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MEMORANDUM

DATE: June 27, 2017
TO: Michigan Public Service Commission
FROM: Eric Stocking – Resource Adequacy & Retail Choice
SUBJECT: Staff comments and observations on filings under U-18197

**MPSC Staff Comments RE:
Self-Assessments by Electric Utilities of Ability to Meet Customers’
Electric Requirements and Associated Reserves
MPSC Case No. U-18197**

On January 12, 2017, the Michigan Public Service Commission (MPSC or Commission) issued an order in Case No. U-18197 for certain Michigan energy providers¹ to submit their electric supply reliability plans for 2017 through 2021 to the Commission.

“Each assessment should include the LSE’s expected peak demand and the resources available and committed to meet peak demand, including applicable regional transmission organization (RTO) requirements such as expected reserves by applying MISO’s 2017-2018 planning year reserve for each of the five years addressed by this order. [...] Each assessment should justify the expected reserve margin in light of the LSE’s circumstances, including the reliability characteristics of its resource base and the characteristics and diversities of the customer load. Load forecasts should separately identify choice load and bundled load. Each assessment should also distinguish between in-state and out-of-state generation resources, and any applicable transmission service or capacity import limits, and analyze how this generation is expected to serve customer demand and meet applicable RTO requirements such as MISO Module E requirements.”

This order also directed the Commission Staff to compile and analyze the supply plans submitted by these load-serving entities (LSEs) and other interested entities, and to assess the overall capacity

¹ These load-serving entities (LSEs) are Consumers Energy, DTE Electric, I&M, Alpena Power Company, Upper Peninsula Power Company, Upper Michigan Energy Resources Corporation, Northern States Power Company, d/b/a Xcel Energy, and the following electric cooperatives: Alger-Delta Cooperative Electric Association, Cherryland Electric Cooperative, Cloverland Electric Cooperative, Great Lakes Energy Cooperative, Midwest Energy Cooperative, The Ontonagon County Rural Electrification Association, Presque Isle Electric & Gas Co-op, Thumb Electric Cooperative of Michigan, and HomeWorks Tri-County Electric Cooperative.

outlook for Michigan and areas within Michigan in a report to be filed by June 30, 2017 in the same docket. This work was to be done in coordination with applicable regional transmission organizations as needed. The order also invited interested parties to file comments on the self-assessments and/or electricity capacity issues in Michigan.

This Staff report is based on the self-assessments submitted by each entity of its ability to meet its customers' expected electric requirements and associated reserves during the upcoming five-year period, other submitted comments, and the resource adequacy survey conducted by the Midcontinent Independent System Operator, Inc. (MISO) in conjunction with the Organization of MISO States (OMS), commonly known as the OMS-MISO Survey.² No protected Critical Energy/Electric Infrastructure Information or other commercially sensitive information is disclosed in this Staff summary report.

The primary concern regarding resource adequacy in Michigan is driven by the recent, and potential for future retirement of many of Michigan's older coal-fired generation units, due in part to environmental regulations imposed by the United States Environmental Protection Agency, as well as age and economic considerations. The retirement of these resources significantly impacts the amount of in-state generation resources that can be utilized to meet the projected peak demand requirements in the coming years and could result in a possible capacity shortfall, depending on any import constraints.

Generally speaking, the primary focus of the Staff's analysis of the filings received in this proceeding has been on MISO Local Resource Zone (LRZ) 7, which comprises the Lower Peninsula of Michigan (with the exception of the southwest corner, served by the Indiana Michigan Power Company (I&M), a PJM Regional Transmission Organization market participant). Additionally, to the extent that LRZ 7 could experience significant reliability concerns as early as the 2018/19 planning year, Staff is keenly interested in working with the Michigan LSEs to address these concerns in a proactive manner.

The term 'capacity shortfall,' when used in the context of the relative capacity position of a particular LRZ, has the potential to be misinterpreted. The manner in which this term is defined can yield a significant impact on the results, and how those results can be interpreted. Staff proposes that for the purposes of its analysis, the term 'capacity surplus (shortfall)' will be defined as:

The expected total load forecast plus the planning reserve margin requirements versus the total number of available planning resources residing within a particular LRZ.

