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Minneapolis, MN 55401

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June 4, 2019

**—Via Electronic Filing—**

Daniel P. Wolf  
Executive Secretary  
Minnesota Public Utilities Commission  
121 7<sup>th</sup> Place East, Suite 350  
St. Paul, MN 55101

RE: RESPONSES TO MPUC INFORMATION REQUEST NOS. 7, 8 PUBLIC, 9-14  
ACQUISITION OF THE MANKATO ENERGY CENTER (MEC)  
DOCKET NO. IP6949, E002/PA-18-702

Dear Mr. Wolf:

At the request of Commission staff, we enclose our responses to the referenced Minnesota Public Utilities Commission information requests in the above-noted docket for e-filing.

Please contact me at (612) 337-2268 or [amber.r.hedlund@xcelenergy.com](mailto:amber.r.hedlund@xcelenergy.com) if you have any questions regarding this submission.

Sincerely,

/s/

Amber Hedlund  
Regulatory Case Specialist

Enclosures  
c: Service List

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Xcel Energy Information Request No. 7  
Docket No.: E002/PA-18-702  
Response To: MN Public Utilities Commission  
Requestor: Sean Stalpes  
Date Received: May 21, 2019

Question:

In Xcel’s March 29, 2019 reply comments, the Company provides a “MEC Ownership with Early Coal Retirement” scenario, which aligns with the Settlement Agreement Xcel filed on May 20, 2019. To align Xcel’s new proposal with its analysis presented in the Initial Petition, staff seeks additional information on (1) the Continuation of PPAs with Early Coal Retirement scenario and (2) the MEC Ownership with Early Coal Retirement scenario.

7.a. Please update Table 4 of the November 27, 2018 Initial Petition to show the PVSC and PVRP of the following categories of costs/savings associated with the MEC Ownership with Early Coal Retirement scenario relative to the Base (Continuation of PPAs) with Early Coal Retirement:

Capital Cost of Mankato Purchase
Fixed Savings of Mankato PPA
Fixed Cost/Expansion Plan Cost/(Savings)
VOM Cost/(Savings)
Fuel Cost/(Savings)
Market Cost/(Savings)
CO2 Cost/(Savings)
Externalities Cost/(Savings)
PPA Starts/Own Start Fuel Cost/(Savings)
Total Cost/(Savings)

7.b. Please update Table 7 of the November 27, 2018 Initial Petition. Xcel’s response should compare the Continuation of PPAs with Early Coal Retirement scenario to the Owned MEC with Early Coal Retirement scenario, with the same sensitivities as Table 7, shown below.

**Table 7: MEC Ownership with High Renewables**

	Continuation of PPAs	Owned MEC	Delta
Base PVSC (High Ext Costs thru 2024, High Reg Costs)	53,115	52,956	(158)
Base PVSC + Low Gas	52,182	52,002	(180)
Base PVSC + High Gas	54,745	54,673	(72)
Base PVSC + Low Load	49,727	49,652	(75)
Base PVSC + High Load	56,971	56,750	(221)
Base PVSC + Mkts Off, No Dump Credit	53,815	53,729	(87)
Base PVSC + Mkts Off, Dump Credit	52,026	51,939	(87)
Base PVSC + High MEC Ongoing Costs	53,115	52,989	(126)
Base PVSC + Low MEC Ongoing Costs	53,115	52,925	(190)
PVSC - Low Ext Costs All Years	47,684	47,598	(86)
PVSC - High Ext Costs All Years	58,363	58,239	(124)
PVSC - Low Ext Costs thru 2024, Low Reg Costs	46,163	46,072	(92)
PVRR (No CO2)	44,693	44,627	(66)

7.c. Please update “Figure 1: Annual Cost/Savings” of the November 27, 2018 Initial Petition. Xcel’s response should show the annualized PVRR and PVSC of the Owned MEC with Early Coal Retirement relative to the Continuation of PPAs with Early Coal Retirement scenario, with the revised amount of renewable energy as shown in Table 3 of Xcel’s reply comments.

