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March 5, 2019

Via Electronic Filing

Mr. Daniel Wolf
Executive Secretary
Minnesota Public Utilities Commission
121 Seventh Place East, Suite 350
St. Paul, MN 55101-2147

Re: ***In the Matter of the Verified Formal Complaint and Petition for Expedited Relief by SunShare, LLC Against Northern States Power Company d/b/a Xcel Energy for Violations of Its Section 9 and 10 Tariff and Related Solar*Rewards Community Program Rules and Commission Orders***

Docket No. _____

Dear Mr. Wolf:

Pursuant to Minn. Stat. § 216B.17, SunShare, LLC respectfully submits the enclosed Verified Formal Complaint and Petition for Expedited Relief ("Complaint") against Northern States Power Company d/b/a Xcel Energy ("Xcel").

SunShare considers certain information included within the Complaint and attached exhibits to contain not public, proprietary, and trade secret protected data. This information is designated as **PROTECTED DATA** because the same and similar information has been designated as such in other disputes involving the community solar gardens program, including disputes between SunShare and Xcel, and the information includes sensitive, competitive information, the disclosure of which could harm SunShare or Xcel. Further, the information (1) is being supplied by SunShare; (2) is the subject of reasonable efforts by SunShare and/or Xcel to maintain its secrecy; and (3) derives independent economic value, actual or potential, from not being generally known or accessible to the public. Minn. Stat. § 13.37, subd. 1(b). SunShare has therefore included a **NONPUBLIC** and **PUBLIC** version of its Complaint and Exhibits, and has identified the Trade Secret and Not Public information pursuant to Minn. R. 7829.0500.

Pursuant to Minn. R. 7829.1900, subp. 1, and as set forth more fully in the Complaint, SunShare respectfully requests that the Commission handle this matter on an expedited basis. Further, SunShare has provided a copy of this Complaint to Xcel consistent with Minn. R. 7829.1700, subp. 2.

Thank you for your attention to this matter. Please do not hesitate to contact me with any questions or concerns.

Sincerely,

Stinson Leonard Street LLP

/s/ Andrew Gibbons

Andrew Gibbons

STATE OF MINNESOTA
BEFORE THE PUBLIC UTILITIES COMMISSION

*Verified Formal Complaint and Petition for Expedited Relief by SunShare, LLC Against Northern States Power Company d/b/a Xcel Energy for Violations of Its Section 9 and 10 Tariff and Related Solar*Rewards Community Program Rules and Commission Orders*	MPUC Docket No. _____ **VERIFIED FORMAL COMPLAINT AND REQUEST FOR EXPEDITED RELIEF OF SUNSHARE, LLC**

SunShare, LLC ("SunShare") respectfully submits this Verified Formal Complaint and Petition for Expedited Relief ("Complaint") against Northern States Power Company, d/b/a Xcel Energy ("Xcel") to the Minnesota Public Utilities Commission ("Commission").

I. EXECUTIVE SUMMARY.

This Complaint pertains to SunShare's proposed development of three co-located 1 MW gardens to be located in Lester Prairie, McLeod County, Minnesota, designated the Schiller Project **[PROTECTED DATA BEGINS** **PROTECTED DATA ENDS]** The issues underlying this Complaint are substantially similar to those that caused SunShare to initiate an independent engineer ("IE") review of SunShare's Linden Project, which Xcel has since appealed following an IE decision in SunShare's favor.[1] Consistent with the IE's findings regarding the Linden Project, Xcel has repeatedly failed to conduct proper engineering studies for the Schiller Project, resulting in excessive and widely varying estimated interconnection costs. Xcel has also failed to explain the basis for its cost estimates resulting from the erroneous studies, despite internally acknowledging errors and discrepancies in its studies for

[1] *See In the Matter of 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-19-29 (appeal filed on Jan. 3, 2019).

the Linden Project which Xcel was conducting around the same time. Further, rather than work with SunShare to address these issues, Xcel unilaterally terminated the Schiller Project from the interconnection queue. As explained herein, SunShare estimates that Xcel's conduct has caused approximately $153,080 in damages. Xcel's actions have also harmed its residential customers, who comprise 100% of the project's subscribers.

SunShare commenced IE review of the Schiller Project in April 2018, about one month after requesting IE review of the Linden Project. SunShare waited to commence IE review because it was attempting to bilaterally resolve a number of disputes with Xcel on a global basis, rather than unnecessarily involve the Commission and Department of Commerce ("Department"). Incredibly, once SunShare submitted the dispute to the IE out of necessity, Xcel argued that IE review was impossible because, due to Xcel's own actions, the project was no longer in the queue. In light of Xcel's refusal to participate in IE review, the Department suggested that SunShare take the dispute to the Commission. Due to the similarities with the Linden Project, we waited to do so until the IE issued his report for the Linden Project, to better inform the Commission of the issues underlying this dispute. Following issuance of the IE report, SunShare made an additional request to Xcel for its engineering studies for the Schiller Project, in a final attempt to bring Xcel to the table. Xcel again refused, necessitating this Complaint.

