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 ITC MIDWEST LLC FOR A CERTIFICATE OF NEED AND ROUTE PERMIT FOR THE MINNESOTA-IOWA 345 KV TRANSMISSION LINE PROJECT IN JACKSON, MARTIN, AND FARIBAULT COUNTIES

MPUC Docket No. ET6675/CN-12-1053
OAH Docket No. 60-2500-30782

REBUTTAL TESTIMONY OF DR. STEVE RAKOW

ON BEHALF OF

THE MINNESOTA DEPARTMENT OF COMMERCE, DIVISION OF ENERGY RESOURCES

APRIL 25, 2014

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I. INTRODUCTION AND PURPOSE

Q. Please state your name.

A. My name is Dr. Steve Rakow.

Q. Are you the same Dr. Rakow who previously submitted direct testimony on behalf of the Minnesota Department of Commerce, Energy Regulation and Planning unit (Department) in this proceeding?

A. Yes.

Q. What is the purpose of your rebuttal testimony?

A. I respond to Midcontinent Independent System Operator, Inc. (MISO) witness Mr. Chatterjee regarding:

- curtailed MWh;
- meeting the Minnesota renewable energy standard (RES); and
- benefit/cost ratios.

I respond to Clean Energy Intervenors (CEI) witness Mr. Goggin regarding:

- meeting the Minnesota RES;
- price of renewable energy credits (RECs);
- other states' RES;
- generation cost per MWh; and
- MISO's benefit/cost analysis.

Q. Do you change your position in this testimony?

A. No. As indicated in the "Overall Recommendation" section below, I maintain my prior recommendations; however, my goal is to assist in ensuring that the record before the Commission is reasonably complete and accurate.

II. REBUTTAL TO MIDCONTINENT INDEPENDENT SYSTEM OPERATOR, INC.

A. CURTAILED MWH

Q. For ease of reference, please describe the proposed project.

A. In this proceeding ITC Midwest LLC (ITCM) proposes to build part of two multi-value projects (MVPs): MVP3 and MVP4. MVP 3 is described by MISO's *Multi Value Project Portfolio: Results and Analyses* (MVP Report) as:

- Lakefield Junction—Winnebago—Winnco—Burt 345 kV;
- Sheldon—Burt-Webster 345 kV;
- Rebuilt 161 kV transmission on the same towers as the 345 kV line:
  - Lakefield—Fox Lake—Rutland—Winnebago—Winnco; and
  - Wisdom—Osgood—Burt—Hope—Webster
- Winnebago, Winnco, Sheldon, and Burt are new 345 kV stations;
- A 345/161 kV, 450 MVA transformer will be installed at Winnebago;
- this project adds 218 miles of new 345 kV and 92 miles of rebuilt 161 kV transmission (Project).

MVP 4 is described by the MVP Report as:

- Winnco—Lime Creek—Emery—Black Hawk—Hazleton;
- rebuilt 161 kV transmission on the same towers as the 345 kV line:

- Lime Creek—Emery—Hampton—Franklin—Union Tap—Black Hawk—Hazleton.

- A 345/161 kV, 450 MVA transformer will be installed at Lime Creek, Emery and Black Hawk;
- this project adds 206 miles of new 345 kV, 23 miles of new 161 and 149 miles of rebuilt 161 kV transmission.

Q. MISO witness Mr. Chatterjee provides calculations at page 34 of his direct testimony that attempt to demonstrate that, without this project, there would be over 3 million MWh of curtailed renewable energy in Minnesota. Do you agree?

