BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION

Beverly Jones Heydinger	Chair
Nancy Lange	Commissioner
Dan Lipschultz	Commissioner
Matthew Schuerger	Commissioner
John A. Tuma	Commissioner

In the Matter of the Petition of Northern States Power Company, dba Xcel Energy, for Approval of Its Proposed Community Solar Garden Program

In the Matter of a Formal Complaint and Petition by SunShare, LLC for Relief Under Minn. Stat. § 216B.1641 and Sections 9 and 10 of Xcel Energy's Tariff Book

ISSUE DATE: November 1, 2016

DOCKET NO. E-002/M-13-867

DOCKET NO. E-002/M-15-786

ORDER RESOLVING INDEPENDENT-ENGINEER APPEALS AND ESTABLISHING PROCEDURES FOR FUTURE DISPUTES

PROCEDURAL HISTORY

On August 6, 2015, the Commission issued an order establishing a process for developers in Xcel Energy's solar-garden program to submit interconnection disputes to an independent engineer.[1] The order provided that parties could seek Commission review of an independent engineer's decision by filing an appeal in Docket No. E-002/M-13-867 within five business days of delivery of the engineer's written report.

Between April 7 and August 5, 2016, the Commission received appeals of seven independent-engineer decisions, as well as responses to those appeals.

On April 20, 2016, the Commission issued a notice soliciting comments on certain issues raised by the appeals. On May 20 and June 1, the following parties filed comments and/or reply comments in response to the Commission's notice:

- GreenMark Solar LLC
- Minnesota Department of Commerce (Department)
- Minnesota Solar Energy Industry Association (MnSEIA)
- Novel Energy Solutions
- Sunrise Energy Ventures, LLC
- SunShare, LLC
- Xcel Energy

[1] Docket No. E-002/M-13-867, Order Adopting Partial Settlement as Modified ("August 2015 order").

On September 20, 2016, the Commission met to consider the appeals.

FINDINGS AND CONCLUSIONS

I. Summary of Commission Action

In this order, the Commission resolves the seven appeals before the Commission and establishes new procedures for future interconnection disputes. The Commission will require Xcel to submit, within 30 days of the date of this order, any compliance filings necessary to reflect the Commission's decisions.

II. Background

A. Community Solar Gardens

Under Xcel's community-solar-garden program, its customers may subscribe to solar photovoltaic generating facilities (known as "community solar gardens," or simply "solar gardens") and receive bill credits for a portion of the energy generated by the solar garden.[2]

A solar garden may be owned by Xcel or by a private company that contracts to sell the output to the utility. To date, all solar gardens in Xcel's program have been developed by private companies. These developers must obtain Xcel's approval to connect to its electric system through a process known as "interconnection."

B. Solar-Garden Interconnection

Solar-garden interconnection is governed by two sections of the Xcel's tariff. Section 10 sets forth the process for interconnecting any distributed-generation facility with a capacity of ten megawatts (MW) or less.[3] Section 9 contains Xcel's solar-garden program rules, which modify the Section 10 process in several respects.[4]

The Section 10 process begins with the developer submitting an interconnection application (Step 1). This is followed by a preliminary review in which Xcel determines whether an engineering study needs to be done (Step 2). The purpose of an engineering study is to determine whether modifications to the interconnecting facility or upgrades to Xcel's system will be necessary to maintain safe and reliable service.

If an engineering study is needed, the applicant must decide whether to proceed and pay for the study or exit the interconnection queue (Step 3). If the applicant elects to go forward, Xcel completes the engineering study in a specified timeframe that ranges from 20 to 90 working days depending on the size of the project (Step 4).

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[2] *See* Minn. Stat. § 216B.1641.

[3] *See* Minnesota Electric Rate Book section 10, sheets 73–162.

[4] *See* Minnesota Electric Rate Book section 9, sheets 64–68.16.

Once the study is done, Xcel provides the applicant with an interconnection agreement and an estimate of the costs for Xcel's work, including any system upgrades necessary to accommodate the new facility (Step 5). If the applicant wants to continue with the interconnection, it must make any required up-front payments, sign the interconnection agreement, and provide Xcel with a final, detailed design of the facility (Step 6).

Xcel then does a final design review, and the parties order equipment and complete construction of the facility and any system upgrades (Steps 7–8). After final testing, Xcel gives its written approval for the facility to operate, and the applicant provides Xcel with updated engineering drawings (Steps 9–11).

Section 9 modifies the Section 10 interconnection process in at least two ways that are relevant to the appeals under review. First, it excuses Xcel from making "material" upgrades to its distribution system to accommodate co-located solar-garden projects.[5] Second, Section 9 allows a solar-garden developer to obtain an interconnection agreement on an expedited basis if its project meets certain criteria. These modifications will be discussed in greater detail in the sections that follow.