Given the wide-ranging errors and lack of transparency that the IE found with respect to the Linden Project, and Xcel's refusal to bilaterally work with SunShare or participate in IE review for the Schiller Project, SunShare has no choice but to submit this Complaint. For the reasons discussed herein, and consistent with the IE's report regarding the Linden Project, SunShare respectfully requests that the Commission issue the following relief:

1. Find that Xcel violated, *inter alia*, Sections 9 and 10 of its electric tariff book, S*RC program rules, and/or Commission Orders;

2. Require Xcel to immediately restore the Schiller Project to its prior position in the interconnection queue, without impact to the construction timeline, and to complete required interconnection upgrades before September 30, 2019;

3. Require Xcel to study the Schiller Project using appropriate and least-cost industry standards, including Xcel's "simplified" IEEE 1453 methodology, and if interconnection costs are still prohibitively expensive, the current IEEE 1453 methodology recognized by the IE as the appropriate standard;

4. Allow SunShare's engineers to participate in developing and running the studies to address any further issues that arise;

5. As part of the restudy, require Xcel to analyze whether the use of smart inverter functionalities can address flicker and steady state voltage concerns and reduce interconnection costs, and if so, allow for the use of those functionalities;

6. Prohibit Xcel from charging its overhead, profit, bond costs, other markups, or labor to SunShare to complete the interconnection work, recognizing the significant delays and damages caused by Xcel to date;

7. In recognition that Xcel wrongfully removed the Schiller Project from the queue, prohibit Xcel from charging any costs to SunShare to upgrade its grid that would not have been necessary had Xcel not wrongfully removed the project; and

8. Grant any other further relief in SunShare's favor that the Commission thinks appropriate.

Expedited review and relief is also warranted for this dispute. Xcel's delay tactics and cancellation of the Schiller Project have harmed SunShare, and quick action is needed to ensure project completion in 2019, before winter. Xcel is also well aware of the issues raised herein, making typical record development unnecessary. Accordingly, SunShare further respectfully requests that the Commission vary its rules and issue an immediate order requiring Xcel to provide a response to this Formal Complaint within ten business days, which is the same period provided for responses to appeals from IE reports, and to quickly schedule this matter for a hearing.

As explained in SunShare's response to Xcel's Appeal of the Linden IE Report,[2] Xcel's actions here are consistent with the broader persisting interconnection delays and procedural problems that unnecessarily increase costs for developers and significantly impede our ability to timely and efficiently complete interconnections. This is contrary to the purpose of the S*RC program – to promote greater community investment in distributed solar generation, particularly among residential subscribers, churches, schools, and other community groups;[3] and to reasonably allow for the creation, financing, and accessibility of community solar gardens.[4] Again, the Commission should consider the issues raised herein to inform its review of other dockets regarding interconnection standards and adjustments to CSG rates, as the sheer cost of pursuing individual disputes are so high that small companies such as SunShare cannot afford to raise these issues and fully participate in every docket.

I. PARTIES AND JURISDICTION

Complainant:	SunShare, LLC 7705 208th Street North Forest Lake, MN 55205
Complainant's Rep:	David Amster-Olszewski Chief Executive Officer 1151 Bannock Street Denver, CO 80204-8020
Complainant's Counsel:	Andrew Gibbons Thomas Burman Stinson Leonard Street LLP 50 South Sixth Street, Suite 2600 Minneapolis, MN 55402
Respondent:	Northern States Power Company, d/b/a Xcel Energy

[2] SunShare, LLC's Response to Xcel Energy's Appeal of the Independent Engineer Report of December 18, 2018, Docket No. E-002/M-19-29 (Jan. 17, 2019), eDocket ID 20191-149326-02.

[3] See Order Approving Solar-Garden Plan with Modifications at 11, Docket No. E-002/M-13-867 (Sept. 17, 2014), eDocket ID 20149-103114-01.

[4] Minn. Stat. § 216B.164(e)(1).

414 Nicollet Mall
Minneapolis, MN 55401

Respondent's Counsel: Amanda Rome
Lead Assistant General Counsel
Northern States Power Company, d/b/a Xcel Energy
414 Nicollet Mall
Minneapolis, MN 55401

The Commission has jurisdiction to hear this matter, make findings of fact, and order all appropriate relief under, *inter alia*, Sections 216A.05, 216B.09, 216B.14, 216B.164, 216B.17, and 216B.21 of the Minnesota Statutes, and Chapters 7829 and 7835 of the Minnesota Rules.[5]

II. FACTUAL BACKGROUND[6]

1. SunShare was founded in Colorado in 2011 to develop, own, and operate Community Solar projects in partnership with Xcel and other electric utilities across the nation. It expanded to Minnesota in 2014, hired a local workforce, and has since developed and subscribed over 80 MW DC of community solar projects in the State under Xcel's S*RC program. SunShare currently has over 100 MW DC of fully subscribed and operational solar gardens in Colorado and Minnesota. SunShare submitted its first applications to Xcel's Minnesota S*RC program in December 2014.

2. SunShare submitted a complete S*RC application for the Schiller Project on November 17, 2015. 100 percent of the Schiller Project's subscribers are comprised of Xcel's residential customers. Xcel initially – and erroneously – informed SunShare in March 2016 that the Schiller Project was not feasible because the nearby substation had reached maximum capacity

[5] Further, the Commission has previously asserted jurisdiction over complaints similar to this one. *See* Order Finding Jurisdiction and Referring Complaint to Independent Engineer, *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*, Docket No. E-002/M-15-786 (Dec. 1, 2015), eDocket ID 201512-116051-01.