A. No. Mr. Chatterjee states:

> Without the Mid-MISO MVPs [MVP 3 and MVP4 combined], MISO identified that approximately 1,933 megawatts ("MW") of the existing and planned wind connected capacity within the MISO portion of Minnesota and Iowa is would be curtailed in addition to generation from a baseload generating plant, in order to maintain reliable system loading levels. Of this, 976 MW of the existing and planned wind connected capacity falls within Minnesota. Based on an average 36.5 percent capacity factor, this equates to over 3 million mega-watt hours ("MWhs") of curtailed renewable energy in Minnesota otherwise deliverable by the Mid-MISO MVPs.
> MISO Ex. ___ at 34 (Chatterjee Direct)

A capacity of 976 MW times a 36.5 percent capacity factor times 8,760 hours per year does equal a 3.12 million MWh annually.[1] However, Mr. Chatterjee inflates the expected benefits from the Mid-MISO MVPs based upon assumptions that are fundamentally disconnected from actual decision-making. Clearly if the all of the energy

[1] Note that the standard practice to translate capacity (MW) into energy (MWh) is to multiply capacity by the number of hours in a year (8,760) and again by a capacity factor that represents the percent of time during the year that a generation facility produces energy. All of the issues regarding a unit not being available, such as forced outages, are accounted for within the capacity factor.

were to be curtailed the wind farms would not be constructed in this area. Instead, the wind farms would be displaced to other locations or not constructed. Those other locations might be elsewhere in Minnesota or in other states. The essence of the issue that should have been analyzed is where would the lowest cost (transmission plus generation) per MWh location be? Mr. Chatterjee assumed away that issue by assuming the location of the wind facilities rather than searching for the overall least cost (transmission plus generation) locations.

A more realistic portrait of curtailments is provided by Clean Energy Intervenors (CEI) witness Mr. Goggin. Mr. Goggin provides actual curtailment data for all of MISO. Mr. Goggin's data show that about 850,000 MWh of wind were curtailed annually for 2010 to 2012 across the entire MISO footprint. It would be interesting to know why Mr. Chatterjee expects 3 million MWh to be curtailed in this region when historical curtailments for all of MISO are less than one-third of Mr. Chatterjee's 3 million MWh estimate.

In any case, since the proposed project and the 161 kV alternative would address the issues with the wind curtailments up to the transfer capability, it is expected that this concern will be addressed by the decisions in this proceeding.

B. MEETING THE MINNESOTA RES

Q. Mr. Chatterjee states at page 33 of his direct testimony states that the Mid-MISO MVPs will facilitate compliance with various states' RES, including the Minnesota RES. Do you agree?

A. I take no position regarding other states' RES requirements. However, it is not clear that the proposed Project (on its own or in combination with MVP 4) is needed to facilitate compliance with the Minnesota RES in the timeline proposed for the project. Specifically, the *Application of ITC Midwest LLC for a Certificate of Need for the Minnesota-Iowa 345 kV Transmission Line Project in Jackson, Martin, and Faribault Counties, Minnesota* (Petition) at page 6 states that the in-service date for the proposed Project is mid-year 2017. Unfortunately, mid-year 2017 is far too early for such a large project to mesh with the RES compliance plans of Minnesota utilities.

I reviewed the utility filings and Department comments in the most recent resource plan dockets for the utilities that file resource plans and a limited number of subsequent wind power purchase agreements filings for information regarding RES compliance plans.[2] The results in Table 1 below demonstrate that the utilities serving Minnesota do not need to add significant amounts of wind for RES compliance in the near future. Only Interstate Power and Light Company's (IPL) plan proposes to acquire new energy to meet the Minnesota RES in the near future; IPL's Minnesota RES requirement is relatively small. Thus, a smaller transmission project, such as the 161 kV rebuild alternative, would be a better match for the Minnesota RES compliance plans in the near term. Essentially, regarding solely the Minnesota RES, the capacity created by the Mid-MISO MVPs is not needed for the Minnesota RES in the timeline proposed for the project.

[2] Regarding wind PPA filings, see Docket No. E015/M-13-907 for Minnesota Power's (MP) Bison 4 wind farm and Docket Nos. E002/M-13-716 and E002/M-13-603 for Northern States Power Company, doing business as Xcel Energy's (Xcel Energy) Odell, Courtenay, Pleasant Valley, and Border Winds wind farms. The location of MP's Bison 4 is Oliver County, North Dakota. The locations of Xcel Energy's projects are:

- Border Winds–northeastern Rolette County, North Dakota;
- Odell–near Mountain Lake, Minnesota;
- Courtenay–near Jamestown, North Dakota; and
- Pleasant Valley–near Austin, Minnesota.

