COMMERCE DEPARTMENT

December 30, 2019

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

RE: **Comments of the Minnesota Department of Commerce, Division of Energy Resources**
Docket No. E002/M-19-685

Dear Mr. Wolf:

Attached are the comments of the Minnesota Department of Commerce, Division of Energy Resources (Department) in the following matter:

> Northern States Power Company, d/b/a Xcel Energy's 2019 Hosting Capacity Analysis Report.

The report was filed on November 1, 2019, by:

> Bria E. Shea
> Director, Regulatory & Strategic Analysis
> Northern States Power Company d/b/a/ Xcel Energy Services Inc.
> 414 Nicollet Mall
> Minneapolis, MN 55401

The Department will provide its final recommendation in reply comments once the Company responds to the Department's requests for additional information and evaluates the comments of other stakeholders. The Department is available to respond to any questions the Minnesota Public Utilities Commission may have on this matter.

Sincerely,

/s/ MATTHEW LANDI
Rates Analyst

ML/ja
Attachment

Before the Minnesota Public Utilities Commission

Comments of the Minnesota Department of Commerce
Division of Energy Resources

Docket No. E002/M-19-685

I. BACKGROUND

On November 1, 2019 Xcel Energy (Xcel or the Company) filed its 2019 Hosting Capacity Analysis Report (the 2019 Report or HCA Report) as required by Minn. Stat. §216B.2425, subd. 8 (the Statute) and the Minnesota Public Utilities Commission's (Commission) August 15, 2019 Order in Docket No. E002/M-18-684 (the 2019 Order).[1]

Minn. Stat. §216B.2425, subd. 8, states:

> Subd. 8. Distribution study for distributed generation. Each entity subject to this section that is operating under a multiyear rate plan approved under section 216B.16, subdivision 19, shall conduct a distribution study to identify interconnection points on its distribution system for small-scale distributed generation resources and shall identify necessary distribution upgrades to support the continued development of distributed generation resources, and shall include the study in its report required under subdivision 2.

The relevant portions of the 2019 Order listed the following requirements for Xcel's 2019 Report:

> 2. Regarding data acquisition and display,
>
> A. Xcel shall work with stakeholders to improve the value of Xcel's hosting capacity analysis, including but not limited to the provision of more detailed substation, feeder, and other equipment data in its public-facing hosting capacity map.
>
> B. In spreadsheet format, Xcel shall provide hosting capacity data by substation and feeder, with appropriate disclaimers about the data's accuracy, precision, and timeliness. The data shall include, when available, peak load, daytime minimum load, installed generation capacity, and queued generation capacity

[1] Order Accepting Study and Setting Further Requirements, dated August 15, 2019, filed in Docket No. E002/M-18-684.

C. Xcel shall provide the same information in its public-facing hosting capacity map, except to the extent that publicly disclosing this data would violate specific data privacy requirements or pose a significant security risk to Xcel's system or its customers. If Xcel withholds any information on this basis, Xcel shall provide the Commission with a full description and specific basis for withholding the information, including any Trade Secret claims.

D. Xcel shall make the tracking and updating of actual feeder daytime minimum load a priority in 2019, and include those values in its 2019 hosting capacity analysis.

3. Regarding the 95 feeders that Xcel identifies has having no hosting capacity, Xcel shall –

   A. Complete an individual analysis of the feeders and available options for increasing their hosting capacity.

   B. Provide the following information for each feeder:

      1) The frequency at which the constraints to individual feeders occur.

      2) The full range of mitigation options for an individual feeder, including DER capabilities, a range of potential costs for each of the mitigation options available, and a range of total costs.

      3) The amount of additional hosting capacity that could be obtained by implementing the identified mitigation options on a technical and economic basis (that is, the technical potential of the mitigation options and the economic potential of the mitigation options).

      4) Cost-effective mitigation options that might improve the economic viability of DERs, and the size of the financial benefit these options might provide.

4. Xcel shall provide at least one example, using the DRIVE tool to the extent practicable, exploring a feeder's hosting capacity with different locations and levels of generation and load.

5. Xcel shall provide a complete analysis of the DRIVE tool, including the following:

A. A report on the evolving capabilities of the DRIVE tool and whether it is capable of incorporating the technologies included in the broadened definition of DERs, including a discussion of how Xcel's hosting capacity analysis can be used to assist state energy policy goals related to beneficial electrification.

B. A comparison of other methodologies and interconnection study results on a selection of representative feeders, including a discussion of the tools and analyses used by other utilities in other jurisdictions—in particular, Pepco Holdings and other Exelon Corporation utilities.

6. Xcel shall collaborate with stakeholders in evaluating the costs and benefits associated with a hosting capacity analysis able to achieve the following objectives:

   A. remaining an early indicator of possible locations for interconnection;

   B. replacing or augmenting initial review screens and/or supplemental review in the interconnection process; and/or

   C. automating interconnection studies.

7. In its 2019 Report, Xcel shall include—in addition to the requirements set forth above—the following:

   A. Updates on the appropriateness of the methodological choice of the hosting capacity analysis, a discussion of Xcel's ability to obtain more detailed secondary voltage equipment data, and the types of DERs being interconnected in future reports.

   B. All costs related to the hosting capacity exercise, including the time of Xcel's engineering staff and any efforts Xcel is making to reduce the costs over time.

   C. Information on the number of pre-application capacity screens conducted in the previous year, the amount collected for each, and the total amount collected to conduct the pre-application screens, in the previous year.

8. In future hosting capacity reports, Xcel shall do the following:

A. Re-evaluate Xcel's choice to focus its hosting capacity analysis on large centralized DERs rather than smaller ones.

B. Discuss Xcel's ability to obtain more detailed data on secondary voltage equipment, and the types of DERs being interconnected to Xcel's system.

C. Continue to consider and address relevant requests from parties.

D. Continue to consider and address the requirements from the 2017 Order, 2018 Order, and the current order.

Further, on November 15, 2019, the Commission issued its *Notice of Comment Period* (Notice). The Notice requested comments on the 2019 Report regarding the following topics:

- Does Xcel Energy's 2019 Hosting Capacity Analysis Report achieve the requirements outlined in the Commission's August 15, 2019 Order [footnote omitted] and Minn. Stat. §216B.2425, Subd. 8?
- Does the Hosting Capacity Analysis Report and updates to the Company's online map improve the usefulness for customers and developers? Are modifications or clarifications needed?
- Are there other issues or concerns related to this matter?

Since there are no specific rules for Minn. Stat. §216B.2425, subd. 8, the Minnesota Department of Commerce, Division of Energy Resources (Department) examined Xcel's 2019 Report according to the Statute and the 2019 Order. In addition, the Department offers the following comments in response to the Commission's Notice.

II. DEPARTMENT ANALYSIS

A. REQUIREMENTS OF THE STATUTE AND 2019 ORDER

As noted above, the first topic open for comment is whether the 2019 Report achieves the requirements outlined by the Statute and the 2019 Order. The Department's analysis relies on the Statute and the 2019 Order to determine the completeness of the 2019 Report in terms of serving the public-interest-oriented goals of the Statute and the 2019 Order.

