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June 17, 2019

—Via Electronic Filing—

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

RE: RESPONSES TO MPUC INFORMATION REQUEST NOS. 15-20 & 21 PUBLIC
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 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. 15
Docket No.: E002/PA-18-702
Response To: MN Public Utilities Commission
Requestor: Sean Staples
Date Received: June 17, 2019

Question:

Please refer to Attachments A and B of Xcel Energy Responses to PUC Information Request No. 7 (e-Dockets Document ID 20196-153365-03 and 20196-153365-04) received on June 4, 2019.

15.a. Please explain the differences between Attachment A and Attachment B and why they produce such different results. (For example, why is the PVSC savings in Attachment A – 7A \$65 million versus \$193 million in Attachment B – 7A?)

15.b. According to Attachment A – 7H, the “Base Early Coal Retirement” scenario adds 15,528 MW of incremental capacity (=sum(AQ19:AQ30)), and the “Owned Early Coal Retirement” scenario adds 14,849 MW of incremental capacity (=sum(AQ79:AQ90)). However, in Attachment B – 7H, the “Base Early Coal Retirement” and “Owned” scenarios add 12,138 MW of incremental capacity. Please explain why Attachment A adds roughly three gigawatts more incremental capacity than Attachment B.

15.c. In Xcel’s written response to PUC IR No. 7 (Document ID 20196-153365-02), Xcel notes that two different data sets were used, one which optimized the renewable expansion plan and one which locked in the renewable expansion plan. Which Strategist files, data sets, and expansion plans were provided to the Department?

15.d. Has the Department successfully replicated Xcel’s analysis the Company provided in both Attachment A and Attachment B?

Response:

- a. The two attachments are from two different modeling approaches to arrive at an expected system value, and stress test that expectation, of the addition to the system of the owned Mankato facility. Both attachments reproduce the requested tables from MPUC IR No. 7, just from different sets of modeling.

A summary of the two attachments and how the modeling was performed for that version of the attachment is given below:

Attachment A – This attachment is derived from the modeling conducted for the Company’s Reply Comments. This modeling was done in response to comments received on the Company’s initial filing. For this modeling, the company used a preliminary version of the model being used for the upcoming IRP filing. Updated assumptions are described further in the response to MPUC IR No. 18.

Attachment B – This attachment is derived from the modeling provided to the Minnesota Department of Commerce under DOC Informal IR No. 2. For this modeling, the company reverted to the “High Renewables” model used in the Initial Filing, and added the new scenarios from the Reply Comments (2040 & 2050 retirement of MEC, early coal retirements). This modeling was all done with “Market Sales Off”, thus the system (including MEC) was not able to export energy and receive sales revenue from MISO.

As these attachments come from totally different models, analytic processes, and assumptions; there is not a way, nor is it particularly meaningful, to determine root causes of variance of many values from these runs. The primary usefulness of the various modeling approaches is to set a “bandwidth” of potential system operations and customer costs impacts. In almost all scenarios presented, with the exception being some of the more extreme stress-testing scenarios, the addition of the owned Mankato Energy facility shows economic benefit to the system and the Company’s Customers.

- b. The two table 7Hs show the capacity of wind, solar and batteries in nameplate capacity, not firm capacity (as noted in the tables by the asterisk and accompanying note). Strategist determines optimal capacity additions to the system based on firm capacity, not nameplate, so as different resources have different ratios of nameplate to firm capacity (ELCC), the total nameplate additions for various scenarios could, and do, vary widely.
- c. Both sets of modeling have been provided to the Department. For additional information, please see the response to 15(a).

- d. The Company is unaware of the specifics of the Department's modeling efforts, but understands the Department was able to replicate the Company's analysis provided in Attachment B.

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Department: Resource Planning
Telephone: 303.571.2765
Date: June 17, 2019

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Xcel Energy

Information Request No. 16

Docket No.: E002/PA-18-702

Response To: MN Public Utilities Commission

Requestor: Sean Staples

Date Received: June 17, 2019

Question:

In Attachment A – 7H, the Base Early Coal and Owned Early Coal scenarios contain 2,568 MW and 2,889 MW of “Battery,” respectively.

16.a. Please explain what Xcel means by “Battery” and provide all assumptions for the “Battery” resource.

16.b. Why are almost three gigawatts of “Battery” included in the Attachment A – 7H expansion plans and no “Battery” resources contained in the Attachment B – 7H expansion plans?

16.c. Why is there an additional 321 MW Battery in 2036 in the “Owned Early Coal Retirement” scenario?

