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Minneapolis, MN 55401

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January 3, 2019

—Via Electronic Filing—

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

RE: APPEAL OF INDEPENDENT ENGINEER REPORT FOR THE  
SUNSHARE LINDEN PROJECT  
COMMUNITY SOLAR GARDENS PROGRAM  
DOCKET NO. E002/M-19-\_\_\_\_

Dear Mr. Wolf:

Northern States Power Company, doing business as Xcel Energy, submits to the Minnesota Public Utilities Commission this Appeal of the Independent Engineer Report first received on December 18, 2018 (as revised on December 24, 2018) for the SunShare Linden Community Solar Garden site. Under the provisions of our tariff (Section 9, Sheet 68.13), responses to this appeal are due 10 business days from the filing of this appeal. This means that responses to this appeal are due on or before January 17, 2019.

Certain information in this filing has been marked as Not Public Protected Data. Some of this is information that SunShare considered to be its Not Public Protected Data at the time that we submitted this information to the Independent Engineer. Other information has been designated as Not Public Protected Data of Xcel Energy because this data is classified as trade secret pursuant to Minn. Stat. §13.37, subd. 1(b). This information derives independent economic value from not being generally known or readily ascertainable by others who could obtain a financial advantage from its use. Certain information marked as Not Public Protected Data is also classified as security information under Minn. Stat. §13.37, subd. 1(a) as the disclosure of this information would be likely to substantially jeopardize the security of information or property against tampering, improper

use, illegal disclosure, trespass or physical injury. Further, consistent with Minn. Stat. §13.02 subd 9 and §13.03 subd 1, information marked as Not Public Protected Data is “nonpublic data” as federal law treats it as “trade secret” under 18 USC §1839, because it reflects business, scientific, technical, economic, or engineering information, including patterns, plans, compilations, program devices, formulas, designs, methods, techniques, processes, programs, or codes, where reasonable measures have been taken to keep such information secret and it derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable through proper means by, another person who can obtain economic value from the disclosure or use of the information.

We have electronically filed this document with the Commission, and copies have been served on the parties on the attached service list. Please contact me at James.R.Denniston@xcelenergy.com or 612-215-4656 if you have any questions regarding this filing.

Sincerely,

/s/

JAMES R. DENNISTON  
ASSISTANT GENERAL COUNSEL

Enclosures  
c: Service List

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STATE OF MINNESOTA  
BEFORE THE  
MINNESOTA PUBLIC UTILITIES COMMISSION

|                   |              |
|-------------------|--------------|
| Nancy Lange       | Chair        |
| Dan Lipschultz    | Commissioner |
| Matthew Schuerger | Commissioner |
| Katie J. Sieben   | Commissioner |
| John Tuma         | Commissioner |

IN THE MATTER OF AN APPEAL OF AN  
INDEPENDENT ENGINEER REVIEW  
PERTAINING TO THE SUNSHARE LINDEN  
PROJECT AS AUTHORIZED IN DOCKET  
No. E002/M-13-867 (COMMUNITY  
SOLAR GARDENS PROGRAM)

DOCKET No. E-002/M-19-\_\_\_\_  
**XCEL ENERGY APPEAL OF  
INDEPENDENT ENGINEER REPORT OF  
DECEMBER 18, 2018**

### INTRODUCTION

Northern States Power Company, doing business as Xcel Energy (Xcel Energy or the Company), files this Appeal of the Independent Engineer (IE) Sam Wheeler’s written report and decision dated December 18, 2018 (IE Report), attached herein as **Attachment A**. In March 2018, SunShare LLC and Lake Nokomis LLC (SunShare) initiated an Independent Engineer review of the Linden Project, which consists of applications for five co-located 1 MW solar gardens. Xcel Energy’s engineering study limited the Linden Project to three co-located 1 MW solar gardens based on steady state voltage limits (sometimes called high voltage impacts) and the indicative cost estimate of upgrades required for interconnection.

SunShare’s main request in initiating the dispute was that the IE review the Linden project’s engineering study and determine whether the distribution system upgrades required by Xcel Energy for the project’s interconnection are reasonable and whether there is need to limit project capacity due to the \$1 million material upgrade limit. The Department assigned Mr. Wheeler as the IE for this dispute in April 2018.

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Xcel Energy is appealing the IE Report and its conclusions on several grounds.<sup>1</sup> First, the IE simply did not conduct any technical engineering review of the specific issues disputed by SunShare, which is the entire purpose of the IE review process. Indeed, the IE Report does not include any technical assessment or analysis of general industry standards or best practices, nor of the Linden’s projects specific engineering study assumptions, models, or results.

Second, the IE overstepped his authority by granting special treatment for the Linden project and by directing Xcel Energy to make exceptions to tariffed Solar\*Rewards Community program rules and standard interconnection requirements. Some of the exceptions directed by the IE contradict prior Commission Orders. For instance, the IE’s conclusions direct Xcel Energy to:

- Use 2 percent, 3 percent, and 4 percent full on/full off flicker for studying the Linden project, which conflicts with the Company’s current IEEE 1453-based voltage fluctuation methodology;
- Conduct an unusual and labor-intensive flicker study, which would analyze allowable flicker at the Linden site before and after construction;
- Allow the use of equipment that is not specified in the Company’s Overhead Distribution Construction Manual; and
- Grant the Linden project a new 24-month time period to achieve mechanical completion, which is not an option under our Section 9 tariff.

Third, the IE inappropriately granted monetary compensation in violation of the Services Agreement executed for this dispute and ordered relief that was not even requested by SunShare. Specifically, the IE misapplied the program-specific \$1 million material upgrade limit and capped the Linden project’s actual interconnection costs at \$1 million. The IE also required that the Company charge a “wholesale price” for interconnection, excluding overhead and labor. In doing so, the IE misunderstood the Solar\*Rewards Community program processes as well as the applicable tariff provisions. We address these errors in greater detail later in this Appeal.

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<sup>1</sup> The IE followed the Department’s direction to exclude two issues from this dispute. To be clear, we are not appealing the IE Report’s agreement to exclude these two issue from the IE review.

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Fourth, as explained in more detail in our June 28, 2018 Response (**Attachment E** to this Appeal) we believe the issues raised by SunShare have already been resolved by a binding Settlement Agreement executed in January 2017. This prior dispute involved the same main issue – that the Linden project is not receiving the full capacity applied for because of extensive reconductoring and other upgrades required, exceeding the \$1 million material upgrade limit.

The IE Report largely focuses on perceived past study errors and voltage fluctuation thresholds applied in the studies. However, all studies conducted for the Linden project indicate that the limitation of project capacity is related to steady state voltage, not voltage fluctuation. The assumptions of the June 2017 study are correct in all material aspects as are the results, which show a maximum voltage fluctuation of 1.33%, well below the 3% individual threshold applied based on the IEEE 1453 approach. Since steady state voltage was the limiting factor in the June 2017 study, changing the voltage fluctuation threshold to 4% full on/full off as directed by the IE, or even to a higher level, would not increase the allowable capacity for the project.

We include an Issues Matrix as **Attachment B** to this Appeal. The Issues Matrix identifies issues raised in the IE Report that are part of this Appeal and specifies where they are addressed in the Appeal.

We request that the Commission reject the IE Report in total and find that it was proper for Xcel Energy to offer 3 MW of capacity at the Linden site consistent with the results from the June 2017 study.

