BEFORE THE MINNESOTA OFFICE OF ADMINISTRATIVE HEARINGS
600 North Robert Street
St. Paul, MN 55101

FOR THE MINNESOTA PUBLIC UTILITIES COMMISSION
121 7th Place East, Suite 350
St Paul MN 55101-2147

IN THE MATTER OF THE APPLICATION OF XCEL ENERGY AND ITC MIDWEST LLC FOR A CERTIFICATE OF NEED FOR THE HUNTLEY-WILMARTH 345 KV TRANSMISSION LINE PROJECT	MPUC Docket No. E002, ET6675/CN-17-184 OAH Docket No. 82-2500-35157

DIRECT TESTIMONY AND ATTACHMENTS OF DR. STEVE RAKOW

ON BEHALF OF

THE MINNESOTA DEPARTMENT OF COMMERCE
DIVISION OF ENERGY RESOURCES

NOVEMBER 7, 2018

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I. INTRODUCTION

Q. Would you state your name, occupation and business address?

A. My name is Dr. Steve Rakow. I am employed as a Public Utilities Analyst Coordinator by the Minnesota Department of Commerce, Division of Energy Resources (Department or DOC). My business address is 85 7th Place East, Suite 280, St. Paul, Minnesota 55101-2198.

Q. What is your educational and professional background?

A. A summary of these items is included as DOC Ex. ___ at SRR-1 (Rakow Direct).

Q. What is your experience in regulatory matters?

A. I have provided economic analysis of numerous resource planning and resource acquisition filings. A summary of these items is included as DOC Ex. ___ at SRR-1 (Rakow Direct). I also follow some issues before the U.S. Nuclear Regulatory Commission and the Midcontinent Independent System Operator, Inc. (MISO). Finally, I provide analysis of a variety of other filings before the Minnesota Public Utilities Commission (Commission).

II. PURPOSE AND SCOPE

Q. What are your responsibilities in this proceeding?

A. I am submitting testimony on behalf of the Department that:

- summarizes the Northern States Power Company, doing business as Xcel Energy (Xcel), and ITC Midwest LLC (ITCM) (collectively, the Applicants) January 17, 2018 *Application to the Minnesota Public Utilities Commission for the Huntley –Wilmarth 345 kV Transmission Line Project* (Petition);
- presents the criteria established by Minnesota Statutes and Minnesota Rules that are relevant to the Commission's decisions regarding the Petition;
- introduces the other witnesses sponsored by the Department in this proceeding;
- provides the Department's analysis of the need for the proposed Huntley–Wilmarth 345 kV Transmission Line; and
- summarizes the Department's overall conclusions and recommendations at this time.

Q. Would you please introduce the other DOC witnesses in this proceeding and briefly identify the type of issues that their respective testimonies address?

A. In addition to myself, the Department is sponsoring two other witnesses in this proceeding:

- Mr. Matthew Landi who addresses alternatives; and
- Mr. Mark Johnson who addresses rate impacts.

III. OVERVIEW OF PROCEEDING

A. OVERVIEW OF FACILITY

Q. Please briefly describe the facility the Applicants are proposing.

A. The Applicants propose to construct an approximately 50-mile 345 kilovolt (kV) transmission line between Xcel's Wilmarth Substation north of Mankato, Minnesota and ITCM's Huntley Substation south of Winnebago, Minnesota (Project). The Applicants would also make modifications to the existing Wilmarth and Huntley substations to accommodate the new 345 kV transmission line.

Q. Please briefly describe the ownership structure for the proposed Project.

A. According to the Petition, Xcel and ITCM would own the proposed Project jointly as tenants in common. The equipment and improvements inside the Wilmarth Substation would be owned solely by Xcel Energy. The equipment and improvements inside the Huntley Substation would be owned solely by ITCM.

Q. Which entity proposes to construct the proposed Project?

A. Xcel would be responsible for the construction of the proposed 345 kV transmission line. Each Applicant would be responsible for the construction activities at its own substation.

Q. Which entity proposes to maintain the proposed Project after construction is complete?

A. Xcel would be responsible for the maintenance of the proposed 345 kV transmission line. Each Applicant would be responsible for the maintenance of its own substation.

Q. Have the Applicants stated how much the proposed Project would cost?

A. Yes. The Petition provides the Applicants' range of cost estimates. The Petition indicates that the proposed Project is estimated to cost between $105.8 million to $138.0 million (2016 dollars), depending upon the route and design option selected. See Mr. Landi's testimony for information regarding updated cost estimates.

Q. How would costs of the proposed facilities be recovered?

A. I refer to Department Witness Mr. Johnson's testimony for information on cost recovery.

Q. Have the Applicants proposed an in-service date for the proposed Project?

A. Yes. The Petition indicates that the expected in-service date is December 2021.

Q. According to the Applicants, what needs would be addressed by the proposed Project?

A. According to section 1.3 of the Petition several needs would be addressed by the proposed Project:

- improve efficiency by relieving congestion on the transmission system along the Minnesota/Iowa border;
- improve the deliverability of wind generation by reducing curtailments; and
- improve the robustness of the regional backbone transmission system.

Moreover, in section 1.8.2 of the Petition, the Applicants stated that the need is also driven by:

> …the expected coal generation retirements north of the Minneapolis/St. Paul area, such as Sherco 1, Sherco 2, and Clay Boswell Units 1&2, [which] increase the need for power to flow from northern Iowa to the Twin Cities on the currently congested Huntley – Blue Earth 161 kV line.

Q. What actions have the Applicants requested from the Commission?

A. The Petition requests that the Commission approve a certificate of need (CN) for the proposed Project.

B. OVERVIEW OF THE PROCESS

Q. Please summarize the overall Commission process for evaluating the proposed Project.

A. DOC Ex. ___ at SRR-2 (Rakow Direct) presents a high-level graphical representation of the Commission's four-step regulatory process that generally applies to new electric generation and transmission facilities.[1] This proceeding involves the second step

[1] Transmission facilities are not directly involved in integrated resource plans; however, transmission resources may affect and be affected by decisions made in such proceedings.

(resource acquisition); the third step (facility siting and routing) is in the companion routing docket to this proceeding, Docket No. E002,ET6675/TL-17-185.

Q. Is there a difference in the resources considered in resource planning proceedings and those considered in resource acquisition proceedings?

A. Yes. Resource planning proceedings often consider generic resources that reasonably reflect expected costs and other attributes (e.g. expected life, maintenance outages, etc.). Consideration of generic resources provides general estimates about the kinds of resources that may be available in the future. In contrast, resource acquisition proceedings compare actual resources that would be available to meet the needs identified in the planning process.

C. OVERVIEW OF STATUTES AND RULES

Q. Please summarize the provisions of Minnesota Statutes that might apply to the proposed Project.

A. CN petitions are governed by Minnesota Statutes § 216B.243. Facilities with a length greater than 1,500 feet and a capacity greater than 200 kV qualify as a large energy facility (LEF) under Minnesota Statutes § 216B.2421, subd. 2 (3). In turn, Minnesota Statutes §216B.243, subd. 2 requires that LEFs obtain a CN. Since the proposed Project would be greater than 1,500 feet in length and would have capacity greater than 200 kV, the proposed Project qualifies as an LEF and must obtain a CN.

Q. What is the decision criteria under Minnesota Rules for a CN petition?

A. Minnesota Rules 7849.0120 provides four broad criteria for the Commission to consider:

> A. the probable result of denial would be an adverse effect upon the future adequacy, reliability, or efficiency of energy supply to the applicant, to the applicant's customers, or to the people of Minnesota and neighboring states…
> B. a more reasonable and prudent alternative to the proposed facility has not been demonstrated by a preponderance of the evidence on the record…
> C. by a preponderance of the evidence on the record, the proposed facility, or a suitable modification of the facility, will provide benefits to society in a manner compatible with protecting the natural and socioeconomic environments, including human health… and
> D. the record does not demonstrate that the design, construction, or operation of the proposed facility, or a suitable modification of the facility, will fail to comply with relevant policies, rules, and regulations of other state and federal agencies and local governments.

In addition, there are certain statutory criteria that apply but do not appear to be directly reflected in Minnesota Rules. These statutes are addressed separately.

Q. Which of the CN decision criteria are you addressing?

A. I am addressing:

- Minnesota Rules 7849.0120 A (1) to (5), need analysis;
- Minnesota Rules 7849.0120 D other permits;
- Minnesota Statutes §216B.243, subd. 3 (9), regional robustness and lower costs; and

- Minnesota Statutes §216B.243, subd. 3 (11) whether the applicant has made the demonstrations required under subdivision 3a (Renewable Preference).

IV. ANALYSIS

A. MINNESOTA RULES 7849.0120 A

Q. What determination is required by Minnesota Rules 7849.0120 A?

A. Minnesota Rules 7849.0120 A requires the Commission to determine that "the probable result of denial would be an adverse effect upon the future adequacy, reliability, or efficiency of energy supply to the applicant, to the applicant's customers, or to the people of Minnesota and neighboring states…" The rule then proceeds to provide five specific criteria for the Commission to consider.

1. First Consideration

Q. What is the first consideration under Minnesota Rules 7849.0120 A?

A. Minnesota Rules 7849.0120 A (1) requires the Commission to consider "the accuracy of the applicant's forecast of demand for the type of energy that would be supplied by the proposed facility."

Q. Based on your understanding of MISO in general and this Petition specifically, does it appear that the demand for energy is the driving factor "on which the necessity for the facility is based"?

A. No. While MISO certainly considered expected loads, the Applicants' statement of need, identified in the Petition at page 1, is that the proposed Project "is needed to reduce transmission system congestion which will improve the efficiency of MISO's energy market resulting in lower wholesale energy costs." Moreover, as noted above, the expected closures of Sherco 1, Sherco 2, Clay Boswell 1 and Clay Boswell 2 are also driving the need for the proposed transmission line.

Q. What is the type of energy that would be supplied by the proposed Project?

A. The Petition at pages 65-66 under section 4.1.2 states the following:

> Currently, there is low-cost energy being produced in Iowa and southern Minnesota that is unable to serve load centers, like the Twin Cities, due to transmission constraints in the area of the southern Minnesota/northern Iowa border that create congestion. More specifically, some energy cannot be delivered to load centers because the loading limits on certain system components preclude this additional energy from being transmitted along those facilities. As a result, not all available wind energy can be delivered and it must be replaced by more costly substitute energy from other areas (without transmission constraints).

Therefore, the "type of energy" supplied by the proposed Project is congestion relief.

Q. Please explain what is meant by congestion.

A. The Petition at page 27 explains congestion as follows:

> Congestion happens when either the generators of electricity want to put more power on a line than the existing transmission facilities are able to accommodate or when consumers of electricity want to use more power than can be delivered from the most cost-effective generators … One important distinction to make is that congestion does not mean there is a system issue that is required to be fixed to ensure the reliability of the transmission system. System reliability issues are identified, analyzed and implemented through a very robust process governed by Federal, State, and local industry standards and requirements.

In summary, congestion is a situation that causes an excess of supply of or demand for the most cost-effective generation but customers' needs can still be met by less cost-effective generation. If customers' needs cannot be met at all, then a reliability issue exists. If customers' needs can be met, but must be done so in an uneconomic manner, an economic or congestion issue exists.

Q. Please provide your analysis related to Minnesota Rules 7849.0120 A (1).

A. My first step was to identify the cause of the congestion. Each year MISO develops the MISO Transmission Expansion Plan (MTEP). MISO evaluates various types of transmission projects in the MTEP process. The MTEP process ensures the reliable operation of the transmission system; supports achievement of state and federal energy policy requirements; and enables competitive electricity markets.

The congestion to be addressed by the proposed Project was identified through MISO's modeling for the *MISO Transmission Expansion Plan 2016* (MTEP16). Therefore,

a review of MTEP16 is required. MTEP16 is provided in the Petition as Appendix F and summarized in the Petition's Appendix G.

Generally, MTEP is a multi-step process. First, MISO determines several futures to model; these futures vary several key variables, including the demand for electricity, unit retirements, natural gas prices, and integration of renewable power. The goal is to provide "bookends" or highest and lowest potentials for future developments. MISO's MTEP16 analyzed the system under five different futures.[2]

Second, given that MISO is analyzing potential futures for the transmission system, the quantity of new generation to expect and where it will be located must be estimated. MISO uses a capacity expansion model to determine the size, type, and timing of future generation additions. The model was run for the years 2015 to 2034.[3] The locations of the new generation are discussed in MTEP16's Appendix E2 at pages 30-32 and are illustrated at pages 33-37. Many of the locations for new generation are in the project area.

Third, as will be discussed further, the congestion to be addressed by the proposed Project is being driven, in part, by wind generation. The amount of wind generation assumed in each of the five futures is provided in MTEP16 at page 103. The new (incremental) renewable generation across the MISO footprint for each future is:

- Limited Demand—3,600 MW wind and 1,375 MW solar;
- Business as Usual—5,400 MW wind and 1,500 MW solar;

[2] As noted above, the five future are referred to as Business as Usual, High Demand, Low Demand, Regional Clean Power Plan, and Sub-regional Clean Power Plan. For further information see page 107 of Appendix F.

[3] See pages 18 of Appendix E2 of MTEP16.

- Regional CPP—5,400 MW wind and 20,700 MW solar; and
- High Demand—8,700 MW wind and 1,700 MW solar;
- Sub-Regional CPP—25,800 MW wind and 23,100 MW solar.

Fourth, the data on new generation, along with load forecasts and other data is input to another model to analyze the transmission system. Data from three simulation years (2020, 2025 and 2030) was used as the basis for evaluating projects in the project area. A 20-year benefit was calculated by linearly interpolating and extrapolating from the three years.

Q. Please summarize the results of MISO's process in terms of the claimed need.

A. Based upon the modeling results, MISO determined that "the area with the most congestion, and therefore highest potential benefit, is on the border of Iowa and Minnesota."[4] The element of the transmission system that experiences significant congestion is the Huntley–Blue Earth 161 kV line.[5] More specifically, when the Lakefield–Wilmarth 345 kV path is lost the lower-voltage parallel path, the Huntley–Blue Earth 161 kV line, becomes congested.

MISO's MTEP16 report at page 110 summarized the cause of the congestion in the project area with a list of three main factors:

- the existing wind capacity and coal generation in northern Iowa;
- the increase in wind capacity in Iowa forecast for the next 15 years; and

[4] See Appendix G at page 105.

[5] The Huntley – Blue Earth line is in the proposed Project's study area.

- expected coal retirements near the Minneapolis/Saint Paul area.

Q. From this information what do you conclude must be forecasted under Minnesota Rules 7849.0120 A (1)?

A. As noted above, the Applicants stated that not all available wind energy can be delivered to load centers such as the Twin Cities given expected changes in generation. Given that retirements of coal generation facilities are known factors, and to reduce the issue to a manageable size, I focus on one forecast: the amount of wind capacity expected to be added in Minnesota and Iowa. This forecast is compared to the levels of new wind assumed by MISO to be added within the MTEP16 futures. This comparison provides information regarding the reasonableness of the conclusion that the amount of wind to be added in Minnesota and Iowa is enough to justify the economics of the proposed Project.

Q. Why are you providing a forecast of new wind capacity?

A. At the July 11, 2016 meeting of the Economic Planning Users Group (EPUG) MISO made a presentation stating that the proposed Project (referred to as alternative I-2 in MISO's presentation) is estimated to have a benefit/cost of 1.07 when MISO's Definitive Planning Phase (DPP) queue wind is modeled at 3.7 GW level, and a benefit/cost of 1.25 when DPP queue wind is modeled at 4.3 GW level.[6] In the MISO process, a Market

[6] See Department Ex. ___ SRR-3 (Rakow Direct) for the presentation.

Efficiency Project (MEP) must have a benefit/cost ratio of at least 1.25. MISO's EPUG presentation refers to the wind as being in Iowa and Minnesota.

Q. How does MISO process requests to connect new generation to the transmission system?

A. Currently, MISO lumps all potential generation projects into various regions and studies them in groups. The portions of Minnesota, Iowa, North Dakota, South Dakota, and Montana belonging to MISO make up the "West" region.[7] For the years 2013 to 2017 MISO formed two study groups per year in the West region. For 2018 MISO formed one study group.

Two pages containing different process flow diagrams from MISO's *Business Practices Manual: Generator Interconnection* are included at Department Ex. ___ SRR-4 (Rakow Direct). The diagrams show that each study group undergoes an analysis divided into three phases. The entire study process is referred to as the DPP. Projects can withdraw from consideration during the study process at the end of each DPP phase.

Note that, in the diagram, the next study cycle starts when the current cycle reaches DPP Phase 3. However, MISO's current practice is to start the next cycle when the current cycle starts DPP Phase 2. This modified approach is an attempt by MISO to accelerate the DPP studies.

[7] Note that some transmission owners in the West region own transmission facilities that run into neighboring states, such as Xcel's Wisconsin transmission. A generation project that connects to Xcel's Wisconsin system appears to be studied as part of the West group. Thus, occasionally there are projects in the West group actually located in Wisconsin and Missouri.

If successful, the DPP process ends with a Generator Interconnection Agreement (GIA). A GIA is a contract—typically signed by three parties: MISO, the owner of the transmission the generation project connects to, and the owner of the generation project. The GIA specifies the characteristics of the generation project, how it will interconnect to the transmission system, the type of transmission service being requested, the transmission system upgrades that must be completed, cost responsibility, and so forth. Each successful generation project signs a separate GIA.

Q. At the time MTEP16 approved the proposed Project, what study groups would contain wind projects that might be connected to the transmission system in the future?

A. The "DPP-2015-Feb" West study group was completed on July 16, 2016 and the first GIA for a project in that group was signed in September 2016.[8] Meanwhile, the first draft of the MTEP16 report was posted in August 2016. Therefore, it is unlikely that projects from the DPP-2015-Feb West study group were included in MISO's models as existing units, because a signed GIA and would not have been available and therefore projects in DPP-2015-Feb would not qualify as an existing unit.[9] Therefore, my forecast of new generation starts with the DPP-2015-Feb West study group.

[8] The 2015-Feb DPP West study is available at MISO DPP 2015 February West and the first GIA is available at J416 GIA.

