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Xcel Energy Data Request No. 1
Docket No.: E999/CI-16-521
Response To: All Energy Solar
Requestor: Danielle DeMarre
Date Received: December 5, 2023

Question:

On November 1, 2023 Xcel filed a proposal for modifying the interconnection process for small DER projects to have queue priority as directed by the new legislation. Xcel proposes a separate administrative queue for processing interconnection applications up to 40 kW ac and calls this the “Priority Queue”. Along with a separate queue, Xcel proposes changes to their Technical Planning Standard (TPS). These changes include reserving 50% capacity of feeder/substation equipment ratings for the “General Queue”, while allowing up to 100% of capacity to be used by the “Priority Queue”. This proposal would include removing the Daytime Minimum Load (DML) from equipment capacity calculations.

1. Xcel Energy has been adamant that the TPS was implemented based on engineering judgement and need for providing a safe and reliable grid. How does removing DML and allowing 100% of equipment rating (instead of 80% as currently enforced under the TPS) allow for Xcel to provide a safe and reliable grid?
2. Does Xcel not have concerns that the equipment (feeder/substations) will reach 100% of capacity by DER? If not, then how does this proposal differ from simply allowing 100% of equipment rating to be used?
3. How much does DML contribute toward feeder/substation capacity? What does Xcel forecast DML to be in the next 10, 20, 50 years and how does that affect capacity?

Response:

The Company provides additional detail regarding the questions posed by All Energy in the following three responses. Xcel Energy’s proposal regarding the addition of a “Priority Queue” to the Minnesota Distributed Energy Resource Interconnection Process (MN DIP) is intended to create a separate administrative queue that allows the Area EPS operator to reserve available levels of DER capacity in the “Priority

Queue” that differ from the General Queue. As part of the filing, we stated in part as follows:

If the Commission approves our proposed changes to the MN DIP, the Company will implement our capacity reserve levels by changing our Technical Planning Standard (TPS) for each of the queues above as follows:

- General Queue: Projects are allowed capacity up to 50 percent of the system (feeder/substation) equipment rating.
- Priority Queue: Projects are allowed capacity up to 100 percent of the system (feeder/substation) equipment rating.

The Company will use the following terms in the responses below:

Generator Nameplate Rating or Generator Nameplate Capacity: the maximum generating capacity of a distributed energy resource.

Aggregate Nameplate Generation Capacity: the summation of generator nameplate capacities on a particular feeder, substation, device, or line segment.

Equipment Rating: the current carrying capacity of a device.

Load: the power draw from customer lighting, appliances, electronics, tools, motors, etc.

Daytime Minimum Load (DML): the lowest measured load during daylight hours, coincident with PV production.

Net Power Flow: the resulting current that is the net of load and generation at a given time.

Area Electric Power System (EPS): means the utility electric grid, owned and operated by the Company.

Switching Operation or Circuit Reconfiguration: the opening and closing of switches in the Area EPS to change the feeder or substation a customer or multiple customers are served from, usually for outage restoration or for the Company to safely work on power line equipment.

Abnormal System Conditions or Operation: a situation where an outage or circuit reconfiguration exists in the Area EPS and the feeder is operating outside of how it was initially planned or studied.

Normal System Configuration: no outage or circuit reconfiguration exists in the Area EPS and the feeder is operating how it was originally planned and studied.

Operational Flexibility: the ability to quickly reconfigure circuits or restore customers on the Area EPS without lengthy analysis, disconnection of generation, extended outage times, restricted maintenance times, or equipment overloads.

1. Safety and reliability continue to be paramount to the Company. The current TPS effectively limits the Net Power Flow through equipment to 80% of Equipment Rating. This provides a margin for reliability and Operational Flexibility equal to 20% of the Equipment Rating. The proposal to change the TPS for the applications in the Priority Queue is in response to the legislative requirement to give priority to DER systems less than 40 kW and the proposal would remove the DML from the TPS and allow Aggregate Nameplate Generation Capacity up to 100% of the Equipment Rating. In this situation, the Net Power Flow would never exceed the Equipment Rating in its Normal System Configuration, even if the DML were to decrease. In this case, the actual Load at time of PV production (which is usually higher than the DML), even though it may change or fluctuate over time, would provide the margin for reliability and Operational Flexibility.
2. By removing the DML from the TPS and limiting the Aggregate Nameplate Generating Capacity to 100% of Equipment Rating for those applications in the Priority Queue, the Net Power Flow would never exceed the Equipment Rating in its Normal System Configuration, so the Company would not be concerned about overloads due to fluctuations in DML. Operational Flexibility would still be a concern even with Aggregate Nameplate Generation Capacity limited to 100% of Equipment Rating because Circuit Reconfigurations could result in additional Generator Nameplate Capacity being added to a circuit, creating the potential to exceed the Equipment Rating in an abnormal configuration. This is particularly a concern for large DER systems that far exceed the localized Load or are not associated with a localized Load. However, there is a lower risk for smaller DER systems as they are usually associated with a localized Load, and when impacted by Circuit Reconfigurations, the generation and local Load are transferred together such that the margin of Load increases on the circuit at the same time as the Aggregate Nameplate Generation Capacity.
3. For clarification, the DML does not increase the Equipment Rating, which is a term that is also referred to as “Equipment Capacity.” Therefore, DML does