We believe the following documents should be part of the Commission’s record as either the IE relied on the material or the Company relies on the material in this Appeal. The documents are provided as Attachments to this Appeal.

|              |  |
|--------------|--|
| Attachment A | December 18, 2018 IE Report, as revised on December 24, 2018 |
| Attachment B | Issues Matrix  |

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|              |  |
|--------------|--|
| Attachment C | Services Agreement for IE process with the following Attachments:<br>A- tariff sections,<br>B - Required Intake Form and Standard Format for IE Report, and<br>C - SunShare’s March 16, 2018 Intake Form |
| Attachment D | Non-Disclosure Agreement (NDA) for the IE process  |
| Attachment E | Xcel Energy’s June 28, 2018 Response with Attachments A through O  |
| Attachment F | Sam Wheeler’s July 24, 2018 email on issue of immediate construction of 3 MW   |
| Attachment G | SunShare’s August 14, 2018 Intake Form   |
| Attachment H | Department’s September 4, 2018 email regarding smart inverter capability   |
| Attachment I | Xcel Energy’s September 21, 2018 Response  |
| Attachment J | Xcel Energy’s July 19, 2018 Response to IR No. 2 with Attachments A, and C through F   |
| Attachment K | Xcel Energy’s July 19, 2018 Response to IR No. 4 with Attachments A through E  |
| Attachment L | Xcel Energy’s October 15, 2018 Response to IR No. 9, (excluding Attachments A and B because links to these public documents are included with the Response)  |
| Attachment M | Xcel Energy’s November 14, 2018 Response to IR No. 11 and Attachment A, pages 183-184, and 228-244   |
| Attachment N | Timeline since March 16, 2018  |
| Attachment O | More detail on concerns regarding the IE’s confidentiality determinations  |

**APPEAL**

**I. BACKGROUND**

SunShare submitted Solar\*Rewards Community applications for five 1 MW solar gardens for the Linden project on June 5, 2015. SunShare initiated the first IE dispute regarding the Linden project on April 13, 2016, after which Xcel Energy updated the engineering studies and provided new Interconnection Agreements on May 18, 2016

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(allowing 2.3 MW) and on June 22, 2016 (reducing telemetry costs, allowing the same 2.3 MW).<sup>2</sup> The first IE dispute was placed on hold and did not have an assigned IE. SunShare withdrew the first IE dispute on December 13, 2016 and SunShare and Xcel Energy executed a Settlement Agreement on January 3, 2017 (affecting also several other SunShare projects).

Based on the Settlement Agreement and using the newly adopted IEEE 1453-based voltage fluctuation methodology, Xcel Energy restudied the Linden project and issued an Interconnection Agreement on July 14, 2017 (allowing 3 MW). Between November 1, 2017 and March 16, 2018, Xcel Energy received and responded to extensive questions from SunShare and extended SunShare's deadline to sign and pay the Interconnection Agreement until March 16, 2018. SunShare submitted its first Intake Form for this new IE dispute on that same day.

Our June 28, 2018 Response (**Attachment E**) includes a detailed timeline of the Linden project up to March 16, 2018. We provide additional timeline for the Linden project since March 16, 2018 in **Attachment N**.

## **II. OVERVIEW OF DISPUTE**

The scope of an IE dispute is determined in the Intake Form submitted to the Department by the disputing party. SunShare's Intake Form, dated March 16, 2018 and included in **Attachment C**, specified the following issues for this dispute:

1. Justification for the 750 AL underground cable (\$107,405), verification of industry standard, and using the 225A ampacity rate instead of the actual 630A;
2. Adjustment to the Company's voltage fluctuation methodology, specifically to the 1.5% and 75% on/off voltage parameters, so that they are less restrictive;
3. Confirmation that Xcel Energy has delayed sharing project information and answering various questions presented by SunShare. Requested resetting the 24-month mechanical completion clock, beginning detailed design of 3 MW immediately, requiring Xcel Energy to bear any extra costs of winter construction, and waiving the \$1 million material upgrade limit;

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<sup>2</sup> Xcel Energy adjusted general telemetry requirements for interconnection projects, which impacted several solar garden projects studied in early stages of the Solar\*Rewards Community program.

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4. Justification for the use of 336 AL conductor instead of other less expensive alternatives (4/0 Penguin, 4/0 Oxlip) and verification of industry standard; and
5. Review of Xcel Energy’s engineering studies for Linden project for accuracy and confirmation if the project size can be increased to 5 MW using lower cost industry standard equipment. Review of “any other questionable areas that may arise during his review which we may not be aware of.”

SunShare expanded their dispute in a second Intake Form dated August 14, 2018 (**Attachment G**), specifying the following additional issues:

6. Incorporate capability of Advanced Functionality Inverters (AFIs) into the interconnection study process as a way to mitigate flicker, and
7. Use a 4 percent flicker standard for the Linden project study instead of the simplified IEEE 1453 voltage fluctuation approach adopted by Xcel Energy in April 2017.

The IE and the Department made several determinations that directly impacted the scope of this IE review. First, the IE decided on August 7, 2018 that the prior Settlement Agreement executed between SunShare and Xcel Energy does not preclude the Linden dispute from moving forward (see **Attachment A**, IE Report pp. 6-7). Second, the Department determined on July 24, 2018 that SunShare’s request that the IE order Xcel Energy to begin immediate construction of 3 MW was outside the IE’s jurisdiction (part of Issue No. 3), (see **Attachment A**, IE Report p. 8, and **Attachment F**). Third, the Department determined on September 4, 2018 that SunShare’s request that the IE order Xcel Energy to incorporate smart inverter capability was outside the IE’s jurisdiction (Issue No. 6), (see **Attachment A**, IE Report pp. 8-9, and **Attachment H**). This Department decision was based on the Commission’s ongoing review of Minnesota’s Interconnection Process and Technical Standards and the related upcoming changes in Docket No. E002/M-16-521. The IE Report reflects the above determinations, and our appeal is unrelated to the Department’s decisions above.



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**III. AUTHORITY OF THE IE**

The IE Report refers multiple times to a “Charter” that allegedly gives the IE authority to make decisions that impact the whole Solar\*Rewards Community program. For example, the IE Report states:

The IE notes that his charter mandates that “The IE is also chartered to address appropriate and related best business and technical practices and trends in the PV interconnection industry that would be noteworthy and of benefit to Parties as well as the wider CSG/SRC.” So, in the best interests of the Parties and the wider CSG/SRC Program, the IE can mandate certain results. (IE Report, p. 26)

We are not aware of any such “Charter” that addresses the IE’s authority, and have not been able to identify the source of the quoted language above. The language does not appear in the Services Agreement executed for this dispute or its Attachments, in any Commission Order regarding the solar garden program, or in our tariff. It appears, however, that the IE is using this language as broad authority to make exceptions to the established Solar\*Rewards Community program rules and processes as well as to the Company’s tariffs. We not believe he has this authority.

The IE’s authority is based on our Section 9 Tariff, Sheets 68.11-68.13 and the Services Agreement executed by Mr. Wheeler, SunShare and Xcel Energy. The IE’s role is set forth in the Service Agreement on page 2, par. 1.c., which states:

c) The IE agrees to resolve interconnection disputes between the Parties, including disputes related to, but not limited to, Xcel Energy's determination of application completeness, timeliness of application and study processing, the cost and necessity of required study costs and cost validity of distribution system upgrades. The IE must do so based on the provisions of the Tariff Section 9, Sheets 68.11-68.13 set forth in Attachment “A”, and utilizing the “Intake Form for Independent Engineer Review” set forth in Attachment B, and the “Standard Format for Independent Engineer Review” also set forth in Attachment “B”, and the completed “Intake Form” provided by SunShare as set forth in Attachment “C”.

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There is no reference in any of these documents to the “Charter” that the IE has relied upon in the IE Report. In fact, the Services Agreement in par. 5. affirmatively disavows any prior agreements or understandings:

**5. Prior Agreements and Understandings.** No prior or existing agreements or understandings exist with the IE related to the IE’s review of this interconnection dispute.

The IE does not have authority to make decisions that conflict with the Company’s tariffs or established Solar\*Rewards Community program rules. Nor is it within the IE’s authority to initiate program-wide changes or policy reforms. All the central rules and procedures regarding the Solar\*Rewards Community program and general interconnection are outlined in our tariffs, which have been considered and approved by the Commission. Our business practices – which are intended to enable a fair, consistent approach to building a successful Solar\*Rewards Community program – have also been discussed and vetted in the program’s Implementation Workgroup. The IE’s recommendations have the potential to affect not only SunShare but other solar garden developers in the queue and other customers of Xcel Energy. We believe these recommendations – many of which rise to the level of core policy issues for the Commission and our stakeholders – reach well outside the bounds of the IE’s authority.