7.d. Please update “Figure 3: Net Capacity Position with Ownership” of the November 27, 2018 Initial Petition. Xcel’s response should show the net capacity position through 2034 under the Owned MEC with Early Coal Retirement scenario. Again, please include the revised amount of renewable energy as shown in Table 3 of Xcel’s reply comments. Also, please provide a separate figure showing the net capacity position through 2034 under the Continuation of PPAs with Early Coal Retirement scenario.

7.e. Please update “Figure 4: Displaced Energy” of the November 27, 2018 Initial Petition. Xcel’s response should show the displaced energy (in GWh) by fuel source through 2054 under the Owned MEC with Early Coal Retirement scenario relative to the Continuation of PPAs with Early Coal Retirement scenario.

7.f. Please update “Table 8: Incremental Revenue Requirement Impact MEC Ownership” of the November 27, 2018 Initial Petition. Xcel’s response should include the same rows as shown below. However, staff requests Xcel extend the years of the table through 2034.

Capital Cost of Mankato Purchase
Fixed Savings of Mankato PPA
VOM/Fuel/Market Cost/(Savings)
Total Cost/(Savings)

7.g. Please update “Table 9: MN Forecasted Incremental Impact on Average Monthly Bills” to show the forecasted incremental impact on average monthly bills in Minnesota under the Owned MEC with Early Coal Retirement scenario. Please show the bill impact relative to both the Base and Base with Early Coal Retirement. Please show the revised Table 9 through 2034.

7.h. Refer to the corrected Tables 15-18 of Attachment F of the November 27, 2018 Initial Petition, e-filed on December 18, 2018. Please show the annual expansion plans under the Owned MEC with Early Coal Retirement and the Continuation of PPAs with Early Coal Retirement scenarios.

Response:

The Company has provided responses to the majority of this request using the “Early Coal” modeling conducted for the Company’s Reply Comments, as well as the “Early Coal” supplemental modeling provided to DOC as a response to their Informal IR #2. The Strategist files provided for informal DOC IR 2 were based on the High Renewables scenario included in the Company’s initial filing. To address concerns raised in the Department’s initial comments, the Company conducted additional modeling that excluded market sales, analyzed impacts using the midpoint CO2 externality and regulatory costs, analyzed impacts under early coal shutdown, and analyzed impacts under a 2040 and 2050 end of life assumption for the MEC. In addition, the files did not exceed the saved state limit in Strategist and the run time was significantly reduced from multiple days to less than half an hour. These two sets of modeling data differ primarily by the use of a fully optimized renewable expansion plan that differs between the MEC PPA and Ownership scenarios (Reply Comments) or a “locked in” renewable expansion plan that is the same in the PPA and Ownership scenarios (Informal IR #2). 7g was completed for the Reply Comments modeling only.

- a. Please see Attachments A and B to this response.
  - b. Please see response to part (a).
  - c. Please see response to part (a).
  - d. Please see response to part (a).
  - e. Please see response to part (a).
  - f. Please see response to part (a).
  - g. The Company continues to work on the rate impact analysis requested by this sub-part and will supplement our response with this information no later than June 7, 2019.
  - h. Please see response to part (a).
-

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Date: June 4, 2019

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Xcel Energy Information Request No. 8  
Docket No.: E002/PA-18-702  
Response To: MN Public Utilities Commission  
Requestor: Sean Stalpes  
Date Received: May 21, 2019

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Question:

Please refer to PUC Information Requests 1, 4, and 6 in this docket.

8.a. Please provide a table showing the annual capacity factors (in the Strategist modeling) for every existing and generic dispatchable resource over the modeled time horizon (through 2057) under the Owned MEC with Early Coal Retirement and Continuation of PPAs with Early Coal Retirement scenarios.

