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## MEMORANDUM

DATE: June 29, 2016

TO: Michigan Public Service Commission

FROM: Paul Proutfoot – Director of Electric Reliability Division

SUBJECT: Staff comments and observations on filings under U-17992

**MPSC Staff Comments RE:  
Self-Assessments by Electric Utilities of Ability to Meet Customers' Electric Requirements  
and Associated Reserves  
MPSC Case No. U-17992**

On December 22, 2015, the Commission issued an order in Case No. U-17992 for certain Michigan energy providers<sup>1</sup> to submit their electric supply reliability plans for 2016 – 2020 to the Commission.

*“Each assessment should include the LSE’s expected peak demand, the resources available and committed to meet peak demand, including applicable regional transmission organization (RTO) requirements such as expected reserves by applying MISO’s 2016-2017 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 analyze how this generation is expected to serve customer demand and meet applicable RTO requirements such as MISO Module E capacity tracking 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 outlook for Michigan and areas within Michigan in a report to be filed by August 12,

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<sup>1</sup> These load-serving entities (LSEs) are Consumers, DTE Electric, I&M, Alpena Power Company, Upper Peninsula Power Company, Wisconsin Electric Power Company, Wisconsin Public Service Corporation, Northern States Power Company, d/b/a Xcel Energy, and the following electric cooperatives: Alger-Delta Co-operative Electric Association, Cherryland Electric Cooperative, Cloverland Electric Co-operative, 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.

2016 in the same docket. This work was to be done in coordination with applicable regional transmission organizations (RTOs) as needed. The order also invited interested parties to file comments on the self-assessments and/or electricity capacity issues in Michigan.

The 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 Organization of MISO States (OMS)-MISO Resource Adequacy Survey<sup>2</sup>. No protected CEII or commercially sensitive information is disclosed in this summary Staff report.

The primary concern regarding resource adequacy in Michigan is driven by the recent and impending 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 (EPA), as well as age and economic considerations. The retirement of these resources yields a significant impact on the amount of in-state generation resources that can be utilized to meet the projected peak demand requirements in the coming years.

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 Indiana Michigan Power, a PJM market participant). Additionally, to the extent that LRZ 7 could experience a capacity shortfall as soon as the 2017/2018 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 Load Serving Entity (LSE), and its respective Planning Reserve Margin Requirements (PRMR). For purposes of this calculation, the capacity resources must be physically located within LRZ 7. Provided that any shortfall experienced by a particular LRZ is less than the zonal Capacity Import Limit (CIL), as determined by MISO in the Loss of Load Expectation (LOLE) Working Group<sup>3</sup>, and greater than the Local Clearing Requirement (LCR), the LRZ can theoretically meet its load and reserve obligations without violating the 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:

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<sup>2</sup><https://www.misoenergy.org/Library/Repository/Meeting%20Material/Stakeholder/Workshops%20and%20Special%20Meetings/2016/OMS-MISO%20Survey/2016OMS-MISOSurveyResults.pdf>

<sup>3</sup> 2016 Loss of Load Expectation Study Report

<https://www.misoenergy.org/Library/Repository/Study/LOLE/2016%20LOLE%20Study%20Report.pdf>

- 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 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 in MISO 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 a period of extremely hot weather in multiple regions of the country and/or unplanned major generator or transmission outages.