not contribute toward feeder/substation capacity per se. The Company seeks to move away from including Load in technical planning standards due to the variability inherent in this condition. We note in the paragraph below how DML time periods can change over time. With today's grid conditions, DML periods strongly correlate with periods of maximum solar generation and lower Load conditions. In a future scenario with more flexibility and dispatchability of DER such as energy storage and demand response, there is likely less correlation with the drivers that influence DML today.

Current DML values for feeders and substations can be found in the Public Xcel Energy Interconnection Website¹ under General Resources, Before Interconnecting, "Hosting Capacity Resources." DML values projected in future years are technically available in the 8760 forecasts for the Integrated Distribution Plan (IDP). However, the focus of those forecasts was on growth in peak Load, and the DML values in the forecasts were not scrutinized as thoroughly as peak Load. In general, the changing hourly Load patterns due to energy efficiency markets enabled by FERC 2222, DER load shifting, and beneficial electrification could cause DML to remain flat or decrease during some time periods, so there is not a perfect correlation between growth in peak Load and growth in DML. Therefore, the Company is unable to provide forecasts of DML in 10, 20, and 50 years or the future contribution of DML towards reducing Net Power Flow.

Preparer:	Dean Schiro
Title:	DER Integration Manager
Department:	Distribution
Telephone:	651-229-2241
Date:	December 15, 2023

¹ <https://mn.my.xcelenergy.com/s/renewable/developers/interconnection>

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Xcel Energy Information Request No. 2
Docket No.: E999/M-16-521
Response To: All Energy Solar
Requestor: Danielle DeMarre
Date Received: December 5, 2023

Question:

On November 1, 2023 Xcel filed a proposal for modifying the interconnection process for small DER projects to have queue priority as directed by the new legislation. Xcel proposes a separate administrative queue for processing interconnection applications up to 40 kW ac, and calls this the “Priority Queue”. Along with a separate queue, Xcel proposes changes to their Technical Planning Standard (TPS). These changes include reserving 50% capacity of feeder/substation equipment ratings for the the “General Queue”, while allowing up to 100% of capacity to be used by the “Priority Queue”. This proposal would include removing the Daytime Minimum Load (DML) from equipment capacity calculations.

1. In Xcel’s August 25, 2021 comments under docket 16-521, Xcel proposed a 25% capacity reservation for small DER. Why has Xcel increased the proposal to 50%?
2. How many feeders/substations (percentage) have 50% of capacity to be able to reserve for the “Priority Queue”?
3. The proposal included forecasting on averages across all of Minnesota service areas. What forecasting has Xcel done for when this capacity would be consumed by small “Priority Queue” DER as it relates to rural areas versus urban areas?

Response:

1. The prior proposal would be insufficient to allow current and future customer-sited projects up to 40 kW to interconnect. The Company believes that for its system, applying 50% thermal limits for applications in the General Queue would better allow, and more appropriately allow, current and future projects in the Priority Queue to interconnect. Please see more detailed explanation of the reasoning for this as set forth on pages 1-14 of our November 1, 2023 filing, along with Attachment A to that filing.