Table 1: Minnesota RES Compliance Plans

Utility	Docket	Compliant through	Compliance Plan
Interstate Power	14-77	2014	No specific plan given.[3]
Missouri River	10-735	2021	Red Rock Hydro, 36 MW in 2018.[4]
SMMPA	13-1104	2022	23 MW Wind annually starting 2021.
Minnesota Power	13-53	2022	Does not include Bison 4 wind farm.[5]
Xcel Energy	13-716	2023	See also 13-603.
MMPA	13-1165	2023	Petition pg 28 DOC Comment Apr 21
Minnkota	10-782	2023	
Otter Tail Power	13-961	2024	
Great River Energy	12-1114	2024	Wind: 100 MW in 2024, 300 MW in 2025, and 200 MW in 2026.

Q. Is it your conclusion that this line won't be used to move renewable power?

A. No; the point is that the Minnesota RES is not driving the need for this line in the near term. Most likely the incremental impact of the proposed line, if built, would be to transmit renewable power along with power from new natural gas generating plants that might be interconnected in this area.

[3] Assuming wind is purchased for compliance at a 36 percent capacity factor, IPL would require about 5 MW in 2014, 25 MW in 2016, 35 MW in 2020, and 55 MW in 2025 for compliance with the Minnesota RES.
[4] The Red Rock Hydro project's in-service date was updated based upon information from Missouri River's website: http://www.mrenergy.com/uploads/files/MRES_6034_RedRock_Proof10.pdf
[5] See Docket No. E015/M-13-907 for details regarding the Bison 4 project.

C. BENEFIT/COST ANALYSIS

Q. Mr. Chatterjee states at page 33 of his direct testimony that, in MISO's economic analysis, the benefits from the Mid-MISO MVPs to MISO's zone 1 were 1.6 to 2.9 times cost. Do you agree?

A. I take no position on the accuracy of MISO's benefit/cost ratio calculations. However, the issue at hand is not whether ITCM's proposed Project passes a benefit/cost test or not. The issue is compliance with the criteria specified by Minnesota Statutes and Minnesota Rules; see the Commission's June 27, 2013 *Notice and Order for Hearing* in this docket for details. Minnesota Rules 7849.0120 B provides as a criterion, among others:

> (2) the cost of the proposed facility and the cost of energy to be supplied by the proposed facility compared to the costs of reasonable alternatives and the cost of energy that would be supplied by reasonable alternatives;

The issue in this proceeding is the cost of the proposed Project compared to that of reasonable alternatives. Mr. Chatterjee's benefit/cost information does not compare the cost of the proposed facility to any alternatives. Thus, Mr. Chatterjee's analysis does not provide information relevant to the Commission's decision criteria.

III. REBUTTAL TO CEI

A. MEETING THE MINNESOTA RES

Q. CEI witness Mr. Goggin states at pages 10-11 of his direct testimony that American Wind Energy Association's (AWEA) analysis indicates that between 1,070 MW and 1,338 MW of wind capacity, beyond that installed as of the end of 2013, will be needed to satisfy the Minnesota RES through 2025. Do you agree?

A. I take no position regarding the accuracy of AWEA's calculation of the Minnesota RES compliance needs. However, I note that Minnesota Power's Bison 4 wind project and Xcel Energy's Odell, Courtenay, Pleasant Valley, and Border Winds wind projects were not installed as of 2013; these projects total to about 950 MW of wind capacity. Deducting 950 MW from AWEA's estimate leaves only between 120 MW and 388 MW of wind capacity needed to satisfy the Minnesota RES through 2025. This adjustment makes AWEA's estimate consistent with the numbers shown in Table 1; both estimates (AWEA and Table 1) indicate that significant wind resources, beyond the resources already committed to, are not needed to meet the Minnesota RES in the near future.