### Local Resource Zone 7 (LRZ 7)

Table 1

<b>U-17992 Results - LRZ 7 Capacity Position (UCAP MW)</b>						
Line #	Item		PY 2017/18	PY 2018/19	PY 2019/20	PY 2020/21
1	Planning Reserve Margin Requirements (PRMR)	[1]	22,406	22,406	22,406	22,406
2	Local Clearing Requirement	[2]	20,851	20,851	20,851	20,851
3	Capacity Import Limit	[3]	3,521	3,521	3,521	3,521
4	Total Company Owned - LRZ 7		18,514	18,606	18,806	18,439
5	Total PPA/Contract - LRZ 7		2,740	2,754	2,712	2,711
6	Total Qualified Demand Response Resources including PRMUCAP - LRZ 7		882	948	1,023	1,081
7	Total LRZ 7 Planning Resources		22,136	22,308	22,541	22,231
8	Total Owned or Contracted Planning Resources - LRZ 7	[4]	22,910	23,044	23,272	22,960
9	<b>LRZ 7 Resources Vs. MISO LCR (Line 7 - Line 2)</b>		<b>1,285</b>	<b>1,457</b>	<b>1,690</b>	<b>1,380</b>
10	<b>LRZ 7 Capacity Surplus (Shortfall) (Line 7 - Line 1)</b>		<b>(270)</b>	<b>(98)</b>	<b>135</b>	<b>(175)</b>
11	<b>Total Contracted Resources Vs. MISO PRMR (Line 8 - Line 1)</b>	[4]	<b>504</b>	<b>638</b>	<b>866</b>	<b>554</b>
12	<b>Total Contracted Resources Vs. MISO PRMR [LRZ 4 RETIREMENTS]</b>	[5]	<b>(225)</b>	<b>(91)</b>	<b>137</b>	<b>(175)</b>
[1] MISO Published LRZ 7 PRMR for planning year 2016/17 is 22,406. PRMR is not published for future planning years. For the purpose of its analysis, Staff assumes that the PRMR remains constant.						
[2] MISO published LRZ 7 LCR for planning year 2016/17 is 20,851. LCR is not published for future planning years. For the purpose of its analysis, Staff assumes that the LCR remains constant.						
[3] MISO published LRZ 7 CIL for planning year 2016/17 is 3,406. CIL is not published for planning years beyond 2016/17. For the purpose of its analysis, Staff assumes that the CIL remains constant.						
[4] Includes capacity resources outside of LRZ 7 that are owned or contracted to an LSE within LRZ 7.						
[5] <a href="http://www.nel.org/News-Media/Media-Room/News-Releases/Market-Conditions-Shutter-Three-Illinois-Reactors">http://www.nel.org/News-Media/Media-Room/News-Releases/Market-Conditions-Shutter-Three-Illinois-Reactors</a>						

On May 4, 2016 the MISO published a summary of the annual Planning Resource Auction results for the 2016/2017 planning year<sup>4</sup>. The PRA is a residual market for LSEs who do not have sufficient generation resources or purchased power agreements that are sufficient to satisfy their capacity obligations. Capacity resources, either within or outside the LRZ in question, may be obtained by an LSE to meet the LSE's peak load obligations through the PRA.

Of particular interest to Staff is the Local Clearing Requirement (LCR). The LCR is defined as the amount of planning resources required within a particular zone in order to meet the 1 day in 10 years LOLE criteria. Staff recognizes the importance of a particular LRZ meeting its LCR. Failure to do so not only threatens the FERC-approved NERC reliability standards and the MISO LOLE process, it also places a financial burden on all rate-payers within the LRZ. As indicated by line 9 of Table 1, Staff's findings in this matter indicate that LRZ 7 is not likely to fall short of its LCR for the foreseeable future.

Line 10 of Table 1 outlines the capacity position of LRZ 7 relative to the Planning Reserve Margin Requirements. 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 270 ZRCs in the 2017/2018 planning year. Therefore, Staff would expect approximately 270 ZRCs to be imported into LRZ 7 in the 2017/18 planning year during the peak period, which is well below the zone's CIL of 3,521 MWs/ZRCs.

However, when resources that are located outside of LRZ 7 but are owned or under contract to serve load within LRZ 7 are considered in addition to the in-zone resources, Staff expects the overall capacity position of LRZ 7 to appear more optimistic. The results of this comparison are outlined in Table 1, Line 11. In this case, the projected amount of capacity that will be imported into LRZ 7 is expected to be well within the CIL constraints as defined by MISO. Therefore, as long as the absolute value of the capacity shortfall (line 10) is less than the CIL (Line 3) Staff assumes that additional capacity can be imported from elsewhere in MISO to satisfy the Planning Reserve Margin Requirements. LSE filings in U-17992 represented approximately 739 ZRCs of capacity resource either owned or contracted for outside of, but intending to serve load within LRZ 7. Since the Commission has no current authority to examine the details of such contracts, Staff has no means to confirm the availability of such capacity resources, which make reliance on them largely uncertain.

