through a curtailment service provider (CSP) or third-party aggregator.[20] The Commission made this determination in the context of finding that it will continue to review DR programs offered by AESs as part of the capacity demonstration process.

As the Relevant Electric Retail Regulatory Authority (RERRA), the Commission approved the aggregation of 66 ZRCs of DR to be offered into the 2022 MISO capacity market, which is a slight decline from what was approved for the previous year. Staff continues to work with CSPs, ARCs and MISO to ensure that aggregated DR's PLCMM is accounted for when dispatched on MISO's coincident peak and continues to monitor the discussions taken place regarding FERC Order 2222.

MISO – Local Resource Zone 2

MISO's LRZ 2 encompasses almost the entire upper peninsula of Michigan as well as northern and eastern Wisconsin. MISO LRZ 2 has a CIL of 1,923 ZRCs[21] for planning year 2022/23, but MISO does not define MW capacity imports or export limits between states within the boundaries of the same MISO LRZ. Considering LRZ 2 includes LSEs from Wisconsin (not subject to MCL 460.6w), the data available to Staff for LRZ 2 from capacity demonstration filings is not comprehensive enough to project a zonal capacity position as Staff did in its analysis of LRZ 7. Never less, all Michigan LSEs serving load within MISO LRZ 2 demonstrated sufficient resources to meet their requirements.

[20] September 15, 2017 MPSC Order in Case No. U-18369, p. 5.
[21] MISO LOLE Study Report, Planning Years 2022-2023.

Noteworthy for MISO Local Resource Zone 2

The 2021 OMS-MISO Survey results indicate an installed capacity surplus in the 2022/23 planning year for LRZ 2 of 200-1,200 MW above PRMR, while just meeting the PRMR for 2026, for LRZ 2.[22] Notwithstanding the localized reliability issues in the upper peninsula, the results of the OMS-MISO Survey indicate that LRZ 2 is projected to have an adequate supply of capacity resources to meet its PRMR requirements for the upcoming planning years. The UMERC 100 MW solar project projected in its most recent IRP[23] and planned solar capacity addition by UPPCO in its most recent IRP[24], will have a positive impact on the resource adequacy of the region.

MISO – Local Resource Zone 1

A very small fraction of Michigan's upper peninsula load is located in LRZ 1. Northern States Power, Bayfield Electric Cooperative, and the City of Wakefield municipal utility have less than 30 MW combined in MISO LRZ 1. The 2021 OMS-MISO Survey results indicate an installed capacity surplus of approximately 1,200-2,500 MW for the 2022 planning year and a capacity deficit of 1,400 MW to a surplus of 400 MW in 2026.[25] LRZ 1 is projected to have an adequate supply of capacity resources to meet its PRMR requirements for the 2022/23 planning year.

[22] 2021 OMS-MISO Survey Results, June 11, 2021.
[23] MPSC Case No. U-21081, Direct Testimony of Richard Stasik, p. 4, October 15, 2021.
[24] MPSC Case No. U-20350, UPPCO Annual IRP Implementation Update, p. 3, August 20, 2021.
[25] 2021 OMS-MISO Survey Results, June 11, 2021.

PJM Resource Adequacy

Very few LSEs in Michigan serve load within the PJM RTO. These LSEs are still subject to the requirements of MCL 460.6w requiring sufficient capacity for four years forward in planning year 2025/26. PJM LSEs can demonstrate sufficiency simply by providing evidence that the LSE is in compliance with its PJM obligations.

LSEs in the PJM service territory must meet capacity obligations either through participation in PJM's Reliability Pricing Model (RPM) Base Residual Auction (BRA) or through PJM's Fixed Resource Requirement (FRR) plan. The FRR plan is an alternative to the RPM, where an LSE must demonstrate to PJM that it has enough resources to cover its projected load plus an additional reserve requirement. Both the RPM and the FRR resources are subject to monetary penalties if they fail to maintain PJM's reliability standard.

The largest LSE in PJM is Indiana Michigan Power Company (I&M).[26] I&M elects to file an FRR plan each year. I&M's most recent capacity demonstration filed in Case No. U-21099 indicates that the company plans to continue with the PJM FRR plan baring any major FERC-ordered changes.

In 2018, FERC ordered PJM to revise its auction bid cap rule, also known as the Minimum Offer Price Rule (MOPR), after it threatened the competitiveness of the PJM capacity market. After several years and several rounds of proposals, in December 2019 FERC rejected most of the filed solutions in favor of an expanded MOPR and directed PJM to file a compliance filing by March 18, 2020.[27] Due to these proceedings with FERC, PJM has not conducted a regular BRA since 2018. PJM's current capacity market schedule[28] published in late 2020 held the delivery year 2022/23 BRA in May of 2021, with the 2023/24 auction in late 2021 and early 2022.

PJM American Electric Power System

AEP's subsidiary Indiana Michigan Power Company's capacity demonstration indicates that it has already satisfied PJM's requirements for planning years 2022/23 through 2024/25 and that it expects to meet PJM's requirements for planning year 2025/26.

[26] Indiana Michigan Power Company is an electric operating company of American Electric Power Company, Inc. (AEP). I&M is a wholly owned subsidiary of AEP and is operated as a single utility in the American Electric Power System (AEP System).
[27] PJM Interconnection Docket No. ER21-2582-000 Revisions to Application of Minimum Offer Price Rule, July 30, 2021, accessed 03/04/2022
[28] PJM 2022/2023 BRA Schedule, December 2, 2020, accessed 03/04/2022

Figure 5: Indiana Michigan Power Company Capacity Demonstration Summary

Item	PY 2022/23	PY 2023/24	PY 2024/25	PY 2025/26
Total Planning Reserve Margin (expected reserves), UCAP MW	4,193	4,216	4,236	4,086
Total Company Owned Generation, MW	4,212	3,552	3,331	3,491
Total Demand Response Resources (treated as capacity), UCAP MW	300	357	222	222
Total PPA, UCAP MW	288	307	683	374
Total Planning Resources, MW	4,800	4,216	4,236	4,086
UCAP Surplus / (Shortfall), MW	607	0	0	0
Other PJM Resources (Not I&M), MW	281	281	281	396

In addition to I&M's capacity demonstration, Staff also reviewed information of cooperative and municipal utility obligations in the Michigan portion of PJM's territory for planning year 2023/24 as shown in Figure 5.

Staff expects that the LSEs in the Michigan portion of PJM will continue to meet the PJM capacity obligations based on information included in individual capacity demonstrations and the current level of surplus capacity in the PJM market. With such an abundance of reserve resources, if I&M were to encounter an unanticipated shortfall in the immediate future, Staff expects that it could easily be accommodated through the procurement of reserve resources by market purchases. As market conditions may change over time, Staff will continue to monitor the resource adequacy of the PJM region and the capacity plans of Michigan LSEs located within the PJM territory. As reaffirmed in the Company's most recent IRP, filed in Case No U-21189[29], Staff does not anticipate I&M to have any issues meeting capacity obligations.