Relying on the “Charter” as a broad source of authority, the IE appears to have focused almost exclusively on policy issues rather than the technical analysis contemplated by the IE review process. Indeed, the IE Report lacks any technical review or analysis of the specific engineering issues identified in SunShare’s Intake Forms. Similarly, the IE Report does not address or evaluate industry best practices or standards, whether related to engineering studies, common distribution system equipment, steady state voltage, or voltage fluctuation methodologies. Finally, the IE Report does not evaluate the Linden project engineering studies. Instead, the IE Report includes general statements that the studies had errors, though it is unclear whether the IE assessed the study assumptions, study models, or study results since the IE Report does not include these analyses.

The purpose of the IE dispute process is that an independent, third-party expert technically reviews the specific issues raised by a developer. Here, the IE Report lacks

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any such analysis, evaluation, or assessment. Instead, the IE’s decisions are based on quasi-legal arguments, misinterpretation of the Company’s tariffs, and misreading of two internal Xcel Energy emails. When the IE does touch lightly upon technical questions in the IE Report, the analysis and conclusions lack any basis in engineering practices. For these reasons alone, we believe the Commission should reject the IE Report in total.

#### **IV. THE IE’S DECISION POINTS**

##### **A. Voltage Fluctuation Methodology (SunShare Issues No. 2 and 7)**

Our June 28, 2018 Response (**Attachment E**, pp. 17-20), September 21, 2018 Response (**Attachment I**, pp. 1-4), and Response to IR No. 4 (**Attachment K**) describe the evolution of voltage fluctuation standards and the basis of the Company’s current IEEE 1453-based voltage fluctuation methodology. The Company has consistently applied the simplified IEEE 1453 approach since April 1, 2017 and summarized the methodology in an April 26, 2017 Compliance Filing to the Commission, which included the final technical White Paper and summaries of three Technical Stakeholder Group meetings (these documents are contained in **Attachment K**). The IEEE 1453-based methodology was thoroughly developed and vetted in a transparent process, including extensive review of industry standards, peer utility review and local stakeholder input.

The IE Report disqualifies the Company’s current voltage fluctuation methodology because the Commission did not take any action on the April 2017 compliance filing. Specifically, the IE concludes that the simplified IEEE 1453 approach is “unsubstantiated” and “without legal standing.” For example:

The IE acknowledges that this does create a dilemma. Xcel has chosen to proceed with a Flicker methodology that has not been reviewed, accepted, or adopted by the MPUC. This leaves a vacuum in the use and trust any developer can put into Xcel’s Flicker Study, since it has no legal standing. (IE Report, p. 47)

The IE finds it noteworthy that Xcel did indeed present the compliance filing on Flicker to the MPUC, but since the filing was never reviewed, accepted,

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adopted, or its contents validated in anyway by the MPUC, the IE find its contents and results to be unsubstantiated. (IE Report, p. 27)

There is no legal or other requirement that would dictate that the Commission must take action on our IEEE 1453-based approach for it to be valid. In fact, we have applied this approach to nearly 200 solar garden projects totaling approximately 250 MW since April 2017. The IE's statements and decision regarding voltage fluctuation standards also have the potential to significantly impact the Solar\*Rewards Community program: the IE's conclusions imply that a large number of solar garden projects in operation today have been studied under an invalid voltage fluctuation approach. By doing so, the IE's decision creates significant uncertainty for the program, given the capacity of projects that have already successfully achieved commercial operation and the number of active applications in the program's pipeline.

Moreover, the IE's determination on voltage fluctuation is fundamentally flawed, since the IE did not actually evaluate or assess the Company's current voltage fluctuation approach. For example, the IE Report does not discuss whether the IEEE 1453-based methodology is appropriate from an engineering standpoint or what particular aspects of the methodology the IE finds inappropriate. Instead, the IE simply concludes that the voltage fluctuation methodology does not have legal standing because it was not approved by the Commission. Nor does the IE Report explain why the IE believes his recommendation of applying the full on/full of flicker standard at 2 percent, 3 percent, and 4 percent is a more appropriate approach than the Company's current methodology.

The Minnesota statewide technical standards are being revised in Docket E002/M-16-521. The Technical Subgroup for the Distributed Generation Workgroup (DGWG) discussed power quality issues in its September 21, 2018 meeting. Participants did not raise concerns with the Company's current implementation of IEEE 1453, and the Commission Staff summary notes for this meeting state that "*As a subset of Power Quality, flicker issues associated with IEEE 1453 came up in Xcel Energy's Community Solar Gardens program, and the resolution appears to have addressed the concerns.*"

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We also note that we have an email from SunShare, dated February 21, 2017, which confirms its understanding that the Linden project will be studied under the IEEE 1453-based standard after it is finalized in Xcel Energy’s workgroup (this email is included as Attachment E to our Response to IR No. 4, which is **Attachment K** to this filing). This emails states:

**“[PROTECTED DATA BEGINS**

**PROTECTED DATA ENDS]”**

Finally, the binding Settlement Agreement executed for the first Linden IE dispute (Attachment B (pars. 3 and 4) to the June 28, 2018 Response, which is **Attachment E** to this Appeal) **[PROTECTED DATA BEGINS**

**PROTECTED DATA ENDS]**. We do not object to this alternative. The IE erred by not holding SunShare to the terms of the Settlement Agreement.

We discuss in more detail additional technical aspects of the IE’s decision regarding “flicker standards” in section IV.B below.

**B. Engineering Analysis (SunShare Issue No. 5)**

*1. Study Results Are Accurate – Steady State Voltage Is the Limiting Factor*

The results of the June 2017 study are correct in all material aspects, as are any diagrams and attachments included in the study report. The difference between the April 2017 study and the June 2017 study is the mitigation selected for reducing voltage impacts to acceptable limits. In the April 2017 study, the engineering consultant targeted upgrading existing overhead conductor to mitigate high voltage impacts, leaving in place a section of 1/0 AL underground cable. The amount of overhead reconductoring in the April 2017 Study (approximately 18,500 feet) caused the Linden project to exceed the \$1 million material upgrade limit. After recognizing

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that a re-study was needed since the consultant did not apply the \$1 million material upgrade limit,<sup>3</sup> the Company's engineers directed the consultant to run additional scenarios where the underground cable (approximately 800 feet) was upgraded to 750 AL in order to determine if this was a more optimal scenario to mitigate the high voltage impact.<sup>4</sup> In these scenarios, steady state voltage rise was resolved and the total length of rebuild overhead line decreased to approximately 13,600 feet. Although this scenario includes a combination of overhead (13,600 feet) and underground cable (800 feet), it is the least cost option compared to a significantly longer overhead line only.

Figure 1 below shows a high-level depiction of line upgrade scenarios in the April 2017 and June 2017 studies. The June 2017 study ultimately calls for less rebuild than the April 2017 study, due to the characteristics and location of the line being replaced.

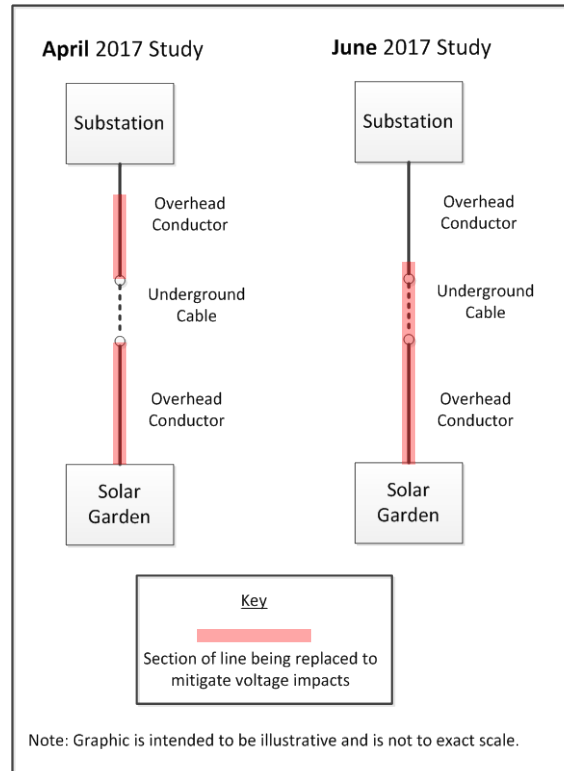
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<sup>3</sup> The engineering consultant did not apply the \$1million limit because the majority of other studies occurring at that time were for 1 MW non-co-located projects, for which the material upgrade limit no longer applies.