When defined in this manner, the capacity surplus or shortfall of a particular zone is equal to the difference between the total amount of MW (or in the case of Staff's analysis in this matter, Zonal Resource Credits (ZRCs)) that are owned or contractually obligated to a particular LSE, and its respective Planning Reserve Margin Requirements (PRMR). For purposes of this calculation, the

²<https://www.misoenergy.org/Library/Repository/Meeting%20Material/Stakeholder/Workshops%20and%20Special%20Meetings/2017/20170616%20OMS-MISO%20Survey%20Results%20Conference%20Call/2017%20OMS-MISO%20Survey%20Results.pdf>

capacity resources must be physically located within LRZ 7. Provided that any shortfall experienced by a particular zone is less than the zonal Capacity Import Limit (CIL), as determined by MISO in the Planning Year 2017/18 Loss of Load Expectation Study Report,³ and the amount of resources in the zone is greater than the Local Clearing Requirement (LCR), the zone can theoretically meet its load and reserve obligations without violating the loss of load expectation (LOLE) reliability criteria of one day of outage in 10 years due to an insufficient amount of resources. Specifically, an LRZ can fall short of its planning reserve margin requirements, as long as the following conditions are not violated:

- The magnitude of the shortfall is less than the amount of resources that can physically be imported.
- The LRZ must have a specified amount of capacity resources, equal to or greater than the local clearing requirement (LCR), physically located within the LRZ in order to meet the LOLE reliability criterion.

The **only exception** to this condition would occur if there were not sufficient capacity resources available within the MISO footprint outside of the LRZ and available for import. In this specific case, even if the zonal capacity shortfall is less than the CIL, the LRZ could potentially not meet its capacity obligations due to an overall lack of available resource within the MISO footprint. With this caveat, in which there is an insufficient amount of resources available within MISO's footprint to import into a particular LRZ to satisfy its respective PRMR, the statistical likelihood of a resource adequacy related outage would increase exponentially, depending on the severity of the shortage, such as an extended period of extremely hot weather in multiple regions of the country and/or significant unplanned generator or transmission outages.

³ 2017 Loss of Load Expectation Study Report
<https://www.misoenergy.org/Library/Repository/Study/LOLE/2017%20LOLE%20Study%20Report.pdf>

Local Resource Zone 7

Table 1

U-18197 Results - LRZ 7 Capacity Position (ZRCs)						
Line #	Item		PY 2018/19	PY 2019/20	PY 2020/21	PY 2021/22
1	Planning Reserve Margin Requirements (PRMR)	{1}	22,170	22,170	22,170	22,170
2	Local Clearing Requirement	{2}	20,973	20,973	20,973	20,973
3	Capacity Import Limit		3,320	3,320	3,320	3,320
4	Total Company Owned - LRZ 7		18,304	18,608	18,470	18,724
5	Total PPA/Contract - LRZ 7		1,865	2,005	2,004	1,884
6	Total Qualified Demand Response Resources - LRZ 7		1,010	1,166	1,227	1,298
7	Total LRZ 7 Planning Resources		21,179	21,779	21,701	21,906
9	LRZ 7 Resources Vs. MISO LCR (Line 7 - Line 2)		206	806	728	933
10	LRZ 7 Capacity Surplus (Imports) (Line 7 - Line 1)		(991)	(391)	(469)	(264)
{1} Consistent with the assumptions included in the 2017 OMS-MISO Resource Adequacy Survey, Staff's analysis in this matter projects a slight decrease in PRMR in 2018, compared to the 2017 Zone 7 PRMR value of 22,295.						
{2} Zone 7 LCR for 2018 is calculated based on the 2017 LCR/PRMR ratio of 94.6%.						

On April 14, 2017 the MISO published a summary of the annual Planning Resource Auction (PRA) results for the 2017/18 planning year.⁴ The PRA is a residual market for LSEs who do not have sufficient generation resources or purchased power agreements to satisfy their capacity obligations. Capacity resources, either within or outside the LRZ in question, may be obtained by an LSE to meet its planning reserve margin requirements through the PRA, owning a resource outside of the Zone, or bilateral contract.