C. Interconnection Disputes

As required by the Commission's August 2015 order, Section 9 provides a process for solar-garden developers to submit interconnection disputes to an independent engineer selected by the Department. The tariff includes a nonexclusive list of topics that may be submitted to an independent engineer: Xcel's determination that a developer's application is incomplete, the timeliness of application and study processing, and the cost and necessity of required study costs and distribution-system upgrades.[6]

Either the developer or Xcel may appeal an independent engineer's decision to the Commission by making a filing in Docket No. E-002/M-13-867 within five business days of delivery of the engineer's written report.

III. SunShare's Becker, Glazier, Bartlett, and Murphy Sites

A. Introduction

On August 28, 2015, SunShare filed a complaint in Docket No. E-002/M-15-786 alleging that Xcel had violated its Section 9 and 10 tariffs in processing the developer's requests to interconnect solar gardens to Xcel's system.[7]

The Commission referred SunShare's complaint to the Department for review by an independent engineer under the process set forth in Section 9.[8]

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[5] A "co-located" solar-garden project is a group of solar gardens that display characteristics of a single development. Section 9, sheet 68.

[6] Section 9, sheet 68.11.

[7] The original complaint encompassed more than 100 solar gardens located at 15 separate sites. However, only 4 of those sites are involved in these appeals.

[8] Docket No. E-002/M-15-786, Order Finding Jurisdiction and Referring Complaint to Independent Engineer (December 1, 2015).

The Department appointed an engineer to hear the case. The parties submitted written arguments to the engineer, executed nondisclosure agreements, and responded to numerous information requests.

In early 2016, the independent engineer issued reports setting forth his recommended resolution of the parties' disputes for four of SunShare's solar-garden sites. In many cases, SunShare alleged the same tariff violation at multiple sites; the engineer treated these global issues consistently among the affected sites.

Xcel and SunShare both appealed aspects of the engineer's first report, which concerned SunShare's Becker site. Xcel also appealed the reports for the other three sites.

By the time the matter came before the Commission, the parties had significantly reduced the number of live issues. At the Commission hearing, the major points of contention concerned

- Xcel's decision to limit the allowed generation capacity and/or require costly upgrades at two sites due to concerns about system impacts from voltage fluctuation and its refusal to permit SunShare to use advanced-functionality inverters to mitigate these impacts; and
- Variations between Xcel's preliminary, or "indicative," interconnection-cost estimates and updated estimates that it provided at later stages of the interconnection process.

In the following sections, the Commission addresses these topics and related issues raised by the parties' appeals.

B. Voltage Fluctuation

1. Introduction

Voltage fluctuation, also called "flicker," refers to repeated changes in voltage magnitude within a utility's distribution system that may cause customers' lights to visibly flicker or sensitive electronic equipment to malfunction.

Flicker can occur when a generator comes online or goes offline. More relevant to this case, it can also occur if clouds passing over the solar arrays cause large, rapid changes in electricity production.

Xcel's Section 10 tariff requires that a distributed generator must not produce "excessive flicker" to adjacent customers.[9] The tariff specifies that the maximum acceptable amount of flicker is 4% when the load is added to or removed from Xcel's system.[10] But it states that most utilities use a 2% "design criteria."[11]

[9] Section 10, sheet 146.

[10] *Id.*

[11] *Id.*

In its engineering studies of SunShare's solar gardens, Xcel limited the permissible level of flicker to 1.5%.[12] At the Becker site, where SunShare had planned to locate 5 MW of solar gardens, this restriction reduced the allowable capacity to 3.5 MW. At the Glazier site, it created a need for extra infrastructure upgrades to accommodate the planned gardens.

The independent engineer concluded that Xcel's flicker-related interconnection practices were not in compliance with current engineering standards. More specifically, he concluded that the IEEE[13] 1547 standard and related GE Flicker Chart, which Xcel relies on in its modeling, had been superseded by IEEE 1453 and other standards.

The engineer recommended that Xcel use a 2.0% flicker threshold in modeling both the individual and the aggregate impact of the Becker and Glazier gardens. Longer term, he recommended that the Commission provide a deadline for Xcel to come into compliance with the latest IEEE standards and suggested that one year would be a reasonable period.

SunShare also requested that it be allowed to use advanced-functionality inverters (also known as smart inverters) to mitigate potential flicker.[14] Xcel had granted SunShare permission to install smart inverters but not to activate their advanced functions.

