STATE OF MINNESOTA
PUBLIC UTILITIES COMMISSION

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February 28, 2019

XCEL ENERGY'S 2018 DISTRIBUTION SYSTEM HOSTING CAPACITY STUDY **Docket E002/M-18-684**

FRESH ENERGY'S COMMENTS ON XCEL'S 2018 HOSTING CAPACITY STUDY

Fresh Energy appreciates the opportunity to provide comments pursuant to the November 20, 2018 Notice of Comment Period on Xcel Energy's third annual Distribution System Hosting Capacity Analysis (HCA). In addition to the information provided in Xcel's study, our comments have been informed by responses to a survey sent to the most active developer members of the Solar*Rewards Community (S*RC) Workgroup. Fresh Energy sent ten surveys and received six responses. We have included the full responses, anonymous to the developer, as Exhibit A.

The survey asked the following questions:

1. What types of and sizes of projects (community solar, net metering, etc.) do you develop in Xcel's Minnesota service territory?
2. Have you viewed or used Xcel's Hosting Capacity Map and/or tabular results spreadsheet? If so, please describe how you have used them.
3. Have you completed capacity screens or full interconnection studies in areas where you first checked the hosting capacity resources? If so, how did the screen and/or study results compare to the hosting capacity results?
4. Per the Commission's July 19, 2018 Order in Docket No. E002M-17-777 (Xcel Energy's 2017 Hosting Capacity Analysis):

   Xcel's 2018 Hosting Capacity Report must be detailed enough to provide developers with a reliable estimate of the available level of hosting capacity per feeder at the time of submittal of the report to the extent practicable. The information should be sufficient to provide developers with a starting point for interconnection applications.

   Has the above Order been met? Are Xcel's hosting capacity resources sufficiently reliable and detailed enough to provide you, the developer, with a starting point for interconnection applications?
5. Please provide suggestions for how the effort could be made more valuable.

Introduction

Fresh Energy continues to be supportive of modeling and assessing the hosting capacity of Xcel Energy's distribution grid. We understand that this is an iterative process, and we appreciate the Commission's annual review and pointed direction to the Company to ensure the analysis provides real value and is on the right trajectory. Before commenting on the details of the study, we raise two high level concerns.

First, Xcel's approach to the HCA seems to have narrowed in scope such that it provides little, if any, value. Developers seeking to determine where to locate their projects have found the map to be "of almost no value at all." As detailed below, one developer told us that over half the time "the locations we screened had more capacity indicated in the screen than the map. We no longer use the map as a result." The value of the hosting capacity exercise has everything to do with the accuracy of the results. If it is not accurate, it is of no use. As we enter year four of this exercise, we recommend that the Commission require a much more complete analysis of the accuracy of the DRIVE tool, comparing it to other methodologies and interconnection study results on a selection of representative feeders. If the DRIVE tool is unable to provide results that match the results of interconnection studies, the Commission should order Xcel to use a different methodology.

An accurate and complete HCA can do so much more. The opportunities to streamline interconnection, integrate with Xcel's distribution planning process, consider the impact of non-CSG DER, identify upgrades necessary to facilitate future DER growth, etc. are still not being sufficiently explored or addressed. While Xcel seems to also see the larger potential value, their report is lacking commitment to these additional capabilities. In order to produce a model that lives up to its potential and is "detailed enough to provide developers with a reliable estimate of the available level of hosting capacity,"[1] Fresh Energy recommends that the Commission set clear expectations of use cases and timelines for delivery of results.

Second, Xcel is only considering new generation and not considering new load. Meeting our state emission-reduction goals[2] will require converting end-uses powered by gasoline, diesel, propane, fuel oil, and/or natural gas to electricity in the transportation, buildings, and industrial sectors. Per *the Matter of Commission Inquiry into EV Charging and Infrastructure Findings*[3], "The growth of EVs has the potential to significantly impact the electric grid, because scores of EVs charging during times of peak demand could necessitate large investments in generation and distribution infrastructure to handle this new load." There are established methodologies that Xcel could adopt to provide available load capacity in addition to generation hosting capacity. We strongly recommend the Commission makes

[1] https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId=%7bD048B364-0000-C110-B912-A75F943579A1%7d&documentTitle=20187-145039-01

[2] https://www.revisor.mn.gov/statutes/cite/216H.02

[3] https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId=%7b10BBAA68-0000-C413-9799-DF3ED0978E75%7d&documentTitle=20192-149933-01

the output of load capacity and preparedness for rapid beneficial electrification a priority in Xcel's 2019 HCA.