The Commission order in Case No. U-16090 set I&M's customer choice cap amount to zero, and was subsequently reset to ten percent on February 1, 2019, pursuant to the Commission order and MCL 460.10a(1)c. On February 1, 2019, I&M began enrolling customers in its choice program and is now fully subscribed at the cap. Currently I&M is responsible for the capacity of its choice load in its FRR plan under the PJM RAA. If suppliers were to choose to self-supply capacity, then that capacity would also need to be included in I&M's FRR plan. Constellation NewEnergy Inc. is currently the only AES serving load in I&M's service territory.

[29] MPSC Case No. U-21189, Direct Testimony of Stephan F. Baker, p. 7, February 28, 2022.

LSE Capacity Demonstration Results (PY 2025/2026)

Staff appreciates the time and effort made by all Michigan LSEs to comply with the provisions of MCL 460.6w, as well as to comply with the questions, audits, contract reviews, and requests for additional information throughout this process. The LSE capacity demonstration results are reported for planning year 2025/2026 because, following the initial capacity demonstration which covered four years, only the fourth year forward is required for compliance. As previously described in its September 15, 2017 order in Case No. U-18197, the Commission requested a table be included in this report that identifies the capacity by type for each individual electric provider without revealing the identity of any specific electric provider. The requested table with a breakdown for each electric provider that filed a capacity demonstration is included as Appendix A. In addition to the breakdown by individual supplier, Staff reports the following aggregate results in Figure 5 below.

Figure 6: Resource Breakdown (%) by Supplier Type Planning Year 2025/26

Supplier Type	Owned	DR	Contract – PPA	Contract - ZRC	Auction
Muni/Co-Op Aggregate	78.0%	0.0%	14.2%	5.0%	2.8%
AES Aggregate	0.3%	0.2%	9.0%	90.2%	0.2%
Utility Aggregate	76.4%	6.2%	17.2%	0.0%	0.2%

Demand Response

As part of its analysis, Staff reviewed the LSEs' DR programs as an optional source of capacity. When used by a LSE, a reduction in demand through DR programs offsets a portion of their capacity needs. LSEs can utilize interruptible DR during critical peak times to quickly respond to bulk electric system needs which can delay future capital investment in new generation. Behavioral DR programs allow the utility to lower its peak demand forecast, thus mitigating the need for an equal of amount supply side resources.

Demand response played a prominent role in LSEs' integrated resource plan filings, where DR is required to be considered along with traditional supply side resources for meeting capacity needs. MCL 460.6t directs Staff to complete a statewide study of DR potential in Michigan every five years, and the most current state of Michigan Demand Response Potential Study was issued on September 24, 2021.[30] In addition, the Commission approved Michigan Integrated Resource Planning Parameters on November 21, 2017 in Case No. U-18418 that include provisions regarding including DR options in future integrated resource plans and Staff is currently working to updated those Parameters.

[30] Michigan Demand Response Statewide Potential Study (2021-2040), Guidehouse, September 24, 2021.

By planning year 2025/26, Consumers Energy is forecasting increased DR levels to support capacity through the expansion of existing programs. The DR levels assumed in both Consumers Energy's and DTE Electric's current integrated resource plans[31] are reflected in their capacity demonstration filing. Consumers Energy is continuing to offer its Bring Your Own Device program for residential customer classes and C&I demand response programs to deliver and manage significant peak load reductions. DTE Electric projects similar levels of Demand Response throughout the next 5 years, as was documented in last year's report. Staff will continue to monitor these plans and the use of DR in Michigan for the foreseeable future.

ZRC Contracts

Staff recommended that forward ZRC contracts be used for capacity demonstration purposes to specify delivery of the ZRCs in the MISO Module E Capacity Tracking (MECT) tool prior to the applicable PRA auction. All new forward ZRC contracts were audited by Staff and all complied with Staff's requested delivery terms, allowing Staff to audit the ZRC transfers each year prior to the PRA. Figure 6 indicates a slight decrease in the percentage of ZRC contracts utilized this year by the utilities, municipal utilities and cooperatives, and a slight increase in the amount utilized by the AESs compared to last year.

An important thing to note is that ZRCs are defined in MISO's tariff and are created in the prompt year when UCAP for supply-side and demand-side resources are converted into ZRCs in the MISO MECT. ZRCs for any year further out than the prompt year are projected and don't become ZRCs until the prompt year. ZRCs are fungible products that can be sold or transferred, and in some cases, sold more than once. The characteristics of ZRCs allow for them to be easily traded and tracked within the MISO MECT. MISO has a view into the source and transfers of those ZRCs that occur prior to the PRA in the prompt year, and those ZRC transfers are audited by Staff as a secondary check on the ZRC contracts utilized in the capacity demonstrations.

At this point in time, the overall amount of ZRC contracts included in capacity demonstration filings do not impact Staff's ability to continue to make forward resource adequacy projections on a zonal basis. Staff will continue to monitor and audit ZRC contracts and ZRC transfers within the MECT going forward.

[31] DTE's current IRP filed and approved in MPSC Case No. U-20471.
CE's current IRP filed in MPAC Case No. U-21090.

AES Load Switching

For this year's report, there was one AES that was required to file an amended or supplemental capacity demonstration. Similar to last year, Staff requested that any AES who experienced load switching during this time provide a signed affidavit confirming the increase or reduction in their load compared to the PLC data provided by the utility with their capacity demonstration that contained the amount of load switching for each planning year. Each supplier contracting for additional customer load provided a copy of its affidavit confirming this transaction to the supplier that was losing the load to be accounted for in both suppliers' demonstrations. For this filing year, all of the load switching had occurred prior to the filing date.

Potential Impacts to the Capacity Demonstration Process

The electric industry continues to evolve. As noted throughout this report, there is a tightening of capacity within MISO Zone 7 largely due to increased reliance on intermittent resources, and the retirement of large baseload generation. This is a necessary step to meet carbon reduction goals and optimize a cleaner generating fleet, but until technologies such as storage mature through scale, economics and duration, MISO and FERC have proposed the following solutions:

MISO's Minimum Capacity Obligation

As noted above, the MISO region has experienced shifts in the generation portfolio causing some LSEs to increase their reliance on the PRA. In November of 2021, MISO proposed a Minimum Capacity Obligation (MCO) to the Federal Energy Regulatory Commission (FERC)[32] in Docket No. ER22-496-000. The MCO, if approved, would require LSEs to maintain capacity of 50% of its PRMR in lieu of relying on the PRA or be assessed a non-compliance charge. MISO has requested that FERC approve this requirement by September 1, 2022, to be implemented for the 2023-2024 PRA. The proposal does incorporate a 50 MW *de minimis* exemption as to not burden small market participants. On March 9th, 2022 FERC issued a deficiency letter[33] that required MISO to address several questions regarding the MCO. MISO will file its response within thirty days and FERC will determine its sufficiency thereafter.