Of particular interest to Staff is the LCR. The LCR is defined as the amount of planning resources required within a particular zone in order to meet the one day in 10 years LOLE criteria. Staff recognizes the importance of a particular LRZ meeting its LCR. Failure to do so would violate the Federal Energy Regulatory Commission (FERC)-approved North American Electric Reliability Corporation reliability standards and the MISO LOLE process, and it would also place a financial burden on certain rate-payers within the Zone. As indicated by line 9 of Table 1, Staff's findings in this matter indicate that LRZ 7 is likely to exceed its LCR by 206 ZRCs in 2018. Any

⁴ <https://www.misoenergy.org/Library/Repository/Report/Resource%20Adequacy/AuctionResults/2017-2018%20PRA%20Summary.pdf>

changes in actual 2018 PRMR requirements, or unforced capacity (UCAP) ratings of Zone 7 resources in 2018 will have a direct impact on this positive balance.

Line 10 of Table 1 outlines the capacity position of LRZ 7 relative to the PRMR. Based on Staff's analysis of LSE filings in this docket, when only generation resources physically located within LRZ 7 are considered, there is an expected shortfall of approximately 991 ZRCs in the 2018/19 planning year. Therefore, Staff would expect approximately 991 ZRCs to be imported into LRZ 7 in the 2018 PRA, which is well below the Zone's CIL of 3,320 ZRCs. As a point of reference, the 2017 MISO PRA results indicate that Zone 7 imported 338 ZRCs.

Hypothetically, if a particular LRZ was projected to experience a capacity shortfall that approached the magnitude of its CIL, it would cause concern amongst the stakeholders with responsibilities regarding resource adequacy. Since the process by which the planning reserve margin is calculated is a probabilistic determination, even if the capacity shortfall exceeded the CIL, it would not necessarily mean that the LRZ in question would experience an outage. The probability of such an outage, however, would exceed the generally accepted criteria that govern the resource adequacy planning process.

Significant Changes in 2018

- Palisades Nuclear Plant
 - Consistent with information contained in Consumers Energy's filing in this docket, as well as in Case No. U-18250, Palisades Nuclear Plant (Palisades) is assumed to be retired in October 2018 in this analysis. Although Palisades will not have ZRCs associated with its output for planning year 2018/19, it will technically be available during the summer of 2018 to provide operational energy and capacity support. Therefore, the significant decrease in Zone 7 resources in 2018 due to the potential Palisades retirement could potentially yield some financial implications, if Zone 7 does not meet its LCR, but likely will not cause any significant operational concerns in the summer of 2018.
 - The exclusion of the total amount of ZRCs associated with the Palisades Nuclear Plant in 2018, even though Palisades will technically be available throughout the summer peak months, implies that the results presented in this memorandum are somewhat conservative.
- St. Clair Power Plant
 - Due to the fire at the St. Clair Power Plant in 2016, which caused significant damage to the building and common equipment, the 2018 UCAP rating of the plant will be significantly impacted due to the forced outage rate impacts. The UCAP rating for the entire plant is projected to decrease by approximately 300 MW from its 2017 capacity rating. If there were to be any delays in returning St. Clair units to service, the effect would be an additional effective capacity derating of those units. However, to the extent that the units are available during the summer peak months, any additional UCAP deratings at would have minimal effect on operational reliability.

- Unit UCAP Ratings
 - In recent years, a few Zone 7 generating units have experienced forced outage events, thereby decreasing the UCAP capacity rating of those units on a three-year rolling average basis. Based on the submittals in U-18197, these units are expected to return to their historical average forced outage rate, thereby increasing the amount of ZRCs available to meet Michigan capacity needs in the future.
- Decreasing Load Forecast and Planning Reserve Margin Requirement
 - Over the past few years Zone 7 has seen a slight decrease in load forecast and PRMR, annually. Lowering a particular Zone's PRMR decreases the amount of planning resources that are required to meet its total capacity obligation in the annual MISO PRA. Consistent with recent historical trends, and with the results of the 2017 OMS-MISO Survey, the analysis presented in this memorandum assumes a slight decrease in the 2018/19 Zone 7 PRMR.

Comparison to 2017 OMS-MISO Resource Adequacy Survey

In June 2017, OMS and MISO published the results of their latest resource adequacy survey, which indicated that LRZ 7 would experience a capacity shortfall of between 700 and 1000 MW⁵ in the 2018/19 planning year. Staff consulted with MISO to ensure that our results were generally consistent. The findings of this investigation is that the results of the OMS-MISO Survey are consistent with Staff's findings in U-18197, with one key difference:

- OMS-MISO survey results are presented in terms of installed capacity (ICAP).
 - Staff's analysis was performed on an UCAP basis.⁶
 - 1 UCAP MW is equal to 1 ZRC.
- OMS-MISO capacity shortfall for LRZ 7 in UCAP basis is roughly equal to the Staff findings in this matter.