[9] Appendix E2 of MTEP16 at page 19 describes three stages for projects: existing, under construction, or planned (with a signed GIA).

Q. Please explain how you forecasted the quantity of wind generation expected to be added in Minnesota and Iowa.

A. I started with the DPP-2015-Feb West study group, obtained MISO's information on the projects in that group. MISO's data includes information on which projects completed the DPP, which were still active, and which had withdrawn.[10] I sorted the projects into generation categories (wind; solar; etc.) and three regions (Minnesota/Iowa; Montana/North Dakota/South Dakota; and Missouri/Wisconsin). I repeated this process for the study groups formed after DPP-2015-Feb West:

- DPP-2015-Aug West study group;
- DPP-2016-Feb West study group;
- DPP-2016-Aug West study group;
- DPP-2017-Feb West study group;
- DPP-2017-Aug West study group; and
- DPP-2018-Apr West study group.

Q. What is the status of the seven West study groups in your list?

A. The DPP-2015-Feb West and DPP-2015-Aug West study groups have been completed and all projects in those groups have either signed a GIA or withdrawn. The DPP-2016-Feb West study group is in the GIA negotiation phase. The DPP-2016-Aug West study group and the DPP-2017-Feb West study group are in different DPP phases. The remaining study groups (DPP-2017-Aug and DPP-2018-Apr) have not started.

[10] This data available publicly at MISO Transmission Queue and is continually updated.

Q. What is the status of wind generation projects in Minnesota and Iowa in the seven West study groups?

A. I accessed MISO's data on September 17, 2018. The generation interconnection queue data for the west region is provided in DOC Ex. ___ at SRR-5 (Rakow Direct). The status as of that date is summarized in Table 1 below.

Table 1: Status of Minnesota-Iowa Wind Projects, 2015-'18 DPPs (MW)[11]

DPP	GIA signed	Active	Withdrawn	SUM
2015-Feb	800.0	-	150.0	950.0
2015-Aug	1,003.0	-	318.9	1,321.9
2016-Feb	-	3,540.0	870.0	4,410.0
2016-Aug	-	2,536.0	269.6	2,805.6
2017-Feb	-	1,624.0	-	1,624.0
2017-Aug	-	3,487.0	238.0	3,725.0
2018-Apr	-	3,664.0	-	3,664.0
SUM	1,803.0	14,851.0	1,846.5	18,500.5
PERCENT	9.8%	80.2%	10%	100%

Table 1 shows that 1,803 MW of wind projects in Minnesota and Iowa have signed a GIA since the MTEP16 draft was published and 16,697.5 MW[12] of wind in Minnesota and Iowa have joined the various DPP study groups. For comparison purposes, Table 2 below shows the same data as Table 1 but for the entire West region.

[11] Note that in MISO's data project J885 is incorrectly labeled as being in Alabama. This project is actually in Minnesota and Table 1 reflects this correction.

[12] Of the 16,697.5 MW a total of 14,851.0 are still active and 1,846.5 MW have withdrawn.

Table 2: Status of West Wind Projects, 2015-'18 DPPs (MW)

DPP	GIA signed	Active	Withdrawn	SUM
2015-Feb	1,000.0	-	150.0	1,150.0
2015-Aug	1,503.0	-	318.9	1,821.9
2016-Feb	-	4,089.8	1,081.8	5,171.6
2016-Aug	-	5,618.0	573.2	6,191.2
2017-Feb	-	3,179.8	-	3,179.8
2017-Aug	-	6,295.1	238.0	6,533.1
2018-Apr	-	5,776.8	-	5,776.8
SUM	2,503.0	24,959.5	2,361.9	29,824.4
PERCENT	8.4%	83.7%	7.9%	100%

Q. Comparing Tables 1 and 2, what percent of West Wind Projects in these various categories are located in Minnesota and Iowa?

A. Table 3 provides those percentages.

Table 3: Percent of Proposed Minnesota-Iowa Projects Compared to MISO West Wind Projects

DPP	GIA signed	Active	Withdrawn	SUM
2015-Feb	80%	-	100%	83%
2015-Aug	67%	-	100%	73%
2016-Feb	-	87%	80%	85%
2016-Aug	-	45%	47%	45%
2017-Feb	-	51%	-	51%
2017-Aug	-	55%	100%	57%
2018-Apr	-	63%	-	63%
TOTAL	72%	60%	78%	62%

Q. How do you forecast the amount of wind in Minnesota and Iowa that might actually go in-service?

A. I reviewed the MISO DPP West study groups for 2012 to 2014 in the same manner as for the MISO DPP West study groups for 2015 to 2018. The results are summarized in Tables 4 through 6.

Table 4: Results for Minnesota-Iowa Wind Projects, 2012-2014 DPPs (MW)

DPP	GIA signed	Withdrawn	SUM
2012-Aug	2,151.7	559.0	2,710.7
2013-Feb	78.0	50.0	128.0
2013-Aug	300.0	40.0	340.0
2014-Feb	-	-	-
2014-Aug	589.0	-	589.0
SUM	3,118.7	649.0	3,767.7
PERCENT	82.8%	17.2%	100%

Table 5: Results for West Wind Projects, 2012-2014 DPPs (MW)

DPP	GIA signed	Withdrawn	SUM
2012-Aug	2,430.7	559.0	2,989.7
2013-Feb	278.0	50.0	328.0
2013-Aug	450.0	40.0	490.0
2014-Feb	-	-	-
2014-Aug	739.0	-	739.0
SUM	3,897.7	649.0	4,546.7
PERCENT	85.7%	14.3%	100%

Table 6 indicates the percentages of West Wind Projects in these various categories that are located in Minnesota and Iowa.

Table 6: Percent of Proposed Minnesota-Iowa Projects Compared to MISO West Wind Projects 2012-2014 DPPs (MW)

DPP	GIA signed	Withdrawn	SUM
2012-Aug	89%	100%	91%
2013-Feb	28%	100%	39%
2013-Aug	67%	100%	69%
2014-Feb	-	-	-
2014-Aug	80%	-	80%
SUM	80%	100%	83%

Q. What do you observe and conclude from these tables?

A. Table 1 above shows that 79.4 percent of the wind capacity in Minnesota and Iowa in the 2015 DPP study groups eventually signed a GIA. Table 2 above shows that about 84.2 percent of the wind capacity in the 2015 DPP West study groups eventually signed a GIA. Table 4 shows that about 82.8 percent of the wind capacity in Minnesota and Iowa in the 2012 to 2014 DPP study groups eventually signed a GIA. Table 5 shows that about 85.7 percent of the wind capacity in the 2012 to 2014 DPP West study groups eventually signed a GIA.

Thus, I conclude that, based upon past experience it would be reasonable to assume that, on average, about 80 to 85 percent of wind projects that enter a DPP study group would eventually sign a GIA.

Q. Is it possible for a wind project to sign a GIA but end up not being constructed?

A. Yes, that is possible and has happened in the past.[13] However, a project that is not constructed would be in violation of the GIA[14] and would have to notify MISO. Thus, projects that sign a GIA but are not constructed should be reported as withdrawn in MISO's historical data.

[13] An example is project "J298", a 300 MW wind project that was to be located in Iowa. J298 signed a GIA effective 09/05/2017 but later withdrew on 10/12/2017.

[14] GIAs contain milestones that typically include payments for transmission upgrades, a commercial operation date, and so forth.

Q. Is it possible for a wind project to sign a GIA but have a project that has already been constructed?

A. Yes, that is possible. While comparing effective dates for the most recent GIAs to the commercial operation dates in the GIA milestones I found that some projects had a commercial operation date prior to the GIA's effective date. However, there are several explanations for such occurrences.

First, it could be that the project signed a provisional GIA in order to start construction before having the final DPP results.[15] In such a case the generation project takes a risk regarding transmission costs. However, such a project would still be new because the final GIA would be the first indication of the project in the data.

Second, it could be that what was thought to be a final GIA was signed only for the project to become subject to restudy and the signing of an amended GIA at a later date. For example, some projects in the DPP-2012-Aug West study group were subject to one restudy that was completed in October 2014; another restudy was completed in June 2015. The re-studies were triggered by projects with a higher queue priority withdrawing. The restudy results could trigger a need to amend the original GIA. Some projects in the DPP-2012-Aug West study group have GIAs with effective dates in July 2016. However, for purposes of MTEP16 such projects still can be identified as already existing and not new based upon the study group the project belongs to. This is because the restudy happens within the original study group. I assume that projects in

[15] An example from the DPP-2015-Feb West study group is project J385 (North Star Solar, a 100 MW solar facility that has a power purchase agreement with Xcel). Project J385 signed a provisional GIA on November 11, 2015, had a commercial operation date of October 1, 2016, but did not sign a final GIA until November 10, 2016.

study groups formed in 2012 to 2014 most likely would be "already existing" in the MTEP16 analysis of the proposed Project regardless of the date of the most recent GIA.[16]

Q. What is your forecast of wind capacity that would be expected in Minnesota and Iowa from projects currently in MISO's transmission queue?

A. As explained above, recent history indicates that about 80 percent to 85 percent of wind capacity in the West region (and Minnesota and Iowa only) that enter the DPP study phase eventually signs a GIA. The DPP-2015-Feb West and DPP-2015-Aug West study groups resulted in about 1,803 MW of signed GIAs. The West study groups for DPP-2016-Feb to DPP-2018-Apr contain 16,228.6 MW of wind in Iowa and Minnesota. Applying the 80 percent factor to this capacity results in a forecast of 12,983 MW of additional GIAs from wind projects in Minnesota and Iowa. The overall forecast is 1,803 MW plus 12,983 MW or 14,786 MW.

Since the past is not always a good predictor of the future, I provide an alternative forecast assuming a much lower ratio of wind MW entering a DPP study group to wind MW with a GIA. If only 50 percent of the wind in Minnesota and Iowa for DPP-2016-Feb to DPP-2018-Apr signs a GIA and is constructed, the result still would be 9,917 MW of wind (1,803 MW plus 8,114 MW) added in Minnesota and Iowa since MTEP16.

[16] The reason is in the time requirements of the DPP process illustrated in Department Ex. ___ SRR-4 (Rakow Direct).

All of these wind facilities would have been added far in advance of the 2030 cutoff date used in MISO's MTEP16 analysis. Even the lower estimate of 9,917 MW of wind exceeds by a large margin (more than double) the 4,300 MW threshold established by MISO at EPUG. Thus, wind that might enter the DPP process in the future does not need to be considered.

Q. Please compare your forecasted amount of wind to that assumed in the MISO futures.

A. The 14,786 MW base forecast and the 9,917 MW lower bound of wind in Iowa and Minnesota would exceed the amounts assumed for all of MISO by 2030 for the Limited Demand, Business as Usual, High Demand, and Regional CPP futures. The forecast would be less than the assumed amount only in the Sub-Regional CPP future. However, my forecast does not consider wind facilities that might enter the yet-to-be-formed study groups and still be in-service by 2030.

Q. What is your conclusion from this analysis?

A. Considering these results, I conclude that a reasonable forecast of new wind capacity will exceed by a significant margin the 4,300 MW amount necessary to achieve a 1.25 benefit/cost ratio.

Based on this information and the changes in the transmission system due to closure of the coal facilities relative to load centers such as the Twin Cities, I conclude that the Applicants have shown that the probable result of denial would be an adverse effect upon the future adequacy, reliability, or efficiency of energy supply to the

applicant, to the applicant's customers, or to the people of Minnesota and neighboring states.

2. Second Consideration

Q. What is the second consideration under Minnesota Rules 7849.0120 A?

A. Minnesota Rules 7849.0120 A (2) requires the Commission to consider "the effects of the applicant's existing or expected conservation programs and state and federal conservation programs."

Q. Please provide your analysis related to Minnesota Rules 7849.0120 A (2).

A. Table 26 of the Petition shows that, to alleviate the congestion, flow reductions in the Mankato area would have to range from 120 MW to 373.33 MW. The Applicants calculated the load reduction—conservation and load management—necessary to achieve the flow reductions using shift factors. A shift factor represents the percentage change that additional load at one point would have on an identified constraint.[17] Table 27 of the Petition shows that, assuming a shift factor of 0.3[18]:

- 400 MW of load reduction would be required to alleviate the 120 MW of congestion present in the Existing Fleet future of MTEP17;[19]

[17] See the Petition at page 123.

[18] The Applicants' response to Department Information Request No. 1 states that Table 27 should read 0.3 rather than 0.2. See Department Ex. ___ SRR-6 (Rakow Direct).

[19] The math is 400 MW (load reduction) * 0.3 (shift factor) = 120 MW (congestion relief); 844.43 MW * 0.3 = 253.33, and so on.

- 844.43 MW of load reduction would be required to alleviate the 253.33 MW of congestion present in the Policy Regulations future of MTEP17; and
- 1,244.43 MW of load reduction would be required to alleviate the 373.33 MW of congestion present in the Advanced Alternative Technologies future of MTEP17.

Furthermore, according to the Petition at page 123, the load reductions from a shift factor of 0.3 would have to occur "in a limited area on the north side of the identified congestion, meaning all load reductions would be required in and around the Mankato area." These levels of load reduction are far in excess of what might be expected from a targeted load management and conservation alternative.

For comparison to these levels of load reduction, targeted demand-side management was explored as an alternative to transmission in Docket No. E002, ET2/CN-12-113. Xcel's April 10, 2018 compliance filing indicated that from April 1, 2017 through February 28, 2018 Xcel achieved about 4.5 MW of savings in the "Hollydale Focused Study Area" which consists of the customers that are served by 13 distribution feeders that experience overload conditions.

Q. What is your conclusion from this analysis?

A. I conclude that the effects of the Applicants' existing or expected conservation programs and state and federal conservation programs cannot be expected to address the claimed need.

3. Third Consideration

Q. What is the third consideration under Minnesota Rules 7849.0120 A?

A. Minnesota Rules 7849.0120 A (3) requires the Commission to consider "the effects of promotional practices of the applicant that may have given rise to the increase in the energy demand, particularly promotional practices which have occurred since 1974."

Q. Please provide your analysis related to Minnesota Rules 7849.0120 A (3).

A. As noted above the need relates to congestion relief. The Petition at page 13 states:

> Neither Xcel Energy nor ITC Midwest has conducted any promotional activities or events that have triggered the need for the Project. The Project is needed due to the large amount of wind capacity in southern Minnesota and northern Iowa coupled with transmission constraints, causing congestion on this part of the transmission system.

I agree with the Applicants that the need for congestion relief is due to the large amount of generation capacity in southwestern Minnesota and northwestern Iowa. This phenomenon was not created by the Applicants' promotional activities. Instead, it is due to the cost of energy from wind resources in the project area relative to the cost of energy from other existing and potential resources in the MISO region and changes in existing generation resources, including the fact that wind at costs available using sites in southwestern Minnesota and northwestern Iowa, is typically a least cost addition to a utility's resource mix.[20]

[20] For examples, see the most recent resource plans of Interstate Power and Light Company (Docket No. E001/RP-17-374); Great River Energy (Docket No. ET2/RP-17-286); Otter Tail Power Company (Docket No. E017/RP-16-386); ALLETE, Inc. doing business as Minnesota Power (Docket No. E015/RP-15-690); and Northern States Power Company doing business as Xcel Energy (Docket No. E002/RP-15-21).

Q. What is your conclusion from this analysis?

A. I conclude that promotional practices of the Applicants did not give rise to the need for congestion relief.

4. Fourth Consideration

Q. What is the fourth consideration under Minnesota Rules 7849.0120 A?

A. Minnesota Rules 7849.0120 A (4) requires the Commission to consider "the ability of current facilities and planned facilities not requiring certificates of need to meet the future demand."

Q. Please provide your analysis related to Minnesota Rules 7849.0120 A (4).

A. As explained by the Applicants in the Petition on page 95, MISO's model development practices are to include in MISO's models all projects that have been approved by MISO. Therefore, "the ability of current facilities and planned facilities not requiring certificates of need to meet the future demand" have been considered since all current facilities would be in MISO's transmission models and all planned facilities that have been approved by MISO would also be included in MISO's transmission models. Further, I note that Department Witness Matthew Landi addresses various alternatives to the Applicants' proposal.

Q. What is your conclusion from this analysis?

A. I conclude that current facilities and planned facilities not requiring certificates of need have not been shown to be able to meet the need for congestion relief.

5. Fifth Consideration

Q. What is the fifth consideration under Minnesota Rules 7849.0120 A?

A. Minnesota Rules 7849.0120 A (5) requires the Commission to consider "the effect of the proposed facility, or a suitable modification thereof, in making efficient use of resources."

Q. Please provide your analysis related to Minnesota Rules 7849.0120 A (5).

A. The Petition at Tables 22-24 on pages 109-110 demonstrates that the proposed Project would reduce curtailment of wind generation. The Petition at Tables 25 on pages 111 demonstrates that the proposed Project would reduce line losses. Thus, the proposed Project would enable MISO to use generation resources more efficiently.

Q. What is your conclusion from this analysis?

A. I conclude that the proposed Project will enable MISO to use generation resources more efficiently.

B. MINNESOTA RULES 7849.0120 D

Q. What determination is required by Minnesota Rules 7849.0120 D?

A. Minnesota Rules 7849.0120 D requires the Commission to determine that "the record does not demonstrate that the design, construction, or operation of the proposed facility, or a suitable modification of the facility, will fail to comply with relevant policies, rules, and regulations of other state and federal agencies and local governments."

Q. Please provide your analysis related to Minnesota Rules 7849.0120 D.

A. I reviewed the information on potentially required permits provided in Table 34 on pages 177-178 of the Petition. Regarding the permits required by other agencies, I presume that the various agencies will review and confirm that the Applicants are in compliance prior to granting their permits. I rely upon the agencies to enforce their requirements. Of course, should any permits be denied, the proposed Project would not be constructed, regardless of the Commission's decision regarding the Petition.

Q. What is your conclusion from this analysis?

A. Based upon the above discussion, I conclude that the record does not demonstrate that the design, construction, or operation of the proposed Project, or a suitable modification of the proposed Project, would fail to comply with relevant policies, rules, and regulations of other state and federal agencies and local governments. Thus, I conclude that the record does not demonstrate that the Applicants would fail to comply.