[32] MISO Minimum Capacity Obligation filing, FERC Docket ER22-496-000, November 30, 2021.
[33] FERC deficiency letter in FERC Docket ER22-496, March 9, 2022.

Seasonal and Accreditation Requirements Filing

In November of 2021, MISO submitted a proposal to FERC Docket No. ER22-495-000[34] to revise its Open Access Transmission, Energy and Operating Reserve Markets Tariff. If approved, this tariff revision would establish a seasonal resource adequacy requirement for each summer, fall, winter and spring season. In addition, it would establish a seasonal accredited capacity methodology for certain resources participating in MISO's PRA to align with real time availability and planned outages. MISO explains that these changes are necessary to ensure future operation reliability due to an increase in system wide maximum generation emergency events outside of the traditional summer peak. On March 9, 2022, FERC also issued a deficiency letter in this docket.[35] Similarly, MISO has thirty days to file its response and FERC will determine its sufficiency thereafter.

If approved, Staff believes that the Commission's current annual capacity demonstration process could continue as it is done currently with relatively minor adaptations to include the seasonal PRMR requirements in lieu of the current summer peak load contribution.

FERC Order No. 2222

In September of 2020, FERC issued Order No. 2222, which enables Distributed Energy Resources (DER) to participate in wholesale markets alongside traditional resources through aggregation.[36] The rule requires each Independent System Operator and Regional Transmission Operator to develop tariffs allowing participation of DERs in these markets not to exceed an aggregated 100 kW. Due to the complexity of the required tariff and lack of functionality within its current systems, MISO has announced that it intends to seek a 2030 implementation date and PJM has requested a Feb 2, 2026 implementation date for compliance with the Order. MISO's Order 2222 compliance filing is due April 18, 2022. PJM filed their compliance filing February 1, 2022.[37]

[34] MISO Seasonal Construct tariff filing, Markets Tariff filing, FERC Docket ER22-495-000, November 2021.
[35] FERC deficiency letter in FERC Docket ER22-495, March 9, 2022.
[36] Order No. 2222, FERC Docket No. RM18-9-000, September 17, 2020.
[37] Order No. 2222 Compliance Filing of PJM Interconnection, February 1, 2022.

Conclusion and Recommendations

All Michigan LSEs required to file capacity demonstrations with the Michigan Public Service Commission for planning year 2025/26 pursuant to MCL 460.6w and the July 2, 2021 Commission Order in Case No. U-21099 have filed. Staff has audited the filings, contracts and other materials and finds that all Michigan LSEs, with the exception of Spartan Renewables, have satisfied the capacity demonstration requirements and have procured appropriate levels of resources for planning year 2025/26. As stated above, with respect to Spartan Renewables, Staff does not recommend that the Commission open a show-cause docket at this time.

Staff appreciates the cooperation of all Michigan LSEs with respect to this process and the willingness to provide sensitive data and answer questions necessary for Staff to complete its review. To help accommodate further process efficiency improvements for future capacity demonstrations Staff has the following recommendation as stated below.

Staff has historically taken the position in capacity demonstrations filings, that the prompt year, at the time of filing, will act as a snapshot in time so the PLC and any expansion plan filed with the Commission, or expected to be filed, would be accepted to fulfil the requirements of MCL 460.6w four years into the future. While Staff continues to believe this works well for the PLC, it sees some issues with utilizing capacity expansion plans that may potentially change based on contested case proceedings. This was especially evident this year where LSEs demonstrated resources in the 2025/2026 planning year that are part of an ongoing, contested proceeding. Staff therefore recommends that LSEs supplement their most recent capacity demonstration filing based on any subsequent commission order, regulatory decision or legal ruling at such time that decision is made.

Appendix A

Planning Year 2023/24 Resource Breakdown (%) by Individual Supplier[38]

LSE	Owned	DR	Contract - PPA	Contract - ZRC	Auction
Supplier 1	0%	0%	100%	0%	0%
Supplier 2	61%	0%	15%	19%	5%
Supplier 3	91%	0%	2%	2%	1%
Supplier 4	48%	52%	29%	0%	0%
Supplier 5	68%	0%	15%	10%	7%
Supplier 6	0%	0%	0%	100%	0%
Supplier 7	0%	0%	0%	100%	0%
Supplier 8	0%	0%	0%	98%	2%
Supplier 9	0%	0%	0%	100%	0%
Supplier 10	32%	0%	68%	0%	0%
Supplier 11	0%	0%	100%	0%	0%
Supplier 12	91%	0%	9%	0%	0%
Supplier 13	0%	0%	0%	100%	0%
Supplier 14	58%	33%	9%	0%	0%
Supplier 15	0%	0%	100%	0%	0%
Supplier 16	0%	0%	100%	0%	0%
Supplier 17	90%	8%	2%	0%	0%
Supplier 18	0%	0%	100%	0%	0%
Supplier 19	58%	9%	33%	0%	0%
Supplier 20	72%	0%	28%	0%	0%
Supplier 21	0%	0%	0%	100%	0%
Supplier 22	0%	0%	100%	0%	0%
Supplier 23	0%	0%	0%	100%	0%
Supplier 24	0%	0%	100%	0%	0%
Supplier 25	0%	0%	0%	100%	0%
Supplier 26	10%	7%	83%	0%	0%
Supplier 27	86%	5%	6%	0%	2%

[38] Suppliers (municipal and cooperative electric utilities) that combined their capacity resources are shown as one supplier in the above figure. The total number of suppliers may vary from year to year based on changes to which suppliers combine their capacity demonstrations as well as new suppliers or suppliers no longer serving load in Michigan.