The Department notes that Xcel's 2019 Report is bifurcated into a Compliance Filing that offers a summary of the 2019 hosting capacity analysis (HCA) report, and the actual 2019 HCA, which is Attachment A of the 2019 Report. While there are additional attachments in the filing, the two main substantive elements of the filing are the Compliance Filing and Attachment A.

1. The Statute

Minn. Stat. §216B.2425, subd. 8, as aforementioned, states that Xcel:

> *…shall conduct a distribution study to identify interconnection points on its distribution system for small-scale distributed generation resources and shall identify necessary distribution upgrades to support the continued development of distributed generation resources*, and shall include the study in its report required under subdivision 2. [emphasis added].

The Department views the statute as having two distinct requirements: (1) a substantive requirement, which is found in the *italicized* text above; and (2) a procedural requirement, which is found in the underlined text above.

Further, the completeness analysis of the substantive requirement of the Statute involves two components and requires answers to two questions:

> (1) Does the 2019 Report identify interconnection points on Xcel's distribution system for small-scale distributed generation resources, and;
> (2) Does it identify distribution upgrades that will help facilitate the development of distributed generation resources?

The Department concludes that the 2019 Report identifies a reasonable and sufficient amount of interconnection points on Xcel's distribution system[2] and identifies necessary distribution upgrades to support the continued development of distributed generation resources.[3] Therefore, the Department concludes that the 2019 Report is complete as far as the substantive requirement of the Statute is concerned.

The completeness analysis of the procedural requirement of the Statute involves only one component and requires an answer to one question: was the 2019 Report included in the study that is required by the Statute under subdivision 2 (referring to the Biennial Transmission Projects Report[4])?

While the answer is technically no, as it was filed in a separate regulatory proceeding, Order Points #8 and #9 of the Commission's Order in Docket No. E002/M-17-777 (2018 Order) state the following:

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[2] 2019 Report, Compliance Filing, at 22. Xcel identified and included 1,050 feeders in the 2019 Report, while excluding 115 feeders from the public "heat map" based on confidentiality and security concerns.
[3] 2019 Report, Compliance Filing, at 10-12. See also Attachment A, at 29-38. Xcel's mitigation analysis identifies distribution system upgrades that increase hosting capacity, which would allow for the continued development of distributed generation resources.
[4] Minn. Stat. §216B.2425, subd. 2. The biennial transmission report is filed every two years and was filed in Docket No. E002/M-19-205 on October 31, 2019.

8. The hosting capacity report identified in Minn. Stat. § 216B.2425, subd. 8, may be filed separately from the Biennial Transmission Projects Report.

9. Xcel must file a Hosting Capacity Report on an annual basis by November 1 each year.

Thus, the Department concludes that the procedural requirement of the Statute is satisfied.

2. The 2019 Order

The 2019 Order created eight requirements for Xcel's next Hosting Capacity Report. The requirements can be organized into two categories: (1) structural requirements, and; (2) substantive requirements. Below, the Department reviews both categories of requirements to assess completeness. The Department's conclusions in this section of the analysis are not necessarily related to the Department's position on the qualitative assessment of the 2019 Report.

a) Structural Requirements

The Department views Order Points #2A, #2C, #6, and #8C as the structural requirements of the 2019 Order. These Order points refer generally to the development and presentation of the 2019 Report.

Stakeholder engagement for the 2019 Report was identified as an important element in the development of the 2019 Report. After all, the HCA is only as useful as stakeholders deem it to be so. By design, the HCA is intended to be a tool available for use in the orderly development of distributed energy resources (DERs) on Xcel's system. If the stakeholders interested in DERs do not find value in using the HCA, then it is at best an experiment that the Commission is asking Xcel's ratepayers to fund. At worst, it is a superfluous and wasteful step that adds no meaningful value to the DER interconnection process. It is therefore essential that the stakeholder community derive value from the HCA, and Xcel expediently and reasonably develops its potential to provide that value.

The plain language of Minn. Stat. §216B.2425, subd. 8, requires the HCA to aid in the development of DERs in Minnesota. At this point in the stage of development of Xcel's HCA—its third iteration[5]—the HCA should be useful and valuable to stakeholders to a reasonable extent. Toward that end, the Department reviews these structural requirements with a particular emphasis on the adequacy of the stakeholder engagement and the actual and potential value of the HCA to stakeholders.

[5] Xcel's first HCA report was filed in Docket No. E002/M-17-777 and the second in Docket No. E002/M-18-684. The 2019 Report is the third HCA report.

i) Order Points #2A and #2C

Order Point #2A, as mentioned above, requires Xcel to work with stakeholders to improve the value of the hosting capacity analysis (HCA), including the provision of more detailed information in its public-facing hosting capacity map. Order Point #2C requires Xcel to provide specific data in its public-facing hosting capacity map, and to discuss the information that it withholds from its map on the basis of privacy concerns.

Pages 13 through 17 of the Compliance Filing details Xcel's stakeholder engagement performed in the development of the 2019 Report. Xcel indicated that it hosted a HCA workshop on September 6, 2019 (Workshop) and created a survey soliciting feedback from its Solar*Rewards and Solar*Rewards Community program lists, and to members of the Minnesota Solar Energy Industries Association (MnSEIA). Xcel also indicated that these two subsets of the broader public and stakeholder community are a "small portion" of the total.

The Department believes that these are reasonable starting points for stakeholder engagement, but by virtue of Xcel's own admission, concludes that this level of engagement is insufficient on an ongoing basis and for the next iteration of the HCA.

The Department requests that Xcel provide in reply comments a preliminary plan to identify and engage additional stakeholders for involvement in the Company's next iteration of the HCA. (Request 1)

The Department will also review the comments of other stakeholders in this proceeding and may recommend specific actions for Xcel to take based on the input and feedback of these stakeholders.

Xcel indicated that the feedback it received from the Workshop and the survey results yielded information related to what data and information is useful for the Company to provide in its public-facing hosting capacity map, available by the Company on its website.[6] Xcel stated that Workshop participants identified the following additional information as "urgent," presumably referring to information that stakeholders need in making determinations on where to site DERs:[7]

- Substation name, location, and transformer capacity;
- Feeder name, voltage, and location;
- Line characteristics (phase, overhead/underground);
- Queued distributed generation (DER) capacity;
- Daytime minimum load; and
- Voltage regulation.

[6] https://www.xcelenergy.com/working_with_us/how_to_interconnect/hosting_capacity_map.
[7] 2019 Report, Compliance Filing, at 14.

Xcel indicated that, based on this feedback, additional data was included in the public-facing hosting capacity map and tabular spreadsheet, and that stakeholders viewed the main benefit of this data as reducing the time and resources required to review sites and avoid unsuitable locations resulting from capacity constraints or high distribution system upgrade costs.

Figure 2 on page 16 of Xcel's Compliance Filing indicates a rank of the five most important functionality changes for the HCA. The Company indicated that its Figure 2 was based on responses to the survey disseminated by Xcel. Table 1 below is based on Xcel's Figure 2. The functionality changes are listed in descending order of their rank score.