<sup>4</sup> The determination of upgrading cable versus overhead line is not trivial because each option impacts impedance differently which in turn affects the efficacy of advanced inverter functions (i.e., non-unity power factor).

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**Figure 1: Line Upgrade Mitigations Selected in April 2017 and  
June 2017 Studies**



The Company has provided the modeling inputs for each engineering study conducted for the Linden project, included in the body and appendices of each study. The IE did not offer a technical opinion on the engineering merits identified in these details. The IE states that the June 2017 study is not accurate, but fails to point to the factual basis for this conclusion. For example, to discredit the entire June 2017 study, the IE points to what is essentially a typo for a conductor ampacity rating, which is an irrelevant factor in the study and did not impact the results. We have previously communicated the irrelevancy of the conductor ampacity rating to SunShare and the IE. And the IE Report provides no explanation whatsoever regarding how an ampacity rating in a table might have impacted the voltage constraints that account for the reduced Linden project capacity.

In addition, the IE dismisses the June 2017 study as erroneous based on an internal Xcel Energy email. This email, however, is about the written study report, not the study results. The email criticizes the presentation in the June 2017 study report,

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which is not as reader-friendly as it could be (i.e., some assumptions from the prior April study were not spelled out in the June version), but the email does not address the accuracy of the study assumptions or results, or in any way state that they would be incorrect. We also note that the IE is mistaken that SunShare paid for all Linden project studies. SunShare paid for one study and the rest were conducted at the Company’s cost.<sup>5</sup>

All the engineering studies provided to the IE indicate that the limitation of Linden project capacity is related to steady state voltage. Though voltage fluctuation does appear in some of the study scenarios, especially earlier studies with 1.5% or 2% limits, every study performed indicated that steady state voltage was a constraint in at least one case. For the 3 MW case in both the April 2017 and June 2017 studies, steady state voltage was the limiting factor. Table 1 below summarizes the technical limitation for each study performed. The IE asserted that additional project capacity may be gained by changing the voltage fluctuation criteria, but it is unclear what is the technical basis for this conclusion, and this conclusion is not supported by the studies that are in the record here.

**Table 1: Summary of Technical Limitations in Linden Project Studies**

| <b>Study Capacity Limitation For Each Study</b> |   |  |
|---|---|--|
| <b>Study Date</b>                               | <b>Limitation</b>   | <b>Voltage Fluctuation Method</b>                                |
| February 17, 2016                               | Steady State Voltage<br>Voltage Fluctuation                   | 1.5% Individual / 2% Aggregate                                   |
| May 6, 2016                                     | Steady State Voltage<br>Voltage Fluctuation                   | 1.5% Individual / 2% Aggregate                                   |
| January 11, 2017                                | Steady State Voltage<br>Voltage Fluctuation                   | 2% Individual / 2% Aggregate                                     |
| April 14, 2017                                  | Steady State Voltage<br>Voltage Fluctuation <sup>Note 1</sup> | 3% Individual / 5% Aggregate<br>2% at Voltage Regulation Devices |

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<sup>5</sup> When the Company finds a discrepancy in a study, for example an issue with the \$1 million material upgrade limit or a mapping inaccuracy, the Company typically pays to have the study modified accordingly. For example, as the Company has revised voltage fluctuation thresholds, all re-studies were performed at the Company’s cost.



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| <b>Study Capacity Limitation For Each Study</b>  |                      |  |
|--|----------------------|--|
| <b>Study Date</b>  | <b>Limitation</b>    | <b>Voltage Fluctuation Method</b>                                |
| June 27, 2017  | Steady State Voltage | 3% Individual / 5% Aggregate<br>2% at Voltage Regulation Devices |
| <p>Note 1: In the April 14, 2017 study, voltage fluctuation was a limitation only in case where no upgrades were performed and 0.8 MW of project could be accommodated. In the upgrades case with 3 MW of project, steady state voltage was the only limiting factor, which is consistent with the 3 MW case in the June 27, 2017 study.</p> |                      |  |

The IE incorrectly attributes an increase in project capacity between studies to be a result of “inaccuracies and errors,” when the situation is much more nuanced and involves the transition to a 2% individual threshold, adoption of the IEEE 1453 method, application of the \$1 million material upgrade limit and refinements in the study model (i.e., field conductor verification). Modeling can be an iterative exercise and there is no one approach for mitigating impacts. The effectiveness of various options is highly dependent on the unique characteristics of each feeder.

2. *Voltage Fluctuation Is Not a Limiting Factor*

Voltage fluctuation is not a limiting factor for the Linden project: changing the voltage fluctuation threshold in a study will not change the results, since the extensive reconductoring is needed because the project causes high voltage rather than voltage fluctuation. The June 2017 study results show a maximum voltage fluctuation of 1.33%,<sup>6</sup> well below the 3% individual threshold applied based on the Company’s IEEE 1453-based approach. The 3% threshold is consistent with IEEE 1547-2018<sup>7</sup> Rapid Voltage Change limits of 3% for this project with the point of common coupling at primary voltage. Steady state voltage during light loading cases reached 105% of nominal voltage, which is the upper limit of the relevant industry standard

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<sup>6</sup> Table 24: Heavy Load Individual Voltage Fluctuation, Base Case 3: New Gen On, Existing Gen, June 2017 study p. 13 (Attachment K to **Attachment E** to this Appeal).

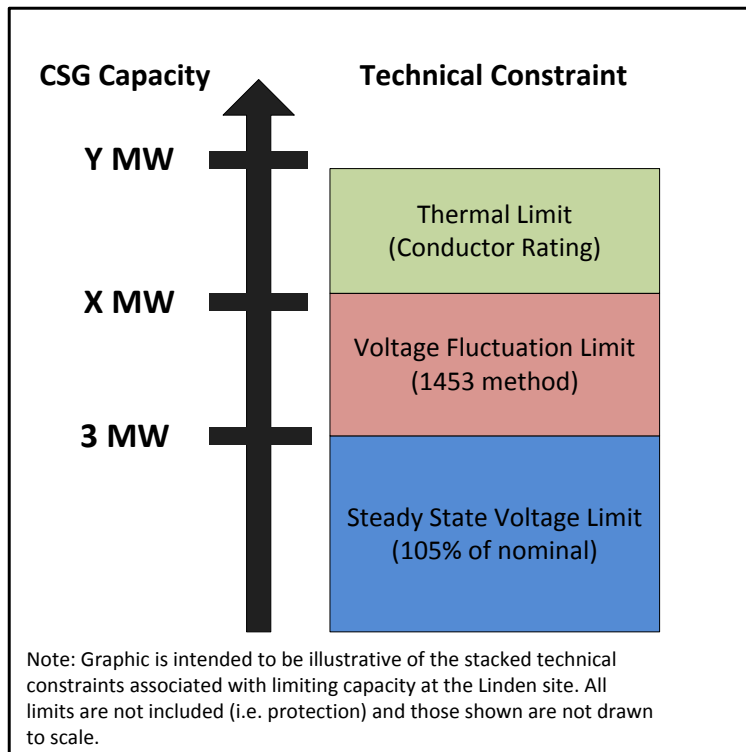
<sup>7</sup> Since the Linden Application was received prior to publication of IEEE 1547-2018, it is technically grandfathered in under IEEE 1547-2003. Nevertheless, IEEE 1547-2018 is the revised standard to be used for new applications and can be used to measure practices under previous standards such as IEEE 1547-2003 and IEEE 1453-2015.