Xcel's tariff requires that, prior to installation, an inverter "shall be Type-Certified for interconnection to the electrical power system."[15] "Type-certified" means that the inverter "is listed by an OSHA listed national testing laboratory as having met the applicable type testing requirement of UL 1741."[16]

The independent engineer found that no manufacturer's advanced inverter functions had yet been approved by IEEE or tested and certified by UL. He concluded that Xcel was justified in forbidding the use of smart inverters' voltage-control functions until such time as the relevant IEEE standards and UL 1741 are jointly updated and revised and the functions are tested and certified by UL.

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[12] Xcel's internal distributed-generation-study requirements specified a 1.5% flicker limit for individual systems and a 2% limit for the aggregate solar PV on a distribution feeder. *See* Docket No. E-999/CI-15-755, Response to MPUC Information Requests 1–5, Attachment C.1 "Distributed Generation Engineering Study Requirements," at 2 (February 5, 2016).

[13] Institute of Electrical and Electronics Engineers

[14] An inverter is a component of a solar PV system that converts the direct current (DC) electricity produced by solar panels into grid-compatible alternating current (AC) electricity. An advanced-functionality inverter or smart inverter has voltage-control functions that enable it to fully or partially mitigate flicker.

[15] Section 10, sheet 143.

[16] Section 10, sheet 138. UL, formerly Underwriters Laboratories, develops product-safety standards and tests products for compliance with those standards.

2. Positions of the Parties

a. Xcel

Xcel disagreed with the engineer's conclusion that the voltage-fluctuation standards on which it relies have been superseded by IEEE 1453. According to Xcel, IEEE 1453 merely offers an alternative approach to measuring and evaluating voltage fluctuation that relies on data-driven modeling to account for the particular attributes of the site in question. But Xcel stated that it was not opposed to further studying IEEE 1453 and refining its voltage-fluctuation study practices over the coming year.

Xcel argued that its specific flicker limits, while conservative, are reasonable and in line with industry practice. The Company nevertheless acknowledged that the independent engineer's recommended limit of 2% individual/aggregate for the Becker and Glazier sites was within a range of reasonable flicker values. And at the September 2016 hearing in this matter, Xcel stated that it currently applies a 2% individual/aggregate flicker limit to new solar-garden applications.[17]

Finally, Xcel agreed with the independent engineer's conclusion that the Company had properly declined to allow SunShare to use advanced inverter functions, arguing that these functions had not been certified under national standards, did not comply with the relevant IEEE standards, and posed unjustified risks to system reliability and safety.

b. SunShare

SunShare asked that Xcel be required to restudy its Becker and Glazier projects using a 2% individual/aggregate flicker threshold, consistent with the independent engineer's recommendation. And it supported the engineer's recommendation that Xcel be given a year to comply with the latest IEEE standards pertaining to flicker.

SunShare appealed the engineer's determination that Xcel properly denied its request to use advanced smart-inverter functions. It argued that permitting the use of advanced inverter functions would allow more megawatts of solar gardens to interconnect, reduce interconnection costs, and increase project certainty.

SunShare stated that, although IEEE has not yet updated its standards for advanced functionality inverters, the State of California has developed its own standard, known as Rule 21, and UL has provided a supplement to UL 1741 (UL 1741 "SA") that allows inverters to be type-certified to the Rule 21 standard. SunShare asked that the Commission require Xcel to make a compliance filing indicating how it will use Rule 21 and UL 1741 SA type-certified smart inverters as a flicker mitigation strategy for solar gardens greater than 1 MW in size.

[17] Xcel apparently changed the limit in or around August 2016; on August 23, it filed with the Commission a "voltage fluctuation settlement offer" offering developers without signed interconnection agreements the option to have their previously studied projects restudied using a 2% limit, subject to certain conditions.

c. Voltage Flicker Task Force

Finally, a group of solar-garden developers filing jointly as the Voltage Flicker Task Force proposed additional modifications to Xcel's flicker modeling assumptions.[18] The modeling assumptions suggested by this taskforce were intended to better approximate the effect of clouds passing over solar gardens, and included

- A maximum change of 70% nameplate capacity in PV plant output due to transient cloud cover (as opposed to the "full-on full-off" assumption used in Xcel's current modeling);
- A minimum of 1.5 seconds ramp time (up and down) due to fast-moving clouds; and
- A maximum of 10 to 25 voltage changes within any 60-minute period.

3. Commission Action

The Commission will require Xcel to use a 2.0% flicker threshold (full-on full-off), for both individual and aggregate PV systems, in its engineering studies for SunShare's projects at the Becker and Glazier sites. This resolution conforms to Xcel's current practice of using a 2% threshold and addresses the specific complaints raised by SunShare. In particular, as Xcel confirmed at hearing, using a 2% flicker threshold will allow the full 5 MW to be interconnected at the Becker site and will reduce the reconductoring required at the Glazier site from 6,400 feet to only 2,400 feet.