1. **Does Xcel Energy's 2018 Hosting Capacity Study achieve the requirements outlined in the Commission's July 19, 2018 Order and Minn. Stat. §216B.2425, subd. 8?**

No. Xcel's 2018 HCA fails to meet Order Points 2, 3, 4, and 6.[4]

a) **Order Point 2:** *Xcel's 2018 Hosting Capacity Report must be detailed enough to provide developers with a reliable estimate of the available level of hosting capacity per feeder at the time of submittal of the report to the extent practicable. The information should be sufficient to provide developers with a starting point for interconnection applications.*

Fresh Energy asked the developers to comment on this Order Point specifically, asking "Has the Order been met? Are Xcel's hosting capacity resources sufficiently reliable and detailed enough to provide you, the developer, with a starting point for interconnection applications?" We received the following responses:

From developer #1:

> No. The hosting capacity maps do not list hosting capacity per feeder – in fact feeders are not even designated on the map. Tabular data is helpful for understanding queue competition, but without running a capacity screen, there is no way of identifying how the queue competition does or does not correspond to feeder capacity. The maps and tabular data are better than nothing, but do not represent "a reliable estimate of the available level of hosting capacity per feeder at the time of submittal of the report to the extent practicable". Such a resource would identify the capacity available per feeder specifically, map the location of that feeder, and update capacity annually based on changes in load and whenever a new proposed project is added to that feeder.

From developer #2:

> No "reliable estimate" has not been met, and no they can not be used as a starting point. Over 50% of the locations we screened had more capacity indicated in the screen than the map. We no longer use the map as a result. One location that showed 0 capacity, had 14MW of capacity without upgrades when in final design with Xcel.

From developer #3:

> This map does not seem to be totally reliable to base decisions on signing landowner agreements and submitting funds for an interconnection study without first obtaining a capacity screen. Additionally, it is used on a case by case basis to start

[4] Commission Order Accepting 2017 Study and Setting Further Requirements, July 19, 2018, p. 5

initial conversations with landowners, but does not provide enough information to determine whether or not to move forward with a contract.

From developer #4:

Not really. Substation transformer capacity would be more valuable to a developer then the feeder capacity. The value of this map would be enhanced if the hosting map showed:

1) Transformer capacity
2) Minimum daytime load
3) DG installed
4) DG in queue

This is essentially what a developer gets when it pays for a capacity screen for $250.

From developer #5:

No, and when asking for additional details to allow us to make decisions, they told us we had to move forward in the interconnection process to get more details because the capacity screen reports are so cheap they didn't want to do more work for such a small fee.

From developer #6:

No. The map was of almost no value at all, other than that it helped identify the location of some DG lines.

b) Order Point 3: *Xcel's 2018 Hosting Capacity Report must be detailed enough to inform future distribution system planning efforts and upgrades necessary to facilitate the continued efficient integration of distributed generation.*

Not only is this a Commission Order Point, but it is in state statute §216B.2425, subd. 8 that the study "shall identify necessary distribution upgrades to support the continued development of distributed generation resources."[5] The need for supplemental information in order to begin a conversation about the technical and economic potential of grid investments and mitigation solutions was requested in comments regarding the 2017 HCA by the Department of Commerce[6], and is also addressed in Order Point 7g which suggested Xcel might "file supplemental information that would result in a broader understanding of how to guide distribution upgrades for additional hosting capacity."[7]

The "Impacts and Mitigations" section of the 2018 HCA report where Xcel "generally discuss[es] various constraint conditions and the type of mitigations that might be necessary to mitigate them"[8] fails to meet the Order Points and the statutory requirement. Xcel states, "a detailed study is needed to determine the optimal solution when DER is

[5] https://www.revisor.mn.gov/statutes/cite/216b.2425

[6] https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId={20605861-0000-C613-938D-A51D85E3AC3F}&documentTitle=20182-139740-01

[7] Commission Order Accepting 2017 Study and Setting Further Requirements, July 19, 2018, p. 5

[8] 2018 Hosting Capacity Report, p. 14-15

proposed on our feeders"[9] and points to the NREL report to "further reiterate the difficulty in providing more detailed feeder specific mitigations due to the variabilities across the system."[10]