Table 1. Rank Score of Functionality Changes to HCA Requested by Stakeholders

Functionality Change	Rank Score
Combine Pre-Application and HCA	94
Monthly Updates	87
Notes Fields for Heat Map	80
Defined Lines by Color in Heat Map	57
On Screen Pop-up Data	39
Nodal Data on Heat Map	26
Other (Please Specify)*	26
Quarterly Updates	25
Application Interface Access (API)	23

*Xcel did not provide the results of the survey indicating the specific requests made by stakeholders under this category.

It appears that only one of the functionalities identified through the survey responses led to a material change to the 2019 Report: Xcel stated that they have added an on-screen pop-up functionality in the public-facing hosting capacity map, which displays additional data.

The initial stakeholder process Xcel conducted between the issuance of the 2019 Order (August 15, 2019) and the due date of the 2019 Report (November 1, 2019) was commendable, given the abridged timeframe and the work flow of the HCA, which is typically conducted over the summer months and appears to have been finalized in August 2019.[8] While this was a good faith effort to comply with the Commission's Order and attempt to implement some of the feedback after the HCA itself was completed, the Department concludes that stakeholder processes and outreach should occur before or during the inception of the HCA such that the HCA itself is conducted in a manner that is responsive to stakeholder feedback. Allowing for well-timed stakeholder feedback is fundamentally reasonable and necessary in order to carry out the public-facing intent of Minn. Stat. §216B.2425, subd. 8 and the Commission's Orders.

[8] 2019 Report, Compliance Filing, at 6. Xcel indicated that results of the HCA are current as of August 2019.

While the bar for the 2019 Report is reasonably lower given the abridged timeframe, the Department expects Xcel to engage additional stakeholders during the inception of the next iteration of the HCA, and importantly, expects that the next HCA will be responsive to the stakeholder processes. Further, the Department expects Xcel to provide responses to the functionality changes suggested by participants in response to the survey it conducted for the 2019 Report.

For the purposes of determining compliance with the 2019 Order, however, it appears that the stakeholder processes that Xcel engaged in for the 2019 Report were reasonable, given the time constraints. Therefore, the Department concludes that Xcel complied with Order Points #2A and #2C.

ii) Order Point #6

Order Point #6, also mentioned above, requires Xcel to collaborate with stakeholders in evaluating the cost and benefits associated with an HCA that is able to achieve three objectives: (1) remaining an early indicator of possible locations for interconnection; (2) replacing or augmenting initial review screens; and (3) automating interconnection studies.

Xcel discusses this Order Point in length on pages 46 through 50 of Attachment A. This section is oriented around the most common request expressed by stakeholders: the integration of the pre-application data report process with the HCA. In this section, and in particular Table 9 on pages 48 and 49 of Attachment A, Xcel details the information that needs to be compiled in the formation of a pre-application data report, the source of the data, whether there are privacy or security concerns, the relative level of administrative difficulty of obtaining the information, and how frequently the data is updated.

Xcel indicated that a number of technical changes would need to be implemented in order to integrate the pre-application data report process with the HCA, ultimately concluding that such efforts would require significant funding and time. Xcel's discussion in this section concludes with the supposition that if the pre-application report and the HCA were integrated, the Company would likely have to institute "a fee or subscription service for access in order to cover the cost [of integrating the two processes]" and the HCA would likely no longer be freely accessible to the public.[9]

The Department notes that, while this information and discussion is helpful as a preliminary matter, providing a specific plan to integrate the pre-application data report and the HCA with an accompanying cost estimate and implementation timeline is necessary in order for stakeholders and the Commission to weigh the merits of such an endeavor, as the 2019 Order specifically contemplates the evaluation of "costs and benefits" of an HCA capable of replacing or augmenting initial review screens and/or supplemental review in the interconnection process.[10] Therefore, the Department concludes that the level of discussion pertaining to integrating the pre-application data report and the HCA that was provided in the 2019 Report is inadequate and insufficient.

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[9] 2019 Report, Attachment A, at 50 of 57.
[10] 2019 Order, Order Point #6B, at 15.

Further, the Department is concerned with any preclusion of free and public access to the HCA, as the Department agrees with Xcel that the "hosting capacity map was originally intended to be a free tool, open to the public with an easy access."[11] It is reasonable to expect that the Company will incur additional expenses to develop the HCA into a more meaningful tool for stakeholders, but the current record lacks the specific plan and cost information that is needed in order to determine whether such an integration would result in the HCA being no longer freely and publicly accessible.

The Department requests that Xcel develop a specific plan, including a specific cost estimate and timeline for implementation, to integrate the pre-application data report and the HCA and provide the plan in its reply comments. The plan should identify any pathways that would enable Xcel to maintain free and public access to the HCA. (Request 2)

Until this additional information is provided, the Department is unable to conclude that Xcel complied with Order Point #6.

iii) Order Point #8C

The Commission directed Xcel to "continue to consider and address relevant requests from parties" in Order Point #8C.[12] Xcel appears to have considered and addressed feedback from stakeholders that participated in its Workshop and survey. Further, at the time of drafting these initial comments, Xcel is in the process of developing a formal response to information requests (IRs) from a stakeholder planning to file comments in this proceeding. The Department concludes that Xcel is making several good faith efforts to work with stakeholders to consider and address relevant requests from parties.

Accordingly, the Department concludes that Xcel complied with Order Point #8C.

b) Substantive Requirements

The Department views Order Points #2B, #2C, #2D, #3A-B, #4, #5A-B, #7A-C, #8A #8B, and #8D as the substantive requirements of the 2019 Order. These Order points refer to requirements for the content of the 2019 Report.

i) Order Point #2B

Order Point #2B, as mentioned above, requires Xcel to provide hosting capacity data by substation and feeder in a spreadsheet format. Attachment B of the filing contains such information, and the Department notes that the Company also filed an Excel spreadsheet containing all the required information in eDockets in this proceeding, with the exception of "peak load" information.

[11] 2019 Report, Attachment A, at 50 of 57.
[12] 2019 Order, Order Point #8C, at 16.

Xcel explained that the spreadsheet does not publicly provide the peak substation transformer load or peak feeder load data, and excluded it from the public-facing hosting capacity map, because the Company deemed it unnecessary to provide based on stakeholder feedback from the Workshop and the survey results.[13] Xcel stated that "publicly publishing peak load or maximum capacity information for our system components would allow bad actors to target an attack for maximum impact and disruption."[14] The Department agrees that the security risks of providing this data publicly outweigh the public interest in making this data publicly available.