[6] Xcel's conduct underlying this dispute is consistent with prior disputes on other projects, and those disputes inform the issues asserted and relief requested herein. As a result, SunShare includes allegations regarding those other projects and disputes here, to provide greater context and further inform the Commission's decision making.

for distributed generation.[7]

3. Around the same time, SunShare initiated a dispute with respect to other projects by filing a Formal Complaint and Petition for Relief with the Commission ("November 2015 Complaint").[8] The Commission issued an order on December 1, 2015, that referred four projects for IE review – SunShare's Becker, Glazier, Bartlett, and Murphy projects. The IE's recommended resolution of these four project disputes, and the Commission's acceptance of those recommendations, inform the issues underlying the instant dispute and SunShare's requested relief.

4. The IE issued reports for the four project disputes in early 2016.[9] Following the Commission's directive that "industry standards should be the touchstone for solar-garden interconnection requirements[,]"[10] the IE observed that "it is expected that Xcel use and apply the latest, most current editions of ANSI/IEEE Standards" when conducting its engineering studies.[11] The IE concluded that the IEEE 1547-2003 standard and related GE Flicker Chart that was applied at the time, which Xcel had until that point relied on in its engineering studies, was superseded by IEEE 1453 and other standards.[12] He recommended that the Commission provide a one-year deadline for Xcel to comply with the latest IEEE standards.[13] The IE also concluded that Xcel improperly applied a 1.5% flicker threshold, rather than a 2.0% threshold, in its engineering

[7] Correspondence reflecting this assessment from Xcel is included as Attachment A.

[8] Formal Complaint and Petition, Docket No. E-002/M-15-786 (Dec. 1, 2015), eDocket ID 201511-115399-02.

[9] *See, e.g.*, Resolution of the SunShare Flicker Dispute at the Golf/Hassan/St. Michael/Becker Interconnection Site, MPUC Docket No. 13-867 (Mar. 31, 2016) (included as Appendix A to Xcel Energy's Appeal from the Independent Engineer Report, MPUC Docket No. E-002/M-13-867 (Apr. 7, 2016), eDocket ID 20164-119858-02).

[10] *Id.* at 38 (quoting Order Approving Tariffs as Modified and Requiring Filing at 7, MPUC Docket No. 13-867 (Dec. 15, 2015), eDocket ID 201512-116474-01).

[11] *Id.* at 39.

[12] *Id.* at 36–39.

[13] *Id.* at 39.

studies.[14]

5. SunShare also asked the IE to allow it to use voltage control functions on its advanced-functionality inverters (known as smart inverters) to mitigate potential flicker and steady-state overvoltage, which in turn could reduce interconnection costs. However, the IE recommended – now almost three years ago – that Xcel continue to be allowed to prohibit the use of the 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.[15] At that time, Xcel permitted SunShare to install smart inverters but disallowed the use of their voltage-control functions, despite their benefits in mitigating flicker and steady-state overvoltage, which lower interconnection costs. SunShare and Xcel appealed the reports.

6. While the appeal regarding those four projects was pending, Xcel restudied the Schiller Project, and on August 1, 2016, provided SunShare with the interconnection agreement and indicative cost estimate from that restudy.[16] According to Xcel's revised study, the Schiller Project could be installed and connected to the nearby substation at an indicative estimated interconnection cost of **[PROTECTED DATA BEGINS PROTECTED DATA ENDS]**

7. The Commission held a hearing on SunShare's and Xcel's appeals on September 20, 2016. At the hearing, the Commission indicated it would adopt the recommendations from the IE's report; namely, that Xcel should restudy those projects utilizing a correct 2% flicker threshold. Following the hearing, SunShare requested that the Schiller Project also be restudied utilizing the

[14] *Id.* at 46-48.

[15] *Id.* at 53.

[16] The August 1, 2016 interconnection agreement and indicative cost estimate package that Xcel provided to SunShare is included as Attachment B.

same 2% flicker threshold ordered by the Commission. Xcel agreed to restudy the project.[17]

8. On November 1, 2016, the Commission issued an order that largely adopted the IE's recommendations regarding the issues raised in its four project disputes.[18] First, recognizing that the IEEE 1453 methodology is a "data-driven method" that "holds promise for better reflecting real-world conditions," the Commission ordered Xcel to "work with other interested parties to develop a transition plan for incorporating the IEEE 1453 standard into its modeling of voltage fluctuations and flicker for solar PV."[19] The Commission also determined that SunShare should not be permitted to utilize voltage-control functions on its smart inverters "until such time as the inverter functions have been tested and certified under UL standards, or until further order of the Commission."[20] Lastly, the Commission ordered Xcel to "work with other interested parties to develop a transition plan for incorporating the IEEE 1453 standard into its modeling of voltage fluctuations and flicker for solar PV."[21] The Commission also determined that SunShare should not be permitted to utilize voltage-control functions on its smart inverters "until such time as the inverter functions have been tested and certified under UL standards, or until further order of the Commission."[22] The Commission also ordered Xcel to restudy the Becker and Glazier sites using a 2.0% (full-on full-off) rather than 1.5% flicker threshold.[23]

9. On December 22, 2016, SunShare signed a settlement agreement that resolved all remaining issues raised in the November 2015 Complaint. Xcel countersigned the agreement on

[17] Correspondence reflecting this request by SunShare is included as Attachment C.