This may be an area where the DRIVE tool is unable to meet a key objective to the HCA, and we recommend that the Commission address this shortcoming. Investments in incremental distribution system capacity, sensors, and automation, in addition to advanced voltage regulation, can increase hosting capacity.[11] Further, Xcel could make its hosting capacity analysis more accurate by measuring and using actual daytime minimum load on its feeders, rather than using an imprecise assumption of twenty percent of peak load.[12] As a starting point, the Commission should require Xcel to complete an individual analysis of the 95 circuits identified as having a hosting capacity of zero.[13] This analysis should provide the cost and benefits of traditional and non-wires alternatives that can increase the hosting capacity in those locations. For example, on feeders with voltage violations, requiring the use of advanced inverters could allow the deployment of additional distributed energy resources without costly upgrades.

c) **Order Point 4:** *Xcel must file a color-coded, map-based representation of the available Hosting Capacity down to the feeder level. […]*

The map has not been made available down to the feeder level. Per Xcel, "For feeders that are in close proximity to another feeder that has differing available hosting capacity, we have indicated the higher of the two capacities."[14]

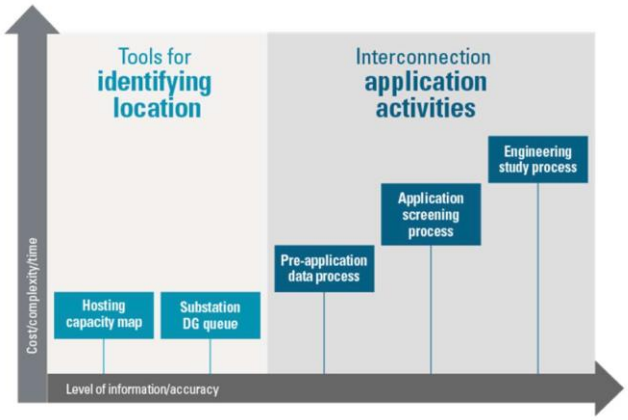
d) **Order Point 6:** *Xcel must provide information on the accuracy of the Hosting Capacity Report information; both estimates on the accuracy of the 2018 report and an analysis of the 2017 results compared to actual hosting capacity determined through any interconnection studies or other reasonable metric.*

This year, Xcel used only the screening results to evaluate the accuracy of the DRIVE tool results and did not provide a comparison to the study results. Per Xcel, "because there are fewer underlying differences between the HCA and interconnection screening, we believe this comparison provides a more fair assessment of hosting capacity accuracy."[15] We disagree. The goal of the HCA is not to align the results with the screening criteria, it is to understand the actual hosting capacity of the distribution grid. And the actual capacity is

[9] *Id.*, p. 15
[10] *Id.*, p. 16
[11] Additional information and discussion regarding mitigation solutions can be found in the "MN Solar Pathways: Enhanced Hosting Capacity Analysis" report, prepared by Smarter Grid Solutions, October 15, 2018: http://mnsolarpathways.org/wp-content/uploads/2018/10/mn-solar-pathways_pv-hosting-capacity-report.pdf
[12] *Id.*, p. 12
[13] *Id.*, Attachment A
[14] *Id.*, p. 23
[15] *Id.*, p. 17

only fully understood after the full engineering study has been performed. Xcel's Figure 3 illustrates that point.[16]

Figure 3: Xcel Energy DER Interconnection Tools and Processes



If there are irreconcilable "underlying differences" between the HCA and the study results, that's a red flag.

It was clear from the developer survey that there have been instances where the capacity map differed considerably from the end results of the studies and, therefore, developers are hesitant to use or trust the tool. When asked, "How did the screen and/or study results compare the hosting capacity results?", Developer #2 said, "Many differed greatly as locations shown as having no capacity with the map, ended up having capacity in the screen and in the final design with either no upgrade or minor upgrade." Developer #3 replied, "For the most part the capacity screens have lined up what we've expected after reviewing the hosting capacity map. However, the full interconnection studies have varied. As in, the capacity map appears to show good potential (green to yellow), but the interconnection study and cost comes in at 600k+. Whereas, we've had interconnection studies come back on areas that are identified in the red area on the map, and those costs come in much lower than expected."

