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Xcel Energy			
Docket No.:	E002/RP-15-21		
Response To:	MN Public Utilities Commission	Information Request No.	36
Requestor:	Sean Stalpes		
Date Received:	October 31, 2018		

<u>Question:</u>

The Commission's January 11, 2017 Order Approving Plan with Modifications and Establishing Requirements for Future Resource Plan Filings identified a number of issues Xcel is required to examine in the Company's next resource filing, including but not limited to:

- scenarios for cost-effective and orderly retirement of Xcel's aging baseload fleet, including Sherco, King, Monticello, and Prairie Island;
- combinations of supply-side (distributed and centralized), demand-side, and transmission solutions that could in the aggregate meet post-retirement energy and capacity needs;
- solar acquisition; and
- technical and economic achievability of 1,000 MW of additional demand response.

To assist the Commission's decision on whether to grant Xcel an extension to submit its 2020-2034 resource plan, staff requests Xcel provide in this Request for Information a general response to the following issues:

1. Xcel was required to "acquire approximately 650 MW of solar in 2016–2021 through a combination of the Company's community solar gardens program or other acquisitions" (Ordering paragraph 4.a.).

a. Based on the Company's current projections, how much of the 650 MW of solar in 2016-2021 is expected to come from CSG/small-solar versus utility-scale solar?

b. Does Xcel have any plans to issue an all-source, renewable energy, or solar resource solicitation of bids (similar to its November 28, 2017 all-source bid in Colorado) in the near-term?

2. As noted above, the Commission's Order required Xcel to examine retirement at Sherco, King, Monticello, and Prairie Island.

   a. Can the Company discuss at this time what baseload retirement scenarios will be included in the 2020-2034 IRP filing? Is Xcel considering relicensing its nuclear facilities?

   b. Will the resource plan include a proposed action plan for its nuclear facilities?
   Can the Company discuss that action plan at this time?

3. The Commission's Order required that "Xcel shall acquire no less than 400 MW ofadditional demand response by 2023" (Ordering paragraph 10). Please provide a general discussion of how Xcel may propose to meet the 400 MW by 2023 requirement. (For example, will the 400 MW be limited to MISO-accredited demand response resources, or will it include a combination of convential DR resources and AMI-enabled pricing programs?)

4. Has the Company initiated any technical studies to examine the transmission reliability impacts of retiring any of the baseload units, in order to support the economic evaluation of early retirement in the Strategist analysis? (In other words, has Xcel performed analysis similar to Attachment D of January 29, 2016 Supplement to Resource Plan in the instant docket, which examined the grid impact of retiring Sherco 1 and/or 2?)

5. How does the Company plan to include electrification scenarios in its 2020-2034 IRP filing? Generally, how might the impact on electric loads from, for example, new electric vehicles be included in the modeling?

<u>Response:</u>

1.a. We continue to project that our CSG program will provide at least 650 MW by 2021. In our recently-filed Integrated Distribution Plan (IDP), we forecasted CSG additions of 673 MW through 2020. See Table 21 below, which is from page 192 of our IDP filed November 1, 2018 in Docket No. E002/CI-18-251:

Table 21: Reference Case – Per-Year Distributed Solar Additions (MW/AC)

Year	Solar* Rewards	Made in MN	Made in MN Bonus	Net-metering	S*R Community
<=2017	10.2	11.5	4.9	11.1	246.0
2018	9.4	2.1	0.0	5.8	259.1
2019	8.1	0.0	0.0	8.1	124.5
2020	4.5	0.0	0.0	9.3	43.7
2021	3.1	0.0	0.0	9.3	54.1
2022	1.2	0.0	0.0	10.4	6.2
2023	0.2	0.0	0.0	11.7	6.2
2024	0.0	0.0	0.0	12.4	6.2
2025	0.0	0.0	0.0	12.4	6.2
2026	0.0	0.0	0.0	12.4	6.2
2027	0.0	0.0	0.0	12.4	6.2
2028	0.0	0.0	0.0	12.4	6.2
Total	**36.7**	**13.6**	**4.9**	**127.7**	**770.8**

In the IDP, we discuss our assumptions for this reference case scenario in more detail, as well as other potential distributed solar PV adoption futures.