The Department concludes that Xcel complied with Order Point #2B.

ii) Order Point #2C

While Order Point #2C was discussed in section a) Structural Requirements, a portion of Order Point #2C requires substantive information to be provided regarding the public disclosure of certain information that could be a security or privacy risk to Xcel's system or its customers. Order Point #2C directs Xcel to provide the Commission with a full description and specific basis for withholding such information. As a high-level overview, Xcel's process determining which data to exclude from the public-facing hosting capacity map led to the exclusion of 115 feeders out of a total of 1,050 feeders, or about 11% of Xcel's distribution system feeders.[15] The Department notes that these 115 feeders are included in the tabular spreadsheet filed with the 2019 Report without being identified as those that were excluded from the public-facing hosting capacity map (which would defeat the purpose of their exclusion).[16]

Xcel provided a detailed discussion of this Order point and security and privacy concerns on pages 17 through 22 of the Compliance Filing. Xcel articulated several security and privacy concerns related to the provision of certain data for certain feeders on the public-facing hosting capacity map, and explained that publication of such data is a novel issue that the industry is just starting to examine. Specifically, Xcel stated that "existing regulatory, legal, and industry frameworks provide little specific guidance with respect to data security protections and customer privacy and confidentiality considerations as it relates to distribution grid data."[17]

As such, Xcel relied upon other state- and federal-level guidelines regarding customer privacy and grid security issues to create a set of criteria for excluding sensitive data from being displayed on the public-facing hosting capacity map. Specifically, Xcel relied on its 15/15 data aggregation standard to

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[13] 2019 Report, Compliance Filing, at 18.
[14] 2019 Report, Compliance Filing, at 18.
[15] 2019 Report, Compliance Filing, at 22.
[16] The Department notes that there exists a concern that the 115 feeders that were excluded from the public-facing hosting capacity map can be specifically identified in the spreadsheet: while it would be an arduous task, a bad actor could cross-reference the feeders displayed on the public-facing hosting capacity map with the feeders listed in the spreadsheet, and through the process of elimination, the 115 excluded feeders could be identified along with the substations to which the feeders are connected.
[17] 2019 Report, Compliance Filing, at 20.

preserve the anonymity of customer usage information and to protect distribution grid data associated with Critical Infrastructure Sectors that have been identified by the U.S. Department of Homeland Security (DHS). As applied to distribution grid data, application of the 15/15 data aggregation standard excludes feeders that serve less than 15 premises and feeders where the load of one customer is 15 percent or more of the feeder's load.[18] Xcel explained that the 15/15 standard marks customer data as Trade Secret information pursuant to Minn. Stat. §13.37, subd. 1(b).

Additionally, Xcel indicated that it relied upon the Commission's decisions on customer Personally Identifiable Information (PII) and Customer Energy Usage Data (CEUD) from Docket No. E,G999/CI-12-1344.[19] In consideration of these standards and guidance, Xcel developed the following categories to identify customers and their associated feeder(s) and excluded the associated data from the public-facing hosting capacity map:[20]

- Critical Energy Infrastructure (similar to DHS Energy sector) on distribution feeder;
- Critical Hospital - Level 1 or 2 Trauma Center (similar to DHS Healthcare and Public Health sector) on distribution feeder;
- Critical Data Center (similar to DHS Communications and Information Technology sectors) on distribution feeder; and
- Critical Public Gathering Center (similar to DHS Commercial Facilities sector) on distribution feeder.

In review of Xcel's detailed explanation, the Department concludes that Xcel provided the Commission with a full description and specific basis for withholding information, including Trade Secret claims. Therefore, the Department concludes that Xcel complied with Order Point #2C.

iii) Order Point #2D

Order Point #2D requires Xcel to track and update actual feeder daytime minimum load (DML), and include those values in the 2019 Report. Xcel discussed this Order point on pages 16 and 17 of Attachment A (13 and 14 of the 2019 Report).

Xcel indicated that, in its DRIVE analysis, actual DML data was used for only 25% of feeders since those are the feeders that have a significant amount of existing interconnected DERs.[21] Xcel explained that during the rest of the HCA process, it was able to establish actual DML values for all feeders, and that 100 percent of feeders in the public-facing hosting capacity map and spreadsheet have actual DML data.

[18] 2019 Report, Compliance Filing, at 18.
[19] 2019 Report, Compliance Filing, at 20-21.
[20] 2019 Report, Compliance Filing, at 21.
[21] 2019 Report, Attachment A, at 16-17 of 57.

Therefore, the Department concludes that Xcel complied with Order Point #2D.

iv) Order Points #3A and #3B

Order Points #3A and #3B require Xcel to more deeply analyze the 95 feeders identified in the 2018 Report[22] that were reported to have zero hosting capacity.[23] As explained above, Order Points #3A and #3B require Xcel to indicate the available options for increasing the hosting capacity of those 95 feeders, and provide the following information:

- the frequency at which constraints occur;
- the full range of mitigation options for an individual feeder including a range of potential costs for each option and a range of total costs;
- the amount of additional hosting capacity that could be obtained on a technical and economic basis; and
- cost-effective mitigation options that might improve the economic viability of DERs, and the size of the financial benefit that the mitigation options may offer.

Xcel detailed its analysis related to Order Points #3A and #3B on pages 34 – 43 of Attachment A. Xcel noted that it was the first utility to use a new mitigation assessment tool developed by the Electric Power Research Institute, Inc. (EPRI). The Company's use of this tool allowed them to obtain additional information on the number and type of violations on the feeders that were identified as having zero hosting capacity, and it found that many of the feeders had multiple violations, including: overvoltage (87 feeders), unintentional island (82 feeders), reverse power flow (81 feeders), breaker fault current (73 feeders), and feeder fault current (67 feeders).[24]

Xcel provided a list of mitigation options for some of the violations that occurred and their cost, summarized in Table 2 below.[25]

[22] 2018 Report, Docket No. E002/M-18-684, dated November 1, 2018.
[23] Fresh Energy Initial Comments in Docket E002/M-18-684, dated February 28, 2019, at 5.
[24] 2019 Report, Attachment A, at 35 of 57. Xcel also noted that one of the 95 feeders was incorrectly assigned excess generation and removed from the mitigation analysis.
[25] 2019 Report, Attachment A, at 36 of 57.

Table 2. Mitigation Options for Overvoltage and Thermal Violations

Mitigation Option	Cost
Adjusting the Fixed Power Factor of Existing Generation	No Cost
Adjusting the Fixed Power Factor of Future Generation	No Cost
Using Smarter Inverters with Volt-Var Function on Future Generation	No Cost
Using Smart Inverters with Volt-Watt Function on Future Generation	$10 / kW curtailed
Adjusting the Settings of Existing Regulators	$5,000
Adding a New Regulator	$75,000
Reconductoring	$250,000 / mi

Xcel also provided a list of mitigation options for secondary violations, as most of the 94 feeders identified has other secondary violations that had to be addressed. Table 3 below provides a list of these mitigation options and their cost.

Table 3. Mitigation Options for Secondary Violations

Mitigation Option	Cost
Updated Protection Settings	$7,500
New Recloser Mid-Feeder	$50,000
Voltage Supervisory Reclosing at the Feeder Breaker	$120,000

Xcel stressed that the costs associated with these options are general estimates and would need further analysis and study for more precise estimates, such as those performed through an interconnection engineering study or estimates developed in detailed design of the interconnection process.