C. MINNESOTA STATUTES §216B.243, SUBD. 3 (9)

Q. What consideration is established by Minnesota Statutes §216B.243, Subd. 3 (9)?

A. Minnesota Statutes §216B.243, Subd. 3 (9) requires the Commission to evaluate "with respect to a high-voltage transmission line, the benefits of enhanced regional reliability, access, or deliverability to the extent these factors improve the robustness of the transmission system or lower costs for electric consumers in Minnesota."

Q. Please provide your analysis related to Minnesota Statutes §216B.243, Subd. 3 (9).

A. According to the Petition, the adjusted production cost (APC) "is the total production costs of a generation fleet including fuel, variable operations and maintenance, startup cost, and emissions, adjusted for import costs and export revenue." According to the Petition, APC Savings are calculated as "the difference in total production costs of a generation fleet adjusted for import costs and export revenues with and without the proposed transmission project." Department Ex. __ SRR-3 (Rakow Direct) at page 15 provides MISO's preliminary cost allocation. The distribution of benefits (the APC Savings) shows that:

- 65.0 percent of APC Savings were in local resource zone (LRZ) 3;
- 34.5 percent of APC Savings were in LRZ 1; and
- 0.5 percent of APC Savings were in LRZ 5.

Pages 14 to 15 of Department Ex. __ SRR-3 (Rakow Direct) shows that most utilities serving Minnesota (NSP, MP, GRE, OTP, DPC, and SMMPA) are in LRZ 1 and the

remainder are in LRZ 3. Finally, in order to qualify as an MEP, the proposed Project must have a benefit to cost ratio of at least 1.25 so that benefits must exceed costs.

Q. What is your conclusion from this analysis?

A. I conclude that the proposed Project would result in lower costs for electric consumers in Minnesota and enhance the deliverability of energy. Therefore, I conclude that the considerations established by Minnesota Statutes §216B.243, Subd. 3 (9) have been met.

D. MINNESOTA STATUTES §216B.243, SUBD. 3 (11)

Q. What consideration is established by Minnesota Statutes §216B.243, Subd. 3 (11)?

A. Minnesota Statutes §216B.243, Subd. 3 (11) requires the Commission to evaluate "whether the applicant has made the demonstrations required under subdivision 3a." Minnesota Statutes §216B.243, Subd. 3a states:

> The Commission may not issue a certificate of need under this section for a large energy facility that generates electric power by means of a nonrenewable energy source, or that transmits electric power generated by means of a nonrenewable energy source, unless the applicant for the certificate has demonstrated to the Commission's satisfaction that it has explored the possibility of generating power by means of renewable energy sources and has demonstrated that the alternative selected is less expensive (including environmental costs) than power generated by a renewable energy source. For purposes of this subdivision, "renewable energy source" includes hydro, wind, solar, and geothermal energy and the use of trees or other vegetation as fuel.

Q. Please provide your analysis related to Minnesota Statutes §216B.243, Subd. 3 (11).

A. As explained by the Petition at page 95 and cited above, the interconnection of numerous generators is conditional upon the completion of the proposed Project. Thus, the incremental impact of the proposed Project would be to enable the transmission of energy from all new resources, including renewable resources. Many of the new resources are expected to be renewable because some of the best wind resources in Minnesota and the nation are located in the project area.[21] Further, as discussed above the proposed Project would reduce congestion and related curtailments of wind energy in the project area.

Q. What is your conclusion from this analysis?

A. I conclude that the proposed Project is an integral part of generating and delivering power generated by means of renewable energy sources and in light of other generation changes occurring in Minnesota and elsewhere in the MISO system. Therefore, the consideration established by Minnesota Statutes §216B.243, Subd. 3 (11) has been met.

V. SUMMARY OF RECOMMENDATIONS

Q. Based on your investigation, what do you recommend at this point?

A. I recommend that the Commission approve the proposed Project.

[21] See Figure 12 on page 55 and Figure 28 on page 120 of the Petition.

Q. Please summarize the Department's overall conclusions and recommendations at this time.

A. The Department recommends that the Commission approve the proposed project subject to the conditions specified by Mr. Johnson.

Q. Have you completed your Direct Testimony?

A. Yes.

Dr. Steve Rakow
Minnesota Department of Commerce
85 7th Place East, Suite 500
St. Paul, MN 55101-2145

Professional Background

1996 to present Public Utilities Analyst Coordinator • Minnesota Department of Commerce. Analyze resource plans, certificates of need, and miscellaneous public policy issues. Testify before the Minnesota Public Utilities Commission in contested-case proceedings. A list of related filings analyzed and testimony presented is included below.

1999 to 2005 Board of Governors • MinforMed, L.L.C. Wrote portions of and advised on the economic and business sections of several grant proposals and the 2002 business plan. Named to Board of Directors, March, 2000.

1995 Instructor • University of Nebraska-Omaha. Taught Principles of Macroeconomics.

1993 to 1994 Instructor and Academic Assistant to the Rector • Concordia International University-Estonia. Taught Introduction to Economics. Wrote Student Handbook and Faculty Introduction to Tallinn Handbook.

1993 Instructor • Concordia University-Nebraska. Taught Principles of Microeconomics.

1989 to 1993 Graduate Teaching Assistant • University of Nebraska. Taught Introduction to Economics, Principles of Microeconomics, Principles of Macroeconomics, Current Economic Issues and Intermediate Macroeconomics. Specialized in public policy, economic history and comparative economics.

Education

Doctor of Philosophy, Economics, University of Nebraska, December 1994

Master of Arts, Economics, Mankato State University, March 1989

Bachelor of Arts, Economics, Moorhead State University, May 1987

Bachelor of Science, Accounting, Moorhead State University, May 1987

Testimony in Contested Case Proceedings

Docket No.	Company	Description	Subjects
E015/AI-17-568	MP	Nemadji Trail CC	Resource Plan, Contracts
E015/GR-16-664	MP	Rate Case	Avoided Cost, Terms of Service
E015/CN-12-1163	MP	Manitoba-Minnesota 500 kV	Alternatives, Policy
ET6675/CN-12-1053	ITC Midwest	Minnesota-Iowa 345 kV (MVP3)	Alternatives, Policy
E002/CN-12-1240	Xcel Energy	Competitive Resource Acquisition	Alternatives
E002/CN-12-0113	Xcel Energy	Hollydale 115 kV	Alternatives, Policy
E017/M-10-1082	OTP	Big Stone AQCS	Alternatives
E017/GR-10-0239	OTP	Rate Case	Big Stone II Background
E015/PA-09-0526	MP	Purchase DC Line	Alternatives
E002/CN-08-0510	Xcel Energy	Prairie Island ISFSI	Planning, Alternatives, Policy
E002/CN-08-0509	Xcel Energy	Prairie Island EPU	Planning, Alternatives, Policy
E002/CN-08-0185	Xcel Energy	Monticello EPU	Planning, Alternatives, Policy
E002, ET2/ CN-06-1115	Xcel Energy GRE	CapX 161/230/345 kV	Planning Background, Alternatives, Policy
E002, ET3/ CN-04-1176	Xcel, Dairyland	Chisago-Apple R. 115/161 kV	Planning Background, Alternatives, Policy
E017 et al/ CN-05-0619	OTP, et al	Big Stone-Morris 230 kV Big Stone-Granite F. 345 kV	Planning Background, Alternatives, Policy
E002/CN-05-0123	Xcel Energy	Monticello ISFSI	Alternatives, Policy
E002/CN-04-0076	Xcel Energy	Blue Lake CT	Alternatives
IP6339/CN-03-1841	Trimont LLC	Trimont Wind	Settlement-Alternatives
E001/GR-03-0767	Interstate	Rate Case	Rate of Return
IP6202/CN-02-2006	MMPA	Faribault CC	Settlement, Enviro. Report
ET2/CN-02-0536	GRE	Plymouth-Maple Gr. 115 kV	Forecasting
E002/CN-01-1958	Xcel Energy	SW Minn. 115/161/345 kV	Forecasting
PL9/CN-01-1092	Lakehead	Clearbrook-Superior Pipeline	Alternatives, Social Consequences
E002/CN-99-1815	NSP	Black Dog CC	Alternatives, Forecasting
ET2/CN-99-0976	GRE	Pleasant Valley CT	Social Consequences, Forecasting, Enviro. Report
IP3/CN-98-1453	Tenaska NRG	Lakefield Junction CT	Alternatives, Enviro. Report Social Consequences
PL9/CN-98-0327	Lakehead	Clearbrook-Donaldson Pipeline	Alternatives, Social Consequences

Comments in Planning and Resource Acquisition Proceedings

Docket No.	Company	Type	Subjects
E015/M-18-0600	Minnesota Power	Acquisition-Wind	All Areas
E015/M-18-0545	Minnesota Power	Acquisition-Wind	All Areas
IP6964/CN-16-0289	Nobles 2 Power	Need-Wind	All Areas
ET9/RP-17-0753	SMMPA	Resource Plan	Modeling
E002/M-17-0551	Xcel Energy	Termination-Biomass	Economics
E002/M-17-0532	Xcel Energy	Acquisition-RDF	Economics
E002/M-17-0531	Xcel Energy	Termination-Landfill	Economics
E002/M-17-0530	Xcel Energy	Termination-Biomass	Economics
ET2/RP-17-0286	Great River	Resource Plan	Supply
E002/M-16-0777	Xcel Energy	Acquisition-Wind	Economics
ET10/RP-16-0509	Missouri River	Resource Plan	Modeling
E017/RP-16-0386	Otter Tail Power	Resource Plan	Modeling
E002/M-16-0209	Xcel Energy	Acquisition-Wind	Economics
E002/M-15-0962	Xcel Energy	Distribution Plan	All Areas
E015/RP-15-0690	Minnesota Power	Resource Plan	Modeling
E002/M-15-0330	Xcel Energy	Acquisition-Solar	All Areas
E002/RP-15-0021	Xcel Energy	Resource Plan	Modeling
E015/M-14-0926	Minnesota Power	Acquisition-Hydro	All Areas
E015/M-14-0960	Minnesota Power	Acquisition-Hydro	All Areas
E002/M-14-0162	Xcel Energy	Acquisition-Solar	Modeling
ET6/RP-14-0536	Minnkota	Resource Plan	Forecasting
E001/RP-14-0077	Interstate Power	Resource Plan	Modeling
E015/RP-13-0053	Minnesota Power	Resource Plan	Modeling
E015/M-12-1349	Minnesota Power	Acquisition-Biomass	Modeling
ET2/CN-12-1235	Great River	Need-Transmission	All Areas
ET3/RP-11-0918	Dairyland	Resource Plan	Supply
E002, ET2/CN-11-0826	Xcel Energy, GRE	Need-Transmission	Alternatives, Policy
ET6133/RP-11-0771	MMPA	Resource Plan	Supply
IP6853,6866/CN-11-0471	Black Oak & Getty	Need-Wind	All Areas
E999/M-11-0445	All Utilities	Transmission Plan	All Areas
E002/CN-11-0332	Xcel Energy	Need-Transmission	Alternatives, Policy
E002/RP-10-0825	Xcel Energy	Resource Plan	Modeling
ET6/RP-10-0782	Minnkota	Resource Plan	Modeling
E002/CN-10-0694	Xcel Energy	Need-Transmission	Alternatives, Policy

Comments in Need, Planning, and Resource Acquisition Proceedings-Continued

Docket No.	Company	Type	Subjects
E017/RP-10-0623	Otter Tail Power	Baseload Study	Modeling
E017/RP-10-0623	Otter Tail Power	Resource Plan	Modeling
E002/M-10-0486	Xcel Energy	Acquisition-Digester	Modeling
ET6838/CN-10-0080	Geronimo Wind	Need-Wind	All Areas
E002/CN-09-1390	Xcel Energy	Need-Transmission	Alternatives, Policy
E015/RP-09-1088	Minnesota Power	Baseload Study	Modeling
IP6701/CN-09-1186	National Wind	Need-Wind	All Areas
IP6830/CN-09-1110	Geronimo Wind	Need-Wind	All Areas
E015/RP-09-1088	Minnesota Power	Resource Plan	Modeling
E002/M-09-0821	Xcel Energy	Acquisition-Biomass	Modeling
E999/M-09-0602	All Utilities	Transmission Plan	All Areas
ET9/RP-09-0536	SMMPA	Resource Plan	Modeling
E015/PA-09-0526	Minnesota Power	Acquisition-Transm.	Need, Alternatives
E002/CN-08-0992	Xcel Energy	Need-Transmission	All Areas
IP6688/CN-08-0961	EcoHarmony Wind	Need-Wind	All Areas
ET6125/RP-08-0846	Basin	Resource Plan	Supply
ET2/RP-08-0784	Great River	Resource Plan	Supply
E001/RP-08-0673	Interstate Power	Resource Plan	Modeling
E002/RP-07-1572	Xcel Energy	Resource Plan	Modeling, Nuclear
E017 et al/CN-07-1222	MP, OTP, Minnkota	Need-Transmission	Alternatives, Policy
E999/M-07-1028	All Utilities	Transmission Plan	All Areas
E017/CN-06-0677	Otter Tail	Need-Transmission	All Areas
ET9/RP-06-0605	SMMPA	Resource Plan	Supply
E001/RP-05-2029	Interstate Power	Resource Plan	Supply
E999/TL-05-1739	GRE, MP	Need-Transmission	All Areas
E999/TL-05-1739	All Utilities	Transmission Plan	All Areas
ET10/RP-05-1102	Missouri River	Resource Plan	Modeling
ET2/RP-05-1100	Great River	Resource Plan	Supply
E017/RP-05-0968	Otter Tail Power	Resource Plan	Supply
E002/RP-04-1752	Xcel Energy	Resource Plan	Modeling, Bids
E015/RP-04-0865	Minnesota Power	Resource Plan	DSM, Supply
E002/M-04-0091	Xcel Energy	Acquisition-Biomass	All Areas

Comments in Need, Planning, and Resource Acquisition Proceedings-Continued

Docket No.	Company	Type	Subjects
E999/TL-03-1752	All Utilities	Transmission Plan	All Areas
ET2/RP-03-0974	Great River	Resource Plan	DSM
E002/RP-02-2065	Xcel Energy	Resource Plan	DSM, Nuclear
ET6/RP-02-1145	Minnkota	Resource Plan	Forecasting, Contingency
E999/TL-01-0961	All Utilities	Transmission Plan	All Areas
ET2/RP-01-0160	Great River	Resource Plan	DSM
ET3/RP-00-1619	Dairyland	Resource Plan	All Areas
ET9/RP-00-0863	SMMPA	Resource Plan	Forecasting
E002/RP-00-0787	Xcel Energy	Resource Plan	DSM, Nuclear
E015/RP-99-1543	Minnesota Power	Resource Plan	DSM, Forecasting
E017/RP-99-0909	Otter Tail Power	Resource Plan	Rate Design
ET10/RP-98-0938	Missouri River	Resource Plan	Supply, Rate Design
ET2,3/RP-98-0366	CPA/Dairyland	Resource Plan	Supply
E002/RP-98-0032	NSP	Resource Plan	Supply, Nuclear
E015/RP-97-1545	Minnesota Power	Resource Plan	DSM
E001/RP-97-0955	Interstate Power	Resource Plan	Supply
ET9/RP-97-0954	SMMPA	Resource Plan	Forecasting
ET7/RP-97-0001	United Power	Resource Plan	DSM

Docket No. E002, ET6675/CN- 17-184

Department Ex. __ SRR-2

Commission's Regulatory Process

Resource Planning

Alternatives
Forecast
DSM
Existing Generation
Planning Model
Size, Type, & Timing Approved

Resource Acquisition

Forecast Update
Alternatives
Environment & Socioeconomics
Facility Approved

Facility Siting & Routing

Public Participation
Alternative Sites
Environmental Review
Siting/Routing Approved & Constructed

Cost Recovery

Finance Adjustments
Design Rates
Forecast Adjustments
Rate Increase Approved
Assign Costs

RESOURCE PLAN (Minn. Stat. 216B.2422, Minn. Rules 7843)

- DOES identify generic size, type, and timing of plants needed.
- DOES NOT identify specific power plants that would supply the deficit.
- Filed by every electricity provider (or its wholesale provider) with 100 MW of capacity and supplying electric service to 10,000 Minnesota customers.
- Consists of a 15-year forecast of projected power needs, existing energy supplies, and generic new additions to provide power to those projected customers.
- Results in a Commission determination of any projected deficits in supply on a generic basis i.e., identifies the size (how many MW), type (whether baseload, intermediate, peaking, wind, etc), and timing (which year) of resource needs.
- May substitute for a certificate of need process in circumstances prescribed by Minnesota Statute.

CERTIFICATE OF NEED (Minn. Stat. 216B.243, Minn. Rules 7849, 7851, 7853, and 7855)

- DOES identify specific large energy facilities.
- Filed by every electric provider (or its wholesale provider) for generation facilities above 50 MW and transmission facilities above 100 kV and 10 miles long or above 200 kV and 1,500 feet long.
- Consists of forecast of resource needs (the deficit to be addressed) and alternative projects to provide power to customers (supply).
- Starts with a resource plan-determined size, type, and timing of a need, confirms a specific need exists, and evaluates the economic, environmental, and social consequences of the alternatives to fulfill the need.
- Results in a Commission determination of the specific facility needed to fulfill demand (if any).