[18] Order Resolving Independent-Engineer Appeals and Establishing Procedures for Future Disputes, Docket No. E-002/M-13-867 (Nov. 1, 2016), eDocket ID 201611-126177-02.

[19] *Id.* at 15–16.

[20] *Id.*

[21] *Id.* at 7.

[22] *Id.*

[23] *Id.*

January 2, 2017 ("January 2017 Settlement Agreement"). The January 2017 Settlement Agreement **[PROTECTED DATA BEGINS**

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10. **[PROTECTED DATA BEGINS**

PROTECTED DATA ENDS] However, on January 24, 2017, only three weeks after signing the Settlement Agreement with SunShare, Xcel provided SunShare a revised interconnection agreement and cost estimate for the Schiller Project.[24] Xcel's revised estimate stated that the project could only be installed at a substantially increased cost of **[PROTECTED DATA BEGINS PROTECTED DATA ENDS]**. This made the project under Xcel's antiquated and incorrect study methodology financially infeasible. Notably, however, the cost did not breach the $1 million material upgrade threshold, as part of the cost was made up of items that did not count towards that cap. All said, the new cost was nearly double the previous estimate, apparently due to necessary line upgrades that Xcel did not identify in its prior cost estimate (or identified incorrectly in the new estimate). This increase occurred despite the fact that shifting from a 1.5% to a 2% flicker input should have reduced costs, if anything. This strongly indicated that there likely were other errors in either the new or old study.

11. The new estimate also contradicted itself in several locations regarding the distances of needed line upgrades, contradictions that could alter the cost estimates by hundreds

[24] The January 24, 2017 interconnection agreement and indicative cost estimate package that Xcel provided to SunShare is included as Attachment D.

of thousands of dollars. Xcel refused to clarify the results.

12. The new estimate substantially revised upward the anticipated costs associated with distribution upgrades, from $373,000 to $709,500, or 90%. Previously, Xcel determined that SunShare would need to replace approximately 4,900 feet of #2AI conductor with 336 AL, at an estimated cost of $269,500. In its revised analysis, however, Xcel determined that 10,000 feet of 336 AL replacement line was needed, at a cost of $616,000. This in turn was contradicted, without explanation, by the statement of work included in Xcel's revised interconnection agreement, which stated that 11,200 feet of #2AI conductor needed to be replaced. It also is unclear whether the new study used least-cost industry standard equipment or modeling inputs.

13. Following receipt of the revised interconnection agreement and cost estimate, SunShare repeatedly asked Xcel to restudy the Schiller Project using the new IEEE 1453 standards, which Xcel had not applied to the revised study, in addition to clarifying the change in inputs Xcel must have used to deliver such vastly different line upgrade cost estimates. SunShare last requested a copy of Xcel's second study for the Schiller Project on January 14, 2019, for one final try in order to avoid taking another issue before the Commission. Again, Xcel refused to provide this study.[25] A restudy under the standards, even the "simplified" version used by Xcel, would likely significantly reduce the estimated indicative interconnection costs for the project. Further, as was discovered in the Linden Project's studies, the IE and SunShare were able to identify numerous errors that could further reduce interconnection costs if corrected, such as overly conservative set points.

14. Xcel refused to restudy the Schiller Project under the IEEE 1453 standard, noting that it was not one of the projects included for restudy under the January 2017 Settlement

[25] This correspondence is included as Attachment E.

Agreement. However, SunShare did not request the project to be included under that agreement because, at the time the settlement was executed, Xcel had estimated the interconnection costs to be only **[PROTECTED DATA BEGINS PROTECTED DATA ENDS]** Xcel also refused to clarify discrepancies between its estimates, instead threatening to cancel the project if SunShare did not execute the new interconnection agreement, despite the ongoing disagreements between the parties regarding Xcel's new estimate.

15. SunShare never consented to the Schiller Project being removed from Xcel's queue, as it was still seeking clarification and justifications regarding Xcel's updated study. SunShare also could not execute the revised interconnection agreement or make payment on the agreement, because the costs identified in the revised estimate were inaccurate, and Xcel refused to adequately respond to SunShare's requests for clarification notwithstanding the vastly different cost estimates.