Xcel stated that it "focused on mitigations that would improve the hosting capacity by at least 1 MW at the midpoint," explaining that this "generally means that the hosting capacity between the midpoint and the substation is going to be greater than 1 MW and the hosting capacity between the midpoint and the end of the feeder will be below 1 MW."[26]

Further, Xcel stated that their mitigation analysis tried to determine the best solution for each feeder, and did not "try to convey this data for each feeder individually, as the volume was too large to interpret in a meaningful way."[27] The Department is concerned that Xcel characterized its efforts as trying to determine the "best" solution, but then conditioned the effort by saying the volume of data in analyzing mitigation options presented a barrier to identifying the solutions the Commission required

[26] 2019 Report, Attachment A, at 37 of 57.
[27] 2019 Report, Attachment A, at 37 of 57.

Xcel to provide. Order Point #3B (2) specifically requires Xcel to provide "a full range of mitigation options for an individual feeder."

Xcel's mitigation analysis relied on several criteria that seemed to focus on the "best" solution to mitigate a feeder's constraint and increase hosting capacity. This also seems to be in conflict with Order Point #3B (2), which requires a "full" range of mitigation options—not the "best." The Department interprets the Commission's Order to require Xcel to provide information on each potential mitigation option, the potential cost for each mitigation option at each feeder, and a range of total costs for each of the mitigation options in the aggregate. Limiting the mitigation analysis to the "best" solution appears to be a subset of the data that the Commission's Order requires Xcel to provide. Xcel attaches qualification and condition to this Order Point in a way that may contravene the intent of the Order Point, in that the Commission's Order does not direct Xcel to focus only on the "best" solutions available, nor does it relieve Xcel of the obligation to provide the required information for any reason, let alone if some unspecified volume of data was reached.

However, the Department expects Xcel's qualification and condition may have a reasonable basis, or it may be that had the Commission been aware of the time, effort and cost of full compliance with the Order Point, the Order Point would have been worded differently. The Department, however, cannot make a determination of the merit of Xcel's analysis without additional information. **The Department requests Xcel to explain why it did not determine all of the solutions for increasing the hosting capacity for each individual feeder, as required by the Commission in Order Point #3B. (Request 3)**

Xcel later described that after applying the criteria to determine the "best" solution for each feeder to all 94 feeders, 17 feeders still required extensive additional mitigation options. Further, for those 17 feeders, their violations could not be solved with the mitigation options that were available on an individual basis. Therefore those feeders were removed from further analysis.[28] Again, the Commission's Order does not relieve Xcel of the requirement to provide information related to the mitigation options for any of the identified feeders.

The Department requests Xcel to provide (1) information on each potential mitigation option available to the feeders identified by the Commission as having zero hosting capacity, (2) the potential cost for each mitigation option for each feeder, and (3) a range of the total aggregate cost of the mitigation options. If Xcel is unable to provide this information, the Department requests Xcel to provide an explanation that establishes a reasonable basis for Xcel's inability to do so. (Request 4)

While it appears that Xcel does have a semblance of a reasonable basis, without additional information and clarity, the Department cannot make a determination as to whether Xcel complied with Order Points #3A and #3B.

[28] 2019 Report, Attachment A, at 38 of 57.

v) Order Point #4

Order Point #4 requires Xcel to provide at least one example, using the DRIVE tool to the extent practicable, exploring a feeder's hosting capacity with different locations and levels of generation and load. Xcel provided such an example on pages 43 through 45 of Attachment A.

Xcel conducted a case study on Watertown substation feeder WTN062 "due to its primarily rural construction with small areas of town/urban loading, which is typical for feeders that experience interconnection requests for a large number of community solar gardens and some rooftop solar installations."[29]

Xcel created 20 different scenarios for this study, analyzing under various load levels (20% low load, 50% load, peak load, and 150% load) and generation levels (0.5 MW and 0.25 MW) at different locations on the feeder.[30] Using a Synergi model to populate the loading information, Xcel used the DRIVE tool to obtain hosting capacity results. Xcel concluded its analysis with the general finding that "in all loading cases except the 20%, DER was able to be interconnected without consuming capacity for the entire feeder" and that "the results show that more hosting capacity is realizable if DER is connected closer to the substation and as more load is added."[31]

The Department concludes that Xcel complied with Order Point #4.

vi) Order Points #5A and #5B

Order Points #5A and #5B require Xcel to provide a complete analysis of the DRIVE tool, including a report on its capabilities and its ability to incorporate a broader definition of DERs, how it can be used to assist state energy policy goals related to beneficial electrification, and what other methodologies exist and are in use in other jurisdictions to conduct interconnection studies.

Xcel offered a summary of the changes that EPRI made to the DRIVE tool between the time the 2018 Report was published and the time the 2019 Report was completed. Xcel indicated that they utilized some, but not all, of the new DRIVE enhancements.[32] Additionally, Xcel provided a list of further changes to the DRIVE tool that EPRI announced that will be available for the 2020 HCA.[33]

Xcel also offered an explanation of how DERs were incorporated into the 2019 Report. Xcel indicated that while the DRIVE tool has the capability to analyze the load characteristics of newer forms of DER, including battery storage and electric vehicles, Xcel indicated that its modeling "considered only DER that acts as a generation source to the distribution system" because it believes that "the penetration of

[29] 2019 Report, Attachment A, at 43 of 57.
[30] 2019 Report, Attachment A, at 43 of 57.
[31] 2019 Report, Attachment A, at 45 of 57.
[32] 2019 Report, Attachment A, at 6 of 57.
[33] 2019 Report, Attachment A, at 6-7 of 57.

energy storage on our distribution system (approximately 35 projects) has yet [to reach] a level where the benefits of such additional analysis would justify the required resources."[34]

Last, Xcel briefly explained that "load hosting capacity results could be used to identify areas with greater potential for siting EV charging stations or other loads associated with beneficial electrification," but stated that this type of analysis is part of traditional distribution planning and referred to its 2020-2029 Integrated Distribution Plan,[35] which the Department notes was filed in Docket No. E002/M-19-666 on November 1, 2019. While the Department agrees with Xcel that traditional distribution planning should incorporate and anticipate the impacts of, and potential for, beneficial electrification, it appears the Commission was contemplating the potential for HCAs to inform broader policy discussions and decisions. Therefore, the Department defers to the Commission's assessment of whether Xcel's very brief and limited explanation of how the DRIVE tool can assist state energy policy goals related to beneficial electrification is sufficient to fulfill the intent of Commission's Order Point #5A.

Order Point #5B states:

> 5. Xcel shall provide a complete analysis of the DRIVE tool, including the following:
> …
> B. A comparison of other methodologies and interconnection study results on a selection of representative feeders, including a discussion of the tools and analyses used by other utilities in other jurisdictions—in particular, Pepco Holdings and other Exelon Corporation utilities.

The Department interprets Order Point #5B to require Xcel to analyze representative feeders using other methodologies and interconnection study tools, including the tools and analyses used by other utilities in other jurisdictions, and to compare those results to the results of the DRIVE tool used in Xcel's HCA.

In response to Order Point #5B, Xcel provided a brief discussion of four main methods to analyze hosting capacity, summarized in Table 1 on page 8 of Attachment A of the 2019 Report, and included excerpts of an EPRI Technical Report on Hosting Capacity as Appendix A of Attachment A of the 2019 Report. The discussion provided on pages 8 and 9 of Attachment A of the 2019 Report combined with Appendix A provide information on other methodologies to conduct HCA, as well as an overview of the tools and analyses that are used by other utilities in other jurisdictions, including Pepco Holdings and other Exelon Corporation utilities.