Q. CEI witness Mr. Goggin states at page 5 of his direct testimony that when the capacity needed for the Minnesota RES and capacity needed for other jurisdictions are combined, the capacity needed exceeds the acquired capacity by 204 MW in 2020. Do you agree?

A. No, Mr. Goggin is in error. The numbers provided in in Mr. Goggin's testimony at page 5 are that the capacity that he believes is needed for the Minnesota RES (5,059 MW) and capacity he states is needed for other jurisdictions (1,178 MW) when combined equal 6,237 MW.[6] This amount is 204 MW *less* than the capacity listed as already acquired (6,441 MW). Thus, the biennial transmission planning data indicates that the utilities are already compliant with the 2020 RES milestones of Minnesota and other jurisdictions.

A third source of data indicates that additional transmission is not needed by mid-year 2017 (the proposed in-service date). In terms of Minnesota Rules 7849.0120 B (1),

[6] These numbers are from the biennial transmission plan (Docket No. E-999/M-13-402).

the timing of ITCM's proposed Project does not match the timing of the remaining RES needs for utilities serving Minnesota.[7]

B. PRICE OF RECS

Q. CEI witness Mr. Goggin states at page 9 of his direct testimony that "the increase in supply of renewable energy will lower the cost of RECs used for compliance with state RES requirements. Do you agree?

A. I agree with Mr. Goggin that to the extent any transmission line increases the supply of renewable energy, and thus increases the supply of RECs, everything else equal the price of RECs should fall. However, the data in this proceeding demonstrate that all of the utilities except IPL have RECs in excess of their needs through at least 2021. IPL's energy sales in Minnesota are relatively small, less than 850,000 MWh annually. Thus, the utilities serving Minnesota are unlikely to be buying RECs in significant quantities, if at all. This result means that there is little benefit to Minnesota utilities from a lower REC price, at least in the near term.

C. OTHER STATES' RES

Q. CEI witness Mr. Goggin calculates at page 11 of his direct testimony that the RES for various utilities and states in MISO equals about 48 million MWh in 2021 and 55 million MWh in 2026. How likely is Minnesota to be the source for significant quantities of energy to meet other states RES?

[7] Note that Mr. Goggin's data indicates that for 2016, the date closest to ITCM's proposed in-service date of mid-year 2017, the utilities have a surplus of 1,528 MW over their RES needs. Specifically, 4,095 MW for the Minnesota RES plus 1,086 MW for other jurisdictions equals a total need of 5,181 MW while the utilities have already acquired 6,709 MW, or 1,528 MW more than needed.

A. I reviewed the list of wind projects that have applied for a site permit in Minnesota.[8] A total of 55 wind projects have applied for a site permit. Based upon my review it appears that, to date, only three wind projects are providing energy to utilities that do not serve Minnesota:

- Wisconsin Power and Light Company: Bent Tree Wind project;
- various Wisconsin and Michigan municipal utilities: Lakeswind project; and
- Indianapolis Power & Light Company: Lakefield Wind project.

Relatively few wind projects are currently being purchased by entities outside of Minnesota. While those facts may change in the future, past experience regarding demand for wind projects to meet the other states' RES requirements does not support the transfer capability of ITCM's proposed Project or the proposed in-service date.

D. GENERATION COST PER MWH

Q. CEI witness Mr. Goggin states at page 23 of his direct testimony that transmission congestion tends to force wind energy development to occur in lower quality wind resource areas with lower wind capacity factors, increasing the prices in purchase power agreements. Do you agree?

A. I do not disagree with Mr. Goggin's statement. However, the issue for this proceeding is not which regions have the lowest generation cost per MWh; the issue is the total cost per MWh (generation plus transmission) for potential projects in this region compared to the total cost per MWh in other areas.

[8] The data is available at: http://mn.gov/commerce/energyfacilities/Docket.html?searchSubject=Wind%20power&searchStatus=All.