More generally, the Commission finds that Xcel's flicker-related interconnection practices comply with IEEE 1547, a current engineering standard. However, IEEE 1453—which is also a current engineering standard—provides a data-driven method for modeling voltage fluctuations from solar PV. This method holds promise for better reflecting real-world conditions, once the necessary input data are available. Accordingly, the Commission will require Xcel to work with other interested parties to develop and file a plan for transition to incorporating the standards of IEEE 1453 into its modeling of voltage fluctuations and flicker for solar PV.

Additionally, the Commission will require Xcel to file a compliance report, within three months of the date the Becker and Glazier projects begin operating, providing an assessment of impacts from voltage fluctuation and flicker, if any, on Xcel's system—and to file a similar assessment annually for the solar-garden program as a whole. This will allow the Commission and other stakeholders to assess the extent of voltage fluctuations from solar gardens and how they are affecting Xcel's system.

Finally, the Commission agrees with the independent engineer that SunShare should not be permitted to activate noncertified functions of advanced-functionality inverters to perform flicker mitigation without Xcel's explicit permission until such time as the inverter functions have been tested and certified under UL standards, or until further order of the Commission. Xcel's tariff requires that inverters be type-certified using UL 1741. UL 1741 is specifically intended to be used with IEEE 1547, which does not yet include standards for advanced smart inverter functions.

[18] The members of the taskforce who joined in this recommendation were GreenMark Solar, Novel Energy Solutions, Innovative Power Systems, Sunrise Energy Ventures, Minnesota Solar Connection, Ameresco, and SunShare.

C. Indicative Cost Estimates

1. Introduction

As mentioned earlier, Xcel's Section 9 tariff provides a process for solar-garden developers to obtain an interconnection agreement on an expedited basis. Once a developer has shown that its garden project is "expedited ready," Xcel has 50 business days to study the project and to provide an interconnection agreement.[19]

In addition to shortening the deadline for Xcel to deliver an interconnection agreement, Section 9 makes several changes to the Section 10 engineering-study process. Instead of completing a detailed engineering study, Xcel undertakes a more abbreviated "engineering scoping study" that results in an "indicative cost estimate."[20]

The developer must pay one-third of the indicative cost estimate and provide a letter of credit for the remaining portion before Xcel will countersign the interconnection agreement.[21] Detailed engineering studies are not done until after the parties sign the interconnection agreement.[22]

In August 2015, Xcel provided SunShare with indicative cost estimates for the Becker, Glazier, and Bartlett sites. It provided updated indicative cost estimates in October. In December, Xcel began a design-refinement process to produce more detailed cost estimates for these garden sites. As part of this process, Xcel performed "site due diligence" by visiting the sites and confirming the details of its infrastructure adjoining the sites.

In January 2016, Xcel provided SunShare with refined cost estimates. Certain components of these refined estimates showed substantial variation from the earlier, indicative estimates. For example, at the Becker site, Xcel had initially projected substation upgrades costing $339,000; in the January 2016 estimate, the number was $181,000, a 47% decrease. For distribution upgrades, the Company had initially projected costs of $233,250; in the January estimate, the number was $486,000, a 108% increase.

The independent engineer concluded that it would be reasonable for Xcel to undertake infrastructure due diligence before performing the engineering scoping study and delivering an indicative cost estimate. He also concluded that it would be reasonable for Xcel to provide indicative cost estimates with +/-20% accuracy and recommended that the Commission excuse SunShare from paying actual costs above a +20% threshold. Finally, he concluded that it would be

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[19] *See* Section 9, sheets 68 (establishing 50-day "Interconnection Agreement Time Line") and 68.5 (providing that "once a Community Solar Garden is Expedited Ready, the Company will have the time in the Interconnection Agreement Time Line . . . to provide an Interconnection Agreement for signature"). A developer must meet a number of requirements to achieve "expedited ready" status, but these requirements are not material to the dispute at hand.

[20] Section 9, sheet 68.

[21] Section 9, sheet 68.8.

[22] *See* Section 9, sheet 68.5 (providing that "[n]o detailed estimates per Step 5 of the Section 10 tariff will be performed" before an applicant is provided with an interconnection agreement).

unreasonable for Xcel to charge SunShare for redoing any studies, models, or cost estimates based on incorrect flicker values, equipment ratings, or other errors.