8.b. As in Xcel's response to PUC Information Request No. 6, please make public the average capacity factor for each dispatchable unit over the 2018-2057 study period under both scenarios.

8.c. Please provide the annual and total CO2 emissions for the Owned MEC with Early Coal Retirement and Continuation of PPAs with Early Coal Retirement scenarios.

Response:

- a. Please see TRADE SECRET Attachment A to this response.
- b. Please see TRADE SECRET Attachment A to this response.
- c. Please see Attachment B to this response.

Attachment A to this response includes information the Company considers to be trade secret data as defined by Minn. Stat. § 13.37(1)(b). The information derives independent economic value from not being generally known or readily ascertainable by others who could obtain a financial advantage from its use. Thus, Xcel Energy considers this not public data.

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Telephone: 303.571.2765  
Date: June 4, 2019

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Xcel Energy

Information Request No. 9

Docket No.: E002/PA-18-702

Response To: MN Public Utilities Commission

Requestor: Sean Stalpes

Date Received: May 21, 2019

Question:

Refer to Table 13 of Attachment F of the November 27, 2018 Initial Petition. Please provide a table that compares the assumptions for the Sherco CC to the Mankato Energy Center, such as:

**Table 13: Thermal Generic Inform**

Resource	Sherco CC
Technology	7H
Location Type	Brownfield
Cooling Type	Wet
Book life	40
Nameplate Capacity (MW)	916
Summer Peak Capacity with Ducts (MW)	870
Summer Peak Capacity without Ducts (MW)	643
Capital Cost (\$/kW)	\$914
Electric Transmission Delivery (\$/kW)	NA
Ongoing Capital Expenditures (\$/kW-yr)	\$6.77
Gas Demand (\$/kW-yr) 2018\$	\$32.56
Fixed O&M Cost (\$000/yr) 2018\$	\$2,605
Variable O&M Cost (\$/MWh)	\$1.42
Levelized \$/kw-mo (All Fixed Costs) \$2018	\$12.04
Heat Rate with Duct Firing (btu/kWh)	6,494
Heat Rate 100% Loading (btu/kWh)	6,331
Heat Rate 75% Loading (btu/kWh)	6,464
Heat Rate 50% Loading (btu/kWh)	6,876
Heat Rate 25% Loading (btu/kWh)	7,831
Forced Outage Rate	3%
Maintenance (weeks/yr)	5

Response:

See the table below:

Resource	Mankato CC
Technology	
Location Type	Brownfield
Cooling Type	
Book life	
Nameplate Capacity (MW)	762
Summer Peak Capacity (MW)	668
Capital Cost (\$000) 2018\$	\$650,000
Electric Transmission Delivery (\$000) 2018\$	NA
Ongoing Capital Expenditures (\$000-yr) 2018\$	\$3,052
Gas Demand (\$000-yr) 2018\$	\$4,833
Gas Pipeline CIAC (\$000) 2018 \$	NA
Capital Cost (\$/kW) 2018\$	\$853
Electric Transmission Delivery (\$/kW) 2018\$	
Ongoing Capital Expenditures (\$/kW-yr) 2018\$	\$4.01
Gas Demand (\$/kW-yr) 2018\$	\$6.34
Fixed O&M Cost (\$000/yr) 2018\$	\$7,659
Variable O&M Cost (\$/MWh) 2018\$	\$0.29
Levelized \$/kw-mo (All Fixed Costs) \$2018	\$7.28
Summer Heat Rate 100% Loading (btu/kWh)	7,431
Summer Heat Rate 75% Loading (btu/kWh)	7,108
Summer Heat Rate 50% Loading (btu/kWh)	7,569
Summer Heat Rate 25% Loading (btu/kWh)	7,723
Forced Outage Rate	10%
Maintenance (weeks/yr)	2
CO2 Emissions (lbs/MMBtu)	118
SO2 Emissions (lbs/MWh)	0.00
NOx Emissions (lbs/MWh)	0.09
PM10 Emissions (lbs/MWh)	0.06
Mercury Emissions (lbs/MMWh)	0.00

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Preparer: Jon Landrum  
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 Telephone: 303.571.2765  
 Date: June 4, 2019



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Xcel Energy Information Request No. 10  
Docket No.: E002/PA-18-702  
Response To: MN Public Utilities Commission  
Requestor: Sean Stalpes  
Date Received: May 21, 2019

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Question:

10.a. Please refer to Table 4 of Xcel's reply comments.