2. Based on a high-level assessment, approximately 90% of feeders and 60% of substations would currently have capacity for the Priority Queue. The percentages are subject to change as new applications are submitted into the interconnection process.
 3. The date(s) on when capacity would be consumed on specific feeders or substations would depend on the size and timing of future applications, and of those applications which decide to go forward to interconnect. We have not performed specific forecasting on rural v. urban areas with this analysis.
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Preparer: Dean Schiro
Title: DER Integration Manager
Department: Distribution
Telephone: 651-229-2241
Date: December 21, 2023

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Xcel Energy Information Request No. 3
Docket No.: E999/M-16-521
Response To: All Energy Solar
Requestor: Danielle DeMarre
Date Received: December 5, 2023

Question:

On November 1, 2023 Xcel filed a proposal for modifying the interconnection process for small DER projects to have queue priority as directed by the new legislation. Xcel proposes a separate administrative queue for processing interconnection applications up to 40 kW ac and calls this the “Priority Queue”. The “Priority Queue” proposal includes a 120% limitation for customer-sited DER.

1. How does Xcel propose to determine PV system production for implementing the 120% requirement?

Note: Xcel’s Solar*Rewards program uses Standard losses in PVWatts, with 5% snow losses, and not actual on-site existing conditions for shade, etc.

2. Please clarify what is meant by calculating the 120% “*based on standard 15-minute intervals, measured during the previous 12 calendar months*”. How does this differ from how Xcel calculates 120% max currently, under the Solar*Rewards program?

3. How many applications over the last 1, 2, 3 years, has Xcel received that are not in the Solar*Rewards program that exceed 120%? How many of those applications exceed 200%?

Response:

1. The Company intends to continue with its current methodology, using NREL’s PVWatts Calculator to provide the estimated production of the system based on location, system size, azimuth, tilt, and default system losses (including 5% snow losses).

2. The methodology is the same regardless of program type. The “15-minute interval” reference would be applicable to the Time of Use customers, but otherwise the Company would just review the customer’s usage from the last 12 months and compare it to the PVWatts estimate (reference Answer #1 above).

3. With data as of December 18, 2023, the Company provides the following table which includes non-Solar*Rewards applications under 40 kW AC that have received program approval, been deemed complete, and the 120% level has been exceeded in the last three years.

Year	Number of Applications
2021	329
2022	802
2023	600

Regarding evaluating projects for the 200% threshold, we do not currently track this. To do so would require a special study which is not required for responding to an IR and would be unduly burdensome to pull together.

Preparer: Callie Walsh
Title: Product Portfolio Manager
Department: Renewable and Choice Programs
Telephone: 612-216-8333
Date: December 21, 2023

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Xcel Energy Information Request No. 4
Docket No.: E999/M-16-521
Response To: All Energy Solar
Requestor: Danielle DeMarre
Date Received: December 5, 2023

Question:

On November 1, 2023 Xcel filed a proposal for modifying the interconnection process for small DER projects to have queue priority as directed by the new legislation. Xcel proposes a separate administrative queue for processing interconnection applications up to 40 kW ac, and calls this the “Priority Queue”. Xcel’s proposal includes modifications to MN DIP.

1. In the proposal under **A. MN DIP Changes**, section 1.8.5 of the proposed redlines says that applications in the “Priority Queue” have priority unless the application ahead in queue has begun a System Impact Study *“or been issued an Interconnection Agreement”*. All interconnection applications receive an Interconnection Agreement - please advise why receiving an Interconnection Agreement would effect the queue order.

2. Please explain what section 1.8.6 of the proposed redlines is meant to achieve? It does not match with the rest of the proposal which says 50% reservation for General Queue. Why is it not specified this way in the redline?

Response:

1. The proposed change to MN DIP 1.8.5 shows the interaction between the Priority and General Queues. Applications in the Priority Queue take precedence as being ahead-in-queue over all applications in the General Queue, except where an application in the General Queue already has started a System Impact Study or already has a signed Interconnection Agreement. Both System Impact Study and Interconnection Agreement are included since not all applications that receive an Interconnection Agreement go through the System Impact Study process.

To be clear, the queue position of any project is determined by the date it is Deemed Complete and which queue it is in. But, once an application in the General Queue has started a System Impact Study or has a signed

Interconnection Agreement, it will keep that queue position relative to the Priority Queue regardless of whether new applications are subsequently deemed complete in the Priority Queue.

2. Our MN DIP proposal includes the ability for Area EPS Operators to reserve available DER capacity based on their system needs for specific implementation – as not all utilities are situated similarly. The proposed MN DIP redlines would apply to all utilities in Minnesota subject to the MN DIP. The proposed general language would allow the Company to apply 50% thermal limits to applications in the General Queue, if our proposed redline changes to MN DIP are approved.

Preparer: Jessica Peterson
Title: Program Policy Manager
Department: Customer Energy and Transportation Solutions - Policy
Telephone: 612-216-7972
Date: December 21, 2023