2022/2023 Planning Resource Auction (PRA) Supplementary Material

April 20, 2022

Resource Adequacy Sub-Committee

Revised 5/3/22

Purpose & Key Takeaways

Purpose:

Additional discussion on the results of the 2022-2023 Planning Resource Auction (PRA)

Key Takeaways:

- Under the Tariff, MISO establishes Sub-Regional Resource Zones (SRRZ)
- The multi-zone optimized auction includes the marginal cost of binding Sub-Regional limits
- This auction experienced, as in years past, price separation along those SRRZs due to Sub-Regional limits
- The objective of the multi-zone optimization methodology is to minimize the overall costs of capacity
- Application of lowest cost zonal CONE to a SRRZ in the case of PRMR capacity insufficiency is consistent with the Tariff

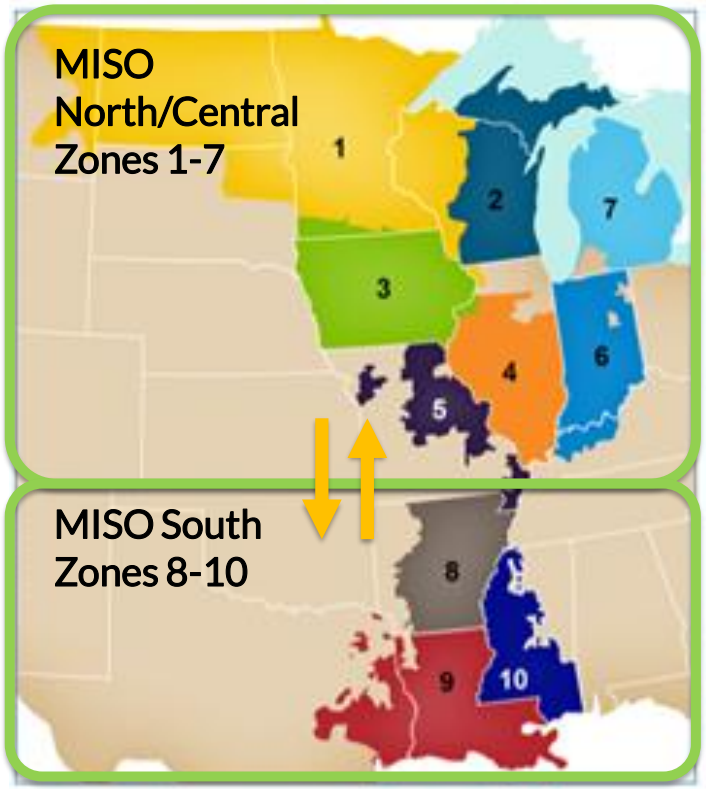
MISO establishes Sub-Regional Resource Zones (SRRZ) for which the multi-zone optimized auction includes the marginal cost of binding Sub-Regional limits

Module E-1 Section 68A.3.1 Establishment of SRRZs, SRECs and SRICs
The Transmission Provider will establish and publish, on the Transmission Provider's public website, SRRZs, SRECs and SRICs as soon as practical but no later than the first business day of March for the following Planning Year.

Posted on MISO webpage>Planning>Resource Adequacy>PRA Documents> PY22-23:

https://cdn.misoenergy.org/SRIC_SREC%20Posting%20for%202022_23%20PRA622751.pdf

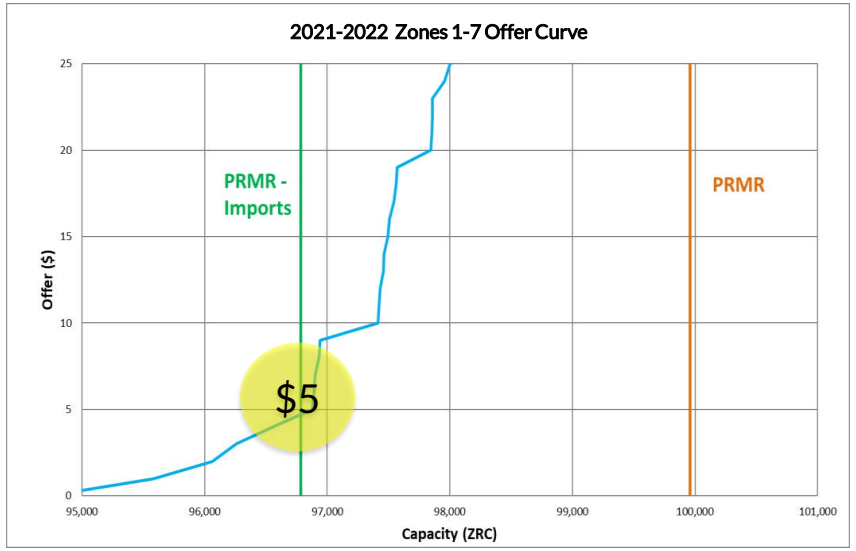
South to North Limit = 1900MW
North to South Limit = 3000MW



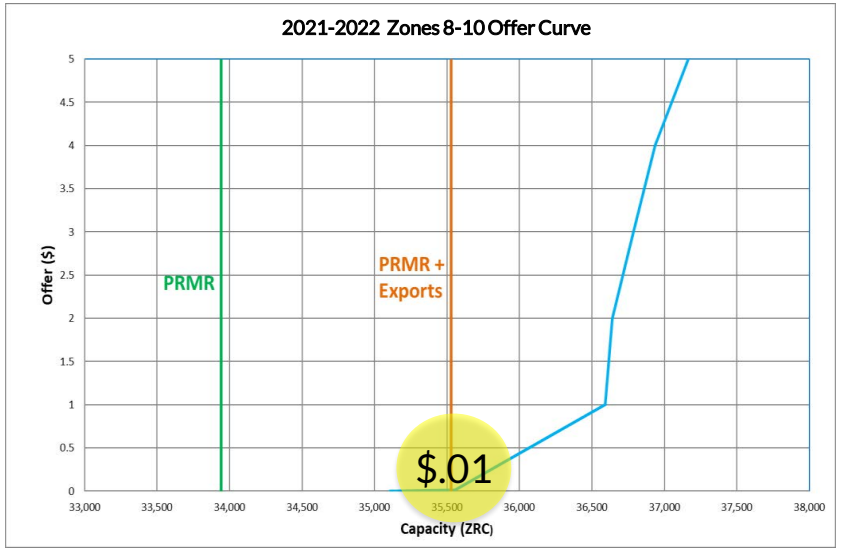
Revisiting the 2021-2022 PRA Results

In an auction without capacity scarcity, such as in 21-22, each Sub-Regional Resource Zone (MISO North/Central Zones 1-7 and MISO South Zones 8-10) both cleared at the least cost marginal capacity offer for each Sub-Region even though some individual zones were long and some were short capacity to meet their Zonal PRMR