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 CIL 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.

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<sup>4</sup>[https://www.misoenergy.org/Library/Repository/Meeting%20Material/Stakeholder/RASC/2016/20160504/20160504%20RASC%20Item%2003a%202016-17\\_PRA\\_Summary.pdf](https://www.misoenergy.org/Library/Repository/Meeting%20Material/Stakeholder/RASC/2016/20160504/20160504%20RASC%20Item%2003a%202016-17_PRA_Summary.pdf)

## Risk Assessment

Staff notes that while the near-term resource adequacy outlook in LRZ 7 is improving in comparison to previous studies, the long-term resource adequacy outlook in Michigan remains uncertain. DTE Energy Co. (DTE)<sup>5</sup> has announced that it intends to retire eight coal-fired generation units between 2020 and 2023 due to age and economic considerations. Furthermore, Staff is concerned that if a significant mechanical failure event should occur in the near-term at a DTE unit slated to retire by 2023, it is likely that DTE would suspend operation of the unit, rather than repair and return it to service. Based on the age of the units, as well as economic considerations, DTE may decide that a significant capital investment into such a plant will not be the least cost solution to satisfy their capacity obligations.

Another area of concern is the overall capacity position of the MISO region. Historically, if a particular LSE did not possess adequate generation capacity, it could choose to procure additional capacity resources in the annual MISO PRA. Currently, this is a viable option provided that a reasonably priced surplus of available capacity options exist elsewhere in the MISO region, and there is sufficient capacity import capability into the LRZ in question.

However, due to recently announced closure of nuclear<sup>6</sup> and coal-fired<sup>7</sup> generators in Illinois within the next three years, the overall MISO capacity market is tightening. In comparison to last years survey, the 2016 OMS/MISO resource adequacy survey<sup>8</sup> shows an significant decrease in forecasted regional capacity surplus. Staff asserts that the loss of capacity resources throughout the region constitutes a major risk to resource adequacy in Michigan. This is especially true if any portion of these at-risk capacity resources in Illinois are utilized to satisfy capacity requirements within Michigan. While these retirements will not directly affect the ability for LRZ 7 to meet or exceed its MISO-established LCR, they could potentially compromise the LRZ's ability to meet its PRM requirements. Line 12 of Table 1 above shows the overall capacity position of LRZ 7, including resources committed to load within the LRZ, should any of the announced Illinois plants in LRZ 4 actually retire.

While not directly related to long-term capacity planning, Staff notes that concurrent unplanned outages at multiple generating units could cause localized voltage support and other electric reliability issues, depending on the operational conditions of the bulk electric system at the time that such an event occurred. While the resulting effects of such an event are difficult to ascertain, Staff contends that heavy reliance on transmission import capability, and a tightening capacity outlook throughout the MISO, would only exacerbate the local reliability issues associated with such an event.

Staff emphasizes that while the current resource adequacy outlook in Michigan may not pose an imminent threat, prudence requires evaluating a multitude of supply options to meet capacity obligations in the near- and long-term, in order to ensure reliable electric service to ratepayers in the future.