16. Nonetheless, on April 17, 2017, Xcel wrote to the Schiller Project's primary application manager at Mortenson Construction Company, a partner of SunShare's and the financier of the project, threatening to cancel the application for the project and remove it from the queue if Xcel did not receive an executed interconnection agreement by April 21, 2017.[26]

17. A junior manager at Mortenson responded, stating that if Xcel ended up cancelling the application, any deposit funds that were provided for the application should be refunded to Mortenson's account and not SunShare's. As Xcel knew at the time, and consistent with Xcel's own processes, that this junior manager lacked authority to request or authorize cancellation of the project from the queue, and was not aware of the extent of conversations between Xcel, SunShare, and Mortenson regarding the project. However, Xcel has since retroactively misinterpreted this response from the junior manager at Mortenson as an approval to cancel the project, in an attempt

[26] A copy of the correspondence between Xcel and Mortenson is included as Attachment F.

to justify Xcel's actions over a year after removing the project from the queue. Contrary to Xcel's interpretation, the junior manager did not consent to cancellation. Instead, the junior manager made this request because, on two prior occasions, Xcel had wired over $1 million of unrelated developers' deposits to SunShare out of the blue rather than to other developers who owned the deposits, and had requested those funds to be repaid by Xcel, triggering SunShare loan repayment requirements and causing financial stress to SunShare. Xcel had wired the other developer's money to SunShare, creating a significant breach in their fiduciary duty to protect millions of dollars of program deposits. The junior manager's response to Xcel's statements that they would return the deposit funds on this project were made simply to avoid a similar occurrence with the Schiller Project, and should not be conveniently interpreted by Xcel as consent to cancel the project.

18. On or around April 26, 2017, Xcel returned the deposit for the Schiller Project to Mortenson, stating that it was removing the project from the queue without restudy because SunShare would not sign the revised interconnection agreement. However, Xcel left the Schiller Project in its S*RC Salesforce system, acknowledging the continuing bilateral discussions between the companies, only finally removing it suddenly in late 2017.

19. Notably, Xcel returned the deposit money on the same day it submitted a filing to the Commission which, among other things, outlined a "simplified IEEE 1453 study process" to be used in its interconnection studies ("April 2017 Compliance Filing").[27] Consistent with the Commission's November 2016 order requiring Xcel to implement IEEE 1453, SunShare, through its industry partners, had been working with Xcel in transitioning to the new standard. Xcel's firm

[27] *See* Compliance – Transition to Incorporating the Standards of IEEE 1453, Docket No. E-002/M-13-867 (Apr. 26, 2017), eDocket ID ID 20174-131247-01.

position was that it would initially develop a "simplified" IEEE 1453 process, rather than a full and complete application of 1453, as had been intended by the IE in 2016. While disagreeing with Xcel, industry participants had no choice but to simply wait and see how the "simplified" process methodology impacted projects. Minutes from these stakeholder meetings reflect that "there continued to be dissent within the workgroup regarding the simplified approach to IEEE 1453 recommended practice"[28] and that developers were not willing to adopt the simplified approach for projects exceeding 1 MW.[29] Although the simplified IEEE 1453 method helps many projects, for some projects it did not go far enough, and a full IEEE 1453 study would have been critical to those projects that required further study after the application of the "simplified" methodology.

20. Xcel thereafter restudied the Linden Project. Xcel's restudy, and the information that SunShare obtained during its IE dispute over the Linden Project, revealed two issues that are pertinent to SunShare's Schiller Project – first, that Xcel was fully capable of restudying the Schiller Project under the simplified IEEE 1453 methodology, but chose not to; and second, that Xcel's engineering studies contained numerous inaccuracies and errors that Xcel kept from SunShare, despite Xcel's engineers internally acknowledging them. The issues underlying the Linden Project dispute, and the IE's findings and remedies ordered, inform this dispute.

21. When conducting the restudy for the Linden Project, Xcel utilized the "simplified" IEEE 1453 methodology. Even though the Linden Project was designed to include five 1 MW co-located gardens, Xcel's July 14, 2017 revised cost estimate restricted the project to three 1 MW co-located gardens, apparently because any greater capacity would push interconnection costs above the $1 million material upgrade threshold applicable to the project. Xcel calculated an

[28] *See* Attachment B to April 2017 Compliance Filing.

[29] *See id.* at 11 ("The Stakeholder group seemed to be comfortable moving forward with the simplified approach in the interim for 1 MW projects in the pipeline.").

indicative interconnection cost estimate of **[PROTECTED DATA BEGINS PROTECTED DATA ENDS]** for the 3 MW restricted project. Xcel did not explain the material upgrades that would have caused a 5 MW project to exceed the threshold, nor did Xcel indicate that it conducted any study for the project at a capacity greater than 3 MW, and Xcel would never answer these questions over the following months.

22. Over the following months, SunShare made multiple requests to Xcel to clarify and provide justification for aspects of the revised study for the Linden Project. SunShare asked Xcel to provide, among other things: (1) justification for the type of lines called for in the revised study; (2) the project inputs used for the restudy; (3) an explanation of the upgrades that would push a 5 MW project above the $1 million material upgrade threshold; (4) an explanation for why expensive underground lines were required; (5) an explanation for why Xcel utilized the simplified IEEE 1453 method when it appeared to limit capacity, rather than the full method that the Commission ordered it to implement; and (6) an explanation for why SunShare could not use voltage control measures on its smart inverters even though doing so would likely mitigate potential flicker and steady-state overvoltage issues and avoid other costly upgrades, and because industry acceptance of this technology had progressed substantially since 2016.

23. As was eventually revealed through the IE dispute for the Linden Project, at the same time SunShare was requesting this information, Xcel's own engineers were acknowledging internally that the most recent engineering study, which formed the basis for Xcel's most recent cost estimate for the Linden Project, contained numerous errors and inaccuracies. Yet Xcel provided answers that were evasive, delayed, and incorrect in response to SunShare's requests, just as it did for the Schiller Project.