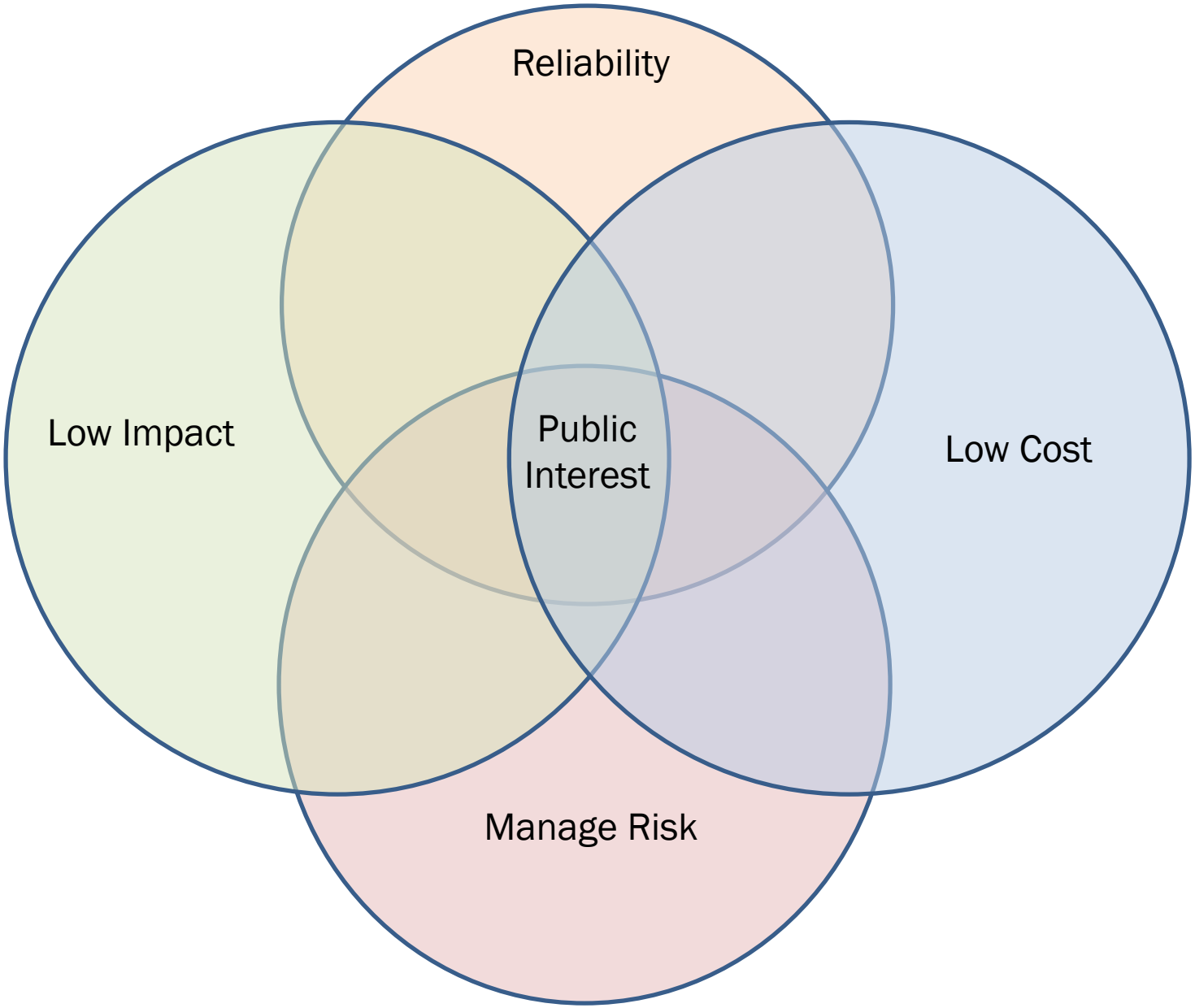
ROUTING AND SITING (Minn. Stat. 216E, Minn. Rules 7850, 7852, and 7854)

- Determines the location for new large energy facilities.
- Filed by every electric provider (or its wholesale provider) for generation facilities above 50 MW and transmission facilities above 100 kV and 1,500 feet long.
- May take place without a certificate of need for transmission facilities above 100 kV and between 1,500 feet and 10 miles in length.
- For other facilities, may take place simultaneously (at the same time as the certificate of need) or sequentially (after the certificate of need).
- Consists of a specific facility and one or more alternative locations.
- Starts with a certificate of need-determined facility and evaluates the economic, environmental, and social consequences of the alternative locations for the facility.
- Results in Commission determination of the specific location for a specific facility.

RATE CASE (Minn. Stat. 216B.16, Minn. Rules 7825)

- Determines the charges applied to customer bills for all utility services.
- Filed by every investor-owned retail electricity provider.
- Generally, new large energy facilities may only be included in a rate case only after they are constructed.
- Consists of one year’s data on sales, utility costs, and customer rates on a forecasted or historic basis.
- Starts with the costs incurred and evaluates the prudence of the utility’s costs.
- Results in specific rates being charged to specific customer classes.

Overlapping Decision Criteria in Planning & Acquisition Proceedings



Examples of Reliability in Decision Criteria:

Certificate of Need

- 216B.243 subd. 3 (5)—benefits of this facility, including its uses to .. increase reliability of energy supply in Minnesota and the region
- 216B.243 subd. 3 (9)—…the benefits of enhanced regional reliability, access, or deliverability to the extent these factors improve the robustness of the transmission system
- 7849.0120 A—the effect upon the future adequacy, reliability, or efficiency of energy supply
- 7849.0120 B (4)—the expected reliability of the proposed facility compared to the expected reliability of reasonable alternatives

Resource Planning

- 7843.0500 Subp. 3 A—ability to maintain or improve the adequacy and reliability of utility service

Examples of Cost in Decision Criteria:

Certificate of Need

- 216B.243 subd. 3 (9)—with respect to a high-voltage transmission line, the benefits of enhanced regional reliability, access, or deliverability to the extent these factors improve the robustness of the transmission system or lower costs for electric consumers in Minnesota;
- 216B.243 subd. 3 (12)—if the applicant is proposing a nonrenewable generating plant, the applicant's assessment of the risk of environmental costs and regulation on that proposed facility over the expected useful life of the plant, including a proposed means of allocating costs associated with that risk.
- 7849.0120 B (2)—the cost of the proposed facility and the cost of energy to be supplied by the proposed facility

Resource Planning

- 7843.0500 Subp. 3 B—keep the customers' bills and the utility's rates as low as practicable

Examples of Risk in Decision Criteria:

Certificate of Need

- 216B.243 subd. 3 (12) —if the applicant is proposing a nonrenewable generating plant, the applicant's assessment of the risk of environmental costs and regulation on that proposed facility over the expected useful life of the plant, including a proposed means of allocating costs associated with that risk.

Resource Planning

- 7843.0500 Subp. 3 E—risk of adverse effects on the utility and its customers from financial, social, and technological factors that the utility cannot control

Examples of Impact in Decision Criteria:

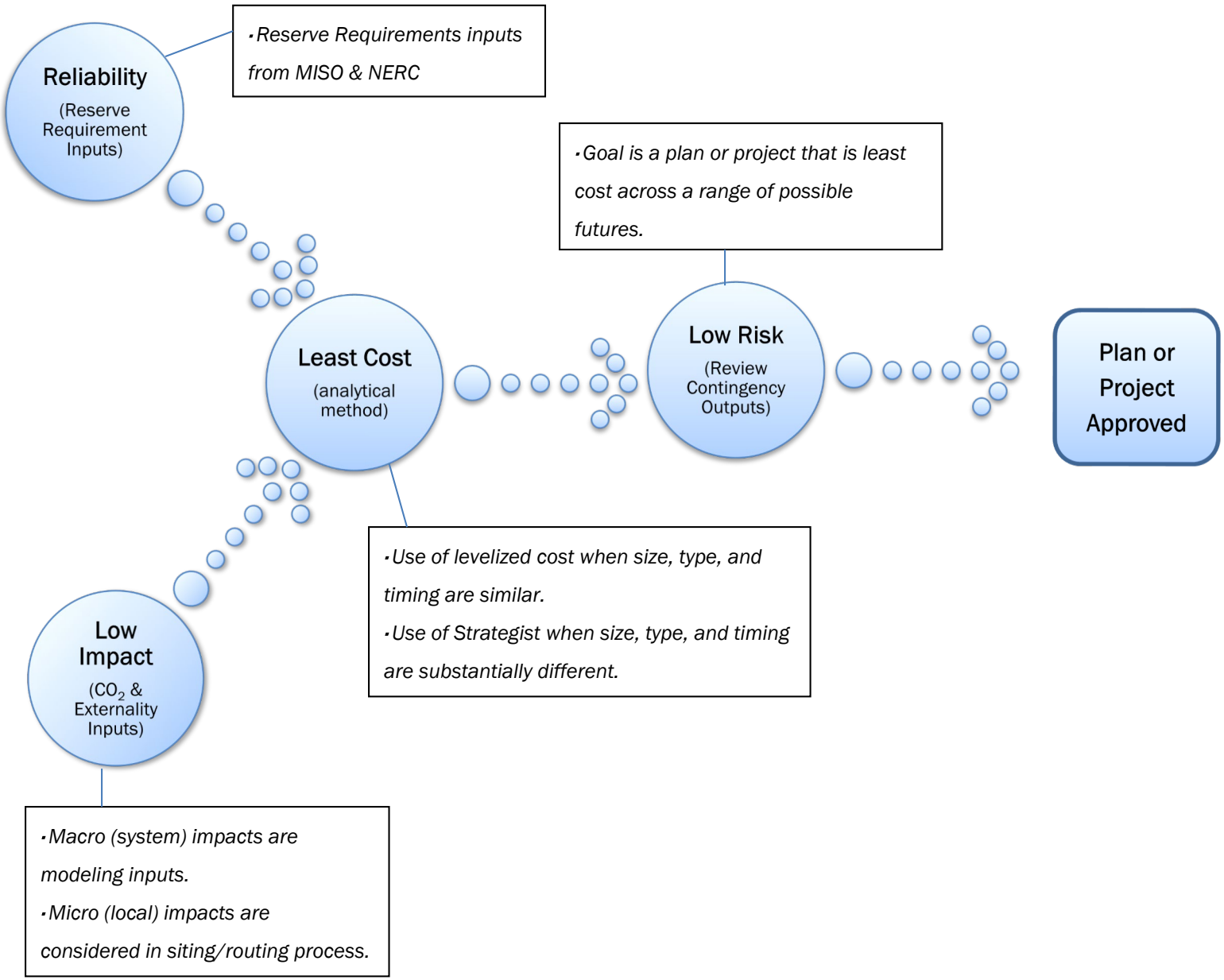
Certificate of Need

- 216B.243 subd. 3 (5)—benefits of this facility, including its uses to protect or enhance environmental quality
- 7849.0120 B (3)—the effects of the proposed facility upon the natural and socioeconomic environments compared to the effects of reasonable alternatives
- 7849.0120 C (2)—the effects of the proposed facility, or a suitable modification thereof, upon the natural and socioeconomic environments compared to the effects of not building the facility
- 7849.0120 C (4)—the socially beneficial uses of the output of the proposed facility, or a suitable modification thereof, including its uses to protect or enhance environmental quality

Resource Planning

- 7843.0500 Subp. 3 C—minimize adverse socioeconomic effects and adverse effects upon the environment

Example of How the Criteria Guide the Department's Analysis



MTEP16 MCPS Update – North/Central

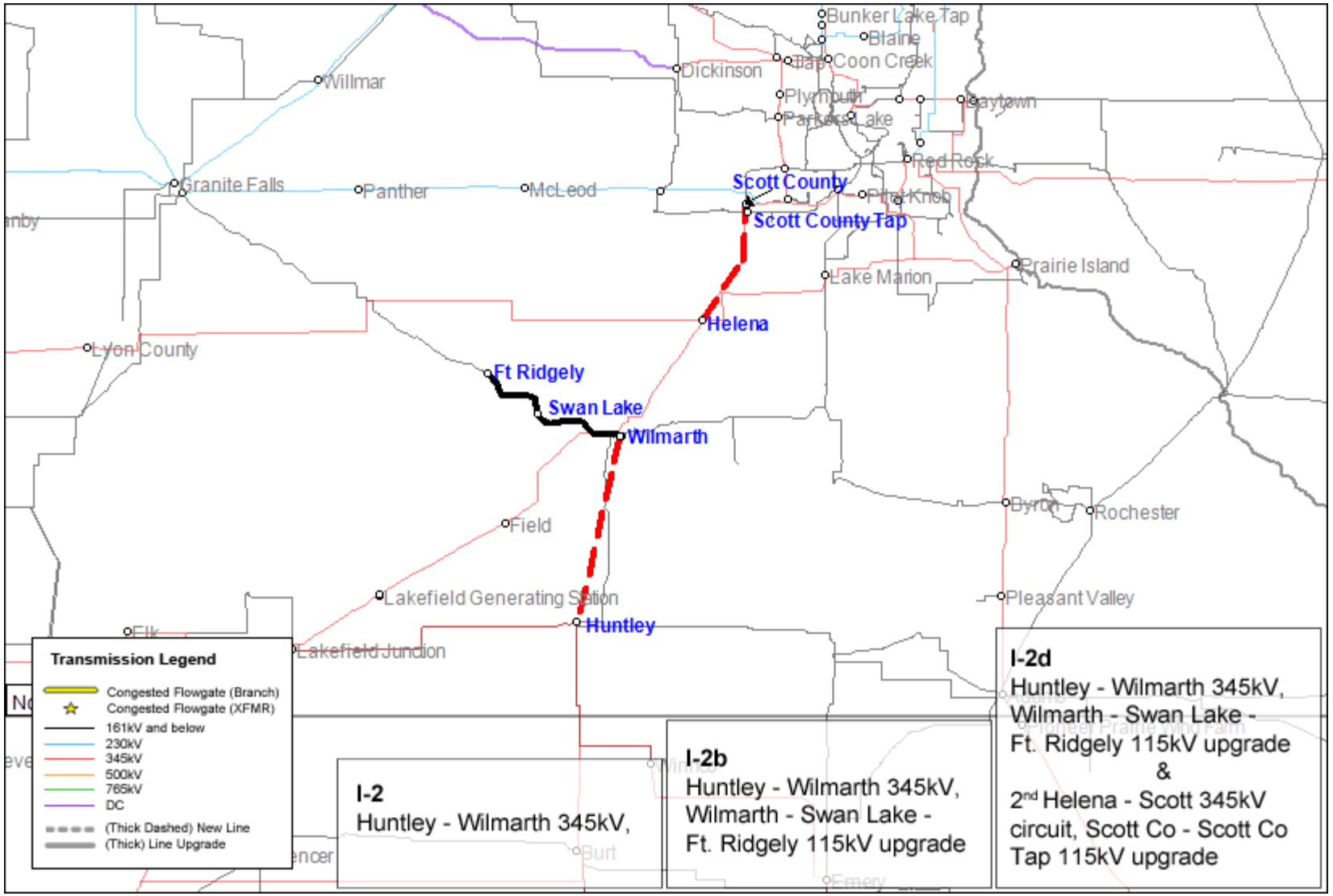
Economic Planning Users Group

7/11/2016

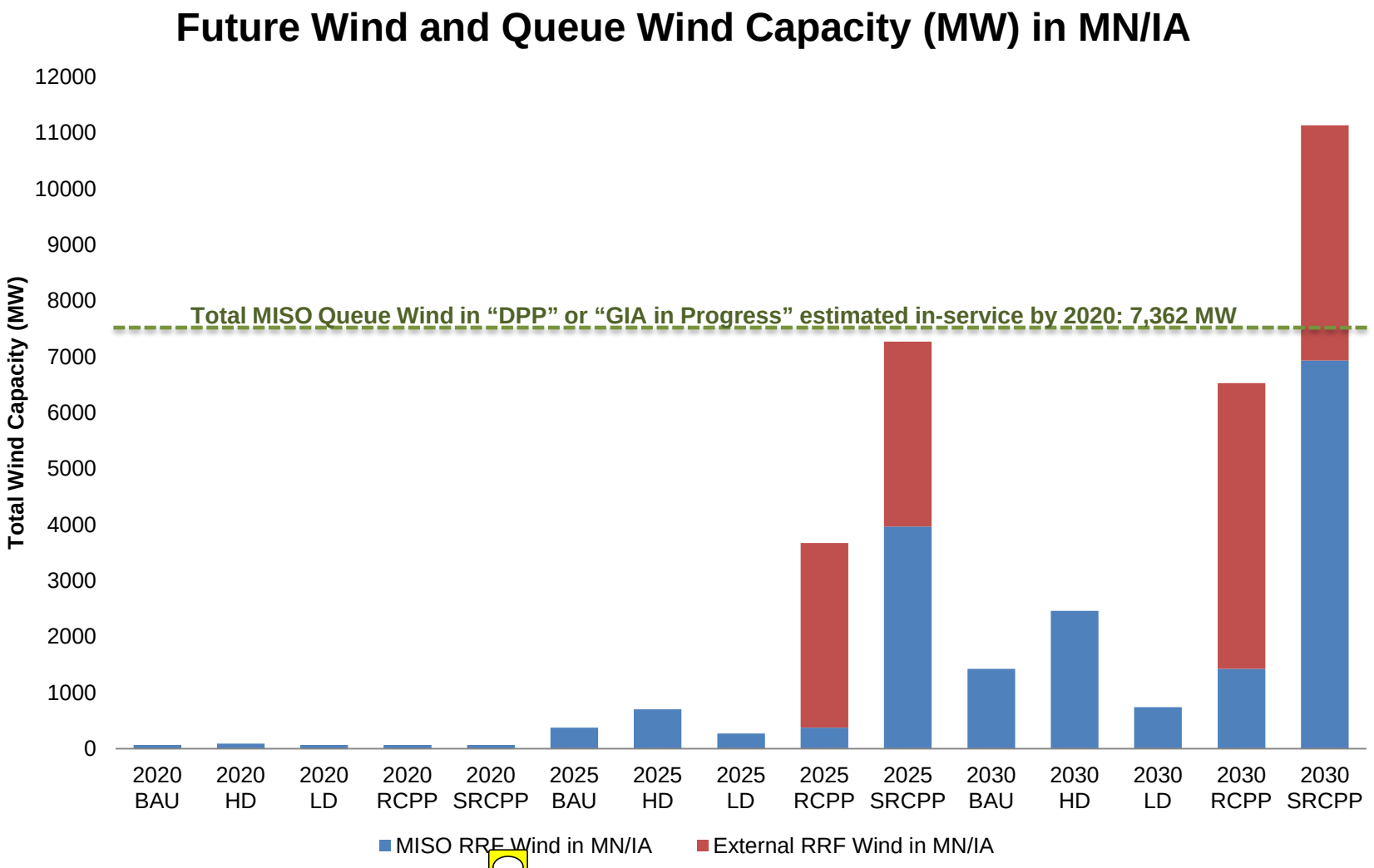
(Updated on 7/26/2016)