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<sup>5</sup> <http://www.prnewswire.com/news-releases/dte-energy-to-retire-eight-coal-fired-generators-at-three-plants-by-2023-300281685.html>

<sup>6</sup> <http://www.nei.org/News-Media/Media-Room/News-Releases/Market-Conditions-Shutter-Three-Illinois-Reactors>

<sup>7</sup> [http://phx.corporate-ir.net/phoenix.zhtml?c=147906&p=irol-newsArticle\\_Print&ID=2164582](http://phx.corporate-ir.net/phoenix.zhtml?c=147906&p=irol-newsArticle_Print&ID=2164582)

<sup>8</sup> <https://www.misoenergy.org/Library/Repository/Meeting%20Material/Stakeholder/RASC/2016/20160629/20160629%20RASC%20Item%2003%20OMS-MISO%20Survey%20Full%20Deck.pdf>

## Demand Response and Dynamic Peak Pricing

As part of the capacity analysis, Staff has reviewed the LSE's interruptible 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 demand response during critical peak times to quickly respond to bulk electric system needs and potentially delay future capital investment in new generation.

The Commission has issued an order in two cases<sup>9</sup> involving Michigan's largest regulated utilities, Consumers Energy Company and DTE Electric. The Commission recognizes potential in future DR programs. Both cases state that "[t]he Commission remains committed to ensuring strong education efforts by utilities for DR options, and to give an appropriate amount of consideration and analysis of DR programs as an alternative to new generation and to help lower costs."<sup>10</sup> The Commission has also directed "Staff to explore the feasibility of conducting a statewide study of DR potential in Michigan."<sup>11</sup>

Historically the customers with the largest loads offered the most demand reduction for the LSEs and fastest response in critical peak conditions. Studies have shown that with the availability of recently implemented technology, the residential class has significant potential to reduce critical peak load through interruptible load such as space conditioning load.<sup>12</sup> Staff notes that, in general, LSEs have identified interruptible demand response potential that has yet to be achieved. Additionally, some LSEs have identified behavioral demand response as a peak demand modifier throughout demand forecasts for the next five years. Staff contends that untapped DR exists, and as companies continue deployment of smart meters and other demand side tools as a way for customers to manage energy consumption, DR can provide additional peak load reduction. As an example, DTE Energy's recent Smart Currents Dynamic Peak Pricing Pilot provides insight as to the potential for behavioral demand response in the residential customer class.<sup>13</sup>

## Comparison to 2016 OMS/MISO Resource Adequacy Survey

In June 2016 the OMS/MISO published the results of their latest resource adequacy survey<sup>14</sup>, which indicated that LRZ 7 would experience a capacity shortfall of approximately 300 MW in the 2017/18 planning year. Staff conferred with MISO to reconcile the differences between our respective shortfall projections. The findings of this reconciliation are as follows:

- OMS/MISO survey results are presented in terms of Installed Capacity (ICAP).

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<sup>9</sup> Case No. U-17936 for DTE Electric and Case No. U-18013 for Consumers Energy Company.

<sup>10</sup> Case No. U-17936 and Case No. U-18013, March 29, 2015, p. 3.

<sup>11</sup> Case No. U-17936 and Case No. U-18013, March 29, 2015, p. 4.

<sup>12</sup> *Benchmarking of Demand Response Potentials – Final Report*, retrieved April 8, 2015, <https://www.xcelenergy.com/staticfiles/xcel/Regulatory/Regulatory%20PDFs/CO-DSM/Colorado-Benchmarking-of-Demand-Response-Potentials-2012.pdf>.

<sup>13</sup> *DTE Energy Smart Currents Dynamic Peak Pricing Pilot*, retrieved April 8, 2015, [https://www.smartgrid.gov/sites/default/files/doc/files/dte%20interim%20report%20final\\_01132014b.pdf](https://www.smartgrid.gov/sites/default/files/doc/files/dte%20interim%20report%20final_01132014b.pdf).

<sup>14</sup> <https://www.misoenergy.org/Library/Repository/Meeting%20Material/Stakeholder/RASC/2016/20160629/20160629%20RASC%20Item%2003%20OMS-MISO%20Survey%20Full%20Deck.pdf>

- Staff's analysis was performed on an Unforced Capacity Basis<sup>15</sup> (UCAP).
- 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-17992 and the 2016 OMS/MISO Survey<sup>16</sup> share a very similar outlook of the relative capacity position of LRZ 7 for the 2017/18 planning year.