Response:

- a. The “Battery” is the generic storage alternative used in the IRP. It is based on cost and performance of a 4-hr battery using lithium ion technology. Specific assumptions are shown below:

| Storage Generic Information | |
|---|---------|
| Resource | Battery |
| Technology | Li Ion |
| Location Type | NA |
| Book life | 40 |
| Nameplate Capacity (MW) | 321 |
| Summer Peak Capacity (MW) | 321 |
| Storage Volume (hrs) | 4 |
| Cycle Efficiency (%) | 88 |
| Equivalent Full Cycles per Year | 156 |
| Electric Transmission Delivery (\$000) 2018\$ | 0 |
| Levelized \$/kw-mo (All Fixed Costs) \$2023 | \$10.53 |

- b. The modeling that is shown in Attachment B did not include a battery alternative. See response to PUC 15 (a).
 - c. Capacity is needed in 2036 in the MEC ownership scenario whereas it is not in the PPA scenario due to the cumulative differences in the expansion plans up to that point (*i.e.*, earlier capacity additions in the PPA scenario).
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Xcel Energy

Information Request No. 17

Docket No.: E002/PA-18-702

Response To: MN Public Utilities Commission

Requestor: Sean Staples

Date Received: June 17, 2019

Question:

Please refer to Attachment A – 7H.

Why is there 1,000 MW less solar, in total, in the “Owned Early Coal Retirement” scenario than the Base Early Coal Retirement scenario?

Response:

The model is selecting solar to meet additional capacity needs in the Base Early Coal Retirement scenario at the time the PPAs retire. The approach used for this modeling was to allow for an optimization of all resources under a constraint that required an 80 percent reduction in carbon by 2030 from 2005 levels. Both the Base Early Coal Retirement and Owned Early Coal Retirement scenarios achieve at least an 80 percent reduction in carbon emissions by 2030 from 2005 levels.

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Xcel Energy

Information Request No. 18

Docket No.: E002/PA-18-702

Response To: MN Public Utilities Commission

Requestor: Sean Staples

Date Received: June 17, 2019

Question:

Please refer to Xcel's response to PUC IR No. 11, Xcel's Attachment A– 7B, and Tables 6 and 7 of the Petition.

18.a. In Xcel's written response to PUC IR No. 11, Xcel states, "Inputs to the base case were not changed in the files provided to the DOC." However, according to Xcel's Attachment A – 7B, the Base PVSC is lower than in Tables 6 and 7 of the Petition. If inputs to the base case were unchanged, why does the Base PVSC have a lower cost? And if Strategist was optimized for the Petition, how was the Base PVSC able to be lowered substantially in the supplemental analysis?

Response:

Attachment A-7B to MPUC IR No. 7 provides updated tables based on the reply comment modeling. As noted in the response to MPUC IR No. 11, the updated assumptions in the Reply Comment modeling are detailed on pages 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 optimized all resource additions and 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.

Attachment B-7B provides updated tables based on the modeling provided in response to Informal DOC IR No. 2. The response to MPUC IR No. 11 states that inputs to the base case were not changed in the files provided to the Department in response to Informal DOC IR No. 2. We provided additional files to run early coal shutdown scenarios and early MEC retirement scenarios. Attachment B-7B provides the results of the early coal shutdown scenario using the high renewables base assumption from the initial petition.

Additional information regarding the differences in Attachments A and B can be found in the response to MPUC IR No. 15 (a).

| | |
|-------------|--------------------------------------|
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Xcel Energy

Information Request No. 19

Docket No.: E002/PA-18-702

Response To: MN Public Utilities Commission

Requestor: Sean Staples

Date Received: June 17, 2019

Question:

Please refer to Attachment A – 7A and Attachment B – 7A.

19.a. In the third and fourth rows of Attachment A – 7A and Attachment B – 7A (shown below), please explain why the majority of savings switches from the VOM Cost/(Savings) category in Attachment A to the Fixed Cost/Expansion Plan category in Attachment B.

| MEC Ownership with Early Coal Retirement | | | MEC Ownership with Early Coal Retirement | | |
|--|-------|-------|--|-------|-------|
| | PVSC | PVRR | | PVSC | PVRR |
| Capital Cost of Mankato Purchase | 915 | 915 | Capital Cost of Mankato Purchase | 915 | 915 |
| Fixed Savings of Mankota PPA | (555) | (555) | Fixed Savings of Mankota PPA | (555) | (555) |
| Fixed Cost/Expansion Plan Cost/(Savings) | (24) | (60) | Fixed Cost/Expansion Plan Cost/(Savings) | (563) | (552) |
| VOM Cost/(Savings) | (538) | (540) | VOM Cost/(Savings) | (39) | (31) |

19.b. What are the major drivers of the more than \$500 million in VOM savings in Attachment A and the more than \$550 million in Fixed Cost/Expansion Plan savings in Attachment B?