Under the Base with Early Coal Retirement scenario, there is very little cost difference between the Market Sales On and Market Sales Off sensitivity under the PVRR (\$82m to \$89m). Yet, there is a large cost difference difference between the Market Sales On and Market Sales Off sensitivity in the PVSC (\$271m to \$147m). Why is cost difference small using the PVRR but large using the PVSC under the Base with Early Coal Retirement scenario?

Conversely, under the MEC Ownership with Early Coal Retirement scenario, the cost savings are identical in both the Market Sales On and Market Sales Off using the PVSC (\$337m), but the cost savings are nearly twice as large using the PVRR. Why is there no cost difference using the PVSC but a larger cost savings using the PVRR under the MEC Ownership with Early Coal Retirement scenario? And why do the Base and MEC Ownership have opposite effects in the PVRR and PVSC when turning market sales on and off in the model?

10.b. Under the MEC Ownership with Early Coal Retirement—Market Sales On scenario, please provide a table showing the percentage of the increase in combined cycle generation that is sold into the spot market for each year of the study period (for a reference, see Figure 1 on page 23 of the Department's March 5, 2019 initial comments).

10.c. Tables 4 and 5 of Xcel's reply comments refer only to market sales. Is Strategist allowed to make market purchases in both Market Sales scenarios? Please explain.

10.d. For the Owned MEC with Early Coal Retirement and Continuation of PPAs with Early Coal Retirement scenarios, what is the annual percentage of market purchases for each year of the study period?

Response:

- a. Table 4 is reproduced below to aid in the discussion. The primary reason for the observed differences between the cases in PVRR vs. PVSC and Markets On vs. Markets Off is the differences in the expansion plans between the cases. The observed differences mainly occur due to how those different expansion plans (a) interact with the market and (b) change dispatch when carbon costs are included.

In Table 4, both “Early Coal” scenarios (PPA and Ownership) are being compared to the PPA “No Early Coal” scenario. Thus, there are really two things changing between the scenarios: early coal or normal retirement dates, as well as the difference in the PPA vs. Ownership expansion plans discussed in the previous paragraph.

**Table 4: MEC and Early Coal Retirement Cost/Savings (\$000s)**

	Markets Sales On		Market Sales Off	
Scenario	PVSC	PVRR	PVSC	PVRR
Base (Continuation of PPAs)	-	-	-	-
Base with Early Coal Retirement	(\$271)	\$82	(\$147)	\$89
MEC Ownership with Early Coal Retirement	(\$337)	(\$51)	(\$337)	(\$98)

From Table 4, one can see that the PVSC for the PPA/Early Coal scenario changes more than the Own/Early Coal scenarios when comparing Market On/ Off (see Table A1 below). The PPA/Early Coal scenario relies on market sales to sell excess energy more than the Own/Early Coal scenario does, and is thus more affected by the Market On/Off sensitivity.

**Table A1: MEC and Early Coal Retirement Cost/Savings (\$000s)**

Market Sales Off Minus Market Sales On	
Scenario	PVSC
Base with Early Coal Retirement	\$124
MEC Ownership with Early Coal Retirement	\$0

Table A2 below shows the difference between PVRR and PVSC with Markets On/Off held constant. In the PPA/Early Coal row, the PVRR vs. PVSC savings change more under Markets On than Markets Off. This is due to the

fact that a large portion of the savings (from Table 4 this is the savings between PPA Base and PPA Early Coal, in other words, just the impact of Early Coal) is from avoidance of carbon by the added solar and ability to sell excess generation into the market. Without Market Sales the delta between PVSC and PVRR becomes smaller.