MISO North/Central

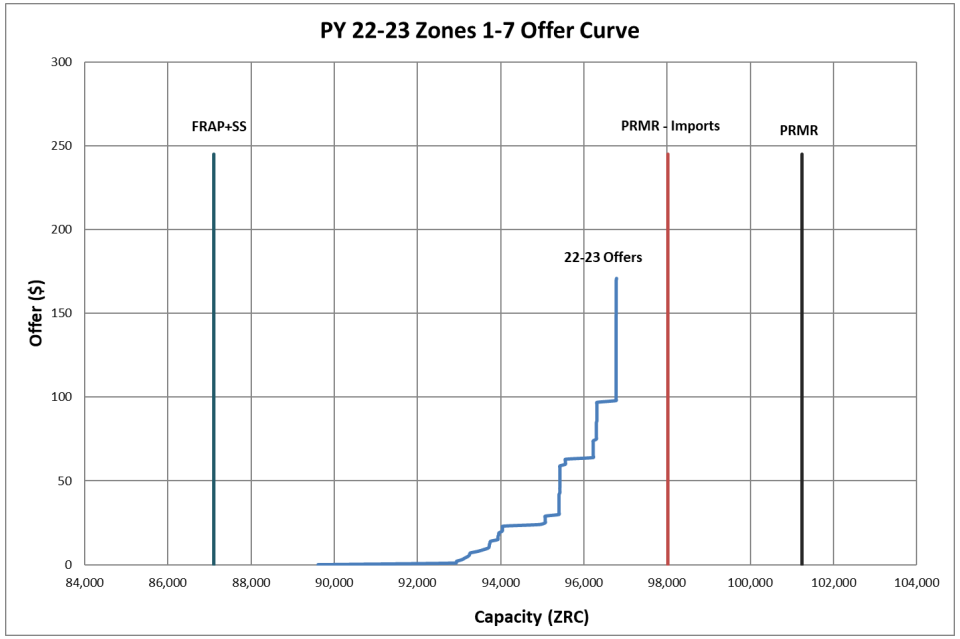


MISO South

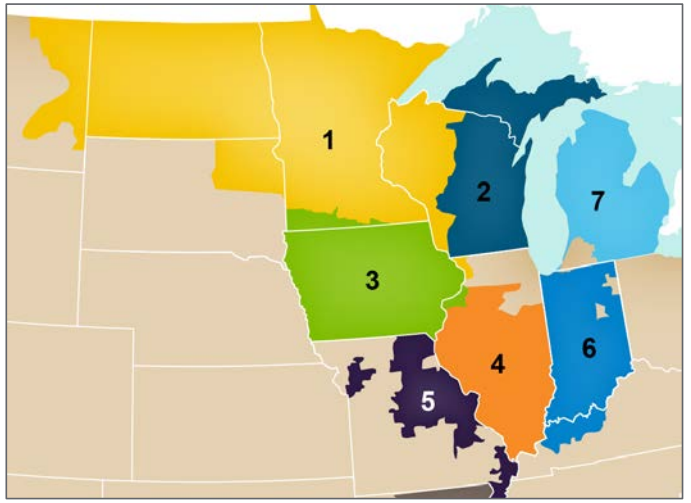


Revised 5/3/22

Application of lowest cost zonal CONE to a SRRZ in the case of PRMR capacity insufficiency is consistent with the Tariff's objective of the multi-zone optimization methodology minimizing the overall costs of capacity



MISO North/Central



Additional Topics

Purpose:

Additional discussion on the results of the 2022-2023 Planning Resource Auction (PRA)

Topics:

- Capacity Deficiency Charge (CDC)
- Zonal Deliverability Benefits
- Loss of Load Expectation Sensitivity
- Posting of masked offer data
- May RASC - notable observations and additional analytics

No Market Participants Elected to Pay the Capacity Deficiency Charge (CDC)

- LSEs may opt out of all or a portion of their PRMR by paying the CDC
- LSEs voluntarily choose to opt out by making an entry into the MECT before the auction window opens
- Module E-1 Section 69A.1.d.

"All LSEs shall report to the Transmission Provider, through the MECT, whether such LSE will meet their PRMR for each LRZ in which the LSE serves Load by:

(i) submitting a Fixed Resource Adequacy Plan;
(ii) Self-Scheduling ZRCs;
(iii) purchasing ZRCs through the Planning Resource Auction process; and/or,
(iv) paying the Capacity Deficiency Charge."

Next Steps

- Zonal Deliverability Benefit (ZDB) – May RASC
- PRA Notable Observations – May RASC
- Posting of Masked Offers – May 14
- LOLE Sensitivity – TBD – scope and schedule being developed

Acronym List

BPM	Business Practices Manual
BTMG	Behind-the-Meter Generation
CDC	Capacity Deficiency Charge
CONE	Cost of New Entry
CPNode	Commercial Pricing Node
CROW	MISO Outage Scheduler
DBZ	Deliverability Benefit Zone
DR	Demand Resource
DRR	Demand Response Resource
EDR	Emergency Demand Response resource
EFORd	Equivalent demand Forced Outage Rate
EMT	MISO Energy Markets Tariff
EOP	Emergency Operating Procedure
ERO	Electric Reliability Organization
FERC	Federal Energy Regulatory Commission
FRAC	Forward Reliability Assessment Commitment
GADS	Generating Availability Data System
GVTC	Generation Verification Test Capacity
ICAP	Installed Capacity value
IMM	Independent Market Monitor
LBA	Local Balancing Authority - shall have the meaning set forth in the Balancing Authority Agreement
LMR	Load Modifying Resource
LOLE	Loss of Load Expectation
LOLEWG	MISO Loss of Load Expectation Working Group
LRZ	Local Resource Zone
LSE	Load Serving Entity
MECT	Module E Capacity Tracking tool
Module E	MISO EMT module governing Resource Adequacy requirements
MP	Market Participant
MTEP	MISO Transmission Expansion Planning
NERC	North American Electric Reliability Corporation
Planning Resource	Capacity Resources or Load Modifying Resources that can be used to satisfy RAR
Planning Year	The period of time from June 1st to May 31st of the following year
PowerGADS	MISO GADS database
PPA	Power Purchase Agreement
PRA	Planning Resource Auction
PR Offer	Planning Resource Offer
PRM	Planning Reserve Margin
PRMR	Planning Reserve Margin Requirement
RA	Resource Adequacy
RAC	Reliability Assessment Commitment
RAR	Resource Adequacy Requirement
RASC	MISO Resource Adequacy Sub Committee
RE	Regional Entity
SRIC/SREC	Sub-Regional Import/Export Constraint
SRRZ	Sub-Regional Resource Zone(s)
TO	Transmission Owner
UCAP	Unforced Capacity value
XEFORd	Forced outage rate value calculated to exclude outage causes that are Outside Management Control
ZDB	Zonal Deliverability Benefit
ZRC	Zonal Resource Credit

Revised 5/3/22

MISO

MW Capacity in MISO Queue as of May 10, 2022 by Interconnection Study Phase and Application Commercial Operation Date

Solar	PHASE 3	PHASE 2	Study Not Started	TOTAL
Pre 2023	1960	0	0	1960
2023	675	2130	3307	6112
2024	0	600	450	1050
6/1/2025	0	0	720	720
TOTAL	2635	2730	4477	9842