Again, the value of the hosting capacity exercise has everything to do with the accuracy of the results. Fresh Energy recommend that the Commission require a much more complete analysis of the accuracy of the DRIVE tool and Xcel's approach, including a comparison of the map results to both screen *and* study results. If the DRIVE tool is unable to provide results that can accurately identify when system constraints exist, the Commission should order Xcel to use a different methodology that accurately represents the grid conditions and can be used to make decisions by developers and the utility.

2. **Does the Hosting Capacity Study adequately address stakeholder recommendations, or what modifications or clarifications are needed?**

[16] *Id.*, p. 18

No. Particularly inadequate is Xcel's response to Order Point 7d, 7f, and 7g (addressed above).

a) **Order Point 7d:** *explore a range of options for better presenting the public-facing results of the Hosting Capacity Analysis after consideration of, but not limited to, any security and privacy issues that may be implicated in providing more detailed information and what information might be useful to developers and stakeholders*

No improvements were made to the HCA map or the presentation of the results to make them more useful to developers and stakeholders. At the very least, Xcel should provide peak load, daytime minimum load, installed generation capacity, and queued generation capacity for each feeder and substation in a pop-up box on the map.

b) **Order Point 7f:** *file more detailed data on load profile assumptions used in the analysis, including peak load (kW) by substation and feeder*

Xcel responded to this Order Point with a written explanation of Loading Levels and Load Allocation[17] but did not provide peak load data by substation and feeder. As described later, it is important to understand not only peak loads but also daytime minimum loads at the feeder and substation level. It is also not clear from Xcel's HCA report if feeders with SCADA are using actual or estimated daytime minimum loads. We recommend that the Commission require Xcel to prioritize the capability to publish full feeder load profiles as part of its 2019 HCA filing.

3. **Should the Hosting Capacity Study continue to be filed independently from the statute required Biennial Grid Modernization Report or Integrated Distribution Plan in years in which they are required to be filed?**

Yes. Fresh Energy very much supports the full integration of the HCA with Xcel's distribution plan and grid modernization efforts. That said, one key objective of the hosting capacity map, tabular results, and study report is to guide the siting of future DER projects. For ease of use and access, we suggest this remain a stand-alone filing. Additionally, in order to optimize value and increase accuracy of the tool, we anticipate that over time a new HCA will be filed more frequently than the other reports.

4. **Are there other issues or concerns related to this matter?**

Yes. Fresh Energy appreciates the Commission's considerations of the following additional issues and concerns:

a) **Daytime Minimum Loads**

[17] 2018 Hosting Capacity Results, p. 12

The Company's 2018 HCA now includes a new "Reverse Power Flow" threshold, which is a dominant factor in the results – 84% of the Company's feeders have a maximum limiting factor of Reverse Power Flow.[18]

Fresh Energy believes this severe constraint in the HCA is directly related to the Company's conservatively low assumptions for daytime minimum loads, which Xcel calculates as 20% of the feeder peak demand because the actual daytime minimum loads are not known.[19] In other words, assuming a lower-than-actual daytime minimum loads results in an exaggerated risk of reverse power flow at the substation feeder breaker and artificially low hosting capacity on the feeder. We also believe that as beneficial electrification accelerates, feeder daytime minimum loads will increase.

Fresh Energy recommends that the Commission require Xcel to make the tracking and updating of actual feeder daytime minimum load a high priority in 2019 and include these values in its next HCA.

b) Transparency of cost and time allocated

Fresh Energy recommends that the Commission request Xcel to file all costs related to the hosting capacity exercise with the 2019 report, including time required of Xcel's engineering staff, and any efforts Xcel is making to reduce the costs over time. At this point, it is concerning that such a significant undertaking is providing zero to little value to the developers and the utility.

c) Evolution of the DRIVE tool

Xcel seems committed to their partnership with the Electric Power Research Institute (EPRI) and the future potential of the DRIVE tool. While we acknowledge that the tool has improved over the last three iterations of the analysis, it is important for the Commission and stakeholders to understand more fully the current limitations and future potential of the tool. With DRIVE, will it be possible to achieve the following:

- Can load DER (storage, EVs) be modeled? If yes, by when?
- Will Xcel be able to use actual daytime minimum load? If yes, by when?
- Can advanced inverter functionality be modeled? If yes, by when?
- Can Xcel's secondary be modeled such that the addition of small DG such as rooftop solar be considered? If yes, by when?
- Can the map provide results that match the interconnection screens and include the information currently provided by Xcel's pre-application report? If yes, by when?
- Can the HCA replace the interconnection screens and streamline Xcel's interconnection process? If yes, by when?