2. Positions of the Parties

a. Xcel

Xcel appealed the independent engineer's indicative-cost-estimate findings. It argued that under the expedited Section 9 process, no detailed cost estimates are performed before an interconnection agreement is signed, and that requiring the Company to perform cost estimates to a +/-20% certainty could require changes to the tariff.

Xcel argued that it cannot complete the diligence contemplated by the independent-engineer reports in 50 business days. According to Xcel, assuring a +/-20% level of accuracy would require several visits to the project site to inspect surrounding poles, wires, trees, and the relevant substation, as well as coordination between the Company's distributed-generation engineers, local-area engineers, substation engineers, project designers, the developer, and internal or external construction resources.

Moreover, Xcel argued that the engineer's recommendation that Xcel not be allowed to charge SunShare for costs above a +20% threshold both conflicts with the tariff and fails to account for the complexities involved in designing and constructing interconnection projects. The tariff requires developers to pay the actual costs of interconnection even if those costs exceed what is initially estimated.[23] And Xcel argued that requiring the Company or its ratepayers to absorb costs above the initial estimate would unreasonably insulate developers from the risk of costs changing due to unforeseen circumstances such as weather, permitting requirements, equipment availability, or the actions of other developers in the interconnection queue.

b. SunShare

SunShare asked the Commission to require Xcel to (1) perform its detailed infrastructure due diligence prior to delivering an indicative cost estimate and (2) calculate cost estimates within a +/-20% certainty based on site-verified Xcel infrastructure data.

SunShare argued that Xcel should be required to provide developers with an accurate estimate before they are required to put down a deposit, stating that widely varying cost estimates make gardens difficult to finance. It argued that there is nothing in the tariff to prevent Xcel from undertaking site due diligence before calculating an indicative cost estimate, and it found Xcel's claim that it cannot deliver detailed estimates within 50 days unpersuasive.

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[23] See Section 10, sheet 116, which states,

> The Interconnection Customer is responsible for the actual costs to interconnect the Generation System with Xcel Energy, including, but not limited to any Dedicated Facilities attributable to the addition of the Generation System, Xcel Energy labor for installation coordination, installation testing and engineering review of the Generation System and interconnection design. . . . While estimates, for budgeting purposes, have been provided . . . the actual costs are still the responsibility of the Interconnection Customer, even if they exceed the estimated amount(s).

SunShare maintained that Xcel should be held to its initial estimate by being forced to bear costs above 120% of the estimate. However, if the Commission chooses not to implement this cost-allocation recommendation, SunShare recommended that the Commission implement some other mechanism to ensure that Xcel is making its best efforts to deliver accurate, financeable cost estimates.

c. Department

The Department recommended that Xcel be required to stand behind its cost estimates by keeping the costs within a +/-20% variance from the original estimate. It argued that developers need some assurance of the accuracy of interconnection cost estimates to successfully finance and construct solar gardens.

3. Commission Action

The Commission finds that Xcel's cost-estimate process, which provides an indicative cost estimate prior to execution of the interconnection agreement and a refined estimate later, is consistent with the Section 9 process outlined earlier. The Commission therefore declines to adopt the independent engineer's recommendation to require Xcel to undertake infrastructure due diligence before calculating an indicative cost estimate or to hold the Company to a +/-20% accuracy range for the estimate.[24]

SunShare argues that widely varying estimates make gardens difficult to finance. Yet Xcel reports that hundreds of megawatts of solar gardens are currently in the detailed design and construction phase of development, a fact which the Company suggests undercuts SunShare's claim that the process is hindering garden financing. Without knowing the level of cost variance experienced by developers other than SunShare, however, it is difficult to evaluate either party's argument.

To gain a better understanding of cost-estimate variance across Xcel's solar-garden program, the Commission will require the Company to report variances between the indicative cost estimate and actual project costs—both the total cost and the substation and distribution components. For each of these costs that falls outside a +/-20% range, Xcel will be required to provide a detailed explanation for the variance. The Company will report this information within 30 days of the actual cost being provided to the developer, in its monthly solar-garden program update.

Finally, the independent engineer recommended that Xcel not be allowed to charge SunShare for redoing any studies, models, or cost estimates based on incorrect flicker values, equipment ratings, or other errors by the Company. At hearing, Xcel stated that when it makes a mistake in its modeling, its practice is to correct the error at its own expense. The Commission agrees that Xcel's current practice is appropriate and will require the Company to perform all engineering rework necessary to correct its input errors at no additional charge to SunShare.

[24] As of April 2016, none of the four SunShare projects had experienced cost increases of more than 16% on a total-project basis.