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ANSI C84.1-2016.<sup>8</sup> Steady state overvoltage was a constraint in at least one case for every Linden project study performed to date.

In interconnection technical analysis for distributed energy resources (DER), different technical constraints are encountered as the modeled DER capacity increases. Figure 2 below illustrates some capacity limits associated with the Linden project’s interconnection for the 3 MW reconductoring case. The first limit triggered is the steady state voltage limit of 105%, which was addressed by \$1 million of reconductoring. If the program rules allowed more reconductoring, the voltage fluctuation and thermal limits would have been triggered next at a higher capacity value.

**Figure 2: Stacked Technical Constraints for the Linden Project**



<sup>8</sup> Table 21: Steady State Light Load, Base Case 3: New Gen On, Existing Gen On, June 2017 study p. 11 (Attachment K to **Attachment E** to this Appeal).

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The IE uses the terms “Flicker” and “Flicker Standards” in many instances throughout the report to describe the Company’s current study practices and thresholds. *However, the Company’s simplified IEEE 1453 approach does not contain flicker study thresholds for solar generation.*<sup>9</sup> Voltage fluctuation limits associated with Rapid Voltage Change and equipment compatibility were applied to the April 2017 and June 2017 studies, but consistent with the approach outlined in the Company’s White Paper, no flicker limits were applied.<sup>10</sup> Therefore, we interpret the IE’s frequent use of “Flicker” to more broadly mean voltage fluctuation, including Rapid Voltage Change.

Table 2 below summarizes the key points in the White Paper regarding the implementation of IEEE 1453-2015 for DER impact studies.<sup>11</sup>

**Table 2: Summary of IEEE 1453 White Paper Key Points**

“Applying IEEE 1453-2015 for Determining the Voltage Deviation Limits for Medium Voltage Distribution Connected Photovoltaics for Step-Changes in Voltage and Ongoing Voltage Deviations Due to the Passage of Clouds”:

- The discussion shows that the passing cloud flicker is not a significant perception factor and perception limits do not need to be set.
- The step voltage limit of 3% for a single large PV tripping is proposed. 3% preserves some system fluctuation tolerance for other sources and the medium and small Distributed Energy Resources (DER), greatly reduces the analysis burden for smaller DER facilities.
- The passing cloud voltage variations can be a serious maintenance factor for medium-voltage voltage-regulation devices. Ongoing voltage variation limits do need to be set for equipment compatibility reasons such as this.
- A 1.5%  $\Delta V$  [voltage change] at the regulator may result in a modest increase in operations. This increase is expected to be modest for several reasons.

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<sup>9</sup> The White Paper (**Attachment K**, pp. 63-77) describes that flicker emissions from passing clouds are acceptable and that Rapid Voltage Change and Equipment Compatibility are the primary considerations.

<sup>10</sup> This means no Pst, Plt, or percent threshold limits were applied for the purpose of flicker as defined by IEEE 1453-2015.

<sup>11</sup> The White Paper, **Attachment K**, pp. 63 and 72.

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The IE appears to miss important background and technical elements regarding the origin of the voltage regulator threshold and IEEE 1547 scope. IEEE 1547-2003 was an interconnection standard and IEEE 1547-2018 adds interoperability to this scope; neither revision of this standard addresses impact on grid equipment remote from the point of common coupling. The IE may not understand that application of the Company’s 1.5%<sub>75 percent drop</sub> (2%<sub>full-on/full-off</sub>) standard is relevant only at location voltage regulation equipment, which is remote from the garden location and outside the scope of IEEE 1547. The IE directs the Company to perform a study using 2% full-on/full-off criteria, when in fact the June 2017 study uses a 3% full-on/full-off criteria at the point of common coupling and 2% full-on/full-off at the voltage regulator.

When the IE determines that “the 1.5% with a 75% drop criteria is not to be used in any variation,” but instead “[v]oltage regulators shall be modeled with a 2% full on/full off value,” the IE fails to recognize that these measure are essentially equivalent in terms of modeling impacts. The Company provides the mathematical equation to make the conversion between 75% output drop to full-on/full-off in Figure 3 below.

**Figure 3: 75% Output Drop to Full-On/Full-Off**

$$\frac{\text{Voltage Change}}{\text{Output Drop}} = \text{Equivalent Voltage Change, Full On/Full Off}$$

$$\frac{1.5 \%}{0.75} = \frac{2.0 \%}{1.00} = 2\%$$

The IE mistakenly refers to flicker in a percentage (i.e., “4% flicker”) whereas the national interconnection standard IEEE 1547-2018 refers to flicker in P<sub>st</sub> and P<sub>lt</sub>. Rapid Voltage Change is central to national standards on voltage fluctuation and critical to the Company’s study methodology, but is barely mentioned in the entire IE Report. Rapid Voltage Change is characterized by a percent change and frequency of occurrence. The Company’s White Paper and simplified IEEE 1453 methodology indicate that flicker is not an issue, but rather Rapid Voltage Change and equipment compatibility are the major considerations. The IE report mentions Rapid Voltage Change in passing twice, while it refers to “flicker” over one hundred times.

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The Company did not write the statewide technical requirements found in the Section 10 tariff. The IE attributes this “poorly written and misleading” section to the Company, where in fact it was the result of a stakeholder process with public input and Commission approval. The IE states that the Company should describe in tariff “how the Xcel 4% maximum voltage fluctuation limit, used by this Tariff, fits underneath the ANSI C84.1 Voltage Standard.” (IE Report, p. 42) Here, the IE appears to be confusing steady state voltage with voltage fluctuation, which may explain some of the oddities found in the IE Report.

*3. Additional Flicker Study Requested by the IE*

While there is no need to fixate on flicker, as the Company is not limiting any Linden project capacity based on potential technical flicker impacts ( $P_{st}$  and  $P_{lt}$ ), the IE creates partial requirements for an unusual study. This study should not be seriously contemplated. Applying a full 1453 methodology to one project would involve a week’s worth of high resolution field data collection and time-series computer simulations. The Solar\*Rewards Community program would grind to a halt if this kind of study was required program-wide. The IE implies that detailed baseline flicker analysis should be performed on a site-by-site basis to determine unique levels of allowable flicker for each site, but this is also not practical given the current size of the program.

The IE also directs the Company to perform studies at various levels of voltage fluctuation (i.e., 2%, 3%, 4%), without providing any technical basis for the relationship between the requested percentages and the industry standard. Similarly, without providing examples from other jurisdictions or the industry practice, the IE Report makes an unusual conclusion that the interconnection technical review is a joint responsibility and SunShare has a role in running the models. The IE also states that the Company should determine the percent of allowable voltage fluctuation after the garden site is built, which is misaligned with proper risk management and presents numerous technical and legal challenges. Potentially, if these post-construction studies show that there is too much DG nameplate capacity, the Company would be obligated to immediately curtail the project that was just built.

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The IE implies that the Company should be using the full IEEE 1453 methodology, but the IE Report (Section VII: IE Determinations Related to a Revised Linden Study 4) outlines a study that in no way resembles the full IEEE 1453 methodology. The full methodology would require a baseline analysis as well as performing a time-series power flow study with high resolution load and solar data in order to determine  $P_{st}$  and  $P_{lt}$ . The IE states that a baseline should be done in the field, but provides no indication as to how the  $P_{st}$  and  $P_{lt}$  levels are to be determined during the power flow study. How IEEE 1453 can be implemented in practice is precisely the matter addressed in the Company's White Paper. Again, the Company's approach determined that visible flicker, as defined by IEEE 1453, is not an issue due to passing cloud cover effect on existing generation.