Accounting for this known and measurable difference in survey methodology shows that Staff's analysis of the filings in Commission Case No. U-18197 and the 2017 OMS-MISO Survey share a very similar outlook of the relative capacity position of LRZ 7 for the 2018/19 planning year.

The 2017 OMS-MISO Resource Adequacy Survey indicates that MISO as a whole will have a committed resource reserve margin of 17.9% in 2018, on an ICAP basis. This value exceeds the one day in 10 year LOLE reliability criteria requirement of 15.8%. This abundance of reserve resources is expected to increase over time. Therefore, it is expected that for any potential resource shortage experienced by a particular zone, there is likely adequate capacity resources elsewhere in

⁵ OMS-MISO Survey reports an LRZ 7 shortfall of 0.7 GW when accounting for committed capacity resources. Potential capacity outages account for an additional 0.3 GW, resulting in an overall capacity shortfall range of 0.7 – 1.0 GW.

⁶ Unforced Capacity (UCAP) of a particular generating unit is a measure of the amount of capacity available to an LSE to meet its capacity obligations, when accounting for historical average unplanned outage rates.

MISO that could be imported to alleviate the shortage condition, subject to the zone's overall capacity import limit and local clearing requirement limitations.

Demand Response and Dynamic Peak Pricing

As part of its analysis in this matter, Staff reviewed the LSEs' demand response (DR) programs as an optional source of effective capacity. A reduction in demand through the use of DR programs could potentially offset the need for a portion of capacity needed by LSEs. LSEs can utilize interruptible DR during critical peak times to quickly respond to bulk electric system needs and potentially delay future capital investment in new generation. Behavioral DR programs allow the utility to lower their peak demand forecast, thus avoiding the need for some costly supply side resources.

Demand response is expected to play a prominent role in the LSEs' upcoming integrated resource plan filings where it is required to be considered along with traditional supply side resources for meeting capacity needs. Public Act 341 of 2016 directed Staff to complete a statewide study of DR potential in Michigan, and efforts are currently underway to accomplish this task. Upon completion of the study, Staff and stakeholders will have a firmer grasp on how existing plans for DR match up with the potential for such programs.

Staff is encouraged by the LSEs' plans for existing DR programs and their expansion efforts, which result in a significant reduction to peak capacity needs. However, until the statewide potential study is completed, Staff cannot have a complete understanding of the optimal level of DR.

Indiana Michigan Power (PJM)

The 2017 through 2021 electric supply reliability plan filed by Indiana Michigan Power Company (I&M) in U-18197 reflects the company as a stand-alone utility, due to the termination of the American Electric Power Company, Inc. (AEP) Interconnection Agreement which ended the previous pooling agreement in December 2013.⁷ However I&M has an interim FERC-approved arrangement which allows them continue with the PJM Fixed Resource Requirement (FRR) option that allows them to opt out of participation in the PJM competitive capacity market and are still included within the PJM AEP Zone.

However, as a participant in the PJM energy market, I&M is subject to the performance rules and regulations of the PJM capacity market structure. In response to poor generator performance during the Polar Vortex in 2014, PJM developed new penalties and enhanced performance requirements for generators in their Capacity Performance proposal approved by the FERC in Docket No. ER15-623-000.⁸ These requirements apply to all of the LSEs in PJM, including those electing the FRR option, such as I&M. The FERC order approving PJM's proposal requires that all resources must meet Capacity Performance requirements by 2020. For the purpose of its report, I&M makes the following assumptions about how particular resources meet the capacity performance requirements:

⁷ Indiana Michigan Power U-17751 filing, p. 1. <http://efile.mpsc.state.mi.us/efile/docs/17751/0014.pdf>

⁸ <http://www.pjm.com/committees-and-groups/committees/elc.aspx>

- Run-of-river hydroelectric units have a capacity value of 25% of nameplate capacity.
- Solar resources have a capacity value of 38% of nameplate capacity.
- Wind resources have a capacity value of 5% of nameplate capacity.

I&M does not anticipate any retirements of company owned plants on its system through 2021. Additionally, I&M expects the peak load and associated PRMR on its system to decrease slightly through Planning Year 2021/22. Table 2 below outlines the details of I&M's filing in U-18197.