[34] 2019 Report, Attachment A, at 7-8 of 57.
[35] 2019 Report, Attachment A, at 8 of 57.

In the comparison of the accuracy of different hosting capacity methods, Xcel summarized a study conducted by San Diego Gas and Electric (SDG&E) that compared the hybrid method employed by the DRIVE tool with the Iterative Integrated Capacity Analysis (ICA) method used by SDG&E.[36] This study found that different hosting capacity methods can provide similar results and similar hosting capacity results can be derived more efficiently. Further, Xcel stated that the findings demonstrate that the DRIVE hybrid method produces comparable results to the ICA method, which is one of the early leading industry approaches to HCA and is significantly more labor intensive.[37] The Department concludes that the element of Order Point #5B that requires Xcel to include a discussion of the tools and analyses used by other utilities in other jurisdictions is satisfied.

However, the Department is concerned with the limited analysis of the other element of Order Point #5B that requires Xcel to compare other methodologies and interconnection study results on a selection of representative feeders. In its attempt to comply with Order Point #5B, Xcel compared DRIVE results from the 2018 HCA to Synergi results, and to past interconnection studies, for 15 selected feeders. Xcel indicated that "due to time constraints we were unable to use the 2019 HCA results for these evaluations.[38]

The Department interprets Order Point #5B to require Xcel to analyze representative feeders using other methodologies and interconnection study tools, including the tools and analyses used by other utilities in other jurisdictions, and to compare those results to the results of the DRIVE tool used in Xcel's HCA. Xcel's analysis included two aspects: (1) a comparison of the DRIVE tool to Synergi; and (2) a comparison of the DRIVE tool to interconnection study results. Based on the limited rationale provided by Xcel in the 2019 Report, it is not immediately clear that Synergi is capable of performing hosting capacity analysis. However, the Department reviewed Xcel's response to IREC IR No. 7, which, combined with the information presented in the 2019 Report, leads to the understanding that Synergi is capable of performing hosting capacity analysis.

The Department concludes that Xcel complied with Order Point #5B. However, the Department believes the record would be well served with more information related to Synergi's capabilities as it relates to performing hosting capacity analysis.

The Department requests that Xcel explain what capabilities Synergi has in conducting a HCA and to discuss the appropriateness of comparing Synergi and the DRIVE tool to satisfy the requirements of Order Point #5B of the 2019 Order. (Request 5)

To comply with the requirement to compare HCA results to interconnection studies, Xcel compared the interconnection studies conducted for community solar gardens to the range of minimum and maximum hosting capacity values produced in DRIVE.[39] Xcel indicated that "seven of the 15 feeders

[36] 2019 Report, Attachment A, at 20 of 57.
[37] 2019 Report, Attachment A, at 21 of 57.
[38] 2019 Report, Attachment A, at 21 of 57.
[39] 2019 Report, Attachment A, at 23 of 57.

analyzed had interconnection study results that were between the minimum and maximum DRIVE hosting capacities or within 100 kW, which [it] consider[s] to be a positive correlation" and that "eight feeders had interconnection study results that fell outside of the minimum and maximum DRIVE hosting capacities."[40] Xcel provided a number of reasons why there were discrepancies between the DRIVE tool and actual interconnection studies and concluded that an HCA is presently only capable of providing a high-level overview of the potential for DER interconnection and cannot be relied upon for more than just a first step of the interconnection process.

The Department concludes that the Company satisfied the element of Order Point #5B that requires Xcel to compare the DRIVE tool to interconnection study results. While the Department seeks clarification as to the methodological appropriateness of comparing the DRIVE tool and Synergi, the Department agrees that, due to timing issues, Xcel was not able to compare the results of the 2019 Report to other methodologies. The Department concludes that Xcel has minimally complied with Order Point #5B.

However, the Department believes that the record would be best served by maintaining this requirement for the next HCA, should the Commission require future studies.

The Department recommends maintaining Order Point #5B for Xcel's next hosting capacity analysis report. (Recommendation 1)

vii) Order Points #7A, #8A, and #8B

Order Points #7A, #8A, and #8B require Xcel to include updates on the appropriateness of the methodological choice of the hosting capacity analysis, a discussion of Xcel's ability to obtain more detailed secondary voltage equipment data, and the types of DERs being interconnected for the 2019 Report and future hosting capacity reports.

First, pertaining to the methodological choice of the HCA, Xcel provided this discussion on pages 11 and 12 of Attachment A and indicated that the choices for the DRIVE tool were Large Centralized, Large Distributed, and Small Distributed methodologies. Xcel asserted that the Large Centralized allocation method was more appropriate than the Small Distributed method because of the amount of large-scale community solar gardens installed as of October 2019 (625 MW) compared to the amount of small-scale DER installations installed as of October 2019 (100 MW). Xcel did not discuss the merits of the Large Distributed methodology.

Second, regarding Xcel's ability to obtain more detailed data on secondary voltage equipment, Xcel provided this discussion on pages 13 and 14 of Attachment A. Xcel indicated that collecting more detailed secondary information would require additional field collection, which would entail validation of the conductors of each common secondary line and each service line, aerial work for validation of overhead conductors, and validation of underground conductors using qualified operators to open and

[40] 2019 Report, Attachment A, at 25 of 57.

locate equipment, all of which could cost hundreds of millions of dollars. Xcel also discussed how its plans to leverage Advanced Metering Infrastructure (AMI) will help gain information on its secondary system by assisting in the collection of transformer loading data, helping Xcel to plan for increases in load or DER, and to identify locations where customers are experiencing high or low voltages.

Last, regarding the types of DERs being interconnected, Xcel provided this information in Table 2 on page 11 of Attachment A, and referred to its March 2019 Distributed Generation Interconnection Report.

The Department concludes that Xcel complied with Order Points #7A, #8A, and #8B.

viii) Order Points #7B and #7C

Order Points #7B and #7C relate to financial information Xcel is required to provide. Order Point #7B requires Xcel to provide information related to the costs of performing the HCA, including the time of Xcel's engineering staff and any efforts Xcel is making to reduce costs over time. Order Point #7C requires Xcel to provide information on the number of pre-application capacity screens conducted in the previous year, the amount collected for each screen, and the total amount collected.

Xcel provided information related to Order Points #7B and #7C on pages 45 and 46 of Attachment A. Additionally, Xcel provided additional information related to the costs incurred to prepare and conduct the 2019 Report in response to IREC IR No. 7. The Department summarizes the financial information in Table 4 below.