The IE Report also states that a new, unvetted methodology is proposed due to a "gap in the flicker standards," but fails to mention what the gaps are and how they relate to the proposed Study 4 requirements. When the Company's simplified IEEE 1453 methodology was developed, the focus of the analysis and dialogue in Minnesota was not whether the voltage fluctuation standards *exist*, but rather whether the tools and data are available to fully *implement* the methods during a desk evaluation. Power quality tools are available to fully implement voltage fluctuation standards to evaluate installed load or generation and to take baseline measurement. The complexity is related to time series modeling and required data to run the analysis.

This same topic related to power quality was discussed in the DGWG Technical Subgroup that is working on revising Minnesota statewide technical standards for interconnection. In a September 21, 2018 meeting, participants did not raise concerns about the Company's current implementation of IEEE 1453. However, it was noted that getting the statistical flicker measurements ( $P_{st}$  and  $P_{lt}$ ) at the point of common coupling continues to be a challenge.<sup>12</sup>

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<sup>12</sup> Staff meeting notes read: "As a subset of Power quality, flicker issues associated with IEEE 1453 came up in Xcel Energy's Community Solar Gardens program, and the resolution appears to have addressed the concerns. A participant asked if issues related to the application of IEEE 1453, such as metering, measuring, and time series data, were still a concern. It was noted that getting the statistical flicker measurements ( $P_{st}$  and  $P_{lt}$  (Perceptibility in short and long term) were named specifically) at the PCC prior to the installation of DER does continue to be a challenge."

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The Study 4 outlined in the IE Report directs the Company to run a large number of cases, with no clear objective or criteria as to what constitutes a passing case. Considering the number of variables, this study could represent nearly 150 separate power flow runs.<sup>13</sup> The IE clarifies that this is the minimum number of cases and that SunShare can request additional cases.

The IE refers to both generation capacity and voltage fluctuation as “inputs,” when in the practice of running power flow models the former is an *input* and the later an *output* or threshold of the analysis. A system modeler *inputs* generation, load, and electric grid equipment. Running the power flow model gives *outputs* of voltage and current at various modeled system elements. Voltage fluctuation, more specifically rapid voltage change, is determined by comparing the voltage output by the model for power flow cases where the generator is on and off. It is unclear to us if the IE has any experience with power flow modeling. The IE Report does not describe any aspects of modeling and only mentions power flow in a reference to the Company’s June 28, 2018 Response.<sup>14</sup>

The IE indicates that the Company uses a “one size fits all approach to flicker” instead of a “site by site” approach (IE Report, p. 46), when in fact the Company models the unique distribution system, load, and generation characteristics associated with each interconnection study for voltage fluctuation. Again, the Company’s approach sets no limits for solar generation flicker.

### **C. Underground Cable / Least Cost Method (SunShare Issue No. 1)**

The IE directs the Company to determine and communicate to SunShare the reason why a relatively short span of cable was installed underground years ago. The Company has provided this information to SunShare (and the IE) with details that the

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<sup>13</sup> The IE methodology contains three output levels; three voltage fluctuation levels; and two conductor variations. Each case must be run at two loading levels (peak and min); two generator cases (on and off); and two mitigation scenarios (with and without). This would lead to 144 separate power flow runs if the mitigation applied was precisely what was needed on the first attempt.

<sup>14</sup> The Company describes how voltage rise is related to power flow across electrical impedance to address why 750AL was selected. Both SunShare and the IE appear to confuse a voltage constraint for a thermal (ampacity) constraint.

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underground cable corresponds with existing property lines. In these situations, underground cable is typically customer-driven and either paid by the property owner or negotiated as part of an easement. It would be outside the Company's privacy rules to provide SunShare with further information regarding a particular Xcel Energy customer and their choice to go underground.

When performing an engineering scoping study that shows an impact, the Company's objective is to find mitigations that provide the least cost for any required interconnection facilities. This involves selecting inverter reactive power mitigations and conductor upgrades in additional power flow scenarios to determine a solution. For the Linden project, the 750 AL underground cable (792 feet) was included in the June 2017 engineering study as a solution to mitigate high voltage impacts. As a result, the required length of overhead conductor was reduced from approximately 18,500 feet to approximately 13,600 feet. The combination of overhead and underground cable represented the least cost estimate.

However, for the indicative cost estimate, the Company uses as a standard option overhead construction when a new line is assumed to be built. On an equal linear foot basis, installed overhead conductor is less costly than installed underground cable. Therefore, in our June 28, 2018 Response, we agreed to use overhead conductor cost for the total line upgrade in the indicative cost estimate to bring the Linden project's indicative cost below \$1 million. In the engineering study, however, we used power flow scenarios where the underground cable was assumed to be upgraded to 750 AL in order to mitigate steady state voltage rise. Although some of the line being rebuilt included underground cable, this in fact represents the least cost option because the length of overhead cable is significantly reduced.

In either case, the Company communicates to garden developers that the detailed design will have more accurate route and cost information based on the conditions encountered during detailed design. Some factors include: city or county permitting requirements, right-of-way considerations, actual new or replacement of underground cable and existing arrangements with customers or landowners.



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**D. 336 AL Conductor and Other Equipment Requirements (SunShare Issue No. 4)**

SunShare requested that “*the true industry standards to be reviewed regarding the use of 336 AL versus other alternatives such as 4/0 Penguin, 4/0 Oxlip*” and “*if the Independent Engineer discovers that industry standards could require less costly equipment,*” then Xcel Energy must use that equipment or pay the difference in cost.

Although the IE was explicitly asked to review and evaluate industry standards for overhead conductor, he did not do so. Instead, he misinterpreted the Company’s Section 9 tariff and stated that (1) any “equipment alternatives may be allowed if they do not restrict renewable generation and are technically feasible;” (2) “the Tariff does allow substitute materials and equipment to be used if they are technically equivalent and appropriate for renewable energy projects;” and (3) “nowhere in Minnesota Xcel Tariff Sections 9 or 10, is it stated that Xcel is not required to use equipment outside of its normally purchased and used equipment.” (IE Report, p. 33)

The IE refers to the Company’s Section 9 Tariff, Sheet 68.11 to make the above conclusions. Relevant parts of this tariff read:

*The standards employed by the Company (and as used by the independent engineer) should not vary, where applicable, from the standards which the Company uses when constructing, maintaining, or repairing its distribution network for purposes of providing service to its own retail customers. However, if the independent engineer determines that a particular piece of equipment or engineering alternative proposed by Xcel is more restrictive than industry standards but does not discourage cogeneration or small power production, the Company may implement that alternative, if the Company pays the incremental cost in excess of the amount necessary to implement the industry standard. The additional incremental costs paid by Xcel cannot be included in the \$1 million material upgrade limit. [emphasis added]*

The IE overlooked the first sentence of this tariff section, which states that the Company should use for Solar\*Rewards Community program the same standards for building distribution network than are used for building distribution network for the Company’s retail customers. This sets the expectation for interconnecting solar

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gardens, which is that the Company should use the same standard equipment than the Company regularly uses for its distribution network construction and maintenance. In other words, the baseline for interconnecting solar gardens is the Company's standard equipment.

However, then the tariff grants an exception: if the IE determines that a particular piece of equipment that Xcel Energy commonly uses is more restrictive than the industry standard (but does not discourage cogeneration or small power production), the Company may still use that alternative, but only if the Company pays the incremental difference in cost. This allows Xcel Energy to use more restrictive and more costly equipment than is the industry practice, but only if the Company pays the difference in cost and that difference is not counted towards the \$1 million material upgrade limit.

This tariff section does not state, as the IE claims, that the solar garden developers can substitute materials and equipment to be used if they are technically equivalent to the Company's standard equipment and appropriate for renewable energy projects.

A proper IE analysis conforming to the tariff provisions would have reviewed industry standards for the overhead conductor, as was requested by SunShare. The IE should have first focused on the 336 AL conductor, which is a standard conductor for building overhead line and specified in the Company's Overhead Distribution Construction Manual. Had the IE evaluated the industry practice, he would have found that 336AL is a standard conductor commonly used by utilities, and therefore appropriate to use for interconnecting solar gardens as well.