24. SunShare therefore commenced an IE dispute for the Linden Project. The IE issued

his report on December 18, 2018.[30] The IE concluded that Xcel's engineering studies performed for the Linden Project included numerous errors and inaccuracies, which Xcel's own engineers internally acknowledged.[31] At the same time, the IE's report explains that Xcel refused to acknowledge these errors externally to SunShare, and did not provide SunShare with other information to which SunShare was entitled, in order to adequately vet the engineering studies. He also found that Xcel erred in applying its "simplified" version of IEEE 1453 methodology to its most recent engineering study, as that was not consistent with industry standards.[32] Accordingly, the IE ordered Xcel to perform a restudy of the project, and to allow SunShare's engineers to participate in the development and running of that restudy.[33]

25. The IE also issued other forms of relief as compensation for Xcel's delays in conducting its erroneous studies and otherwise processing the Linden Project application. In particular, recognizing that Xcel is prohibited by its tariff from charging the incremental difference between the cost of using more restrictive equipment and less-costly equipment that still meets industry standards,[34] the IE prohibited Xcel from charging its typical profit, overhead, or bond costs, any other markups or labor for the interconnection.[35] Xcel appealed the IE Report on January 3, 2019,[36] and SunShare responded on January 17, 2019.[37]

26. On April 12, 2018, shortly after SunShare submitted its Linden dispute for IE

[30] The public version of the IE Report for the Linden Project, as filed in Xcel's appeal, is included as Attachment G.

[31] IE Report at 23–24.

[32] *Id.* at 42.

[33] *Id.* at 44–47.

[34] *See* Xcel Tariff Section 9, Sheet 68.11(9a).

[35] IE Report at 34.

[36] Xcel Energy Appeal of Independent Engineer Report of December 18, 2018, Docket No. E-002/M-19-29 (Jan. 3, 2019), eDocket ID 20191-148857-01.

[37] SunShare, LLC's Response to Xcel Energy's Appeal of the Independent Engineer Report of December 18, 2018, Docket No. E-002/M-19-29 (Jan. 17, 2019), eDocket ID 20191-149326-02.

review, SunShare also initiated IE review of the Schiller dispute. Given the ongoing bilateral negotiations between Xcel and SunShare regarding the Linden Project, Schiller Project, and other projects in Minnesota and Colorado, which SunShare was attempting to resolve on a global basis, and in order to avoid wasting Commission resources, SunShare chose to wait to submit the Schiller Project for IE review until it was absolutely clear that a negotiated settlement was impossible.

27. The issues that SunShare submitted for IE review were similar to those underlying the Linden Project dispute.[38] Among other things, SunShare asked the IE (1) to review and determine which line upgrade length between the two studies, if any, was actually needed, because the difference in length was the cause of the increased costs between the first and second studies (and within the second study, which contradicted itself); (2) to determine whether Xcel was in fact proposing the use of least-cost industry standards as required under Section 9 Revised Sheet 68.11 of its tariff, as it was refusing to apply the IEEE 1453 standard, which was already agreed to as the most relevant industry standard; (3) to review and determine whether Xcel's application of IEEE 1453 standard at the 1.5% and 75% on/off threshold and simplified methodology to the project was appropriate, as previous IE and Commission rulings had called for the standard IEEE 1453 to be applied rather than the simplified and more conservative version used by Xcel; and (4) to require Xcel to restudy the project and provide new (and accurate) cost estimates utilizing the IEEE 1453 methodology with the proper voltage variation restrictions, as determined by the IE.

28. A restudy with the appropriate IEEE 1453 methodology with SunShare's participation and review is particularly appropriate for the Schiller Project, due to the enormous and unsupported 50% cost increase between Xcel's initial and revised cost estimates (and over 90% increase on the line upgrade portion of the estimate), and in light of the contradictions

[38] A copy of the intake form that SunShare submitted for this IE review is included as Attachment H.

regarding line length included in Xcel's second estimate. Further, the fact that Xcel restudied the project over a year after the application was first submitted and months after the first study was released shows Xcel could easily restudy the project again.

29. Xcel responded to SunShare's request for IE review for the Schiller Project, arguing that review was not warranted or possible because the project had been removed from the interconnection queue. Xcel effectively took the position that the IE review could not move forward because it unilaterally decided to cancel the project from the queue. Xcel also argued that SunShare had waited too long to request review, even though Xcel and SunShare had until shortly before the dispute was submitted been attempting to resolve the dispute, and disputes involving other projects, through bilateral negotiations. The IE dispute process does not include set time limits in which a party must submit a dispute for IE review, nor does it prohibit parties from attempting to resolve outstanding issues without IE intervention. In fact, such negotiations without intervention by Commerce or the IE, as pursued by SunShare, should be encouraged.

30. Because the Schiller Project was no longer in the queue and Xcel was refusing to participate, Commerce informed SunShare that IE review was not possible and recommended that SunShare raise its dispute with the Commission, which SunShare does now.