In the Own/Early Coal scenario a larger portion the savings are from the more efficient MEC unit replacing less efficient units (more CO2 emitted per MWH, higher cost to operate). Without CO2 and externality costs, the dispatch changes but it isn't as drastic as in the "Base with Early Coal Retirement".

**Table A2: MEC and Early Coal Retirement Cost/Savings (\$000s)**

<b>PVRR Minus PVSC</b>		
<b>Scenario</b>	<b>Markets Sales On</b>	<b>Market Sales Off</b>
Base with Early Coal Retirement	\$353	\$236
MEC Ownership with Early Coal Retirement	\$286	\$239

- b. See Attachment A to this response.
- c. Yes. Strategist is allowed to make market purchases in both Market Sales scenarios.
- d. See Attachment B to this response.

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 Date: June 4, 2019

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Xcel Energy

Information Request No. 11

Docket No.: E002/PA-18-702

Response To: MN Public Utilities Commission

Requestor: Sean Stalpes

Date Received: May 21, 2019

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Question:

In Xcel's May 16, 2019 extension request, Xcel explained that the "files the Company provided were inadequate for the Department to replicate the Company's analysis and model results," but the Company "resolved these issues and will provide the Department with corrected files."

On page 22 of the Department's March 5, 2019 comments, the Department noted it was able to "[use] the files provided by Xcel to transform the base case model," and the Department "re-created the base case."

11.a. Why was the Department unable to replicate Xcel's supplemental analysis and model results?

11.b. What did Xcel need to correct?

11.c. Please provide a more detailed discussion than what is in the extension letter regarding how the Department was able to re-create the base case initially but later unable to replicate the supplemental analysis. Also, please identify all inputs that were changed from the November 27, 2018 Initial Petition for the March 29, 2019 reply comments, and explain the reasons for those changes.

Response:

The Department informed the Company that it was not able to replicate the Strategist outputs we provided in response to DOC Informal IR 1. The issues occurred in the markets off scenarios. It is the Company's understanding that in its initial review the Department was able to re-create the base case with markets on, but did not review the markets off files.

Based on the issues noted by the Department, it appears the issues were related to whether the file used a redispatch "S" run or a reoptimize "D" run. In order to

provide the Department with the clear modeling commands, the Company provided additional macros containing the commands necessary to run the files in response to Informal DOC IR 2 on May 20.

For example, the Company provided a macro for the early coal and 2040 MEC shutdown scenario that provided the specific commands to (1) load the base FSV file for the early coal and 2040 MEC shutdown scenario, (2) run the markets off sensitivity, (3) run the Proview “S” run and (3) run the model from 2018 to 2057. We provided these additional commands to the Department and understand that they are now able to replicate our results.

Inputs to the base case were not changed in the files provided to the DOC in response to Informal DOC IR 2. We provided additional files to run early coal shutdown scenarios and early MEC retirement scenarios. As noted above we also provide additional macros with the commands necessary to replicate the Company’s results.

For the modeling that was provided in support the March 29 reply comments, the updated assumptions are detailed on page 19-27 of the Company’s reply comments. The updated assumptions include:

- The addition of EE bundles
- The addition of three DR bundles
- The addition of a generic battery storage alternative
- The addition of a DG solar alternative
- Updated generic resource transmission delivery costs
- The addition of sensitivity combinations shown in Table 2 of the reply

The reply comment modeling also included a constraint to limit carbon emissions to 80 percent of 2005 levels by 2030, early coal retirement scenarios, early MEC retirement scenarios and a sensitivity that included the midpoint of the Commission approved externality and regulatory costs for carbon emissions. The sensitivity combinations were run on the early MEC retirement and early coal retirement scenarios as shown in Tables 6 and 7 of the Company’s reply comments.