The IE's decision regarding the 336 AL overhead conductor also contradicts a prior decision by another Independent Engineer in another dispute. In the Klingelutz and Rice Brunansky IE report,<sup>15</sup> the IE concluded that Xcel Energy's unit cost for distribution upgrades using 336 AL mainline construction was within a reasonable

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<sup>15</sup> The Klingelutz and Rice Brunansky IE Report was filed on August 5, 2016, in Docket No. 13-867, and is available at this link:  
<https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId={9564598F-4EE2-4040-94B8-AAF60E02A08E}&documentTitle=20168-123966-02>.

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range based on his analysis of national data and industry practice. The Commission approved this conclusion in the November 1, 2016 Order:<sup>16</sup>

The Commission accepts the independent engineer’s finding in the Klingelutz 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.

Based on a misreading of the Company’s tariff and without analyzing the industry standard for overhead conductor, the IE in this case determined that Xcel Energy can use 336 AL, but has to discount the cost of installation by excluding profit and bond cost. (IE Report, p. 34) This decision, however, seems to contradict another conclusion by the IE, which states:

If the Revision 4 revised software model for Linden reveals that *reduced cable, or other equipment*, ratings etc., on the Xcel distribution system is acceptable, under the observation and input of SunShare’s engineer(s), *that equipment shall be allowed by Xcel.*” (IE Report, p. 28, emphasis added).

Regardless, as explained above, we disagree with both IE recommendations. Xcel Energy uses standard equipment for constructing its distribution system in order to achieve operational safety and efficiency. An efficient distribution network cannot be built on a project-by-project basis using numerous unique variations in equipment and standards. This would create serious complications and risks during construction, maintenance, and outage recovery as well as cause operational issues for crews who are not expecting or are unfamiliar with the non-standard equipment. Such equipment would also be more expensive to source and inventory.

**E. Delays in the Interconnection Studies and Process (SunShare Issue No. 3)**

The IE report does not discuss the timeline provided by Xcel Energy for the Linden project or attempt to determine which party or what circumstance caused delays for the project. Instead, the IE states that either Xcel Energy delayed the project or the

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<sup>16</sup> Docket No. 13-867, *Order Resolving Independent-Engineer Appeals and Establishing Procedures for Future Disputes*, November 1, 2016, Order Point 10. Included in **Attachment K**, pp. 4-20.

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project was delayed for other reasons, and therefore the IE believes SunShare is entitled to remedies. The remedies directed by the IE, however, are not allowed in our Section 9 and 10 tariffs.

As explained in our June 26, 2018 Response, Xcel Energy has not caused significant delays to the Linden project (**Attachment E**, pp. 20-22). The project was put on hold during the first IE dispute until a settlement was reached in January 2017. This time period – like any period when a project is subject to an IE review – does not count towards the 24-month mechanical completion requirement. Xcel Energy finalized the new IEEE 1453-based voltage fluctuation methodology on April 1, 2017, which was then applied to the Linden project, and the final study and Interconnection Agreement were provided to SunShare on July 14, 2017. SunShare requested extra time to review the Interconnection Agreement, and we did not receive any additional communications from SunShare until October 31, 2017. From here on, SunShare sent multiple sets of detailed (and often repetitive) questions to Xcel Energy, and we responded them within a reasonable time frame. SunShare initiated this IE dispute on March 16, 2018, and the IE issued his report more than nine months later, on December 18, 2018.

*1. 24-Month Clock for Mechanical Completion*

The IE determined based on an internal Xcel Energy email that the 24-month period for mechanical completion is a flexible concept. While it is true the internal email stated that **[PROTECTED DATA BEGINS**

**PROTECTED DATA ENDS]** this statement literally meant that – for a significant number of projects – the 24-month clock has been extended for several varying reasons. These reasons are specified in Section 9 tariff and include Force Majeure events (Section 9, Sheet 67.1), the Company’s failure to meet certain timeframes (e.g., for completing engineering studies within 50 days) (Section 9, Sheet 76), and IE disputes (Section 9, Sheet 76). However, the tariff does not include an option to begin a new 24-month clock for mechanical completion, as was directed by the IE in this case.

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2. *\$1 Million Material Upgrade Limit and Monetary Relief*

The IE's decision regarding the \$1 million material upgrade limit and monetary relief violates the Services Agreement and conflicts with the Company's Section 10 tariff. The IE also misunderstood the purpose of the \$1 million material upgrade limit and applied it to actual interconnection costs. The IE made the following decision:

“The IE does note that because of the wide range of problems encountered with Xcel's various Studies across the time frame of this Interconnection project, *SunShare does deserve some level of compensation for the delays and [sic] in this interconnection.* While the IE does not have the authority to wave the \$1M material limit cap perse [sic], the IE notes that the Linden project's material costs are presently below the \$1M cap due to Xcel recalibrating its indicative cost estimate to use 336 overhead cable rather than the Xcel proposed 750 UG cable segment. *The IE determines that it is reasonable that these revised costs shall continue through to the completion of the project, staying below the \$1M cap. SunShare shall further be granted relief through Xcel not adding its typical profit, overhead or bond costs, or any other markups to this project's cable, poles, and associated line and hardware, as well as labor required to perform this interconnection.* Upon request from SunShare, Xcel shall demonstrate its actual wholesale costs to SunShare for such.” (IE Report, p. 31, emphasis added)

The Services Agreement executed for this dispute does not allow the IE to award costs, monetary relief, or sanctions. Paragraph 4.d of the Services Agreement (**Attachment C**) explicitly prohibits this:

d) The IE has no authority to award costs to any Party (other than the 50/50 split of the fee for the Independent Engineer equally between the Parties). The IE has no authority to: 1) issue monetary or injunctive relief, 2) order interim measures, 3) issue enforcement orders, 4) issue emergency relief, 5) order specific performance, 6) award sanctions, or 7) award attorney fees.

The IE's decision to cap the actual costs of interconnection for the Linden project is a form of monetary relief or sanction. Under the terms of the IE Report, if the actual interconnection costs exceed \$1 million Xcel Energy would not be able to charge that portion of costs to SunShare. The IE also ordered that Xcel Energy must construct the distribution upgrades with a discounted cost, excluding overhead, labor, or any profit.

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The IE's decision above also violates the Company's Section 10 tariff, which requires that any interconnection customer, including solar garden developers, pay the actual costs associated with interconnecting their project to the Company's distribution system. Section 10 Tariff, Sheet No. 116 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 and coordination, installation testing and engineering review of the Generation System and interconnection design.

The \$1 million material upgrade limit is specific to the Solar\*Rewards Community program and applies to legacy co-located garden sites only, such as the Linden project. The \$1 million limit applies to the indicative cost estimate, which is a first-look indicative cost estimate based on the engineering study conducted prior to execution of the Interconnection Agreement and detailed design. If the indicative cost estimate shows that the necessary interconnection upgrades exceed \$1 million, then Xcel Energy is not required to interconnect the whole garden site. Instead, the engineering study will specify what amount of reduced capacity is allowed until the \$1 million limit is reached.

The IE misunderstood the \$1 million material upgrade limit, and applied it to actual interconnection costs. In doing so, the IE ordered monetary relief that SunShare did not even request. SunShare asked that the \$1million material upgrade limit be waived, in effect requesting that the project's 5 MW capacity will not be reduced even if the indicative cost estimate exceeds \$1 million.

We note that the Commission has already once over-ruled Mr. Wheeler's decision as an IE to cap actual interconnection costs, yet he made such a determination again in this dispute. In prior disputes involving SunShare's Becker, Glazier, and Bartlett sites, Mr. Wheeler recommended that Xcel Energy should not be allowed to charge the proportion of actual interconnection costs that exceed the indicative cost by 20

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percent or more. However, the Commission over-ruled this decision in its November 1, 2016 Order.<sup>17</sup> We request that the Commission reach the same conclusion here.