D. Information Exchange

In the proceedings before the independent engineer, Xcel and SunShare executed a nondisclosure agreement (NDA) establishing the conditions under which the parties would share sensitive information with each other and the engineer. Through the NDA, SunShare was able to gain access to the computer models Xcel used in conducting its engineering studies, as well as other trade-secret information.

The independent engineer determined that it was reasonable that a single NDA be sufficient for all future requests to obtain, view, or review information related to SunShare's four projects for the duration of the interconnection process.

Xcel maintained that the NDA does not apply beyond the context of the independent engineer's review of the parties' disputes. The Company noted that the express purpose of the NDA is to allow the engineer to prepare a written report. It argued that since the engineer has already issued his reports, SunShare can no longer access confidential or trade secret material under the NDA.

Xcel also noted that the NDA provides that Xcel's confidential information is shareable with SunShare only if the engineer expects to rely on the information as a basis for his decision or wants SunShare to respond to the information. Xcel argued that this provision further suggests that the NDA is limited to facilitating the independent engineer's review and does not continue in perpetuity.

The Commission concurs with Xcel that, by its terms, the nondisclosure agreement signed as part of SunShare's independent-engineer review process does not apply beyond the context of that process, and is limited in scope to facilitating the engineer's review.[25]

IV. Novel's Raser Project

A. Introduction

As mentioned earlier, Xcel's Section 9 tariff excuses the Company from making material upgrades to its distribution system to accommodate co-located solar-garden projects.

Material upgrades fall into two categories. Certain upgrades, such as installing or upgrading a substation transformer, are "per se" material and will never be performed for co-located solar gardens. A second category of upgrades, generally those that entail extending or rebuilding power lines, will be considered material only if, based on Xcel's indicative cost estimate, the aggregate cost of those upgrades will exceed $1 million.[26] If Xcel determines that a project will require this second type of material upgrade, it must provide the developer with an itemized list of the cost inputs, including unit costs and any underlying data and documentation related to those unit costs.

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[25] The independent engineer's reports also dealt with information that Xcel had withheld on the basis that it was critical infrastructure information as defined in Federal Energy Regulatory Commission (FERC) rules. However, at this time there are no outstanding disputes on the issue of critical infrastructure information, and the independent engineer's statements on this issue are not findings that require the Commission to take action.

[26] Section 9, sheets 68.4–.5.

Xcel's indicative cost estimate for Novel's Raser site was $1,079,500, which exceeded the material-upgrade limit.

Novel requested an independent-engineer review, arguing that its project should be allowed to proceed since indicative cost estimates have a low degree of accuracy, and Xcel's estimate for this project was within a reasonable range of the material-upgrade threshold.

Xcel responded that it uses least-cost assumptions in calculating the indicative cost estimate, an approach that favors developers by subjecting fewer projects to the material-upgrade limit. Moreover, if the estimate later rises above the limit, a project will still be allowed to proceed.

The independent engineer concluded that Xcel's application of the material-upgrade limit was consistent with the tariff. The engineer also found that the Company's use of an indicative cost estimate is consistent with interconnection practices in other states—where initial cost estimates take the form of either "good faith" estimates without an accuracy requirement or nonbinding ranges.

B. Positions of the Parties

1. Novel

Novel recommended that Xcel be required to calculate indicative cost estimates with a greater degree of accuracy, or alternatively, to mitigate the impact of the current indicative cost estimate through one or more of the following approaches:

- Permit developers to move a project to a new site within three miles of the original site if it results in interconnection costs below the material-upgrade limit;
- Let developers hire a third-party cost estimator to determine if the material-upgrade limit is exceeded; or
- Allow developers to pay Xcel a reasonable fee for an estimate with +/-20% accuracy to determine if the limit is exceeded.

2. Xcel

Xcel argued that it had complied with Section 9 by applying the material-upgrade limit to its indicative cost estimate for the Raser project, and that this estimate was reasonable and based on least-cost assumptions. It stated that Novel had not raised any objection to the particulars of how the estimate was calculated.

The Company argued that the tariff is clear that no detailed cost estimate will be performed until after the interconnection agreement is signed. It argued that it could not continue relying on least-cost assumptions if the Commission requires a greater degree of accuracy for indicative cost estimates, and instead would have to either study the projects in depth or use greatest-cost assumptions when calculating the indicative cost estimate.

Xcel stated that, at Novel's request, it had conducted a high-level review of alternative interconnection sites. Xcel found that moving the project to one of these sites would not lower the indicative cost estimate below $1 million. Moreover, Xcel stated that, based on the cost of several recently completed interconnections, the unit costs it used in Novel's indicative cost estimate likely underestimate the actual cost of interconnection.