d) Interconnection Queue

[18] In Fresh Energy's analysis of the 2018 HCA results, 884 out of 1049 feeders (84%) have Reverse Power Flow as the max limiting factor.
[19] *Id.*, p. 12

Fresh Energy disagrees with Xcel's decision to remove from the analysis solar gardens that are underway but not yet in-service. If a project has a signed Interconnection Agreement, the hosting capacity has been claimed by that project and its standing in the queue. Although some of the queued projects may not end up being built, a signed Interconnection Agreement means that the project has met major milestones including the completion of the engineering study. There is meaningful "realness" to a project at that step of the interconnection process. Fresh Energy recommends that the Commission require that the HCA include queued projects with a signed Interconnection Agreement in advance of their in-service status in order to provide a more accurate analysis of remaining hosting capacity.

e) Developer Feedback

Xcel concluded after an S*RC Workgroup presentation on the hosting capacity tool that "the members did not have a strong understanding of the Hosting Capacity Analysis and how to apply it."[20] This is a mischaracterization of the capability of the community solar developers. More likely, the company representatives attending the S*RC Workgroup meeting are neither the land acquisition experts nor the engineers. Fresh Energy encourages both Xcel and the Commission to review the last entry of the developer surveys where developers have provided suggestions for how the hosting capacity effort can be made more valuable. Again, you will find the full surveys below.

Conclusion

Fresh Energy appreciates the opportunity to comment and looks forward to continuing to support this exciting work.

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[20] *Id.*, p. 27

Exhibit A – Survey Responses

Developer Declaration #1
Re: Hosting Capacity Report, Map, and Tabular Results Spreadsheet
Survey sent: 2/15/2019

Note: Responses (anonymous to the developer) will be submitted to the MN PUC under Docket E002/M-18-684, *In the Matter of Xcel Energy's 2018 Distribution System HCA.*

Question: What types and sizes of projects (community solar, net metering, etc.) do you develop in Xcel's Minnesota service territory?

Answer: Community solar 200kW-1.35MW (DC), net metering 3-40kW (DC) via Solar Rewards and previously Made in MN. Currently exploring net metering above 40kW on a few locations using the capacity credit.

Questions: Have you viewed or used Xcel's Hosting Capacity Map and/or tabular results spreadsheet? If so, please describe how you have used them.

Answer: Yes, we have viewed both the Hosting Capacity Map and tabular results. We use the Hosting Capacity Map largely to understand where Xcel is likely to look favorably on community solar gardens, not as a hard and fast rule of whether a project will work in that area or not. We use the tabular results spreadsheet largely to understand the volume of other projects in the queue for a given substation and feeder line, understanding that some of these projects may not occur.

Question: Have you completed capacity screens or full interconnection studies in areas where you first checked the hosting capacity resources? If so, how did the screen and/or study results compare to the hosting capacity results?

Answer: Yes, but only one compared capacity screen to the resources, because the Hosting Capacity Map and tabular results were only available in current form after most of our gardens. In the one instance we have checked, there was a relatively strong agreement between the map conditions and the capacity screen results we received (both negative). Many of our projects are in areas with substantial capacity where we neither checked the capacity screen nor the hosting capacity resources.

Per the Commission's July 19, 2018 Order in Docket No. E002M-17-777 (Xcel Energy's 2017 HCA):

> *Xcel's 2018 Hosting Capacity Report must be detailed enough to provide developers with a reliable estimate of the available level of hosting capacity per feeder at the time of submittal of the report to the extent practicable. The information should be sufficient to provide developers with a starting point for interconnection applications.*

Question: Has the above Order been met? Are Xcel hosting capacity resources sufficiently reliable and detailed enough to provide you, the developer, with a starting point for interconnection applications?

Answer: No. The hosting capacity maps do not list hosting capacity per feeder – in fact feeders are not even designated on the map. Tabular data is helpful for understanding queue competition, but without running a capacity screen, there is no way of identifying how the queue competition does or does not correspond to feeder capacity. The maps and tabular data are better than nothing, but do not represent "*a reliable estimate of the available level of hosting capacity per feeder at the time of submittal of the report to the extent practicable".* Such a resource would identify the capacity available per feeder specifically, map the location of that feeder, and update capacity annually based on changes in load and whenever a new proposed project is added to that feeder.