Recap of June 14th EPUG Results

Huntley – Wilmarth 345kV Options



Total Queue Wind in IA/MN with DPP or GIA In Progress status is greater than all years/futures except 2030 SRCPP



Projects remain robust after replacing all RGOS/RRF wind with DPP queue wind generation in IA and MN

ID	Transmission Solution	Model	MISO Scoping Level Cost Estimate (2016 $M)	Benefit to Cost Ratios						20-yr PV Benefit ($M)
				BAU	HD	LD	RCPP	SRCPP	Weighted	
I-2	Huntley - Wilmarth 345kV new circuit	Base	80.9	0.48	1.53	0.16	1.85	5.23	2.13	221
		Queue Wind Sensitivity		1.76	3.06	0.85	3.11	2.60	2.36	239
I-2b	Huntley - Wilmarth 345kV new circuit, Wilmarth – Swan Lake – Ft Ridgeley 115kV upgrade	Base	106.2	0.46	1.40	0.11	1.44	4.16	1.71	234
		Queue Wind Sensitivity		1.42	2.61	0.69	2.54	2.17	1.95	259
I-2d	Huntley - Wilmarth 345kV new circuit, Wilmarth – Swan Lake – Ft Ridgeley 115kV upgrade Add 2nd Helena – Scott County 345kV circuit, Scott Co – Scott Co Tap 115kV upgrade	Base	147.7	0.32	1.09	0.10	1.16	3.59	1.43	272
		Queue Wind Sensitivity		1.02	2.06	0.52	1.99	1.84	1.54	285

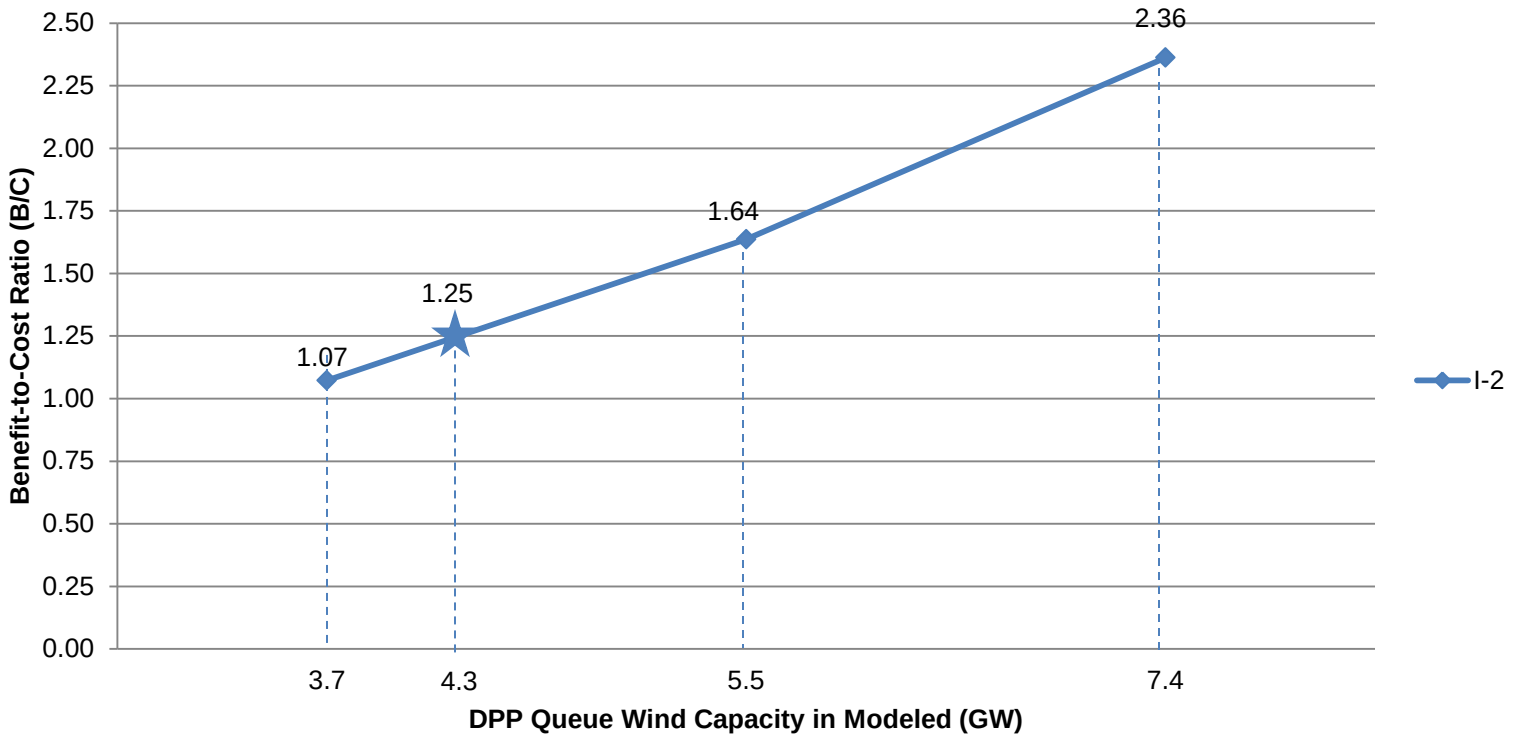
- **Benefits are strong in all futures under the DPP queue wind sensitivity**
- **I-2 is the preferred solution**
  - B/C ratio comparable to I-2 in Queue Wind Sensitivity
  - I-2b has an incremental B/C of 0.38 in base model and 0.63 B/C in queue wind sensitivity when compared with I-2
  - I-2d has an incremental B/C of 0.73 in base model and 0.50 B/C in queue wind sensitivity when compared with I-2b

Huntley – Wilmarth 345kV (I-2): summary of benefits

- Provides 100% relief to the identified issue: Huntley – Blue Earth 161kV
- Highest B/C ratio and 20-yr PV benefit amongst project candidate alternatives
- Unlocks wind output by reducing nearby curtailment issues
- Strengthens high-voltage power delivery system; thus, allowing for greater utilization of lower cost generation to serve load
- Improves reliability by mitigating thermal violations on Blue Earth – Huntley 161 kV for certain P1 and P2 events
- B/C ratio remains robust under all sensitivities tested
  - Sherco units retirement sensitivity ✓
  - Remove external RRF wind from IA/MN sensitivity ✓
  - Queue DPP wind sensitivity ✓

Further Analysis on the Potential MEP

I-2 more than pays for itself when 3.7GW DPP Queue Wind is modeled in IA/MN

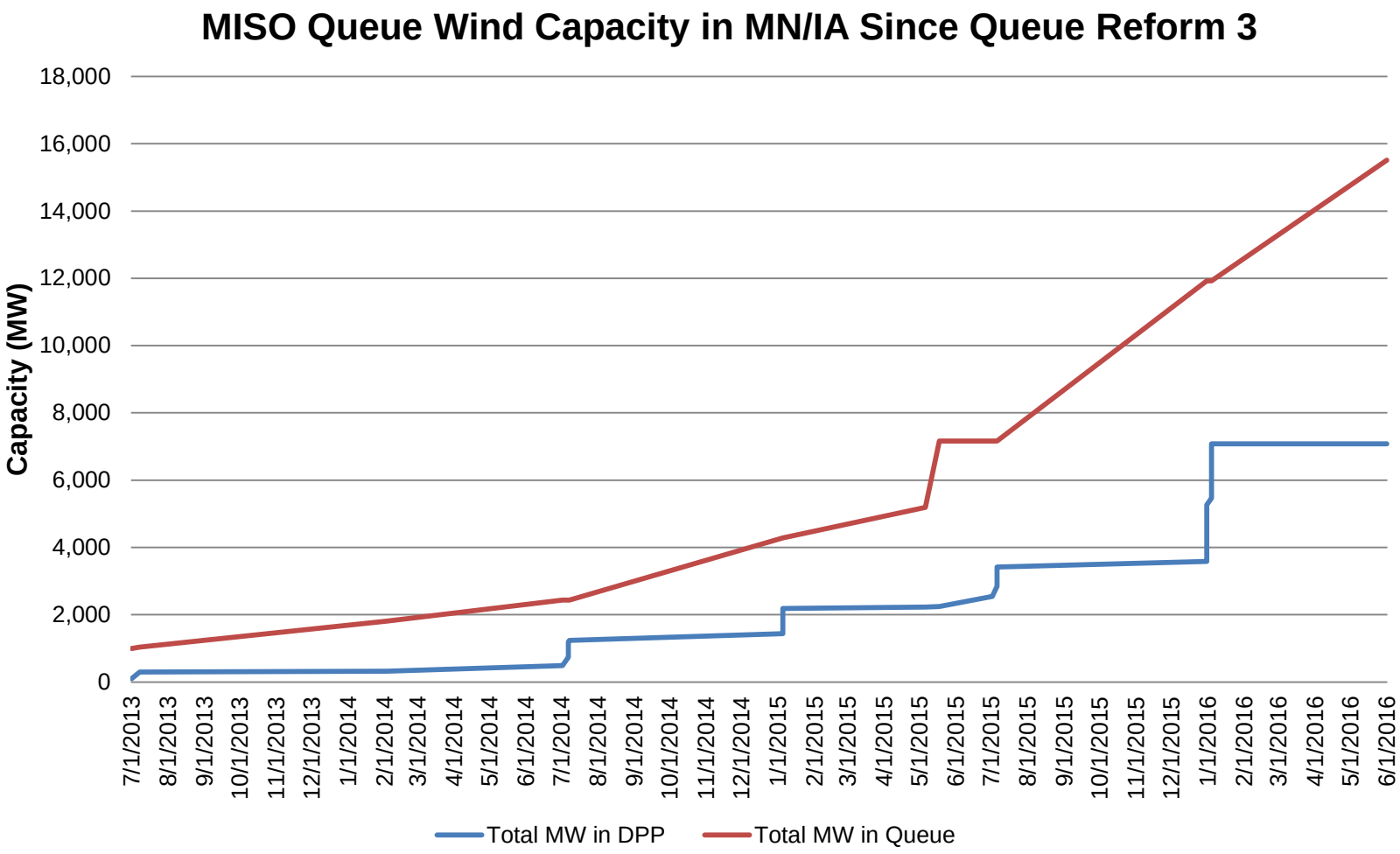


- **I-2 is estimated to have a B/C of 1.07 when DPP queue wind is modeled at 3.7GW level, and a B/C of 1.25 at 4.3 GW level**

Significant Amount of Wind Could Go Into-Service in Future Years

- **The current MN/IA DPP Queue wind's furthest out estimated in-service date is 2020**
- **There's an additional 7 GW of MN/IA wind with SPA status not included as part of this sensitivity (3.8 GW of this was added to the queue in May 2016)**
- **An additional 280 MW of MN/IA wind in the queue has gone to DPP status since this sensitivity was performed and presented in June EPUG meeting**

More and more wind is being added to the queue, and a large portion of that has gradually gone into DPP



Summary of Updated Analysis on Huntley – Wilmarth 345kV (I-2)

- **Findings**
  - Sensitivity results show that project I-2 has a 1.07 B/C when 3.7 GW of DPP queue wind modeled in Iowa/Minnesota
  - Recent additions of queue wind that have gone into SPA or DPP status would further bolster the business case of Huntley – Wilmarth 345kV further

- **MISO intends to recommend I-2 (Huntley – Wilmarth 345kV) as an MEP for MTEP16 BOD approval**
  - Further feedback will be requested in this EPUG and July PAC

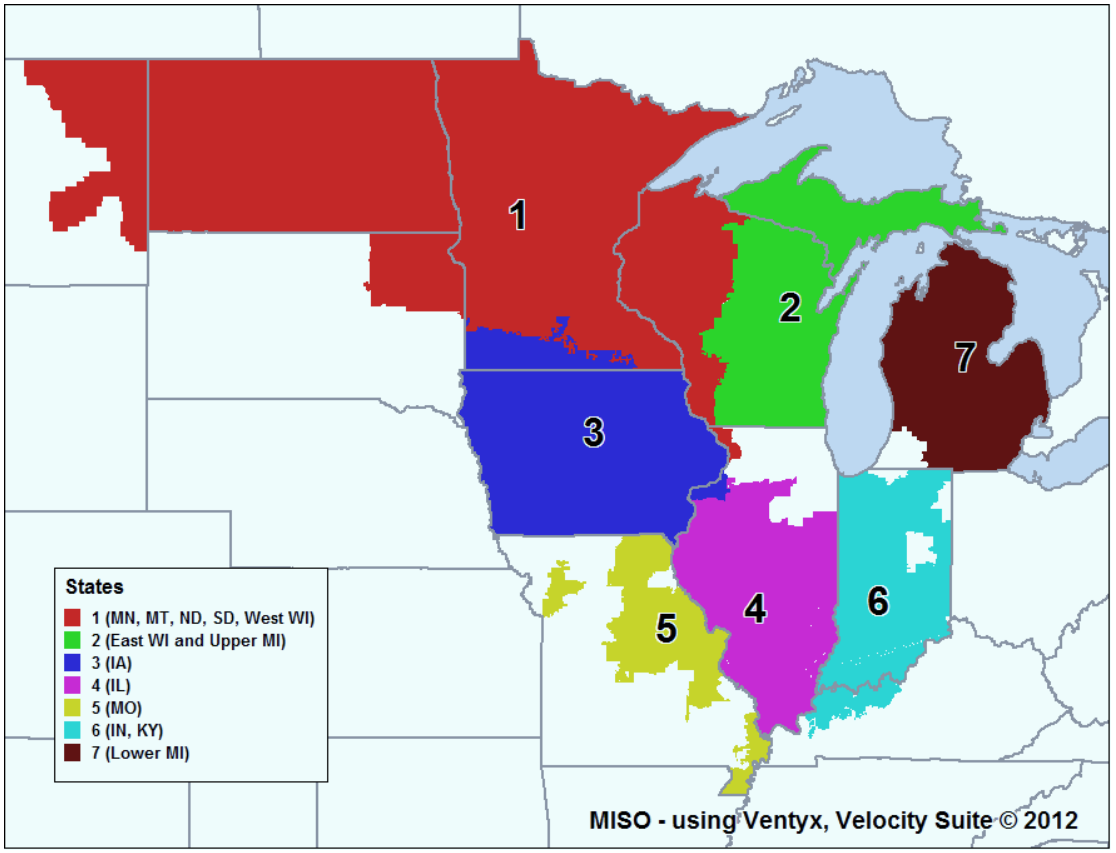
Preliminary Cost Allocation

Cost Allocation Methodology

- Proposed for Appendix A as a Market Efficiency Project
- Cost allocation methodology based on FERC approved MISO Tariff
- Transition Period Provisions
  - Costs of this project are not allocable to MISO South
    - Attachment FF-6 – Projects approved during the Transition Period
      - Projects terminating exclusively in the First Planning Area (MISO North/Central) are not allocable to the Second Planning Area (MISO South)
- Overview of Market Efficiency Project Cost Allocation Methodology
  - 20% of the project costs are allocated to each pricing zone based on MISO load ratio share
  - 80% of the project costs are allocated to pricing zones based on the distribution of positive adjusted production cost savings to the Local Resource Zones (see table and map on next slide)
    - If the total weighted futures for a Local Resource Zone are negative then that Local Resource Zone is not allocated a portion of the 80% of the project cost

Local Resource Zone Benefit Distribution

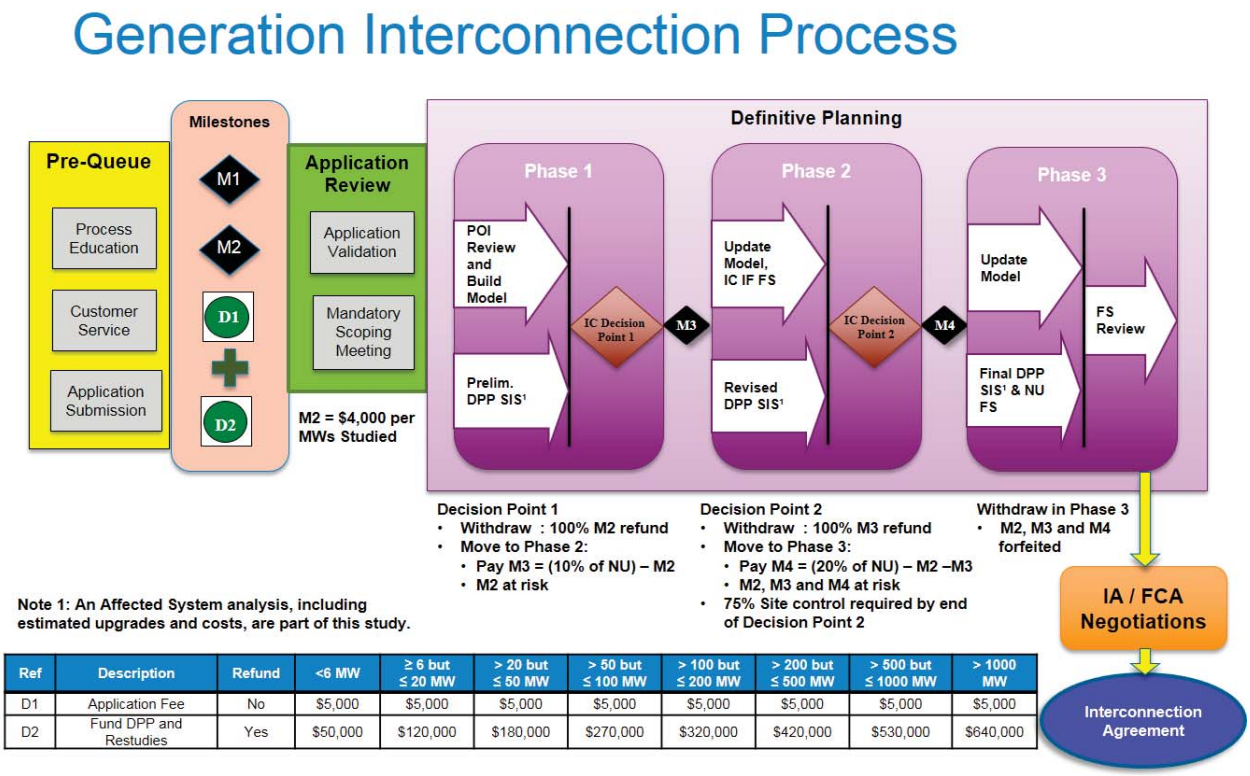
Local Resource Zone	Weighted APC Savings ($ in Millions)	Local Resource Zone Share of Benefits
1	$ 89.35	34.5%
2	$ (4.73)	0.0%
3	$ 168.47	65.0%
4	$ 1.31	0.5%
5	$ (8.34)	0.0%
6	$ (18.96)	0.0%
7	$ (5.74)	0.0%