Solar/Battery Hybrid	PHASE 3	PHASE 2	Study Not Started	TOTAL
Pre 2023	0	0	0	0
2023	0	499	0	499
2024	0	0	750	750
6/1/2025	0	0	0	0
TOTAL	0	499	750	1249

Battery Storage	PHASE 3	PHASE 2	Study Not Started	TOTAL
Pre 2023	20	200	100	320
2023	0	150	0	150
2024	0	0	1450	1450
6/1/2025	0	0	0	0
TOTAL	20	350	1550	1920

Project #	Request Status	Queue Date	Appl In Service Date	Transmission Owner	County	State	Study Cycle	Study Group	Study Phase	POI Name	Summer MW	Winter MW	Fuel	Generating Facility
J1320	Active	4/29/2019	4/20/2019	Michigan Electric Transmissior	Branch County	MI	DPP-2019-Cycle	East (ITC)	PHASE 3	Coldwater - Batavia 138kV Line	150	150	Solar	PV Photovoltaic
J1192	Active	3/25/2019	7/1/2021	Michigan Electric Transmissior	Eaton County	MI	DPP-2019-Cycle	East (ITC)	PHASE 3	Oneida 138kV Substation	35	35	Solar	PV Photovoltaic
J1248	Active	4/29/2019	8/1/2021	Michigan Electric Transmissior	Calhoun County	MI	DPP-2019-Cycle	East (ITC)	PHASE 3	Marshall - Black Stone 138 kV line	100	100	Solar	PV Photovoltaic
J1297	Active	4/29/2019	12/1/2021	Michigan Electric Transmissior	Shiawassee County	MI	DPP-2019-Cycle	East (ITC)	PHASE 3	Cornell - Bell Road 138 kV Line	170	170	Solar	PV Photovoltaic
J1399	Active	4/29/2019	12/1/2021	Michigan Electric Transmissior	Ingham County	MI	DPP-2019-Cycle	East (ITC)	PHASE 3	Delhi - Churchill - Tompkins 138kV Line	90	90	Solar	PV Photovoltaic
J1401	Active	4/29/2019	12/1/2021	Michigan Electric Transmissior	Branch County	MI	DPP-2019-Cycle	East (ITC)	PHASE 3	Batavia - Wagner 138kV Line	150	150	Solar	PV Photovoltaic
J1350	Active	4/29/2019	4/20/2022	Michigan Electric Transmissior	Monroe County	MI	DPP-2019-Cycle	East (ITC)	PHASE 3	Milan â€“ Monroe â€“ Morocco 345 kV Point	150	150	Solar	PV Photovoltaic
J1203	Active	4/25/2019	6/1/2022	Michigan Electric Transmissior	Genesee County	MI	DPP-2019-Cycle	East (ITC)	PHASE 3	Thetford 345kV Substation	125	125	Solar	PV Photovoltaic
J1331	Active	4/29/2019	6/30/2022	ITC Transmission	St. Clair County	MI	DPP-2019-Cycle	East (ITC)	PHASE 3	Greenwood 120 kV Substation	100	100	Solar	PV Photovoltaic
J1389	Active	4/29/2019	8/1/2022	Michigan Electric Transmissior	Saginaw County	MI	DPP-2019-Cycle	East (ITC)	PHASE 3	Murphy Station - Nelson Road 345 kV Line tap	120	120	Solar	PV Photovoltaic
J1430	Active	4/29/2019	8/1/2022	Michigan Electric Transmissior	Calhoun County	MI	DPP-2019-Cycle	East (ITC)	PHASE 3	Verona - Foundary 138kV Line	100	100	Solar	PV Photovoltaic
J1472	Active	4/29/2019	8/1/2022	Michigan Electric Transmissior	Jackson County	MI	DPP-2019-Cycle	East (ITC)	PHASE 3	Leoni - Parr Raod 138kV line	100	100	Solar	PV Photovoltaic
J1196	Active	4/25/2019	8/29/2022	ITC Transmission	Sanilac County	MI	DPP-2019-Cycle	East (ITC)	PHASE 3	Greenwood - Rapson (Banner) 345 kV Line Tap	200	200	Solar	PV Photovoltaic
J1224	Active	4/27/2019	10/30/2022	ITC Transmission	Washtenaw County	MI	DPP-2019-Cycle	East (ITC)	PHASE 3	Majestic - Milan 345 kV Line Tap	170	170	Solar	PV Photovoltaic
J1255	Active	4/29/2019	10/30/2022	Michigan Electric Transmissior	Ionia County	MI	DPP-2019-Cycle	East (ITC)	PHASE 3	Marquette - Vergennes 138 kV Line Tap	200	200	Solar	PV Photovoltaic
J1310	Active	4/29/2019	6/30/2023	Michigan Electric Transmissior	Jackson County	MI	DPP-2019-Cycle	East (ITC)	PHASE 3	Blackstone - Marshall 138 kV Line	125	125	Solar	PV Photovoltaic
J1226	Active	4/27/2019	9/29/2023	Michigan Electric Transmissior	Lenawee County	MI	DPP-2019-Cycle	East (ITC)	PHASE 3	Morocco 345 kV Substation	200	200	Solar	PV Photovoltaic
J1375	Active	4/29/2019	9/29/2023	Michigan Electric Transmissior	Muskegon County	MI	DPP-2019-Cycle	East (ITC)	PHASE 3	Du Pont - Cobb -White Lake 138kv	100	100	Solar	PV Photovoltaic
J1379	Active	4/29/2019	10/1/2023	Michigan Electric Transmissior	Montcalm County	MI	DPP-2019-Cycle	East (ITC)	PHASE 3	Eureka - Vestaburg 138 kV Line Tap	200	200	Solar	PV Photovoltaic
J1210	Active	4/27/2019	10/31/2023	Michigan Electric Transmissior	Iosco County	MI	DPP-2019-Cycle	East (ITC)	PHASE 3	Whittemore - Twining 138kV Line	50	50	Solar	PV Photovoltaic
J1527	Active	6/25/2020	4/1/2023	Michigan Electric Tranmission	Ottawa	MI	DPP-2020-Cycle	East (ITC)	PHASE 2	Kenowa 345kV	200	200	Solar	Photovoltaic
J1587	Active	6/25/2020	9/1/2023	ITC Transmission	Muskegon	MI	DPP-2020-Cycle	East (ITC)	PHASE 2	Du Pont to Cobb 138 KV (J1375 POI)	100	100	Solar	Photovoltaic
J1654	Active	6/25/2020	9/1/2023	Michigan Electric Transmissior	Genesee	MI	DPP-2020-Cycle	East (ITC)	PHASE 2	Goss-Thetford 345kV Line	200	200	Solar	Photovoltaic
J1658	Active	6/25/2020	9/1/2023	Michigan Electric Transmissior	Hillsdale	MI	DPP-2020-Cycle	East (ITC)	PHASE 2	Coldwater to Moore Road 138kV Line	180	180	Solar	Photovoltaic
J1664	Active	6/25/2020	9/1/2023	ITC Transmission	St. Clair	MI	DPP-2020-Cycle	East (ITC)	PHASE 2	Carrigan 120kV Substation	200	200	Solar	Photovoltaic
J1553	Active	6/25/2020	9/15/2023	Michigan Electric Transmissior	Clinton	MI	DPP-2020-Cycle	East (ITC)	PHASE 2	Bingham West 138kV	150	150	Solar	Photovoltaic
J1571	Active	6/25/2020	9/15/2023	Michigan Electric Transmissior	Lenawee	MI	DPP-2020-Cycle	East (ITC)	PHASE 2	Morocco to Beecher 138kV (Ckt 1)	200	200	Solar	Photovoltaic
J1603	Active	6/25/2020	9/15/2023	Michigan Electric Transmissior	Otsego	MI	DPP-2020-Cycle	East (ITC)	PHASE 2	Vantyle 138kV	200	200	Solar	Photovoltaic
J1663	Active	6/25/2020	9/15/2023	Michigan Electric Transmissior	Ottawa	MI	DPP-2020-Cycle	East (ITC)	PHASE 2	Argenta to Tallmadge 345kV	200	200	Solar	Photovoltaic
J1516	Active	6/25/2020	10/1/2023	ITC Transmission	St. Clair	MI	DPP-2020-Cycle	East (ITC)	PHASE 2	Fitz 120kV	100	100	Solar	Photovoltaic