Please provide suggestions for how the effort could be made more valuable.

Comment: A mapping tool that meets the intention of the order would identify the capacity available per feeder specifically, map the location/ area served of that feeder in a distinguishable way, and update capacity annually based on changes in load and whenever a new proposed project is added to that feeder.

End.

Developer Declaration #2
Re: Hosting Capacity Report, Map, and Tabular Results Spreadsheet
Survey sent: 2/15/2019

Note: Responses (anonymous to the developer) will be submitted to the MN PUC under Docket E002/M-18-684, *In the Matter of Xcel Energy's 2018 Distribution System HCA.*

Question: What types and sizes of projects (community solar, net metering, etc.) do you develop in Xcel's Minnesota service territory?

Answer: 1MW CSG or net-metering

Questions: Have you viewed or used Xcel's Hosting Capacity Map and/or tabular results spreadsheet? If so, please describe how you have used them.

Answer: Yes, we have reviewed them and the Xcel write up for the assumptions used. We also compared against projects we had already had secured capacity for to see if they matched and they did not, though assumptions indicated the review process was different.

Question: Have you completed capacity screens or full interconnection studies in areas where you first checked the hosting capacity resources? If so, how did the screen and/or study results compare to the hosting capacity results?

Answer: Yes. Many differed greatly as locations shown as having no capacity with the map, ended up having capacity in the screen and in the final design with either no upgrade or minor upgrade.

Per the Commission's July 19, 2018 Order in Docket No. E002M-17-777 (Xcel Energy's 2017 HCA):

> *Xcel's 2018 Hosting Capacity Report must be detailed enough to provide developers with a reliable estimate of the available level of hosting capacity per feeder at the time of submittal of the report to the extent practicable. The information should be sufficient to provide developers with a starting point for interconnection applications.*

Question: Has the above Order been met? Are Xcel hosting capacity resources sufficiently reliable and detailed enough to provide you, the developer, with a starting point for interconnection applications?

Answer: No "*reliable estimate"* has not been met, and no they can not be used as a starting point. Over 50% of the locations we screened had more capacity indicated in the screen than the map. We no longer use the map as a result. One location that showed 0 capacity, had 14MW of capacity without upgrades when in final design with Xcel.

Please provide suggestions for how the effort could be made more valuable.

Comment: A) if upgrades <$100k where included to show as having capacity and B) Physical equipment (transformer/conductors/etc.) was updated more often it might improve this.

End.

Developer Declaration #3
Re: Hosting Capacity Report, Map, and Tabular Results Spreadsheet
Survey sent: 2/15/2019

Note: Responses (anonymous to the developer) will be submitted to the MN PUC under Docket E002/M-18-684, *In the Matter of Xcel Energy's 2018 Distribution System HCA.*

Question: What types and sizes of projects (community solar, net metering, etc.) do you develop in Xcel's Minnesota service territory?

Answer:

1.4 MW DC Community Solar

Questions: Have you viewed or used Xcel's Hosting Capacity Map and/or tabular results spreadsheet? If so, please describe how you have used them.

Answer:

The Hosting Capacity Map has been used a preliminary screening to develop target areas of development. Additionally, the Hosting Capacity Map has been used to review initial capacity review with Landowners who are interested in developing their property for solar.

Question: Have you completed capacity screens or full interconnection studies in areas where you first checked the hosting capacity resources? If so, how did the screen and/or study results compare to the hosting capacity results?

Answer:

We've completed both capacity screens and interconnection studies. For the most part the capacity screens have lined up what we've expected after reviewing the hosting capacity map. However, the full interconnection studies have varied. As in, the capacity map appears to show good potential (green to yellow), but the interconnection study and cost comes in at 600k+. Whereas, we've had interconnection studies come back on areas that are identified in the red area on the map, and those costs come in much lower than expected.

Per the Commission's July 19, 2018 Order in Docket No. E002M-17-777 (Xcel Energy's 2017 HCA):

> *Xcel's 2018 Hosting Capacity Report must be detailed enough to provide developers with a reliable estimate of the available level of hosting capacity per feeder at the time of submittal of the report to the extent practicable. The information should be sufficient to provide developers with a starting point for interconnection applications.*

Question: Has the above Order been met? Are Xcel hosting capacity resources sufficiently reliable and detailed enough to provide you, the developer, with a starting point for interconnection applications?