Preliminary Market Efficiency Project Cost Allocation

Pricing Zone	Local Resource Zone	Local Resource Zone Distribution of Benefits	MISO N/C Load Ratio Share	Pricing Zone Load Ratio Share of Local Resource Zone	20% Postage Stamp Component	80% Local Resource Zone Component	Pricing Zone Allocation Total (%)
[1]	[2]	[3]	[4]	See Note 1 [5]	[6] = 20% * [4]	[7] = 80% * [3] * [5]	[8] = [6] + [7]
DEI	6	0.0%	8.2%	42.7%	1.6%	0.0%	1.6%
NIPS	6	0.0%	4.0%	20.6%	0.8%	0.0%	0.8%
IPL	6	0.0%	3.1%	16.0%	0.6%	0.0%	0.6%
ATC	2	0.0%	12.8%	100.0%	2.6%	0.0%	2.6%
ITC	7	0.0%	11.4%	54.3%	2.3%	0.0%	2.3%
BREC	6	0.0%	1.9%	9.7%	0.4%	0.0%	0.4%
NSP	1	34.5%	10.4%	57.8%	2.1%	15.9%	18.0%
METC	7	0.0%	8.8%	41.9%	1.8%	0.0%	1.8%
VECT	6	0.0%	1.3%	7.0%	0.3%	0.0%	0.3%
MEC	3	65.0%	5.7%	58.3%	1.1%	30.3%	31.5%
ITCM	3	65.0%	3.9%	40.0%	0.8%	20.8%	21.6%
HE	6	0.0%	0.8%	3.9%	0.2%	0.0%	0.2%
AMIL	4	0.5%	9.4%	90.7%	1.9%	0.4%	2.3%
AMMO	5	0.0%	8.6%	95.4%	1.7%	0.0%	1.7%
MP	1	34.5%	2.2%	12.2%	0.4%	3.4%	3.8%
GRE	1	34.5%	1.4%	7.9%	0.3%	2.2%	2.5%
OTP	1	34.5%	1.7%	9.7%	0.3%	2.7%	3.0%
DPC	1	34.5%	1.2%	6.5%	0.2%	1.8%	2.0%
MICH13A	7	0.0%	0.8%	3.8%	0.2%	0.0%	0.2%
MDU	1	34.5%	0.7%	4.0%	0.1%	1.1%	1.2%
SMMPA	1	34.5%	0.4%	2.0%	0.1%	0.6%	0.6%
SIPC	4	0.5%	0.6%	5.9%	0.1%	0.0%	0.1%
MPW	3	65.0%	0.2%	1.7%	0.0%	0.9%	0.9%
CWLP	4	0.5%	0.4%	3.4%	0.1%	0.0%	0.1%
CWLD	5	0.0%	0.4%	4.6%	0.1%	0.0%	0.1%

Note 1: Calculated by dividing the load of applicable pricing zone by the total load of applicable Local Resource Zone



Ref	Description	Refund	<6 MW	≥ 6 but ≤ 20 MW	> 20 but ≤ 50 MW	> 50 but ≤ 100 MW	> 100 but ≤ 200 MW	> 200 but ≤ 500 MW	> 500 but ≤ 1000 MW	> 1000 MW
D1	Application Fee	No	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000
D2	Fund DPP and Restudies	Yes	$50,000	$120,000	$180,000	$270,000	$320,000	$420,000	$530,000	$640,000

Figure 2-1 Generator Interconnection Process Overview

Generator Interconnection Process

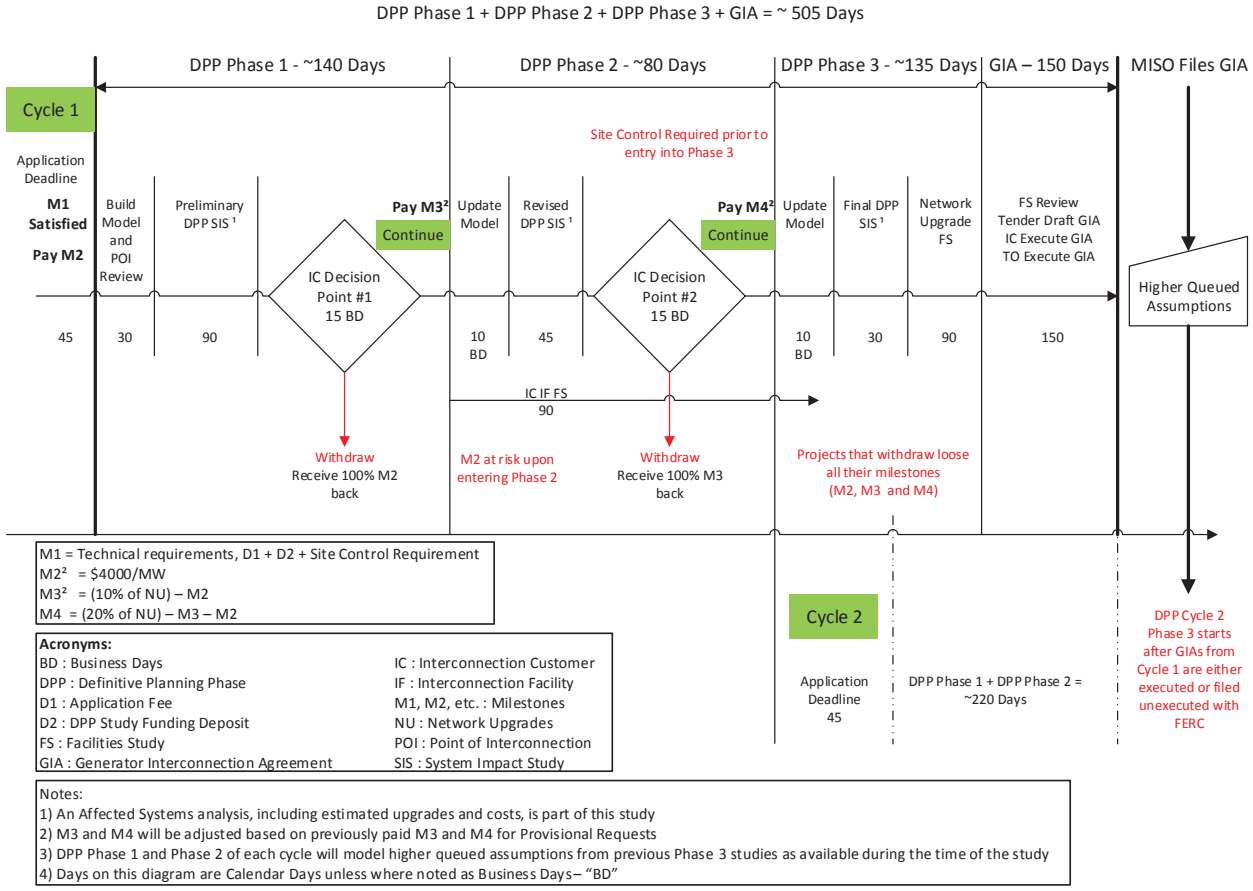


Figure 5-1 Overview of Definitive Planning Phase

MISO Queue Data, accessed September 17, 2018											
Project #	Withdrawn or Done Date	In Service Date	Transmission Owner	State	Study Cycle	Study Group	Service Type	Summer MW	Winter MW	Fuel	Request Status
G517		10/01/2006	ITC Midwest	MN	DPP-2017-AUG	West	ERIS	130.0	130.0	Wind	Active
J1001		09/01/2020	Northern States Power (Xcel Energy)	MN	DPP-2018-APR	West	NRIS	40.0	40.0	Solar	Active
J1006		09/01/2020	Northern States Power (Xcel Energy)	SD	DPP-2018-APR	West	NRIS	100.0	100.0	Solar	Active
J1008		09/01/2020	ITC Midwest	MN	DPP-2018-APR	West	NRIS	50.0	50.0	Solar	Active
J1032		10/31/2021	Northern States Power Company	MN	DPP-2018-APR	West	NRIS	50.0	50.0	Battery Storage	Active
J1036		09/01/2020	Xcel Energy	MN	DPP-2018-APR	West	NRIS	130.0	130.0	Solar	Active
J1037		10/01/2021	Great River Energy	MN	DPP-2018-APR	West	NRIS	15.0	15.0	Battery Storage	Active
J1038		09/01/2020	Missouri River Energy Services (MRES)	MN	DPP-2018-APR	West	ERIS	32.5	32.5	Solar	Active
J1040		09/01/2021	Montana-Dakota Utilities Co.	ND	DPP-2018-APR	West	NRIS	250.0	250.0	Wind	Active
J1041		10/31/2021	Great River Energy	MN	DPP-2018-APR	West	NRIS	20.0	20.0	Battery Storage	Active
J1045		10/31/2021	Northern States Power (Xcel Energy)	MN	DPP-2018-APR	West	NRIS	20.0	20.0	Battery Storage	Active
J1050		06/03/2021	ITC Midwest	IA	DPP-2018-APR	West	NRIS	225.0	225.0	Wind	Active
J1054		10/31/2021	Northern States Power (Xcel Energy)	MN	DPP-2018-APR	West	NRIS	30.0	30.0	Battery Storage	Active
J1057		10/31/2021	Great River Energy	MN	DPP-2018-APR	West	NRIS	125.0	125.0	Solar	Active
J1061		10/31/2021	Northern States Power (Xcel Energy)	MN	DPP-2018-APR	West	NRIS	300.0	300.0	Solar	Active
J1072		09/01/2020	Xcel Energy	MN	DPP-2018-APR	West	NRIS	150.0	150.0	Solar	Active
J1081		09/01/2020	Otter Tail Power Company	MN	DPP-2018-APR	West	NRIS	300.0	300.0	Wind	Active
J1082		09/01/2020	Ameren Missouri	MO	DPP-2018-APR	West	NRIS	400.0	400.0	Wind	Active
J1084		09/01/2020	ITC Midwest	IA	DPP-2018-APR	West	NRIS	150.0	150.0	Solar	Active
J1086		01/02/2021	ITC Midwest	MN	DPP-2018-APR	West	NRIS	120.0	120.0	Solar	Active
J1092		09/30/2021	Xcel Energy	WI	DPP-2018-APR	West	NRIS	100.0	100.0	Solar	Active
J1098		09/30/2021	Xcel Energy	MN	DPP-2018-APR	West	NRIS	40.0	40.0	Solar	Active

MISO Queue Data, accessed September 17, 2018										
Project #	Withdrawn or Done Date	In Service Date	Transmission Owner	State	Study Cycle	Study Group	Service Type	Summer MW	Winter MW	Fuel	Request Status
J1105		09/01/2020	Xcel Energy	MN	DPP-2018-APR	West	NRIS	200.0	200.0	Solar	Active
J1106		08/01/2021	Great River Energy	MN	DPP-2018-APR	West	NRIS	414.0	414.0	Wind	Active
J1108		06/13/2021	Missouri River Energy Services (MRES)	MN	DPP-2018-APR	West	NRIS	150.0	150.0	Solar	Active
J1109		08/01/2021	Xcel Energy	ND	DPP-2018-APR	West	NRIS	207.0	207.0	Wind	Active
J1110		09/15/2021	SMMPA	MN	DPP-2018-APR	West	NRIS	100.0	100.0	Solar	Active
J1114		09/15/2021	MidAmerican Energy Company	IA	DPP-2018-APR	West	NRIS	200.0	200.0	Wind	Active
J1122		09/01/2021	MidAmerican Energy Company	IA	DPP-2018-APR	West	NRIS	200.0	200.0	Wind	Active
J1124		09/15/2021	SMMPA	MN	DPP-2018-APR	West	NRIS	100.0	100.0	Solar	Active
J1128		01/02/2021	SMMPA	MN	DPP-2018-APR	West	NRIS	150.0	150.0	Solar	Active
J1131		10/01/2021	MidAmerican Energy Company	IA	DPP-2018-APR	West	NRIS	100.0	100.0	Solar	Active
J1132		10/01/2021	ITC Midwest	IA	DPP-2018-APR	West	NRIS	50.0	50.0	Solar	Active
J1135		10/01/2021	ITC Midwest	IA	DPP-2018-APR	West	NRIS	50.0	50.0	Solar	Active
J1140		08/01/2020	Great River Energy	MN	DPP-2018-APR	West	NRIS	100.0	100.0	Solar	Active
J1143		08/01/2020	Minnesota Power	MN	DPP-2018-APR	West	NRIS	100.0	100.0	Solar	Active
J1149		11/15/2021	Great River Energy	MN	DPP-2018-APR	West	NRIS	200.0	200.0	Solar	Active
J1164		08/01/2021	ITC Midwest	MN	DPP-2018-APR	West	NRIS	200.0	200.0	Solar	Active
J1169		08/31/2021	Xcel Energy	SD	DPP-2018-APR	West	NRIS	50.0	50.0	Solar	Active
J1170		08/01/2021	Xcel Energy	ND	DPP-2018-APR	West	NRIS	200.0	200.0	Solar	Active
J1174		10/31/2021	ITC Midwest	IA	DPP-2018-APR	West	NRIS	300.0	300.0	Solar	Active
J1175		10/31/2021	ITC Midwest	IA	DPP-2018-APR	West	NRIS	300.0	300.0	Wind	Active
J1176		10/31/2021	ITC Midwest	IA	DPP-2018-APR	West	NRIS	145.0	145.0	Wind	Active
J1177		09/30/2020	Ameren Missouri	MO	DPP-2018-APR	West	NRIS	300.0	300.0	Wind	Active
J1179		10/31/2021	Great River Energy	MN	DPP-2018-APR	West	NRIS	300.0	300.0	Solar	Active
J1181		10/31/2021	ITC Midwest	IA	DPP-2018-APR	West	NRIS	200.0	200.0	Wind	Active
J1182		11/15/2021	Ameren Missouri	MO	DPP-2018-APR	West	NRIS	500.0	500.0	Solar	Active
J1185		09/30/2020	Ameren Missouri	MO	DPP-2018-APR	West	NRIS	200.0	200.0	Wind	Active
J1187		05/01/2020	Great River Energy	ND	DPP-2018-APR	West	NRIS	151.8	151.8	Wind	Active

MISO Queue Data, accessed September 17, 2018											
Project #	Withdrawn or Done Date	In Service Date	Transmission Owner	State	Study Cycle	Study Group	Service Type	Summer MW	Winter MW	Fuel	Request Status
J302		09/01/2015	Montana-Dakota Utilities Company	ND	DPP-2016-AUG	West	NRIS	100.0	100.0	Wind	Active
J310		09/01/2017	Southern Minnesota Municipal Power	MN	DPP-2017-AUG	West	NRIS	200.0	200.0	Wind	Active
J414		07/01/2019	ITC Midwest	MN	DPP-2016-AUG	West	NRIS	120.0	120.0	Wind	Active
J415		07/01/2019	MidAmerican Energy Company	IA	DPP-2016-AUG	West	NRIS	200.0	200.0	Wind	Active
J432		09/15/2018	Northern States Power (Xcel Energy)	SD	DPP-2016-FEB	West	NRIS	98.0	98.0	Wind	Active
J439		12/01/2016	MidAmerican Energy Company	IA	DPP-2016-AUG	West	NRIS	500.0	500.0	Wind	Active
J441		09/01/2018	Northern States Power (Xcel Energy)	MN	DPP-2017-FEB	West	NRIS	200.0	200.0	Wind	Active
J447		07/01/2018	ITC Midwest	IA	DPP-2017-AUG	West	NRIS	150.0	150.0	Wind	Active
J457		09/15/2017	Montana-Dakota Utilities Company	ND	DPP-2016-AUG	West	NRIS	150.0	150.0	Wind	Active
J458		09/30/2019	Otter Tail Power Company	SD	DPP-2017-FEB	West	NRIS	200.0	200.0	Wind	Active
J459		09/30/2017	Otter Tail Power Company	SD	DPP-2016-AUG	West	NRIS	200.0	200.0	Wind	Active
J460		09/30/2017	Northern States Power (Xcel Energy)	MN	DPP-2016-FEB	West	NRIS	200.0	200.0	Wind	Active
J475		09/01/2018	MidAmerican Energy Company	IA	DPP-2016-FEB	West	NRIS	200.0	200.0	Wind	Active
J476		09/01/2017	MidAmerican Energy Company	MO	DPP-2016-AUG	West	NRIS	246.0	246.0	Wind	Active
J485		01/01/2018	Rochester Public Utilities	MN	DPP-2016-FEB	West	NRIS	46.9	46.9	Gas	Active
J488		09/03/2018	Otter Tail Power Company	SD	DPP-2016-FEB	West	ERIS	151.8	151.8	Wind	Active
J493		12/31/2019	Otter Tail Power Company	MN	DPP-2016-FEB	West	NRIS	150.0	150.0	Wind	Active
J495		09/15/2019	ITC Midwest	IA	DPP-2016-FEB	West	NRIS	200.0	200.0	Wind	Active
J498		07/01/2017	MidAmerican Energy Company	IA	DPP-2016-FEB	West	NRIS	340.0	340.0	Wind	Active
J499		07/01/2017	MidAmerican Energy Company	IA	DPP-2016-FEB	West	NRIS	340.0	340.0	Wind	Active
J500		07/01/2017	MidAmerican Energy Company	IA	DPP-2016-FEB	West	NRIS	500.0	500.0	Wind	Active
J503		09/01/2017	Montana-Dakota Utilities Company	ND	DPP-2016-AUG	West	NRIS	100.0	100.0	Wind	Active
J504			ITC Midwest	IA	DPP-2016-FEB	West	NRIS	50.0	50.0	Solar	Active
J506		09/15/2019	MidAmerican Energy Company	IA	DPP-2016-FEB	West	NRIS	200.0	200.0	Wind	Active
J510		09/01/2020	Otter Tail Power Company	SD	DPP-2016-FEB	West	NRIS	266.0	284.5	Gas	Active
J511		09/01/2017	Great River Energy	ND	DPP-2016-AUG	West	NRIS	200.0	200.0	Wind	Active
J512		09/01/2017	Northern States Power (Xcel Energy)	MN	DPP-2016-AUG	West	NRIS	250.0	250.0	Wind	Active