Table 4. Hosting Capacity Report Costs

Cost Item	Cost
Engineering Staff Time (2019)	$160,000
Mitigation Analysis of 95 Feeders (2019)	$50,000
DRIVE Tool Software Acquisition (2016)	$62,500
DRIVE Tool User Group Participation (2017 – 2020)	$10,000
Total 2019 HCA Costs	**$282,500**

Xcel also indicated in their response to IREC IR No. 7 that it cost approximately $250,000 to acquire the DRIVE Tool for its analysis, and the reported cost for 2019 is simply $250,000 divided by four, since Xcel acquired the tool in 2016 and Xcel spread the costs over four years. The Department argues that Xcel has not demonstrated that the Company applied reasonable amortization parameters to the DRIVE Tool costs. Such costs, when capitalized by a utility, typically have an amortization period equal to its expected useful life (Xcel typically uses a 3, 5, 7, 10, or 15-year amortization period for capitalized

software assets in general utility accounting[41]). Because Xcel has not provided information that would support a 4-year amortization period for the DRIVE Tool, the cost to perform the 2019 Report may actually be less than what Xcel represented in the instant filing.

Xcel also briefly noted that if it were required to update the HCA more frequently, it estimated that each round of updates would cost slightly less than the $300,000 estimate. Xcel would not have to file a separate report, but would still need to rebuild feeder models and update system data for each update.

Additionally, in response to Interstate Renewable Energy Council's (IREC) IR No. 13, Xcel indicated that it is attempting to reduce costs by "selectively updating models only of feeders that have experienced significant changes over the previous year" and it is "planning to implement DRIVE's new Feeder Summary Report feature to expedite internal processes."[42]

The Department concludes that Xcel complied with Order Point #7B.

Xcel indicated that it received 288 pre-application requests related to Section 9 Community Solar Garden tariff applications at a cost of $250 each, which amounted to approximately $72,000 in total in 2018.

The Department concludes that Xcel complied with Order Point #7C.

ix) Order Point #8D

Order Point #8D requires Xcel to continue to consider and address the requirements from the 2017 Order, the 2018 Order, and the current Order.

The Department reviewed the 2019 Report to determine compliance with the 2017 and 2018 Orders. For any Order points that appear substantially related, the Department interprets the more recent Commission Order to be superseding.

The relevant portions of the 2017 Order state:[43]

1. The Commission will require that the 2017 Hosting Capacity Report 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

[41] Additional information related to Xcel's amortization periods for capitalized software assets can be found in the Company's recent transmission, distribution, and general accounts depreciation proceeding in Docket No. E,G002/D-19-490
[42] Xcel Response to IREC IR No. 13, dated December 17, 2019.
[43] Order Setting Additional Requirements for Xcel's 2017 Hosting Capacity Report, Docket No. E002/M-15-962, dated August 1, 2017.

sufficient to provide developers with a starting point for interconnection applications.

2. The Commission will require that the 2017 Hosting Capacity Report be detailed enough to inform future distribution system planning efforts and upgrades necessary to facilitate the continued efficient integration of distributed generation.

3. Xcel shall provide a color-coded, map-based representation of the available Hosting Capacity down to the feeder level. This information should be provided to the extent it is consistent with what Xcel believes are legitimate security concerns. If security concerns arise, Xcel shall explain in detail the basis for those concerns.

4. Xcel shall provide the Hosting Capacity results in downloadable, MS-Excel or other spreadsheet file formats.

5. Xcel shall provide (at a minimum) in its next Hosting Capacity Report the information requested by Commission staff and parties in response to the 2016 Report (through comments or information requests) regarding data used in the modeling, including model assumptions and methodology, reasons for the model assumptions and methodological choices, additional detail on the model used and its inherent assumptions.

6. Xcel shall provide information on the accuracy of the Hosting Capacity Report information; both estimates on the accuracy of the 2017 report and an analysis of the 2016 results compared to actual hosting capacity determined through any interconnection studies or other reasonable metric.

The relevant portions of the 2018 Order state:[44]

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.

[44] Order Accepting Study and Setting Further Requirements, Docket No. E002/M-17-777, dated July 19, 2018.

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.

4. Xcel must file a color-coded, map-based representation of the available Hosting Capacity down to the feeder level. This information should be provided to the extent it is consistent with what Xcel believes are legitimate security concerns. If security concerns arise, Xcel must explain in detail the basis for those concerns.

5. Xcel must provide the Hosting Capacity results in downloadable, MS-Excel or other spreadsheet file formats.

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.

7. The Commission hereby requests that Xcel Energy address stakeholder recommendations in the Company's 2018 Hosting Capacity Report filing, including:

    a. consider the methodological options to both improve and measure accuracy of the hosting capacity analysis, including identification and analysis of industry best practices and an explanation of the Company's methodological choice;
    b. consider the feasibility and practicality of including the results of both the Small Distributed methodology and the Large Centralized methodology in future hosting capacity analyses;
    c. conduct a sensitivity analysis;
    d. 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;
    e. provide an update in each report on the evolving capability of the EPRI DRIVE tool and whether it is capable of incorporating the technologies included in the broadened definition of DERs;
    f. file more detailed data on load profile assumptions used in the analysis, including peak load (kW) by substation and feeder; and

g. file supplemental information that would result in a broader understanding of how to guide distribution upgrades for additional hosting capacity.

Table 5 below summarizes the Department's analysis of the 2017, 2018, and 2019 Orders. For the Order points listed in the table that are substantially related to one another, the Department considered the Order point from the more recent Commission Order as superseding. The table displays the Order Points from each Order that are related, and displays the operational Order points in ***bold and italic*** font.

Table 5. Analysis of 2017, 2018, and 2019 Commission Orders

2017 Order	2018 Order	2019 Order
1	***2***	
2	3	***6***
3	4	***2C***
4	5	***2B***
5	7A, 7B, 7D, 7E, 7F	***2A, 2B, 5A, 7A, 8A, 8C***
6	6	***5***
	7C	
	7G	***3***

The Department concludes that the following Order points of the 2017 and 2018 Orders are operational on Xcel's 2019 Report:

- Order Point #2 of the 2018 Order
- Order Point #7C of the 2018 Order

a. Order Point #2 of the 2018 Order

As stated above, Order Point #2 of the 2018 Order has the operational effect of requiring Xcel to produce a hosting capacity analysis that is detailed enough to provide developers with a reliable estimate of the hosting capacity per feeder, and sufficient to provide developers with a starting point for interconnection applications.

The 2019 Report contains detailed hosting capacity information for most of Xcel's individual feeders, excluding only those feeders that are sensitive for privacy or security reasons, or feeders not owned by Xcel. This detailed information on a per-feeder basis was also provided in a spreadsheet attached to the 2019 Report.

Based on the stakeholder feedback Xcel included in the 2019 Report, the Department is concerned that the HCA is not sufficient to provide developers with a starting point for interconnection applications. According to stakeholder feedback, the second most requested feature of the HCA is monthly updates. As it stands, Xcel is only performing the HCA once a year. This is an obvious limitation to the utility of the HCA.