Answer:

This map does not seem to be totally reliable to base decisions on signing landowner agreements and submitting funds for an interconnection study without first obtaining a capacity screen. Additionally, it is used on a case by case basis to start initial conversations with landowners, but does not provide enough information to determine whether or not to move forward with a contract.

Please provide suggestions for how the effort could be made more valuable.

Comment:

Provide substation location on the capacity map. Additional substation information: Total MVA, existing DG on substation, DG in queue.

End.

Developer Declaration #4
Re: Hosting Capacity Report, Map, and Tabular Results Spreadsheet
Survey sent: 2/15/2019

Note: Responses (anonymous to the developer) will be submitted to the MN PUC under Docket E002/M-18-684, *In the Matter of Xcel Energy's 2018 Distribution System HCA.*

Question: What types and sizes of projects (community solar, net metering, etc.) do you develop in Xcel's Minnesota service territory?

Answer:
We develop community solar gardens

Questions: Have you viewed or used Xcel's Hosting Capacity Map and/or tabular results spreadsheet? If so, please describe how you have used them.

Answer:
Yes, we have looked at this resource to see if it helps us locate sites for new gardens

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Question: Have you completed capacity screens or full interconnection studies in areas where you first checked the hosting capacity resources? If so, how did the screen and/or study results compare to the hosting capacity results?

Answer:

The hosting capacity map shows distribution lines. These lines are color coded based on their capacity to host a solar DG facility. There are a few instances where the map does provide value, such as an indicator of a feeder that has a high residual capacity for DG. This may suggest a geographic are that is a strong candidate for solar. These cases are few though.

The capacity map shows the capacity of feeders. That's interesting, but not the most critical piece if DG hosting capacity due diligence. The most important consideration when siting DG is the transformer capacity in a given substation. The hosting map does not offer any information on transformer capacity.

There are many instances where the map shows insufficient DG capacity on feeders surrounding a substation, but where the substation transformer has enough capacity to host DG. In these cases, a developer will apply for interconnection with an expectation that a feeder abutting a chosen site can be reconductored. In these cases, the project will choose to absorb the cost of this reconductoring, if possible.

We run capacity screens for every site – even those where there is a strong indicator on the DG map that a feeder has adequate capacity. The map is not updated inn real time and therefor cannot be relied on to show up-to-the minute verification of DG capacity

Per the Commission's July 19, 2018 Order in Docket No. E002M-17-777 (Xcel Energy's 2017 HCA):

> *Xcel's 2018 Hosting Capacity Report must be detailed enough to provide developers with a reliable estimate of the available level of hosting capacity per feeder at the time of submittal of the report to the extent practicable. The information should be sufficient to provide developers with a starting point for interconnection applications.*

Question: Has the above Order been met? Are Xcel hosting capacity resources sufficiently reliable and detailed enough to provide you, the developer, with a starting point for interconnection applications?

Answer:

Not really. Substation transformer capacity would be more valuable to a developer then the feeder capacity. The value of this map would be enhanced if the hosting map showed:

1) Transformer capacity
2) Minimum daytime load
3) DG installed
4) DG in queue

This is essentially what a developer gets when it pays for a capacity screen for $250.

Please provide suggestions for how the effort could be made more valuable.

Comment:

1) See previous answer
2) It would be good if the cap screen data Xcel provides for $250 was accurate. Our experience has show that approximately 20% of cap screen contain incorrect or misleading data.

End.

Developer Declaration #5
Re: Hosting Capacity Report, Map, and Tabular Results Spreadsheet
Survey sent: 2/15/2019

Note: Responses (anonymous to the developer) will be submitted to the MN PUC under Docket E002/M-18-684, *In the Matter of Xcel Energy's 2018 Distribution System HCA.*

Question: What types and sizes of projects (community solar, net metering, etc.) do you develop in Xcel's Minnesota service territory?

Answer: We develop community solar and utility scale projects in MN.

Questions: Have you viewed or used Xcel's Hosting Capacity Map and/or tabular results spreadsheet? If so, please describe how you have used them.

Answer: Yes – We use the hosting capacity map for preliminary siting of community solar projects.

Question: Have you completed capacity screens or full interconnection studies in areas where you first checked the hosting capacity resources? If so, how did the screen and/or study results compare to the hosting capacity results?