For example, my direct testimony estimated a first-year transmission cost of $57.55 to $134.82 per MWh for the incremental transfer capability provided by the Mid-MISO MVPs, above the capacity provided by the 161 kV rebuild alternative.[9] To this transmission cost the generation cost should be added to get the total cost. The total costs for this region could be then compared to the total generation and transmission costs of wind projects in other areas. Due to data limits (for example, it is not possible to calculate a levelized cost for the Mid-MISO MVPs) no party has provided such information.

E. MISO'S BENEFIT/COST ANALYSIS

Q. CEI witness Mr. Goggin discusses at pages 25-30 of his direct testimony the benefits MISO attributed to the transmission projects approved by MISO as part of the MVP Report. Do you agree?

A. I take no position on the accuracy of MISO's calculation of the benefits attributable to the 17 different projects analyzed in the MVP Report. However, as I explained above such numbers are not relevant to this proceeding. First, this proceeding does not involve evaluating 17 different transmission projects scattered across the MISO footprint. The issue at hand is whether the Commission should approve a CN for ITCM's proposed Project in Minnesota. Second, the issue is not whether any one alternative passes a cost benefit test. Rather, the issue under Minnesota Rules is a comparison of alternatives. Ignoring the issue of comparing alternatives and instead focusing on benefit/cost analysis

[9] The levelized cost would be lower than the first year cost but cannot be calculated due to limits in the data provided by ITCM and available publicly.

of any one project can lead a process towards higher-than-necessary costs and poor decision making.

IV. OVERALL RECOMMENDATIONS

Q. What is your overall recommendation at this time?

A. My recommendation remains the same as in direct testimony. First, I recommend that ITCM and/or MISO explain in rebuttal testimony why the Lakefield Junction—Rutland 345 kV alternative cannot be expected to meet the claimed needs.

Second, I recommend that the Commission order ITCM to make a compliance filing containing a spreadsheet ITCM can use to calculate the cost of alternatives in future CN filings in a consistent manner. The spreadsheet should enable ITCM to include the Commission's CO_2 internal cost and externality values.

Third, I recommend that the Commission order ITCM to use the Commission's externality values and cost of future CO_2 regulation value in future CN proceedings, as I performed in Direct Testimony.

Fourth, (assuming ITCM explains why the Lakefield Junction—Rutland 345 kV alternative cannot be expected to meet the claimed needs) and considering:

- the close economic performance of the two alternatives at the proposed cost level (see Table 5 on page 37 of my direct testimony);
- the superior performance of the 161 kV rebuild alternative at higher cost levels (again, see Table 5 on page 37 of my direct testimony); and
- the lower cost of the incremental transfer capability created by the 161 kV rebuild alternative (see Tables 9 and 10 on page 42 of my direct testimony);

I recommend that the Commission approve a CN for ITCM's proposed Project subject to the cost control process recommended by Mr. Johnson.

Fifth, if ITCM fails to adequately explain why the Lakefield Junction—Rutland 345 kV alternative cannot be expected to meet the claimed needs or if ITCM does not agree with Mr. Johnson's cost control process (or propose a reasonable alternative) I recommend that the Commission reject the Petition and direct ITCM to pursue the 161 kV rebuild alternative.

Q. Given the issues you discussed above regarding the timing of ITCM's proposed Project why do you continue to recommend approval, subject to limits on cost recovery?

A. Essentially, ITCM's proposed Project and the 161 kV rebuild alternative are close in cost impact, as calculated in Table 5 in my direct testimony, but the proposed Project is slightly better at the estimated cost level, assuming that ITCM's cost estimates are accurate. The risks created by the too-early in-service date—that the transfer capability will not be available when needed by Minnesota utilities and thus additional transmission will be necessary—do not outweigh the slight cost advantage of the proposed Project if the costs are accurate. Hence, I recommend that the proposed project be approved subject to the cost control process recommended by Mr. Johnson.

Q. Does this conclude your Rebuttal Testimony?

A. Yes.