31. It is now over three years since SunShare first submitted its application for the Schiller Project to Xcel. Similar to the Linden Project, Xcel's refusal to process the application for the Schiller Project, its lack of transparency regarding the studies it performed for the project, and other delay tactics, has caused SunShare substantial damages. SunShare estimates these damages to be approximately $153,080, and include: **[PROTECTED DATA BEGINS**

PROTECTED DATA ENDS]

32. These amounts do not include other damages that SunShare has certainly suffered, including for example lost profits or the hundreds of hours of staff time that SunShare has devoted to working on the Schiller Project.

III. COMPLAINT

Xcel has frustrated SunShare's attempts to develop the Schiller Project, to the detriment of SunShare and Xcel's own residential customers who have subscriptions and who have been waiting for years for the project to be placed in service. Xcel's actions have also caused significant brand and reputational risk to SunShare, as SunShare continues its attempts to keep customers engaged and project partners such as landowners satisfied, despite Xcel's delays. Immediate relief from the Commission is warranted to address Xcel's misconduct and violations of its tariff and S*RC program rules. Xcel's wrongful actions and violations include:

- Failing to conduct proper engineering studies for the Schiller Project under Paragraph 5 of Section No. 9 of Xcel's Tariff, 1st Rev. Sheet Nos. 68.4 and 68.5, and failing to provide SunShare with information regarding those studies;

- Failing to utilize the most current IEEE 1453 standards, and otherwise failing to use least-cost industry standards, in studying the Schiller Project, as required by, *inter alia*, Minn. Stat. § 216B.1611, subd. 2(2); Section No. 9 of Xcel's Tariff, 1st Rev. Sheet No. 68.11; Section No. 10 of Xcel's Tariff, Original Sheet No. 136; and Commission Orders; and

- Refusing to participate in IE review under Paragraph 9 of Section No. 9 of Xcel's Tariff, 1st Revised Sheet No. 68.11, and instead unilaterally terminating the Schiller Project from the interconnection queue.

Numerous statutes and rules authorize Commission intervention here. In particular, the Commission is broadly authorized to "investigate and examine the condition and operation of any public utility or any part thereof." Minn. Stat. § 216B.14. The Commission may also "ascertain and fix adequate and reasonable standards for the measurement of . . . condition[s] pertaining to the supply of [electric] service[.]" Minn. Stat. § 216B.09, subd. 2. And "[i]n the event of disputes

between a public utility and a qualifying facility, either party may request a determination of the issue by the commission. In any such determination, the burden of proof shall be on the public utility." Minn. Stat. § 216B.164, subd. 5(a). Lastly, upon complaint, the Commission may initiate an investigation into "any regulation, measurement, practice, act, or omission affecting or relating to the production, transmission, delivery, or furnishing of natural gas or electricity or any service in connection therewith . . . ." Minn. Stat. § 216B.17, subd. 1.

The issues underlying the Schiller Project are similar to those that the IE reviewed and decided for the Linden Project. In particular, Xcel's engineering studies for the Schiller Project resulted in vastly different cost estimates, yet Xcel has failed to explain or justify those discrepancies. Xcel also failed to apply the IEEE 1453 standard, even its simplified version, to its study of the Schiller Project, despite its obligation to utilize the most current IEEE 1453 standards. Instead, Xcel unilaterally terminated the Schiller Project from the queue, and refused to participate in an IE review. Accordingly, SunShare requests relief directly from the Commission, including relief that is similar to what was ordered for the Linden Project.

A. Xcel Must Restore the Schiller Project's Prior Position in the Interconnection Queue.

Xcel wrongfully terminated the Schiller Project from the interconnection queue on the grounds that SunShare had not executed the interconnection agreement for the project or paid the deposit on the estimated **[PROTECTED DATA BEGINS PROTECTED DATA ENDS]** interconnection cost that followed from Xcel's January 24, 2017 revised cost estimate. As explained, however, this revised estimate represents a significant departure from the initial **[PROTECTED DATA BEGINS PROTECTED DATA ENDS]** estimate that Xcel provided to SunShare in August 2016. This significant increase between the two estimates is apparently due to additional distribution upgrades that Xcel did not identify as necessary in its first

study, or incorrectly identified in its new study.

Xcel terminated the project and removed it from the interconnection queue without SunShare's consent, while at the same time SunShare was attempting to come to a comprehensive negotiated resolution regarding the project and other SunShare projects in Minnesota and Colorado. Although Xcel was demanding that SunShare execute the interconnection agreement for this project, SunShare could not reasonably have been expected to do so, given the significant discrepancies in cost estimates which Xcel failed to sufficiently explain or justify. Xcel states that it is committed to transparency, previously committing to provide developers with cost information "in as much detail as possible."[39] Yet Xcel has not been forthcoming with this information here. Most recently, SunShare requested one last time that Xcel provide a copy of its second study for the Schiller Project, which Xcel refused. The IE for the Linden Project found a similar lack of transparency regarding Xcel's studies, further justifying SunShare's refusal to sign the interconnection agreement for the Schiller Project. SunShare and its customers should not be penalized for Xcel's refusal to correct or adequately explain its own errors, which Xcel has admitted with respect to the Linden Project.

The issues that SunShare raised in response to Xcel's revised estimate would be appropriate for IE review. However, Xcel refused to participate in any IE review for the project, stating that it is not permitted because the project is no longer in the queue. Of course, it would set a dangerous precedent for the S*RC program if Xcel could unilaterally disallow projects simply by refusing to participate in an IE review, and terminating the project from the queue in its sole discretion.