19.c. According to Attachment B – 7H, the expansion plans for the “Base Early Coal Retirement” scenario and the “Owned Early Coal Retirement” scenario appear to be the same. So how can the “Owned Early Coal Retirement” scenario generate more than \$550 million in Fixed Cost/Expansion Plan savings?

Response:

- a. In Attachment B – 7A, the renewable expansion plans are the same for both the PPA and ownership scenarios. In this case, the addition of Mankato reduces the need for future thermal resources which have primarily fixed costs. In Attachment A – 7A, the expansion plan with Mankato Owned reduces the need for additional capacity, which reduces the amount of solar selected by the model. The costs of the solar resources in the model are reflected as VOM cost.

- b. See response to subpart a above.
 - c. In Attachment B, both cases (Base and Mankato owned) were modeled with the same renewable expansion plan. The fixed savings come from avoiding future thermal resources.
-

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Xcel Energy

Information Request No. 20

Docket No.: E002/PA-18-702

Response To: MN Public Utilities Commission

Requestor: Sean Staples

Date Received: June 17, 2019

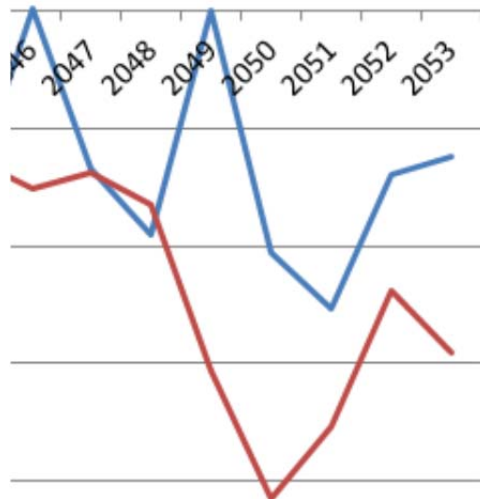
Question:

Please refer to Attachment A – 7C and Attachment B – 7C. The relevant excerpts from the figures are shown below.

20.a. Regarding Attachment A – 7C, what explains the spike in PVRR (red line) savings in the 2048-2050 timeframe?

20.b. Why does the spike not occur in the PVSC (blue line)?

Attachment A – 7C



20.c. A similar spike in PVRR savings occurs in Attachment B – 7C, but in 2033. Why does this spike occur earlier in the study period than in Attachment A – 7C?

Response:

- a. The expansion plans for the PPA and ownership scenarios have the same amount of solar in 2048, but the ownership scenario has 1,000MW less solar in 2049-2057.
 - b. See response to part (a). The reduced solar in these years for the ownership case results in higher CO2 emissions, which incur regulatory costs under PVSC assumptions.
 - c. The spike in Attachment B has no relationship to Attachment A. In the modeling for Attachment B, the ownership case is avoiding a CC unit in 2033 that is in the PPA case.
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Xcel Energy Information Request No. 21
Docket No.: E002/PA-18-702
Response To: MN Public Utilities Commission
Requestor: Sean Staples
Date Received: June 17, 2019

Question:

Throughout Xcel's IR responses, Xcel refers to its responses to "Informal DOC IR 1" and "Informal DOC IR 2." Please e-file Xcel's responses to "Informal DOC IR 1" and "Informal DOC IR 2."

Response:

The referenced informal IRs provided the Department with the Strategist command files required to run the modeling. This information is proprietary and can only be provided to those with a Strategist license. That being said, we provide the Not Public Strategist output files generated by these modelling runs via Not Public CD.

Please note that the CD includes Trade Secret information pursuant to Minnesota Statute § 13.37, subd, 1(b). In particular, the information designated as Trade Secret derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable by proper means by, other persons who can obtain economic value from its disclosure or use.

The CD is marked as "Non-Public" in its entirety. Pursuant to Minnesota Rule 7829.0500, subp. 3, we provide the following description of the excised material:

1. **Nature of the Material:** A CD containing Strategist output files.
2. **Authors:** Resource Planning Analytics.
3. **Importance:** The unit-specific forecast data is proprietary to the Company.
4. **Date the Information was Prepared:** Attachment A was created in the spring of 2019.

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The CD is marked as “Non-Public” in its entirety. Pursuant to Minnesota Rule 7829.0500, subp. 3, we provide the following description of the excised material:

1. **Nature of the Material:** A CD containing Strategist output files.
2. **Authors:** Resource Planning Analytics.
3. **Importance:** The unit-specific forecast data is proprietary to the Company.
4. **Date the Information was Prepared:** Attachment A was created in the spring of 2019.

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