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Xcel Energy Information Request No. 12  
Docket No.: E002/PA-18-702  
Response To: MN Public Utilities Commission  
Requestor: Sean Stalpes  
Date Received: May 21, 2019

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Question:

On page 25 of Xcel's March 29, 2019 reply comments, Xcel states, with respect to Tables 4 and 5, "[t]he results above show that the cost of the MEC acquisition are largely offset by 2040 allowing for flexibility in determining whether an early retirement of MEC is in the public interest as technology evolves."

12.a. What does Xcel mean by "as technology evolves" in the context of the MEC analysis?

12.b. What does Xcel mean by its statement that the costs are offset by allowing for flexibility?

12.c. Does "largely offset by 2040" mean that there is an expected net cost of the acquisition until 2040?

Response:

- a. We expect technology to continue to evolve in the coming decades. Depending on how technology evolves and what alternative resources are available in the future, an early retirement of MEC may be in the public interest.
- b. The Company's analysis, as shown in Table 5 of the Reply Comments, shows the benefits of MEC largely offset its costs by 2040. The acquisition could provide net benefits to customers, even if MEC is shutdown early.
- c. The reference to 2040 refers to an analysis where MEC is shutdown in 2040. Table 5 of the Company's Reply Comments shows a net PVRR cost of \$25 million with markets on. The scenario changed the depreciation life, so that the plant is fully depreciated by the 2040 shutdown date.

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Preparer: Chris Shaw  
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Xcel Energy  
Docket No.: E002/PA-18-702  
Response To: MN Public Utilities Commission  
Requestor: Sean Stalpes  
Date Received: May 21, 2019

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Information Request No. 13

Question:

If any changes were made to Attachment G – Revenue Requirements, please file the updated Microsoft Excel model.

Response:

No changes have been made to Attachment G – Revenue Requirements.

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Preparer: Stan Dufault  
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Date: June 4, 2019

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Xcel Energy

Information Request No. 14

Docket No.: E002/PA-18-702

Response To: MN Public Utilities Commission

Requestor: Sean Stalpes

Date Received: May 21, 2019

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Question:

14.a. In Table 14 of Attachment F of the November 27, 2018 Initial Petition, Xcel shows that the price of generic wind increases from \$33.06/MWh in 2023 to \$71.66/MWh in 2057. Please justify these wind prices, and provide the source(s) that informed these assumptions (just as Xcel provided sources for its natural gas, coal, and market energy price assumptions).

14.b. Please refer to Table 3 of Xcel's reply comments. Were all of these wind and solar additions selected by Strategist as part of the system optimization, or were some fixed resources prior to the expansion plan optimization? Please explain.

Response:

- a. Generic wind costs are based on the National Renewable Energy Laboratory's (NREL) 2018 Annual Technology Baseline data. Please refer to the NREL website (<https://atb.nrel.gov/electricity/2018/index.html>) for information on how their costs were derived. The NREL prices are published as 2016, and without any tax credit impacts.

To convert to Strategist inputs, the NREL prices were converted to 2017 dollars using historical GDPIDP and then escalated at 2% to each in-service year. The NREL prices were then adjusted for PTC benefits and to include transmission costs shown in Table 9 of Attachment F of the November 27, 2018 Initial Petition.

- b. The wind additions in Table 3 of our Reply Comments are approved projects that were not in service at the end of 2018. It also includes an assumption of "no going back" on wind, meaning that the committed levels are maintained (i.e. existing and approved renewable resources are replaced "in-kind" when they reach end of life).



The solar additions in Table 3 are resources selected by Strategist as part of the system optimization and growth in distributed solar and community solar gardens. In addition, generic solar is added starting in 2023 to achieve the 2015 Integrated Resource Plan Preferred Plan solar levels.

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