The Department requests that Xcel develop a proposal to provide monthly, quarterly, and semi-annual updates to the HCA in reply comments, including the costs associated with each frequency, and whether and how any additional costs can be imposed on those who obtain a benefit from more frequent updates. (Request 6)

b. Order Point #7C of the 2018 Order

As stated above, Order Point #7C of the 2018 Order has the operational effect of requiring Xcel to conduct a sensitivity analysis of the 2019 Report. For the 2018 Report, Xcel conducted a sensitivity analysis for the bus voltage and DER power factor on multiple feeders, in response to stakeholder feedback from Fresh Energy related to Xcel's 2017 Report.[45]

Xcel did not perform a sensitivity analysis for the 2019 Report. Xcel provided the following explanation:[46]

> The adjustment of these factors primarily affects the overvoltage threshold. Since there has not been changes to the way that threshold is calculated and the results were for knowledge gain, we did not repeat this exercise in the 2019 HCA as the results would have been redundant and would not have yielded any additional conclusions.

The Department notes that it requested Xcel to explain how the theoretical gains of hosting capacity demonstrated by the Company's bus voltage sensitivity analysis translate into actual gains of hosting capacity in our Initial Comments in the 2018 Report.[47] Xcel explained in its Reply Comments that "lowering bus voltage in the field is not an option in most cases due to low voltage constraints" and that the "theoretical gains are limited by the next violating threshold which cannot be improved upon by decreasing the bus voltage."[48] Further, Xcel indicated that there were a number of reasons why lowering bus voltage without deeper grid visibility can lead to negative consequences for customers:[49]

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[45] Fresh Energy Initial Comments in Docket No. E002/M-17-777, dated February 2, 2018, at 6-7.
[46] 2019 Report, Attachment A, at 39 of 57.
[47] Department Initial Comments in Docket No. E002/M-18-684, at 14.
[48] Xcel Reply Comments in Docket No. E002/M-18-684, at 4.
[49] Xcel Reply Comments in Docket No. E002/M-18-684, at 4.

> Lowering the bus voltage without deeper grid visibility has the potential to lead to poor service quality for customers in the form of low voltage. Low voltage can cause customer equipment to malfunction or experience excessive current draw. Lowering existing bus voltages can also limit our operational flexibility. It inhibits our ability to transfer loads between feeders during maintenance or contingency situations. Lowering the bus voltage by itself is not a reliable solution.

Regarding the power factor sensitivity analysis, Xcel stated in the 2018 Report that "assuming a more leading power factor for all new potential installations in our HCA would definitely show more hosting capacity across our system" but that the HCA would consequently be less accurate.[50]

The Department agrees with Xcel's conclusion that performing a sensitivity analysis on these two variables would have been redundant and would not have yielded any additional conclusions, and further, that translating the theoretical gains in hosting capacity demonstrated by the Company's bus voltage sensitivity analysis in the 2018 Report into actual gains of hosting capacity would likely result in several negative unintended outcomes for customers, and as a result, is not a suitable variable to perform sensitivity analysis on at this time.

However, the Department is interested in exploring whether it is useful to perform sensitivity analysis for other variables in Xcel's HCA in a meaningful way that has the potential to increase hosting capacity. **The Department requests that Xcel discuss whether it is valuable to perform sensitivity analysis on any other variables in Xcel's HCA. (Request 7)**

B. IMPROVING THE USEFULNESS FOR CUSTOMERS AND DEVELOPERS

The second topic of the Commission's Notice asks whether the 2019 Report and updates to the Company's online map improve the usefulness for customers and developers and whether modifications or clarifications are needed.

The Department observes that the Xcel's response to its stakeholder engagement efforts did indeed result in improvements to the public-facing hosting capacity map. The pop-up boxes in the public-facing hosting capacity map were the result of feedback from stakeholders and reflects the information most often requested by stakeholders. However, this appears to be the only modification that Xcel made to the public-facing hosting capacity map.

The Department requests that Xcel respond to each of the stakeholder suggestions and requests listed in Figure 2 of the Compliance Filing and the responses to Xcel's survey by developers and other stakeholders, explaining the feasibility of each of the items related to improving the public-hosting capacity map. (Request 8)

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[50] 2018 Report, at 24.

C. OTHER ISSUES OR CONCERNS

The third topic of the Commission's Notice asks whether there are other issues or concerns related to this matter.

The Department does not have any other issues or concerns related to this matter at this time.

III. DEPARTMENT RECOMMENDATIONS

The Department appreciates the opportunity to comment on Xcel's 2019 Hosting Capacity Analysis Report. The Department requests the following additional information from Xcel:

1. **The Department requests that Xcel provide in reply comments a preliminary plan to identify and engage additional stakeholders for involvement in the Company's next iteration of the HCA.**

2. **The Department requests that Xcel develop a specific plan, including a specific cost estimate and timeline for implementation, to integrate the pre-application data report and the HCA and provide the plan in its reply comments. The plan should identify any pathways that would enable Xcel to maintain free and public access to the HCA.**

3. **The Department requests Xcel to explain why it did not determine all of the solutions for increasing the hosting capacity for each individual feeder, as required by the Commission in Order Point #3B.**

4. **The Department requests Xcel to provide (1) information on each potential mitigation option available to the feeders identified by the Commission as having zero hosting capacity, (2) the potential cost for each mitigation option for each feeder, and (3) a range of the total aggregate cost of the mitigation options. If Xcel is unable to provide this information, the Department requests Xcel to provide an explanation that establishes a reasonable basis for Xcel's inability to do so.**

5. **The Department requests that Xcel explain what capabilities Synergi has in conducting a HCA and to discuss the appropriateness of comparing Synergi and the DRIVE tool to satisfy the requirements of Order Point #5B of the 2019 Order.**

6. **The Department requests that Xcel develop a proposal to provide monthly, quarterly, and semi-annual updates to the HCA in reply comments, including the costs associated with each frequency, and whether and how any additional costs can be imposed on those who obtain a benefit from more frequent updates.**

7. **The Department requests that Xcel discuss whether it is valuable to perform sensitivity analysis on any other variables in Xcel's HCA.**

8. **The Department requests that Xcel respond to each of the stakeholder suggestions and requests listed in Figure 2 of the Compliance Filing and the responses to Xcel's survey by developers and other stakeholders, explaining the feasibility of each of the items related to improving the public-hosting capacity map.**

The Department makes the following recommendations:

The Department recommends that the Commission require Xcel to provide a complete analysis of the DRIVE tool, including a comparison of other methodologies and interconnection study results on a selection of representative feeders, including a discussion of the tools and analyses used by other utilities in other jurisdictions—in particular, Pepco Holdings and other Exelon Corporation utilities.

The Department will provide its final recommendation in reply comments once the Company responds to the Department's requests for additional information and evaluates the comments of other stakeholders.

/ja

CERTIFICATE OF SERVICE

I, Linda Chavez, hereby certify that I have this day served copies of the following document on the attached list of persons by electronic filing, e-mail, or by depositing a true and correct copy thereof properly enveloped with postage paid in the United States Mail at St. Paul, Minnesota.

MINNESOTA DEPARTMENT OF COMMERCE – COMMENTS

Docket Nos. **E002/M-19-685**

Dated this **30th** day of **December, 2019**.

/s/Linda Chavez

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Generic Notice	Residential Utilities Division	residential.utilities@ag.state.mn.us	Office of the Attorney General-RUD	1400 BRM Tower 445 Minnesota St St. Paul, MN 551012131	Electronic Service	Yes	OFF_SL_19-685_M-19-685
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