J1525	Active	6/25/2020	10/1/2023	ITC Transmission	Huron	MI	DPP-2020-Cycle	East (ITC)	PHASE 2	Grassmere 345kV	200	200	Solar	Photovoltaic
J1526	Active	6/25/2020	10/1/2023	ITC Transmission	St. Clair	MI	DPP-2020-Cycle	East (ITC)	PHASE 2	Greenwood 345kV	200	200	Solar	Photovoltaic
J1614	Active	6/25/2020	2/15/2024	Michigan Electric Tranmission	Muskegon	MI	DPP-2020-Cycle	East (ITC)	PHASE 2	White Road - Four Mile 138kV line	250	250	Solar	Photovoltaic
J1537	Active	6/25/2020	7/4/2024	Michigan Electric Transmissior	Genesee	MI	DPP-2020-Cycle	East (ITC)	PHASE 2	Thetford #1 - Dort 138kV T-Line	150	150	Solar	Photovoltaic
J1550	Active	6/25/2020	7/4/2024	Michigan Electric Transmissior	Branch	MI	DPP-2020-Cycle	East (ITC)	PHASE 2	Batavia - Tap Kinderhook distribution station, 138kV Transm	200	200	Solar	Photovoltaic
J1905	Active	7/22/2021	11/1/2023	ITC Transmission	Sanilac	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	Banner-Rapson 345kV Transmission Line	200	200	Solar	Photovoltaic
J1909	Active	7/22/2021	11/1/2023	Michigan Electric Transmissior	Bay	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	Gallagher-Tittabawassee 345kV Transmission Line	200	200	Solar	Photovoltaic
J1910	Active	7/22/2021	11/1/2023	Michigan Electric Transmissior	Bay	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	Gallagher-Tittabawassee 345kV Transmission Line	200	200	Solar	Photovoltaic
J1911	Active	7/22/2021	11/1/2023	ITC Transmission	Livingston	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	Madrid - Blackfoot 345kV	200	200	Solar	Photovoltaic
J1912	Active	7/22/2021	11/1/2023	ITC Transmission	Sanilac	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	Greenwood-Rapson 345kV Transmission Line	200	200	Solar	Photovoltaic
J1913	Active	7/22/2021	11/1/2023	Michigan Electric Transmissior	Midland	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	Murphy-Tittabawassee 345kV Transmission Line	200	200	Solar	Photovoltaic
J1914	Active	7/22/2021	11/1/2023	Michigan Electric Transmissior	Presque Isle	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	Rockport-Port calcite 138kV Transmission line	150	150	Solar	Photovoltaic
J1915	Active	7/22/2021	11/1/2023	Michigan Electric Transmissior	Bay	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	Almeda Junction-Shale 138kV Transmission Line	150	150	Solar	Photovoltaic
J1916	Active	7/22/2021	11/1/2023	Michigan Electric Transmissior	Branch	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	Newton 138 kV substation	100	100	Solar	Photovoltaic
J1917	Active	7/22/2021	11/1/2023	ITC Transmission	Livingston	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	Madrid- Majestic 345 kV	200	200	Solar	Photovoltaic
J1918	Active	7/22/2021	11/1/2023	Michigan Electric Transmissior	Montcalm	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	Nelson Road-Kenowa 345kV Transmission Line	132	132	Solar	Photovoltaic
J1920	Active	7/22/2021	11/1/2023	ITC Transmission	Leelanau	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	Tuscola-Arrowhead 120kV Transmission Line	125	125	Solar	Photovoltaic
J1921	Active	7/22/2021	11/1/2023	Michigan Electric Transmissior	Montcalm	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	Deja- Derby Jct 138kV Transmission line	125	125	Solar	Photovoltaic
J1922	Active	7/22/2021	11/1/2023	Michigan Electric Transmissior	Bay	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	Cottage Grove-Karn 138 kV	150	150	Solar	Photovoltaic
J1924	Active	7/22/2021	11/1/2023	Michigan Electric Transmissior	Bay	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	Cottage Grove-Seven Mile 138 kV	150	150	Solar	Photovoltaic
J1925	Active	7/22/2021	11/1/2023	Michigan Electric Transmissior	Livingston	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	Tihart-Latson 138 kV	100	100	Solar	Photovoltaic
J1939	Active	7/22/2021	11/1/2023	Michigan Electric Transmissior	Saginaw	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	Layton-Cornell White 138 kV	125	125	Solar	Photovoltaic
J1940	Active	7/22/2021	11/1/2023	ITC Transmission	Monroe	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	Monroe-Lallendorf 345kV Transmission Line	200	200	Solar	Photovoltaic
J1942	Active	7/22/2021	11/1/2023	ITC Transmission	Monroe	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	Seville TP-Niles TP 120 kV	100	100	Solar	Photovoltaic
J1944	Active	7/22/2021	11/1/2023	ITC Transmission	Sanilac	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	Banner-Rapson 345 kV	200	200	Solar	Photovoltaic
J1949	Active	7/22/2021	11/1/2023	Michigan Electric Transmissior	Antrim	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	Mancelona - Westwood 69kV	99.6	99.6	Solar	Photovoltaic
J1932	Active	7/22/2021	10/1/2024	Michigan Electric Transmissior	Gladwin	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	Grout Junction - Alger Junction 138kV	100	100	Solar	Photovoltaic
J1969	Active	7/22/2021	10/1/2024	ITC Transmission	Monroe	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	Lemoyne-Majestic 345kV	150	150	Solar	Photovoltaic
J2061	Active	7/22/2021	10/30/2024	Michigan Electric Transmissior	Saginaw	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	Murphy	200	200	Solar	Photovoltaic
J2098	Active	7/22/2021	3/31/2025	ITC Transmission	Calhoun	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	Oneida - Majestic 345 kV	500	500	Solar	Photovoltaic
J2001	Active	7/22/2021	5/1/2025	Michigan Electric Transmissior	Newaygo	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	Ludington to Kenowa 345kV	220	220	Solar	Photovoltaic