C. Commission Action

The Commission accepts the independent engineer's finding upholding Xcel's application of the material-upgrade limit to Novel's Raser site. Xcel applied the material-upgrade limit to the indicative cost estimate, as required by Section 9. And its approach to calculating the indicative cost estimate was fair to Novel in that it used least-cost assumptions for the unit costs that were part of the estimate.

Novel listed several alternative requests for relief. However, the relief it seeks is extremely unlikely to bring its project below the material-upgrade limit, since Xcel's existing estimate already relies on least-cost assumptions. Moreover, the requested relief would require significant changes to Xcel's tariff. While it may make sense to consider tariff changes once Xcel has gained more experience with the program, the Commission does not find it reasonable to make broad program changes at this time.

V. Minnesota Solar's Projects at the Lake Pulaski, Lester Prairie, Montrose, and Waverly Substations

A. The Issue

Minnesota Solar has proposed to develop community solar gardens at eight sites associated with four Xcel substations: Lake Pulaski, Lester Prairie, Montrose, and Waverly. Xcel rejected 37 of the proposed gardens after finding that the substations would not be able to accommodate them without material upgrades.

Minnesota Solar sought an independent-engineer review of Xcel's determination that the substations lacked sufficient capacity to accommodate the gardens. During this review, Xcel reevaluated its prior analysis and determined that hosting capacity totaling 2.1 megavolt-amperes (MVA) was in fact available at the Lester Prairie substation.

The independent engineer confirmed Xcel's analysis, finding that, with the exception of the 2.1 MVA at Lester Prairie, each of the substations had reached its maximum capacity for hosting distributed generation.

Minnesota Solar appealed the engineer's determination, arguing that the engineer's report did not include a sufficiently detailed review of the facts and disputes. It requested that the Commission serve the independent engineer with information requests to establish that the engineer independently verified Xcel's substation-capacity calculations.

Xcel responded that the independent engineer had properly addressed the issues and reviewed the technical assumptions Xcel used in its calculation of substation hosting capacity. The Company argued that it acted properly in rejecting applications that exceeded the available capacity, since increasing the hosting capacity would have required a material upgrade.

B. Commission Action

The Commission will accept the independent engineer's finding that the only available project capacity that could potentially move forward at the four substations in dispute is 2.1 MVA at the Lester Prairie substation. The engineer's report outlines the parties' dispute and sets forth the facts supporting its capacity finding for each substation. Minnesota Solar's request that the independent engineer be served with information requests is unsupported and beyond of the scope of this review process.

VI. Minnesota Solar's Klingelhutz and Rice Brunansky Sites

A. The Issue

Minnesota Solar also sought independent-engineer review of Xcel's determination that the material-upgrade limit had been exceeded at its Klingelhutz and Rice Brunansky solar-garden sites. It challenged Xcel's cost calculations and sought clarification of why the utility did not consider connecting the Klingelhutz gardens to a substation closer to the site to reduce the costs.

The independent engineer found Xcel's cost calculations accurate. The engineer found that the Company does not allow developers in its solar-garden program to choose where their projects will connect to the distribution system. But the engineer suggested that this practice "may be viewed as discriminatory" in light of Xcel's offer, in 1996, to run a dedicated feeder line to a large industrial customer's plant from a nearby substation.

Xcel objected to the engineer's suggestion that the Company's conduct was discriminatory. Xcel stated that it assigned the Klingelhutz gardens to the nearest existing feeder line, as it has done for other solar gardens. According to Xcel, a retail customer does not generally have the right to choose the feeder that serves it; the Company distinguished the 1996 example based on several factors—the customer was one of Xcel's largest, the substation was only 800 feet away and was already assigned to the customer's service address, and the new feeder line was expected to enhance system reliability.

B. Commission Action

The Commission will accept the independent engineer's finding that Xcel's calculation of the amount of reconductoring for these sites is accurate, that the cost per foot is within a reasonable range, and that the overall indicative cost estimates are reasonable. However, the Commission does not accept the engineer's finding that Xcel's conduct may be discriminatory in light of the 1996 case; that case is distinguishable on its facts.