MISO Queue Data, accessed September 17, 2018										
Project #	Withdrawn or Done Date	In Service Date	Transmission Owner	State	Study Cycle	Study Group	Service Type	Summer MW	Winter MW	Fuel	Request Status
J514		03/01/2017	ITC Midwest	IA	DPP-2016-FEB	West	NRIS	30.0	65.0	Gas	Active
J522		09/15/2019	ITC Midwest	MN	DPP-2017-FEB	West	NRIS	20.0	20.0	Battery Storage	Active
J523		09/15/2019	ITC Midwest	MN	DPP-2016-FEB	West	NRIS	50.0	50.0	Solar	Active
J524		09/15/2019	MidAmerican Energy Company	IA	DPP-2016-FEB	West	NRIS	100.0	100.0	Solar	Active
J526			Otter Tail Power Company	SD	DPP-2016-FEB	West	NRIS	300.0	300.0	Wind	Active
J527			MidAmerican Energy Company	IA	DPP-2016-FEB	West	NRIS	250.0	250.0	Wind	Active
J528			MidAmerican Energy Company	IA	DPP-2016-FEB	West	NRIS	200.0	200.0	Wind	Active
J529		10/01/2017	MidAmerican Energy Company	IA	DPP-2016-FEB	West	NRIS	250.0	250.0	Wind	Active
J530			MidAmerican Energy Company	IA	DPP-2016-FEB	West	NRIS	250.0	250.0	Wind	Active
J534		10/01/2017	MidAmerican Energy Company	IA	DPP-2016-FEB	West	NRIS	250.0	250.0	Wind	Active
J535		10/01/2017	MidAmerican Energy Company	IA	DPP-2016-FEB	West	NRIS	210.0	210.0	Wind	Active
J541		09/01/2017	Ameren Transmission Company of Illinois	MO	DPP-2016-AUG	West	NRIS	400.0	400.0	Wind	Active
J545		09/15/2018	Northern States Power (Xcel Energy)	MN	DPP-2017-AUG	West	NRIS	150.0	150.0	Wind	Active
J555		09/01/2017	MidAmerican Energy Company	IA	DPP-2016-AUG	West	NRIS	140.0	140.0	Wind	Active
J556		10/01/2018	Great River Energy	MN	DPP-2017-FEB	West	NRIS	102.0	102.0	Wind	Active
J569		04/15/2018	Northern States Power (Xcel Energy)	MN	DPP-2016-AUG	West	NRIS	100.0	100.0	Wind	Active
J570		09/15/2018	MidAmerican Energy Company	MO	DPP-2017-FEB	West	NRIS	150.0	150.0	Wind	Active
J575		09/15/2018	Northern States Power (Xcel Energy)	MN	DPP-2016-AUG	West	NRIS	100.0	100.0	Wind	Active
J577		09/15/2018	Northern States Power (Xcel Energy)	MN	DPP-2016-AUG	West	NRIS	100.0	100.0	Wind	Active
J580		06/30/2020	Montana-Dakota Utilities Company	ND	DPP-2017-AUG	West	ERIS	305.9	305.9	Wind	Active
J583		10/01/2018	MidAmerican Energy Company	IA	DPP-2016-AUG	West	NRIS	200.0	200.0	Wind	Active
J587		09/30/2019	Northern States Power (Xcel Energy)	MN	DPP-2016-AUG	West	NRIS	200.0	200.0	Wind	Active
J590		10/01/2017	MidAmerican Energy Company	IA	DPP-2016-AUG	West	NRIS	90.0	90.0	Wind	Active
J593		09/01/2018	Montana-Dakota Utilities Company	ND	DPP-2016-AUG	West	NRIS	224.0	224.0	Wind	Active
J594		09/01/2018	ITC Midwest	MN	DPP-2016-AUG	West	NRIS	300.0	300.0	Wind	Active
J596		09/01/2018	Great River Energy	MN	DPP-2016-AUG	West	NRIS	100.0	100.0	Wind	Active

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Project #	Withdrawn or Done Date	In Service Date	Transmission Owner	State	Study Cycle	Study Group	Service Type	Summer MW	Winter MW	Fuel	Request Status
J597		09/01/2018	Northern States Power (Xcel Energy)	SD	DPP-2016-AUG	West	NRIS	300.0	300.0	Wind	Active
J598		05/09/2016	Ameren Transmission Company of Illinois	MO	DPP-2016-AUG	West	NRIS	300.0	300.0	Wind	Active
J599		09/01/2018	Montana-Dakota Utilities Company	SD	DPP-2016-AUG	West	NRIS	200.0	200.0	Wind	Active
J607		09/01/2018	Montana-Dakota Utilities Company	ND	DPP-2016-AUG	West	NRIS	150.0	150.0	Wind	Active
J611		09/01/2018	MidAmerican Energy Company	MO	DPP-2016-AUG	West	NRIS	110.0	110.0	Wind	Active
J613		08/01/2018	Otter Tail Power Company	ND	DPP-2016-AUG	West	NRIS	100.0	100.0	Wind	Active
J614		08/04/2018	Southern Minnesota Municipal Power	IA	DPP-2016-AUG	West	NRIS	66.0	66.0	Wind	Active
J615		08/04/2018	MidAmerican Energy Company	IA	DPP-2016-AUG	West	NRIS	70.0	70.0	Wind	Active
J625		09/15/2019	Northern States Power (Xcel Energy)	MN	DPP-2017-AUG	West	NRIS	400.0	400.0	Wind	Active
J628		09/15/2018	Great River Energy	ND	DPP-2017-AUG	West	NRIS	400.0	400.0	Wind	Active
J637		09/15/2018	Otter Tail Power Company	SD	DPP-2016-AUG	West	NRIS	98.0	98.0	Wind	Active
J638		09/15/2019	Otter Tail Power Company	SD	DPP-2016-AUG	West	NRIS	204.0	204.0	Wind	Active
J705		07/01/2018	Minnesota Power (Allete, Inc.)	ND	DPP-2017-AUG	West	NRIS	100.0	100.0	Wind	Active
J706		07/01/2018	Minnesota Power (Allete, Inc.)	ND	DPP-2017-AUG	West	NRIS	100.0	100.0	Wind	Active
J707		09/30/2020	Otter Tail Power Company	ND	DPP-2017-FEB	West	NRIS	300.0	300.0	Wind	Active
J713		09/15/2019	Minnesota Power (Allete, Inc.)	ND	DPP-2017-AUG	West	NRIS	300.0	300.0	Wind	Active
J718		12/31/2020	Dairyland Power Cooperative	MN	DPP-2017-FEB	West	NRIS	50.0	50.0	Solar	Active
J720		04/01/2020	ITC Midwest	MN	DPP-2017-AUG	West	NRIS	200.0	200.0	Wind	Active
J721		09/15/2019	Otter Tail Power Company	SD	DPP-2017-FEB	West	NRIS	200.0	200.0	Wind	Active
J722		09/15/2019	Otter Tail Power Company	SD	DPP-2017-AUG	West	NRIS	200.0	200.0	Wind	Active
J725		09/15/2019	Great River Energy	MN	DPP-2017-AUG	West	NRIS	200.0	200.0	Wind	Active
J726		09/15/2019	Great River Energy	MN	DPP-2017-AUG	West	NRIS	200.0	200.0	Wind	Active
J731		09/23/2020	MidAmerican Energy Company	IA	DPP-2017-FEB	West	NRIS	200.0	200.0	Wind	Active
J733		09/23/2020	ITC Midwest	IA	DPP-2017-FEB	West	NRIS	200.0	200.0	Wind	Active
J739		09/15/2020	Northern States Power (Xcel Energy)	MN	DPP-2017-FEB	West	NRIS	200.0	200.0	Wind	Active
J741		09/01/2019	Montana-Dakota Utilities Company	ND	DPP-2017-FEB	West	NRIS	51.0	51.0	Wind	Active
J743		08/01/2020	Northern States Power (Xcel Energy)	ND	DPP-2017-AUG	West	NRIS	211.0	211.0	Wind	Active

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Project #	Withdrawn or Done Date	In Service Date	Transmission Owner	State	Study Cycle	Study Group	Service Type	Summer MW	Winter MW	Fuel	Request Status
J745		06/30/2019	Northern States Power (Xcel Energy)	MN	DPP-2017-FEB	West	NRIS	100.0	100.0	Wind	Active
J746		01/08/2019	Great River Energy	ND	DPP-2017-FEB	West	NRIS	200.0	200.0	Wind	Active
J747		10/01/2017	Otter Tail Power Company	SD	DPP-2017-FEB	West	NRIS	200.0	200.0	Wind	Active
J748		10/01/2019	MidAmerican Energy Company	IA	DPP-2017-FEB	West	NRIS	200.0	200.0	Wind	Active
J761		09/15/2020	ITC Midwest	MN	DPP-2017-FEB	West	NRIS	200.0	200.0	Wind	Active
J766		01/01/2018	Minnesota Power (Allete, Inc.)	ND	DPP-2017-FEB	West	NRIS	3.8	3.8	Wind	Active
J767		01/01/2019	ITC Midwest	IA	DPP-2017-FEB	West	NRIS	12.0	12.0	Wind	Active
J768		01/01/2019	ITC Midwest	IA	DPP-2017-FEB	West	NRIS	12.0	12.0	Wind	Active
J769		07/31/2019	Northern States Power (Xcel Energy)	MN	DPP-2017-FEB	West	NRIS	33.0	33.0	Solar	Active
J770		07/31/2019	Northern States Power (Xcel Energy)	MN	DPP-2017-FEB	West	NRIS	90.0	90.0	Solar	Active
J771		07/31/2019	Great River Energy	MN	DPP-2017-FEB	West	NRIS	50.0	50.0	Solar	Active
J776		11/01/2019	MidAmerican Energy Company	IA	DPP-2017-FEB	West	NRIS	99.0	99.0	Wind	Active
J777		11/01/2019	ITC Midwest	IA	DPP-2017-FEB	West	NRIS	99.0	99.0	Wind	Active
J779		09/01/2019	Montana-Dakota Utilities Company	ND	DPP-2017-FEB	West	NRIS	51.0	51.0	Wind	Active
J780		12/15/2020	Otter Tail Power Company	ND	DPP-2017-FEB	West	NRIS	200.0	200.0	Wind	Active
J785		09/15/2019	ITC Midwest	MN	DPP-2017-AUG	West	NRIS	105.0	105.0	Wind	Active
J801		09/01/2019	Northern States Power (Xcel Energy)	WI	DPP-2017-AUG	West	NRIS	74.0	74.0	Solar	Active
J803		10/01/2019	Northern States Power (Xcel Energy)	MN	DPP-2017-AUG	West	ERIS	32.5	32.5	Solar	Active
J814		09/15/2020	Northern States Power (Xcel Energy)	WI	DPP-2017-AUG	West	NRIS	99.9	99.9	Wind	Active
J816		09/15/2019	Otter Tail Power Company	ND	DPP-2017-AUG	West	NRIS	60.0	60.0	Solar	Active
J823		09/15/2020	ITC Midwest	MO	DPP-2017-AUG	West	NRIS	50.0	50.0	Solar	Active
J836		06/01/2020	ITC Midwest	IA	DPP-2017-AUG	West	ERIS	200.0	200.0	Wind	Active
J840		07/01/2020	MidAmerican Energy Company	IA	DPP-2017-AUG	West	NRIS	150.0	150.0	Wind	Active
J863		01/01/2021	Northern States Power (Xcel Energy)	MN	DPP-2017-AUG	West	NRIS	220.0	220.0	Gas	Active
J869		09/01/2019	Great River Energy	MN	DPP-2017-AUG	West	NRIS	50.0	50.0	Solar	Active
J873		07/01/2020	ITC Midwest	IA	DPP-2017-AUG	West	NRIS	200.0	200.0	Wind	Active
J874		09/30/2021	Northern States Power (Xcel Energy)	MN	DPP-2017-AUG	West	NRIS	150.0	150.0	Solar	Active

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Project #	Withdrawn or Done Date	In Service Date	Transmission Owner	State	Study Cycle	Study Group	Service Type	Summer MW	Winter MW	Fuel	Request Status
J876		09/15/2020	ITC Midwest	MN	DPP-2017-AUG	West	NRIS	200.0	200.0	Wind	Active
J877		09/30/2021	MidAmerican Energy Company	IA	DPP-2017-AUG	West	NRIS	250.0	250.0	Solar	Active
J880		09/15/2020	Northern States Power (Xcel Energy)	ND	DPP-2017-AUG	West	NRIS	150.0	150.0	Wind	Active
J885		09/30/2020	ITC Midwest	AL	DPP-2017-AUG	West	NRIS	64.0	64.0	Wind	Active
J889		09/15/2020	Great River Energy	ND	DPP-2017-AUG	West	NRIS	150.0	150.0	Wind	Active
J891		09/15/2020	Northern States Power (Xcel Energy)	MN	DPP-2017-AUG	West	NRIS	300.0	300.0	Wind	Active
J897		10/01/2020	Great River Energy	ND	DPP-2017-AUG	West	NRIS	190.0	190.0	Wind	Active
J898		10/01/2020	Dairyland Power Cooperative	MN	DPP-2017-AUG	West	NRIS	100.0	100.0	Wind	Active
J901		10/01/2020	Northern States Power (Xcel Energy)	MN	DPP-2017-AUG	West	NRIS	200.0	200.0	Wind	Active
J905		09/15/2019	Northern States Power (Xcel Energy)	MN	DPP-2017-AUG	West	NRIS	40.0	40.0	Solar	Active
J916		06/01/2018	ITC Midwest	MN	DPP-2017-AUG	West	NRIS	2.0	2.0	Diesel	Active
J926		09/01/2019	Northern States Power (Xcel Energy)	WI	DPP-2017-AUG	West	NRIS	101.3	101.3	Wind	Active
J927		10/01/2019	ITC Midwest	MN	DPP-2017-AUG	West	NRIS	100.0	100.0	Wind	Active
J929		06/30/2019	Montana-Dakota Utilities Company	ND	DPP-2017-AUG	West	NRIS	25.0	25.0	Solar	Active
J933		09/15/2019	Otter Tail Power Company	SD	DPP-2017-AUG	West	NRIS	200.0	200.0	Wind	Active
J935		09/15/2020	Minnesota Power (Allete, Inc.)	MN	DPP-2017-AUG	West	NRIS	200.0	200.0	Solar	Active
J939		09/15/2019	MidAmerican Energy Company	IA	DPP-2017-AUG	West	NRIS	38.0	38.0	Wind	Active
J940		09/15/2019	Otter Tail Power Company	ND	DPP-2017-AUG	West	NRIS	100.0	100.0	Wind	Active
J941		07/01/2020	Otter Tail Power Company	SD	DPP-2017-AUG	West	NRIS	200.0	200.0	Wind	Active
J943		09/30/2020	Northern States Power (Xcel Energy)	MN	DPP-2017-AUG	West	NRIS	200.0	200.0	Wind	Active
J946		08/31/2019	Northern States Power (Xcel Energy)	ND	DPP-2017-AUG	West	NRIS	200.0	200.0	Solar	Active
J951		11/15/2018	Otter Tail Power Company	MN	DPP-2018-APR	West	ERIS	80.0	80.0	Wind	Active
J952		01/01/2020	Montana-Dakota Utilities Company	SD	DPP-2018-APR	West	ERIS	54.0	54.0	Wind	Active
J953		01/01/2006	ITC Midwest	IA	DPP-2018-APR	West	External NRIS	1.8	2.0	Diesel	Active
J954		10/30/2016	ITC Midwest	IA	DPP-2018-APR	West	External NRIS	1.4	1.4	Solar	Active
J958		09/01/2020	Xcel Energy	MN	DPP-2018-APR	West	NRIS	100.0	100.0	Wind	Active
J959		09/01/2020	SMMPA	IA	DPP-2018-APR	West	NRIS	150.0	150.0	Wind	Active