**V. PROCEDURAL CONCERNS AND MODIFICATIONS**

We believe the Commission should also be aware of several procedural concerns that became apparent during this IE dispute. Our first concern relates to the length of time it took the IE to issue his report. The Parties executed the Services Agreement and NDA on June 13, 2018; however, the IE did not issue his written report until December 18, 2018, more than 6 months later.

The intent of the IE process is to gain an independent opinion from an experienced third-party engineer on technical issues that have already been attempted to be resolved by the parties. Typically at this point, there has been a series of discussions between Xcel Energy and the garden developer regarding the engineering study and technical aspects of the project. Usually, the unresolved items are already identified, and Xcel Energy has responded to the developer's technical questions regarding those items. With this background in mind, the expectation for the IE dispute process is that the IE will issue the written report rather expeditiously and the Company's Section 9 Tariff, Sheet 68.12 states that a written determination is expected in 30 calendar days. We recognize this is a not a hard and fast deadline, and may vary depending on the complexity of the dispute, but we also believe that 6 months exceeds the reasonable amount of time for issuing an IE Report.

In this case, we are especially concerned about the time and amounts billed to prepare the IE report given the absence of any technical or engineering analysis, as already discussed. By December 31, 2018, the IE has billed the Company and SunShare a total of over **[PROTECTED DATA BEGINS PROTECTED DATA ENDS]** for handling this dispute. This amounts to over 470 hours billed by the IE.

We believe the amount and nature of discovery issued by the IE contributed to both the cost and the time it took to prepare the IE report. To be clear, we recognize that

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<sup>17</sup> Docket No. 13-867, *Order Resolving Independent-Engineer Appeals and Establishing Procedures for Future Disputes*, November 1, 2016, pp. 8-10. Included in **Attachment K**, pp. 4-20.

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the Section 9 Tariff, Sheet 68.12 as well as the Services Agreement and NDA allow the IE to determine what additional information is needed from the parties to resolve the dispute. However, we believe the IE overextended his authority in issuing discovery to Xcel Energy or in addressing confidentiality issues in three ways: 1) by requesting all internal and external emails regarding the Linden project without identifying any particular interconnection or engineering issue underlying that request, 2) by attempting to compel Xcel Energy to disclose to non-attorneys at SunShare a large number of Xcel Energy internal emails that the IE did not rely upon for any conclusion in the IE Report and that were marked “Attorney Eyes Only” consistent with the provisions of the NDA, and 3) by attempting to compel Xcel Energy to disclose to SunShare information that is private and confidential to a third-party. Our response to points 2 and 3 are set forth in **Attachment O** to this Appeal.

We objected to the broad discovery regarding internal communications and communications with the contractor who conducted engineering studies for the Linden project, but nevertheless provided the information requested to the IE. We therefore take issue with the IE’s statement that the Company only provided partial responses – as agreed upon search terms and other parameters were described in our responses, which provided all requested materials but marked them either confidential or attorney eyes only.

Our final concern is the failure of the IE to follow Commission directives and contract provisions in the Services Agreement and NDA regarding the IE review process. The Commission’s November 1, 2016 order set new parameters for future IE reviews, including the following:

- 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.
- The independent engineer may request additional information from parties necessary to resolve the dispute before the engineer.
- Xcel shall work with the Department and developers to develop a standardized format for independent-engineer reports.



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Consistent with this, the Company and Department developed a Standardized Form for IE Reports. This was vetted with developers, and was finalized and filed in Docket No. 13-867 on April 12, 2017 and again on May 12, 2017. This Standardized Format also contains requirements that align with the Commission parameters. For example, it has the following provisions:

- The IE should address only those issues raised in the Intake Form(s) as completed by the applicant and necessary to resolve the dispute between the parties.
- The IE must address the applicant's issues as set forth in Intake Forms, with facts or support that the applicant adds during the IE Review as allowed by the IE, and Xcel Energy's responses to those issues. For each issue, the IE will have to decide whether the issue is within his or her authority and necessary to resolve the dispute between the parties.
- The IE Report must provide an attachment describing the education, credentials, licenses and significant publications of the IE.

This Standardized Format for the IE Report was attached to the Services Agreement (as Attachment B to **Attachment C** to this Appeal). Further, the Services Agreement (page 2, par. 1.c.) required the IE to utilize the Standardized Format for the IE Report. Yet, the IE Report at pages 2-3 incorrectly states that no such Standardized Format was ever developed. Consequently, the IE addressed several issues that were not necessary to resolve the dispute and issued discovery that went well beyond that necessary to resolve the dispute before the IE.

In order to avoid similar experiences in future IE reviews, we are planning to better clarify in the Services Agreement expectations and boundaries for the IE, and emphasizing that their role as a technical expert is to focus on engineering and technical issues related to a project's interconnection.

## **VI. BURDEN OF PROOF**

The IE made a determination on burden of proof, although this issue was not raised by SunShare. The IE did not, however, employ the burden of proof standard to decide any issues. We briefly discuss burden of proof to make clear our understanding that the IE was incorrect on this issue, and do so to help set expectations going

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forward on other interconnection disputes arising under the Solar\*Rewards Community program. The IE Report (at page 2) cites to Minn. R. 7835.4500, which provides that in disputes between a utility and a qualifying facility the burden of proof is on the utility. This rule does not apply here. The purpose of the rules in Minn. R. Chapter 7835 is to implement PURPA and Minn. Stat. § 216B.164. (see, Minn. R. 7835.0200). However, the Minnesota Court of Appeals has already ruled that the Solar\*Rewards Community program is not a PURPA program and that Minn. Stat. § 216B.164 does not apply to the Solar\*Rewards Community program.<sup>18</sup> Accordingly, the burden of proof standard cited by the IE does not apply to the Solar\*Rewards Community program.

**CONCLUSION**

All studies conducted for the Linden project indicate that the limitation of project capacity is related to steady state voltage. The assumptions and results of the June 2017 study are correct in all material aspects, as are any diagrams and attachments included in the study report. The results of this study show a maximum voltage fluctuation of 1.33%, well below the 3% individual threshold applied based on the IEEE 1453 approach. Since steady state voltage was the limiting factor in the June 2017 study, changing the voltage fluctuation threshold to 4% full on/full off or even a higher level would not increase the allowable capacity for the project.

The IE dismissed the June 2017 study as erroneous, but did not offer a technical opinion on the engineering merits of the study – the IE Report lacks an engineering analysis of the study assumptions, models and results. In general, the IE Report does not include any technical assessment of the specific issues disputed by SunShare.

We believe the IE exceeded his authority by directing Xcel Energy to make exceptions to tariffed Solar\*Rewards Community program rules (Section 9 tariff) and our standard interconnection requirements (Section 10 tariff). The IE also made decisions that were based on misunderstanding program processes and misinterpreting tariff

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<sup>18</sup> *In the Matter of the Petition of Northern States Power Company, d/b/a Xcel Energy, for Approval of Its Proposed Community Solar Garden Program*, (Minn. Ct. Appeals, 2016) No. A15-1831, at pages 18-20, *review denied*, September 20, 2016.

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provisions. Finally, the IE granted monetary relief in violation of the Services Agreement and not requested by SunShare.

We request that the Commission reject the IE Report and find that it was proper for Xcel Energy to offer 3 MW of capacity at the Linden site consistent with the results from the June 2017 study.

Dated: January 3, 2019

Northern States Power Company

## CERTIFICATE OF SERVICE

I, Paget Pengelly, hereby certify that I have this day served copies of the foregoing document on the attached list of persons.

xx by depositing a true and correct copy thereof, properly enveloped with postage paid in the United States mail at Minneapolis, Minnesota; or

xx by electronic filing.

**Docket Nos.: E002/M-19-\_\_\_\_ & E002/M-13-867**

Dated this 3<sup>rd</sup> day of January.

/s/

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Paget Pengelly  
Regulatory Administrator

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