VII. Procedures for Future Interconnection Disputes

The Commission's August 2015 order outlined basic procedures for independent-engineer review of solar-garden interconnection disputes. Having gained experience with the existing process, the Commission will establish the following additional procedures to further standardize the process and promote the efficient resolution of disputes:

- Once a dispute is submitted to the Department and an independent engineer selected, Xcel will file a notice in Docket No. E-002/M-13-867 that includes (1) the filing and date, (2) the developer, (3) the engineer assigned, and (4) a brief summary of the disputed issues. Once an engineer report is issued, Xcel will file it within ten business days.
- If an appeal is filed, notice shall be given to the E-002/M-13-867 service list and the Commission will open a new docket.
- The independent engineer should address only those issues necessary to resolve the dispute between the parties.
- The independent engineer's report must include the engineer's credentials and licensing.
- When a party appeals an independent-engineer report, each party must identify the documents submitted to the engineer that are necessary for the Commission's record.
- Xcel will be required to revise its Section 9 tariff at sheet 68.13, paragraph 9.h, to allow a party to file an appeal within ten business days of the delivery of the engineer's report, rather than five business days, as currently set forth in the tariff.
- The independent engineer may request additional information from parties necessary to resolve the dispute before the engineer.
- Xcel will be required to work with the Department and developers to develop a standardized format for independent engineer reports.

ORDER

SunShare's Becker, Glazier, Bartlett, and Murphy Sites

1. Xcel shall use a 2.0% flicker threshold (full-on full-off) for both individual and aggregate PV systems in the Section 10, Step 3 and 4 feasibility study computer models for the SunShare projects at the Becker and Glazier interconnection sites.

2. Xcel shall work with other interested parties to develop a plan for transition to incorporating the standards of IEEE 1453 into its modeling of voltage fluctuations and flicker for solar PV. The plan shall be filed within six months of this order.

3. Xcel shall file as a compliance report, within three months of the operational date of the Becker and Glazier projects, an assessment of impacts from voltage fluctuation and flicker, if any, on its system, and shall do so annually for the solar-garden program as a whole.

4. Xcel shall perform all engineering rework (computer models, studies, or cost estimates) necessary to correct Xcel's input errors at no additional charge to SunShare.

5. Xcel shall report cost variances between the indicative cost estimate and the actual costs for the total project, the substation costs, and the distribution costs. For each of these costs that fall outside a +/-20% range, Xcel shall provide a detailed explanation for the variance. Xcel shall report this information to the Commission within 30 days of the actual cost being provided to the developer in its next monthly community-solar-garden update report.

6. SunShare will not be permitted to activate noncertified functions of advanced-functionality inverters to perform flicker mitigation without Xcel's explicit permission until such time as the inverter functions have been tested and certified under UL standards or until further order of the Commission.

7. The nondisclosure agreement signed as part of the SunShare independent-engineer review process does not apply beyond the context of that review process, and is limited in scope to facilitating the independent engineer's review.

Novel's Raser Project

8. The Commission accepts the independent engineer's finding in the report for Novel's Raser project upholding Xcel's application of the material-upgrade limit to that project.

Minnesota Solar's Projects Interconnecting at the Lake Pulaski, Lester Prairie, Montrose, and Waverly Substations

9. The Commission accepts the independent engineer's finding in the Lake Pulaski, Lester Prairie, Montrose, and Waverly report that the only available project capacity that could potentially move forward at the four substations in dispute is 2.1 MVA at Lester Prairie.

Minnesota Solar's Klingelhutz and Rice Brunansky Sites

10. The Commission accepts the independent engineer's finding in the Klingelhutz and Rice Brunansky report that Xcel's unit cost for distribution upgrades is within a reasonable range, its indicative cost estimate is reasonable, and its reconductoring footage is accurate.

Procedures for Future Interconnection Disputes

11. The Commission sets the following parameters for the independent-engineer review process:

    a. Once a dispute is submitted and an engineer selected, Xcel shall file a notice in Docket No. E-002/M-13-867 that includes (1) the filing and date, (2) the developer, (3) the engineer assigned, and (4) a brief summary of the disputed issues. Once an engineer report is issued, Xcel shall file it with the Commission within ten business days.

    b. If an appeal is filed, notice shall be given to those on the E-002/M-13-867 service list, and the Commission will open a new docket.

    c. The independent engineer should address only those issues necessary to resolve the dispute between the parties.

    d. An independent engineer's report must include the engineer's credentials and licensing.

e. When a party appeals an independent engineer's report, each party must identify the documents submitted to the engineer in the record necessary for the Commission's record.

f. Xcel shall revise its Section 9 tariff at sheet 68.13, paragraph 9.h, to allow a party to file an appeal within ten business days of the delivery of the engineer's report rather than five business days as currently set forth in the tariff.

g. The independent engineer may request additional information from parties necessary to resolve the dispute before the engineer.

h. Xcel shall work with the Department and developers to develop a standardized format for independent-engineer reports.

12. Within 30 days of this order, Xcel shall make any compliance filings necessary to reflect the Commission's decisions.

13. This order shall become effective immediately.

BY ORDER OF THE COMMISSION

Daniel P. Wolf

Daniel P. Wolf
Executive Secretary

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