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Project #	Withdrawn or Done Date	In Service Date	Transmission Owner	State	Study Cycle	Study Group	Service Type	Summer MW	Winter MW	Fuel	Request Status
J963		01/01/2017	ITC Midwest	IA	DPP-2018-APR	West	NRIS	10.2	10.2	Diesel	Active
J965		09/01/2020	Xcel Energy	MN	DPP-2018-APR	West	NRIS	150.0	150.0	Wind	Active
J966		12/01/2020	Ameren Missouri	MO	DPP-2018-APR	West	NRIS	400.0	400.0	Wind	Active
J967		09/01/2020	Xcel Energy	MN	DPP-2018-APR	West	NRIS	150.0	150.0	Wind	Active
J971		09/30/2020	Xcel Energy	MN	DPP-2018-APR	West	NRIS	250.0	250.0	Wind	Active
J975		10/31/2021	Otter Tail Power Company	ND	DPP-2018-APR	West	NRIS	150.0	150.0	Wind	Active
J977		03/01/2021	ITC Midwest	MN	DPP-2018-APR	West	NRIS	300.0	300.0	Wind	Active
J981		03/01/2021	MidAmerican Energy Company	IA	DPP-2018-APR	West	NRIS	200.0	200.0	Wind	Active
J982		03/01/2021	MidAmerican Energy Company	IA	DPP-2018-APR	West	NRIS	300.0	300.0	Wind	Active
J990		09/01/2020	ITC Midwest	IA	DPP-2018-APR	West	NRIS	150.0	150.0	Solar	Active
J997		09/01/2020	Montana-Dakota Utilities Co.	ND	DPP-2018-APR	West	NRIS	200.0	200.0	Solar	Active
J998		09/01/2020	MidAmerican Energy Company	IA	DPP-2018-APR	West	NRIS	50.0	50.0	Solar	Active
J999		09/01/2020	ITC Midwest	IA	DPP-2018-APR	West	NRIS	100.0	100.0	Solar	Active
G735	03/23/2015	12/31/2008	ITC Midwest	IA	DPP-2012-AUG	WEST	NRIS	200.0	200.0	Wind	Done
G736	11/21/2016	09/30/2017	Otter Tail Power Company	SD	DPP-2015-FEB	West	NRIS	200.0	200.0	Wind	Done
G798	03/23/2015	12/14/2009	ITC Midwest	IA	DPP-2012-AUG	WEST	NRIS	150.0	150.0	Wind	Done
G826	12/17/2014	10/09/2015	Northern States Power (Xcel Energy)	MN	DPP-2012-AUG	West	NRIS	200.0	200.0	Wind	Done
G830	09/20/2012	12/22/2018	Great River Energy	ND	DPP-2012-AUG	West	NRIS	99.0	99.0	Wind	Done
G858	05/05/2015	03/01/2016	Northern States Power (Xcel Energy)	MN	DPP-2013-FEB	West	NRIS	38.0	38.0	Wind	Done
G870	05/11/2015	09/01/2010	ITC Midwest	MN	DPP-2012-AUG	WEST	NRIS	201.0	201.0	Wind	Done
G947	04/01/2015	12/15/2012	ITC Midwest	IA	DPP-2012-AUG	WEST	NRIS	99.0	99.0	Wind	Done
H008	01/07/2015	11/01/2012	ITC Midwest	IA	DPP-2012-AUG	West	NRIS	36.0	36.0	Wind	Done
H009	04/01/2015	12/03/2012	ITC Midwest	IA	DPP-2012-AUG	WEST	ERIS	150.0	150.0	Wind	Done
H021	03/23/2015	06/09/2014	ITC Midwest	IA	DPP-2012-AUG	WEST	NRIS	138.6	138.6	Wind	Done
H071	05/05/2015	03/01/2016	Northern States Power (Xcel Energy)	MN	DPP-2013-FEB	West	NRIS	40.0	40.0	Wind	Done
H081	12/05/2014	09/01/2017	Northern States Power (Xcel Energy)	MN	DPP-2012-AUG	West	ERIS	201.0	201.0	Wind	Done
H096	04/06/2015	10/15/2012	ITC Midwest	IA	DPP-2012-AUG	WEST	NRIS	50.0	50.0	Wind	Done

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Project #	Withdrawn or Done Date	In Service Date	Transmission Owner	State	Study Cycle	Study Group	Service Type	Summer MW	Winter MW	Fuel	Request Status
J041		09/01/2010	ITC Midwest	IA	DPP-2015-AUG	West	NRIS	90.0	90.0	Wind	Done
J091	03/13/2015	12/11/2009	ITC Midwest	IA	DPP-2012-AUG	WEST	NRIS	66.0	66.0	Wind	Done
J112	09/16/2013	10/30/2011	ITC Midwest	MN	DPP-2012-AUG	West	ERIS	4.9	4.9	Wind	Done
J171	05/27/2015	09/30/2011	Great River Energy	MN	DPP-2012-AUG	West	NRIS	7.0	7.0	Biomass	Done
J183	03/23/2016	12/31/2012	Northern States Power (Xcel Energy)	MN	DPP-2012-AUG	West	NZIS	200.0	200.0	Wind	Done
J191	05/04/2015	12/22/2011	MidAmerican Energy Company	IA	DPP-2012-AUG	WEST	NRIS	101.2	101.2	Wind	Done
J200	07/30/2012	05/20/2014	Montana-Dakota Utilities Company	ND	DPP-2012-AUG	West	NRIS	75.0	99.0	Gas	Done
J233	01/20/2016	03/01/2016	ITC Midwest	IA	DPP-2013-AUG	West	NRIS	635.0	700.0	Combined Cycle	Done
J249	12/12/2013		Montana-Dakota Utilities Company	ND	DPP-2012-AUG	West	NRIS Only	180.0	180.0	Wind	Done
J262	12/07/2014	11/30/2015	Otter Tail Power Company	ND	DPP-2013-FEB	West	NRIS	100.0	100.0	Wind	Done
J263	12/07/2014	11/30/2015	Otter Tail Power Company	ND	DPP-2013-FEB	West	NRIS	100.0	100.0	Wind	Done
J274	01/09/2015	08/18/2014	MidAmerican Energy Company	IA	DPP-2013-AUG	West	NRIS	100.0	100.0	Wind	Done
J278	07/17/2014	10/15/2015	Great River Energy	MN	DPP-2013-AUG	West	NRIS	200.0	200.0	Wind	Done
J279	01/19/2016	01/01/2016	MidAmerican Energy Company	IA	DPP-2013-AUG	West	NRIS	30.0	30.0	Coal	Done
J285	05/09/2016	10/01/2016	MidAmerican Energy Company	IA	DPP-2014-AUG	West	NRIS	250.0	250.0	Wind	Done
J289	02/29/2016	08/18/2014	MidAmerican Energy Company	IA	DPP-2014-AUG	West	NRIS	20.0	20.0	Wind	Done
J290	07/16/2014	10/15/2015	Northern States Power (Xcel Energy)	ND	DPP-2013-AUG	West	NRIS	150.0	150.0	Wind	Done
J292	09/01/2015		Manitoba Hydro		DPP-2014-FEB	West	External NRIS	3,576.0	3,576.0	Hydro	Done
J299	09/08/2016	05/01/2007	Northern States Power (Xcel Energy)	MN	DPP-2015-FEB	West	ERIS	-	73.0	Combined Cycle	Done
J316	08/30/2016	09/01/2017	Montana-Dakota Utilities Company	ND	DPP-2014-AUG	West	NRIS	150.0	150.0	Wind	Done
J320	02/16/2016	03/01/2016	Xcel Energy	MN	DPP-2014-AUG	West	ERIS	-	55.0	Gas	Done
J329	04/22/2016	08/01/2017	Cedar Falls Utilities	IA	DPP-2014-AUG	West	NRIS	55.0	55.0	Hydro	Done
J343	05/09/2016	10/01/2015	MidAmerican Energy Company	IA	DPP-2014-AUG	West	NRIS	150.0	150.0	Wind	Done
J344	06/17/2016	07/01/2017	ITC Midwest	IA	DPP-2014-AUG	West	NRIS	169.0	169.0	Wind	Done
J382	03/14/2016	03/01/2016	American Transmission Co. LLC	WI	DPP-2014-AUG	West	NRIS Only	48.3	48.3	Gas	Done

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J385	10/17/2016	08/15/2016	Northern States Power (Xcel Energy)	MN	DPP-2015-FEB	West	NRIS	100.0	100.0	Solar	Done
J391	11/15/2016	09/01/2016	Missouri River Energy Services (MRES)	MN	DPP-2015-FEB	West	NRIS	50.0	50.0	Gas	Done
J399		10/28/2017	Northern States Power (Xcel Energy)	MN	DPP-2015-AUG	West	NRIS	214.0	232.0	Gas	Done
J400	10/18/2016	09/30/2016	Northern States Power (Xcel Energy)	MN	DPP-2015-FEB	West	NRIS	62.5	62.5	Solar	Done
J405	10/26/2016	12/01/2015	Montana-Dakota Utilities Company	MT	DPP-2015-FEB	West	NRIS	40.0	40.0	Gas	Done
J407	03/24/2017	10/01/2016	ITC Midwest	MN	DPP-2015-FEB	West	NRIS	200.0	200.0	Wind	Done
J411	10/10/2016	07/15/2016	MidAmerican Energy Company	IA	DPP-2015-FEB	West	NRIS	300.0	300.0	Wind	Done
J412	08/23/2017	10/01/2016	MidAmerican Energy Company	IA	DPP-2015-AUG	West	NRIS	200.0	200.0	Wind	Done
J416	09/02/2016	07/01/2019	ITC Midwest	IA	DPP-2015-FEB	West	NRIS	200.0	200.0	Wind	Done
J426	09/22/2016	09/01/2016	Northern States Power (Xcel Energy)	MN	DPP-2015-FEB	West	NRIS	100.0	100.0	Wind	Done
J436		10/10/2017	Otter Tail Power Company	SD	DPP-2015-AUG	West	ERIS	150.0	150.0	Wind	Done
J437		10/10/2017	Otter Tail Power Company	SD	DPP-2015-AUG	West	ERIS	150.0	150.0	Wind	Done
J438		09/01/2016	MidAmerican Energy Company	IA	DPP-2015-AUG	West	NRIS	170.0	170.0	Wind	Done
J442	08/11/2017	09/01/2017	Otter Tail Power Company	SD	DPP-2015-AUG	West	NRIS	200.0	200.0	Wind	Done
J443	05/22/2017	12/31/2015	ITC Midwest	IA	DPP-2015-AUG	West	NRIS Only	41.0	41.0	Wind	Done
J449	06/26/2017	09/15/2017	ITC Midwest	IA	DPP-2015-AUG	West	NRIS	202.0	202.0	Wind	Done
J455		10/10/2018	MidAmerican Energy Company	IA	DPP-2015-AUG	West	ERIS	300.0	300.0	Wind	Done
J558	04/17/2017		Northern States Power (Xcel Energy)	MN	MM-2016-AUG	WEST	ERIS	9.2	9.2	Wind	Done
R42	05/04/2015	09/27/2014	MidAmerican Energy Company	IA	DPP-2012-AUG	West	NRIS	250.0	250.0	Wind	Done
R49	03/16/2015	10/30/2011	MidAmerican Energy Company	IA	DPP-2012-AUG	WEST	NRIS	12.0	12.0	Wind	Done
R65	05/04/2015	12/22/2011	MidAmerican Energy Company	IA	DPP-2012-AUG	WEST	NRIS	92.0	92.0	Wind	Done
G681	06/27/2013		ITC Midwest	MN	DPP-2012-AUG	West	NRIS	44.0	44.0	Wind	Withdrawn
G696	04/04/2017	05/01/2008	Otter Tail Power Company	ND	SPA Parked	West	NRIS	50.0	50.0	Wind	Withdrawn
H048	03/19/2014	12/30/2012	Northern States Power (Xcel Energy)	MN	DPP-2012-AUG	West	NRIS	50.0	50.0	Wind	Withdrawn
H058	03/19/2014	12/30/2012	Northern States Power (Xcel Energy)	MN	DPP-2012-AUG	West	NRIS	45.0	45.0	Wind	Withdrawn
J026	06/05/2015	10/03/2020	ITC Midwest	MN	DPP-2012-AUG	WEST	NRIS	50.0	50.0	Wind	Withdrawn
J092	07/18/2014		ITC Midwest	IA	DPP-2012-AUG	West	NRIS	20.0	20.0	Wind	Withdrawn

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Project #	Withdrawn or Done Date	In Service Date	Transmission Owner	State	Study Cycle	Study Group	Service Type	Summer MW	Winter MW	Fuel	Request Status
J097	04/17/2015	09/01/2015	ITC Midwest	IA	DPP-2012-AUG	West	NRIS	200.0	200.0	Wind	Withdrawn
J118	07/18/2014		MidAmerican Energy Company	IA	DPP-2013-FEB	West	NRIS	50.0	50.0	Wind	Withdrawn
J182	06/26/2013		Great River Energy	MN	DPP-2012-AUG	West	ERIS	150.0	150.0	Wind	Withdrawn
J280	12/17/2014		Northern States Power (Xcel Energy)	MN	DPP-2014-AUG	West	NRIS	207.0	221.0	Gas	Withdrawn
J288	01/25/2016	11/01/2018	Northern States Power (Xcel Energy)	MN	DPP-2013-AUG	West	NRIS	40.0	40.0	Wind	Withdrawn
J298	10/12/2017	09/01/2015	ITC Midwest	IA	DPP-2015-AUG	West	NRIS	300.0	300.0	Wind	Withdrawn
J303	12/15/2015	12/31/2018	Northern States Power (Xcel Energy)	MN	DPP-2014-FEB	West	NRIS	20.0	20.0	Solar	Withdrawn
J309	11/17/2015	09/30/2018	Northern States Power (Xcel Energy)	MN	DPP-2014-AUG	West	NRIS	20.0	20.0	Solar	Withdrawn
J330	05/19/2016	10/01/2017	Northern States Power (Xcel Energy)	MN	DPP-2015-AUG	West	NRIS	24.4	24.8	Solar	Withdrawn
J356	12/15/2014		MidAmerican Energy Company	IA	DPP-2014-AUG	West	NRIS	168.0	232.0	Gas	Withdrawn
J360	12/15/2014		MidAmerican Energy Company	IA	DPP-2014-AUG	West	NRIS	84.0	116.0	Gas	Withdrawn
J361	12/15/2014		MidAmerican Energy Company	IA	DPP-2014-AUG	West	NRIS	84.0	116.0	Gas	Withdrawn
J409	07/17/2015		ITC Midwest	IA	DPP-2015-FEB	West	NRIS	150.0	150.0	Wind	Withdrawn
J454	01/17/2017	03/01/2016	Missouri River Energy Services (MRES)	MN	DPP-2015-AUG	West	NRIS Only	18.9	18.9	Wind	Withdrawn
J489	03/26/2018	09/03/2018	Otter Tail Power Company	SD	DPP-2016-FEB	West	ERIS	151.8	151.8	Wind	Withdrawn
J490	09/01/2017	10/01/2017	Montana-Dakota Utilities Company	SD	DPP-2016-FEB	West	NRIS	60.0	60.0	Wind	Withdrawn
J497	11/17/2016	07/01/2017	ITC Midwest	IA	DPP-2016-FEB	West	NRIS	170.0	170.0	Wind	Withdrawn
J501	09/01/2017	07/01/2017	MidAmerican Energy Company	IA	DPP-2016-FEB	West	NRIS	500.0	500.0	Wind	Withdrawn
J525	03/26/2018	09/30/2017	Great River Energy	MN	DPP-2016-FEB	West	NRIS	50.0	50.0	Solar	Withdrawn
J531	09/01/2017	10/01/2017	ITC Midwest	IA	DPP-2016-FEB	West	NRIS	200.0	200.0	Wind	Withdrawn
J532	02/17/2016		MidAmerican Energy Company	IA	DPP-2016-FEB	West	NRIS	50.0	50.0	Solar	Withdrawn
J562	01/24/2017		MidAmerican Energy Company	IA	DPP-2016-AUG	West	NRIS Only	119.6	119.6	Wind	Withdrawn
J563	01/24/2017		MidAmerican Energy Company	IA	DPP-2016-AUG	West	NRIS Only	150.0	150.0	Wind	Withdrawn
J650	01/24/2017	09/05/2019	Otter Tail Power Company	SD	DPP-2016-AUG	West	NRIS Only	151.8	151.8	Wind	Withdrawn
J651	01/24/2017	09/03/2018	Otter Tail Power Company	SD	DPP-2016-AUG	West	NRIS Only	151.8	151.8	Wind	Withdrawn
J810	08/31/2018	04/01/2023	MidAmerican Energy Company	IA	DPP-2017-AUG	West	NRIS	139.6	145.5	Gas	Withdrawn
J896	06/18/2018	10/15/2019	MidAmerican Energy Company	IA	DPP-2017-AUG	West	NRIS	150.0	150.0	Wind	Withdrawn

MISO Queue Data, accessed September 17, 2018

Project #	Withdrawn or Done Date	In Service Date	Transmission Owner	State	Study Cycle	Study Group	Service Type	Summer MW	Winter MW	Fuel	Request Status
J930	11/16/2017	09/15/2019	MidAmerican Energy Company	IA	DPP-2017-AUG	West	NRIS	38.0	38.0	Wind	Withdrawn
J938	10/09/2017	09/15/2019	MidAmerican Energy Company	IA	DPP-2017-AUG	West	NRIS	50.0	50.0	Wind	Withdrawn
R59	01/10/2017	06/30/2010	MidAmerican Energy Company	IA	SPA-2014-NOV	West	NRIS	28.0	28.0	Wind	Withdrawn
R60	01/10/2017	06/30/2010	MidAmerican Energy Company	IA	SPA-2014-NOV	West	NRIS	54.0	54.0	Wind	Withdrawn
R62	01/10/2017	12/31/2010	MidAmerican Energy Company	IA	SPA-2014-NOV	West	NRIS	300.0	300.0	Wind	Withdrawn

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Xcel Energy
Docket No.: E002,ET6675/CN-17-184
Response To: MN Department of Commerce Information Request No. 1
Requestor: Steve Rakow
Date Received: April 2, 2018

Question:
Please explain:

a) how the ranges of " total MW on the system would need to be reduced from 240 MW to over 600 MW if only the existing generation fleet remains and up to a range of more than 700 MW to more than 1,800 MW if no new facilities were constructed" were created; and
b) how the ranges relate to Table 27.

Response:
a) The ranges given on page 124 correlate to the range of shift factors from 0.2 to 0.5. The two different ranges, 240 MW to over 600 MW and more than 700 MW to more than 1,800 MW, are the result of this shift factor range being applied to the required flow reduction for the Existing Fleet Future and the Advanced Alternative Technologies Future, respectively, with the lower MW value corresponding with the higher shift factor value (i.e., 0.5) for each range.
b) While the ranges provided above relate to a range of shift factors from 0.2 to 0.5, the values provided in Table 27 all utilize a shift factor of 0.3. Table 27 shows the MW reductions required under the three MTEP17 Futures that would be necessary to alleviate the identified congestion utilizing a 0.3 shift factor. A shift factor of 0.3 was used as an example because it is just below the midpoint for each of the two given ranges (0.2 to 0.5).

Preparer: Drew Siebenaler
Title: Senior Engineer
Department: Regional Transmission Planning and Analytics
Telephone: (612)321-3195
Date: April 12, 2018