1.b. Not at this time. As we outlined at our September 10, 2018 IRP Stakeholder Workshop on Strategist Assumptions, our Reference Case indicates no action will be required in the first five years of the 2020-2034 planning period. See Attachment A to this response. We are also happy to provide the strategist modeling files supporting this analysis, along with any additional externalities and regulatory cost of carbon sensitivities, to the Department of Commerce, as requested in the Department's November 19, 2018 comments regarding our request for an extension in this docket.

2.a. While we are continuing to refine our modeling and other analyses underlying the IRP, we outlined the scenarios we are planning to run, at a minimum, at our October 23, 2018 IRP Stakeholder Workshop. See Attachment B to this response for the slide from that workshop that outlines the Baseload scenarios we intend to run in connection with the 2020-2034 IRP – which we note includes nuclear extension scenarios.

2.b. Yes, the 2020-2034 IRP will include a proposed action plan for our nuclear facilities. At this time, we are continuing to work through our analysis to determine the best proposed action plan and are not yet prepared to discuss any plan in detail.

3. We initiated and have been conducting a rigorous stakeholder engagement process toward achieving additional demand response (DR) resources, per updates and materials we have submitted in this docket. We also initiated and are in the final stages of completing an updated DR Potential Study with the Brattle Group.

As noted in our August 8, 2018 Demand Response Stakeholder Workgroup, we have identified more than 15 products in our DR product development process. These potential new programs are in various stages of development, and include MISO-accredited DR resources (conventional DR resources), customer load shifting options, and AMI-enabled pricing programs. We have also continued to expand our existing programs, and have added an additional residential offering for smart thermostats.

We note that adding an incremental 400 MW of DR, including non-conventional resources, requires both initiating pricing programs and bringing them fully to market, which takes time. Doing so by 2023 is a limited timeframe – particularly for programs that require AMI installations. Therefore, we believe the majority of incremental DR toward the 400 MW by 2023 requirement will be within the conventional DR resources framework, or may require customers to utilize energy differently by shifting their overall peak.

We anticipate outlining the actions we expect to take toward meeting this requirement as part of our five-year action plan in the IRP. Within this analysis, we will outline the numbers of megawatts that we project for each of the potential products under development, as well as the levels of customer participation needed to meet these projections. In addition, we are continuing to work with stakeholders. We expect to re-engage our Stakeholder Workgroup again in December 2018 to discuss the products in the development process, and our updated Potential Study.

4. Yes. We have studied several different combinations of baseload retirements in an effort to understand potential transmission system impacts of removing those resources from the grid. We submitted several Attachment Y-2 requests to MISO to aid our analysis. MISO's Attachment Y-2 request process initiates a non-binding/informational purposes only generator retirement study, replicating the analysis that would be performed in the binding retirement studies performed in the MISO Attachment Y process. The scenarios MISO analyzed are listed below:

1. Baseload Retirement Analysis – *Coal*
    a. Retirement of Sherburne County (Sherco) Unit 3
    b. Retirement of Allen S King
    c. Retirement of both Sherco Unit 3 and Allen S King
2. Baseload Retirement Analysis – *Nuclear*
    a. Retirement of Prairie Island Unit 1
    b. Retirement of Prairie Island Unit 2
    c. Retirement of Monticello
    d. Retirement of Prairie Island Units 1 & 2, and Monticello
3. Baseload Retirement Analysis – *Combined*
    a. Sensitivities performed analyzing the impacts of other fuel types retired in addition to above scenarios
        i. Coal retirement scenarios analyzed sensitivities including the retirement of nuclear units
        ii. Nuclear retirement scenarios analyzed sensitivities including the retirement of coal units

These studies included the following set of assumption across all scenarios:

1. Model year 2030 assumptions to analyze impacts of all planned transmission system upgrades.
2. Sherco Units 1 & 2 are replaced by a 786 MW natural gas fired combined cycle generator located at the existing Sherco site.
3. Announced wind additions as follows:
    a. Freeborn
    b. Foxtail
    c. Blazing Star 1 & 2
    d. Allete Clean Energy 1
    e. Crowned Ridge 1, 2, & 3
    f. Lake Benton Repower

5. At this time, we have included a moderate level of light duty vehicle electrification impacts in our base load forecast. We are also currently considering different options to inform high and low load forecast sensitivities. In terms of specific scenarios, as noted in our November 1, 2018 IDP, we have continued work to develop EV adoption scenarios in support of our 2019 IRP since filing an EV forecast on June 1, 2018 in Docket No. E002/M-15-111. In the IDP, we clarified that the EV forecast we would use in the IRP will likely differ that provided in the IDP due to work we are doing to update our internal forecast models, and other efforts we have underway to support various aspects of our IRP analysis – including electrification.