Table 2

Item	PY 2017/18	PY 2018/19	PY 2019/20	PY 2020/21	PY 2021/22
Total Planning Reserve Margin (expected reserves), UCAP MW	4,673	4,551	4,594	4,208	4,212
Total Company Owned Generation, MW	4,278	4,303	4,303	4,321	4,321
Total Qualified Demand Response Resources including PRMUCA, MW	228	240	240	120	169
Total PPA, MW	180	181	180	93	166
Total Planning Resources, MW	4,686	4,724	4,723	4,534	4,656
UCAP Surplus/(Shortfall), MW	13	173	129	326	444

Based on the data provided by I&M, the generation resources owned by the Company are expected to be adequate to serve I&M's load obligations.

In its 2017 Summer Assessment, the Federal Electric Reliability Commission (FERC) projects that PJM will have a reserve margin approaching 28%.⁹ With such an abundance of reserve resources, it is anticipated that if I&M were to encounter an unanticipated shortfall in the immediate future, it could easily be accommodated through the procurement of some amount of these reserve resources.

Local Resource Zone 2 (MI Upper Peninsula)

MISO's LRZ 2 encompasses almost the entire Upper Peninsula (UP) of Michigan and northern and eastern Wisconsin. MISO does not define MW capacity imports or export limits between states within the boundaries of the same MISO LRZ. However MISO does define that Zone 2 has a CIL of 2,227 ZRCs. Considering this, aggregation of data supplied by the UP utilities in their filings for the purposes of determining a net capacity position, as Staff did in its analysis of LRZ 7, is not applicable to LRZ 2 because it is located in both Michigan and Wisconsin.

The Wisconsin Electric Power Company (WEPCo) and the Wisconsin Public Service Corporation (WPS Corp) filed an application with the MPSC requesting the approvals necessary to establish the Upper Michigan Energy Resources Corporation (UMERC) as a Michigan-only electric and natural gas service utility and to transfer WEPCo's Michigan electric distribution assets and WPS

⁹ <https://www.ferc.gov/market-oversight/reports-analyses/mkt-views/2017/2017-summer-assessment.pdf>

Corp's Michigan electric and natural gas distribution assets to UMER. ¹⁰ UMER serves nearly 40,000 energy customers in Michigan's Upper Peninsula.

As discussed in previous Reliability Assessments, MISO determined that there are limitations to the transmission system in the UP that require the availability of the Presque Isle Power Plant (PIPP) to reliably serve all of the load in the UP until such time as additional generation and/or transmission in the UP are constructed. The PIPP is owned and operated by WEPCo and is subject to the Amended and Restated Settlement Agreement (ARSA). ¹¹ Under the ARSA, WEPCo has agreed to operate the PIPP according to prudent utility practice, and provide safe, reliable, and adequate electric service to all of WEPCo's Michigan customers.

The transmission system in the UP and Eastern Wisconsin is owned by the American Transmission Company, LLC (ATC) and operated by the MISO. ATC is the transmission service provider under MISO's tariff. As part of their plans to reinforce the electrical transmission grid in the UP and northeastern Wisconsin, ATC is moving forward with the Bay Lake Project. ¹² UMER's applications before the Commission in Case No. U-18224 requesting approval for construction of two Reciprocating Internal Combustion Engine (RICE) electric generation facilities in the UP and for the Retail Large Curtailable Contract with Tilden are pending. ¹³ Upon completion of the overall Bay Lake Project in 2019, and approval and construction of the proposed RICE units, localized resource adequacy and operational reliability issues experienced in the northern Wisconsin and Michigan's UP region should be lessened.

The 2017 OMS-MISO Survey results indicate a capacity surplus of 6,000 MW in the 2018/19 planning year for LRZ 2. Notwithstanding the localized reliability issues in the UP, 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 for the 2018/19 planning year.

¹⁰ <http://efile.mpsc.state.mi.us/efile/viewcase.php?casenum=18061&submit.x=0&submit.y=0>

¹¹ <http://efile.mpsc.state.mi.us/efile/viewcase.php?casenum=17682&submit.x=0&submit.y=0>

¹² <http://www.atc-projects.com/projects/bay-lake/>

¹³ <http://efile.mpsc.state.mi.us/efile/viewcase.php?casenum=18224&submit.x=0&submit.y=0>