### **Indiana Michigan Power (PJM)**

The 2016-2020 electric supply reliability plan filed by I&M in U-17992 reflects the company as a stand-alone utility, due to the termination of the AEP Interconnection Agreement which ended the previous pooling agreement in December 2013.<sup>17</sup> 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 Federal Energy Regulatory Commission (FERC) in Docket No. ER15-623-000.<sup>18</sup> 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 make the following assumptions about how particular resources meet the capacity performance requirements:

- Run-Of-River hydroelectric units have zero capacity value.
- 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 2020. The company indicates that it intends to add approximately 200 MW (nameplate) of wind power, and 15 MW (nameplate) of solar power. Additionally, I&M expects the peak load, and associated Planning Reserve Margin Requirements (PRMR), on its system to remain relatively constant through Planning Year 2020/21. Table 3 below outlines the details of I&M's filing in U-17992.

<sup>15</sup> 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.

<sup>16</sup> [http://www.eenews.net/assets/2016/06/13/document\\_ew\\_02.pdf](http://www.eenews.net/assets/2016/06/13/document_ew_02.pdf)

<sup>17</sup> Indiana Michigan Power U-17751 filing, p. 1.

<http://efile.mpsc.state.mi.us/efile/docs/17751/0014.pdf>

<sup>18</sup> <http://www.pjm.com/committees-and-groups/committees/elc.aspx>

Table 3

Item	PY 2016-2017	PY 2017-2018	PY 2018-2019	PY 2019-2020	PY 2020-2021
Total Planning Reserve Margin (expected reserves), UCAP MW	4,614	4,640	4,554	4,562	4,548
Total Company Owned Generation, UCAP MW	4,152	4,259	4,288	4,288	4,302
Total Qualified Demand Response Resources including PRMUCAP, MW	232	232	232	232	232
Total PPA, UCAP MW	186	192	198	200	171
Total Planning Resources, UCAP MW	4,570	4,683	4,718	4,720	4,705
UCAP Surplus/(Shortfall), MW	(44)	43	164	158	157

Based on the data provided by I&M, the generation resources owned by the Company, plus limited bilateral purchases in year in which a capacity deficit exists, are expected to be adequate to serve I&M's load obligations.

### Local Resource Zone 2 (MI Upper Peninsula)

MISO's LRZ 2 encompasses the entire Upper Peninsula (UP) of Michigan and most of north 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 1,703 ZRCs. Considering this, aggregation of data supplied by 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 Michigan and Wisconsin.

A primary cause of uncertainty surrounding resource adequacy and operational reliability in the UP is centered on the future of the Presque Isle Power Plant (PIPP) currently owned and operated by Wisconsin Electric Power Company (WEPCo). WEPCo announced its intention to retire the plant in 2014. However, because the continued operation of PIPP was necessary to support the reliable operation of the bulk electric system, MISO designated the plant as a System Support Resource (SSR) pursuant to MISO's tariff. Currently, PIPP is no longer operating under an SSR agreement. It is now subject to the terms of the signed and approved settlement agreement in MPSC's Case No. U-17682. Furthermore in the order approving the settlement agreement, WEPCo will make necessary capital investments and continue operation of PIPP until the earliest of:

- December 31, 2019;
- A new generation resource to be sited in the Upper Peninsula;
- An earlier retirement date of PIPP agreed to between WEPCo and the Mines;

WEPCo has agreed that it will not enter into a SSR agreement with MISO for the operation of PIPP so long as both Mines (Tilden and Empire), if operational, remain full-requirements customers of WEPCo until the earliest of the same three qualifications listed above are satisfied.



All parties involved in this proceeding are still evaluating long-term generation and/or transmission solutions to maintain reliability in the Upper Peninsula.

The 2016 OMS/MISO survey results indicate a capacity surplus of 900 - 1,000 MW in the 2017/18 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 in the 2017/18 planning year.