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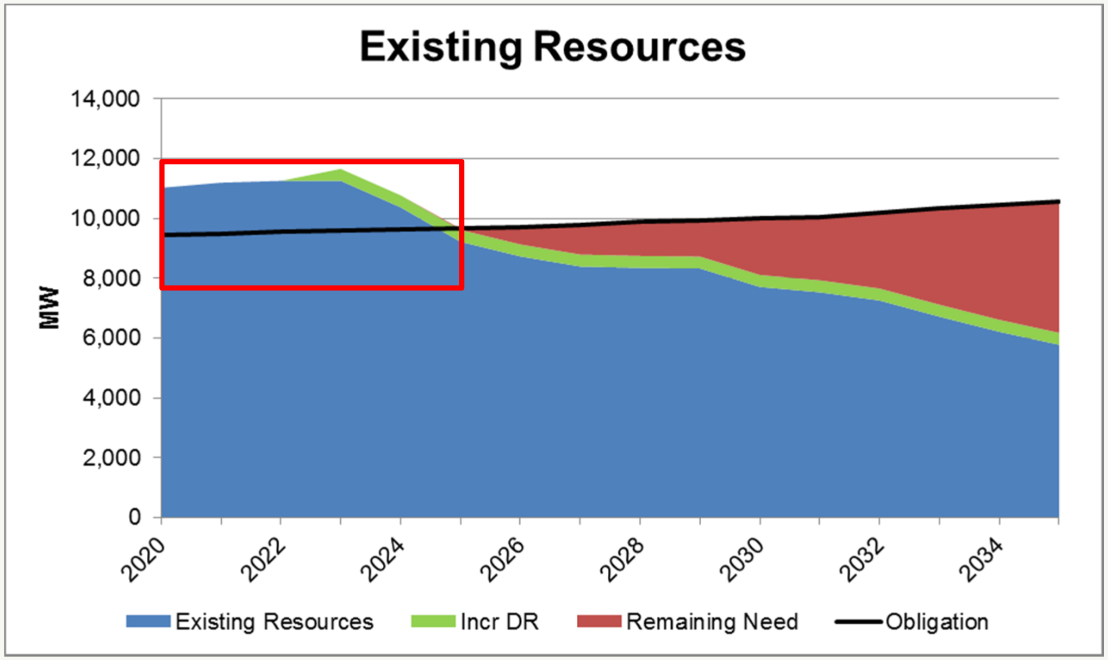
Existing Resources – Net Capacity Position

- Assume PPA's and owned units retire at EOL/expiration
- Prior IRP order requires 400MW incremental DR by 2023
- Projected surplus capacity through Action Period



Step 2: Run Baseload Scenarios with Carbon Constraints

Nuclear Scenarios

- Extension
  - Extend PI 1&2 to 2043 & 2044
  - Extend Monti to 2040
  - Extend All to 2040, 2043, 2044
- Current EOL
  - Monti 2030, PI 1 2033, PI 2 2034
- Early Retirement
  - Early PI 1&2 in 2024, 2025
  - Early Monti in 2026
  - Early All in 2024, 2025, 2026
- Hybrid
  - Early PI 1 2024, PI 2 EOL, Extend Monti to 2040

Top nuclear scenarios advanced to pair with coal scenarios

Coal Scenarios

All assume Sherco 1 retires in 2026, Sherco 2 in 2023

- Early Retirement
  - King 2028
  - King 2028, Sherco 3 2030
- Current EOL
  - King 2037, Sherco 3 2040

Key goals for scenario modeling:

- ***Achieve 85% carbon free* by 2030***
- ***Maintain at least 75% carbon free* after 2030***
- ***Evaluate scenarios that maintain 85% after 2030***

**Carbon free as a % of total annual generation*

Xcel Energy