Answer: The hosting capacity data does not exactly line up with capacity screens. I think it is because the capacity screen doesn't necessarily assess the entire substation. After working through it with Xcel, they would not provide additional details on the capacity screening report, but they did acknowledge the difference between the hosting capacity map data and the screening report data. They addressed this issue by stating that the capacity screening report does not account for everything at the substation (multiple transformers, etc.). We ended up leaving the meeting with the notion that we should base decisions on the hosting capacity map data and queue data. The capacity screening report was mostly helpful to solidify clearly feasible project, but we wouldn't trust the capacity screens for projects that appeared to be unfavorable (a lot of capacity ahead of us, etc.) We had a project where the capacity screening report looked terrible with lots of capacity ahead of us, and over-loaded transformers, but then the hosting map showed it could hold 1 MW. This was because the capacity screening report didn't provide us with the whole picture.

Per the Commission's July 19, 2018 Order in Docket No. E002M-17-777 (Xcel Energy's 2017 HCA):

> *Xcel's 2018 Hosting Capacity Report must be detailed enough to provide developers with a reliable estimate of the available level of hosting capacity per feeder at the time of submittal of the report to the extent practicable. The information should be sufficient to provide developers with a starting point for interconnection applications.*

Question: Has the above Order been met? Are Xcel hosting capacity resources sufficiently reliable and detailed enough to provide you, the developer, with a starting point for interconnection applications?

Answer:

No, and when asking for additional details to allow us to make decisions, they told us we had to move forward in the interconnection process to get more details because the capacity screen reports are so cheap they didn't want to do more work for such a small fee.

Please provide suggestions for how the effort could be made more valuable.

Comment:

Clear definitions of the capacity screening report criteria would be helpful, as well a substation overview (how many transformers, circuits, etc. even just a count would be helpful). The capacity screening results should be able to be tied to a hosting capacity map. The hosting capacity map is helpful so long as it is accurate. There is nowhere in the capacity screen analysis that shows the available capacity in the same way it shows on the hosting capacity map. I understand it is a more specific report, but it should also provide the basic information you can see on the hosting capacity map, and then break it down into specifics.

We understand the capacity screening report is preliminary, but if Xcel won't provide any more details on the report itself because they don't get enough funding, we would recommend an increase in capacity screening application fees so Xcel can explain the results instead of saying that they don't get paid enough to go into the results in depth.

End.

Developer Declaration #6
Re: Hosting Capacity Report, Map, and Tabular Results Spreadsheet
Survey sent: 2/15/2019

Note: Responses (anonymous to the developer) will be submitted to the MN PUC under Docket E002/M-18-684, *In the Matter of Xcel Energy's 2018 Distribution System HCA.*

Question: What types and sizes of projects (community solar, net metering, etc.) do you develop in Xcel's Minnesota service territory?

Answer:
Community solar.

Questions: Have you viewed or used Xcel's Hosting Capacity Map and/or tabular results spreadsheet? If so, please describe how you have used them.

Answer:
Yes. I attempted to use it to identify community solar garden hosts.

Question: Have you completed capacity screens or full interconnection studies in areas where you first checked the hosting capacity resources? If so, how did the screen and/or study results compare to the hosting capacity results?

Answer:

Yes. The map is totally unreliable. It shows that there is almost no capacity available anywhere. This is not true.

Per the Commission's July 19, 2018 Order in Docket No. E002M-17-777 (Xcel Energy's 2017 HCA):

> *Xcel's 2018 Hosting Capacity Report must be detailed enough to provide developers with a reliable estimate of the available level of hosting capacity per feeder at the time of submittal of the report to the extent practicable. The information should be sufficient to provide developers with a starting point for interconnection applications.*

Question: Has the above Order been met? Are Xcel hosting capacity resources sufficiently reliable and detailed enough to provide you, the developer, with a starting point for interconnection applications?

Answer:

No. The map was of almost no value at all, other than that it helped identify the location of some DG lines.

Please provide suggestions for how the effort could be made more valuable.

Comment:

It would be great if the capacity estimate were accurate, although it would create a land rush for the sites along those DG lines. The map would be more useful if it were in a .KMZ format so that it could be integrated into other software to include parcel data, wetlands, etc. Also, the different colors on the map are difficult for color blind people distinguish. If the map were in .KMZ format we could filter the layers by capacity.

End.