Project #	Request Status	Queue Date	Appl In Service Date	Transmission Owner	County	State	Study Cycle	Study Group	Study Phase	POI Name	Summer MW	Winter MW	Fuel	Generating Facility
J1586	Active	6/25/2020	9/30/2023	Michigan Electric Tranmissio	Calhoun	MI	DPP-2020-Cycle	East (ITC)	PHASE 2	Argenta to Tompkins 345kV line	499	499	Hybrid	Solar/Battery
J2057	Active	7/22/2021	4/15/2024	Michigan Electric Transmissio	Montcalm	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	Nelson Road to Kenowa 345 kV line	100	100	Hybrid	Solar/Battery
J2129	Active	7/22/2021	4/15/2024	Michigan Electric Transmissio	Allegan,Barry	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	Bradley 138 kV Substation	150	150	Hybrid	Solar/Battery
J2069	Active	7/22/2021	9/1/2024	ITC Transmission	Montcalm	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	Eureka - Vestaburg 138kV Transmission Line (J1379 POI)	100	100	Hybrid	Solar/Battery
J2139	Active	7/22/2021	9/1/2024	ITC Transmission	Livingston	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	345kV Blackfoot-Madrid Line	400	400	Hybrid	Solar/Battery

Project #	Request Status	Queue Date	Appl In Service Date	Transmission Owner	County	State	Study Cycle	Study Group	Study Phase	POI Name	Summer MW	Winter MW	Fuel	Generating Facility
J1329	Active	4/29/2019	10/30/2022	ITC Transmission	Washtenaw County	MI	DPP-2019-Cycle	East (ITC)	PHASE 3	Majestic - Milan 345 kV Line Tap	20	20	Battery Storage	BS Battery Storage
J1635	Active	6/25/2020	2/1/2022	Michigan Electric Transmi	Branch	MI	DPP-2020-Cycle	East (ITC)	PHASE 2	138kV Michigan Ave to Newton	100	100	Battery Storage	Battery Storage
J1659	Active	6/25/2020	2/1/2022	ITC Transmission	Washtenaw	MI	DPP-2020-Cycle	East (ITC)	PHASE 2	120 kV Dorset	100	100	Battery Storage	Battery Storage
J1492	Active	6/25/2020	8/15/2023	Michigan Electric Tranmis	Kent	MI	DPP-2020-Cycle	East (ITC)	PHASE 2	Gaines 138kV	150	150	Battery Storage	Battery Storage
J2026	Active	7/22/2021	12/2/2022	ITC Transmission	Gratiot	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	Regal	100	100	Battery Storage	Battery Storage
J1860	Active	7/22/2021	9/15/2024	Michigan Electric Transmi	Lenawee	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	Morocco to Beecher 138kV (8.36 miles from Morocco)	60	60	Battery Storage	Battery Storage
J1862	Active	7/22/2021	9/15/2024	Michigan Electric Transmi	Clinton	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	Bingham West 138kV	45	45	Battery Storage	Battery Storage
J1863	Active	7/22/2021	9/15/2024	Michigan Electric Transmi	Otsego	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	Vantyle 138kV	60	60	Battery Storage	Battery Storage
J1880	Active	7/22/2021	9/15/2024	Michigan Electric Transmi	Ottawa	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	Argenta to Tallmadge 345kV (33 miles from Argenta)	60	60	Battery Storage	Battery Storage
J1894	Active	7/22/2021	9/30/2024	Michigan Electric Transmi	Kalamazoo	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	Jaguar	200	200	Battery Storage	Battery Storage
J1900	Active	7/22/2021	9/30/2024	ITC Transmission	Wayne	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	BROWNSTOWN 120kV	200	200	Battery Storage	Battery Storage
J1902	Active	7/22/2021	9/30/2024	ITC Transmission	Wayne	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	IRONTON 120 kV	200	200	Battery Storage	Battery Storage
J2100	Active	7/22/2021	9/30/2024	Michigan Electric Transmi	Van Buren	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	Palisades	250	250	Battery Storage	Battery Storage
J1951	Active	7/22/2021	10/1/2024	ITC Transmission	Monroe	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	Lemoyne-Majestic 345kV	50	50	Battery Storage	Battery Storage
J1980	Active	7/22/2021	10/1/2024	Michigan Electric Transmi	Kent	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	Vergennes 138kV	50	50	Battery Storage	Battery Storage
J1982	Active	7/22/2021	10/1/2024	Michigan Electric Transmi	Gladwin	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	Grout Junction - Alger Junction 138kV	25	25	Battery Storage	Battery Storage
J1984	Active	7/22/2021	10/1/2024	Michigan Electric Transmi	Ottawa	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	Tallmadge 138kV	50	50	Battery Storage	Battery Storage
J1844	Active	7/22/2021	10/7/2024	ITC Transmission	Washtenaw	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	19CVTRY	100	100	Battery Storage	Battery Storage
J2064	Active	7/22/2021	10/7/2024	Michigan Electric Transmi	Jackson	MI	DPP-2021-Cycle	East (ITC)	Study Not Started	Tompkins 138 kV	100	100	Battery Storage	Battery Storage

STATE OF MICHIGAN

BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

In the matter of the Application of **CONSUMERS ENERGY COMPANY** for Approval of an Integrated Resource Plan under MCL 460.6t, certain accounting approvals, and for other relief.	U-21090 ALJ Sally Wallace

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PROOF OF SERVICE

On the date below, an electronic copy of **Official Exhibits of Michigan Environmental Council, Natural Resources Defense Council, Sierra Club and Citizens Utility Board of Michigan (MEC-135 through MEC-137)** were served on the following:

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The statements above are true to the best of my knowledge, information and belief.

OLSON, BZDOK & HOWARD, P.C.
Counsel for MEC, NRDC, SC, CUB

Date: May 23, 2022

By: Karla L Gerds Digitally signed by Karla Gerds Date: 2022.05.23 09:21:42 -04'00'

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