Xcel will likely argue that it was justified in terminating the project because of

[39] Order Approving Tariffs and Modified and Requiring Filing at 6, Docket No. E-002/M-13-867 (Dec. 15, 2015), eDocket ID 201512-116474-01.

correspondence with a junior manager at Mortenson, in which the junior manager directed Xcel to return the deposit funds for the project to its accounts rather than SunShare's. As explained, however, Xcel is conveniently misinterpreting this communication, over a year later, as consent to terminate the project. Xcel never used this justification at the time. Further, Xcel did not terminate the project from its S*RC Salesforce system until late 2017, contradicting its interpretation that the correspondence from Mortenson authorized it to terminate the project in April 2017. To the contrary, Xcel knew that the junior manager at Mortenson lacked authority to cancel the project, and that he was simply trying to prevent Xcel from repeating prior serious mistakes that Xcel made when it returned millions of dollars of other developers' funds to SunShare rather than to those developers, constituting a significant breach of security and Xcel's obligations as a holder of those funds. SunShare therefore requests that the Commission order Xcel to immediately restore the Schiller Project to its prior position in the queue, without impact to the construction timeline for the project. SunShare understands that there currently is capacity in the interconnection queue for the project. Further, because Xcel wrongfully terminated the project, we request the Commission prohibit Xcel from charging any costs to SunShare to upgrade its grid that would not have been necessary had Xcel not wrongfully removed the project. In order to ensure the project can be completed before another winter sets in, SunShare also respectfully requests that the Commission order Xcel to be prepared for interconnection by September 30, 2019.

B. Xcel Must Restudy the Schiller Project Using Appropriate Industry Standards and Least-Cost Technologies.

Xcel's interconnection tariff standards must "provide for the low-cost, safe, and standardized interconnection of facilities." Minn. Stat. § 216B.1611, subd. 2(2). Industry standards, and not more restrictive standards proposed by Xcel, "should be the touchstone for

solar-garden interconnection requirements"[40] This is because more restrictive standards "would impose undue costs on developers, and would risk chilling solar-garden development, in contravention of statutory requirements."[41] Accordingly, Xcel may "choose to implement an alternative that is more restrictive than industry standards" but only if Xcel "does not charge the developer for the extra cost or count that cost toward the $1 million material-upgrade limit."[42]

Further, consistent with the Commission's directive, the State's Distributed Generation Interconnection Requirements,[43] as adopted in Section 10 of Xcel's tariff, provide:

> The second issue is economics; the interconnection design must be affordable to build. The interconnection standard must be developed so that only those items, that are necessary to meet safety and reliability, are included in the requirements. This standard sets the benchmark for the minimum required equipment. If it is not needed, it will not be required.[44]

Xcel's obligation to apply least-cost industry standards is not limited to the equipment that will be used for the interconnection. As recognized by the IE in his report on the Linden Project, and as stated in prior IE decisions, Xcel must utilize the latest edition of IEEE 1453 when conducting engineering studies.[45] Xcel has failed to provide sufficient justification for its revised cost estimate for the Schiller Project. Indeed, it has not explained why it failed in its first study to account for the additional distribution upgrades that it now claims are needed. Further, it appears that the line upgrades that Xcel now claims are necessary are not the least-cost industry standard,

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[40] Order Approving Tariffs as Modified and Requiring Filing at 7, Docket No. E-002/M-13-867 (Dec. 15, 2015).

[41] *Id.*

[42] *Id.* at 8. This Commission directive is implemented in Section No. 9 of Xcel's Tariff, 1st Rev. Sheet No. 68.11.

[43] State of Minnesota, Distributed Generation Interconnection Requirements, *available at* http://www.federatedrea .coop/sites/federatedrea/files/zTechnical%20Requirements%20-%20Attachment%202.pdf.

[44] Xcel Tariff, Section 10, Original Sheet No. 136.

[45] *See* Resolution of the SunShare Flicker Dispute at the Golf/Hassan/St. Michael/Becker Interconnection Site at 38-39, Docket No. 13-867 (Mar. 31, 2016) (included as Appendix A to Xcel Energy's Appeal from the Independent Engineer Report, MPUC Docket No. E-002/M-13-867 (Apr. 7, 2016), eDocket ID 20164-119858-02).

though SunShare cannot determine this in light of the limited information from Xcel.

As a result, in order to get an accurate picture of the true cost to connect the Schiller Project, and to ensure that the cost is no greater than necessary, SunShare requests that the Commission order Xcel to restudy the project using least-cost industry standards. This would include restudying the project under at least the "simplified" IEEE 1453 methodology that Xcel has been using since April 1, 2017. If, after applying this method, interconnection costs remain prohibitive and it appears that further reductions to interconnection costs can be identified through use of the full IEEE 1453 methodology, SunShare also requests that the full method be utilized. Consistent with the relief that was ordered for the Linden Project, SunShare also respectfully requests that its engineers be allowed to participate in developing and conducting the restudy.

Notably, Xcel returned the deposit for the Schiller project around the same time that it filed its April 2017 Compliance Filing which set forth its "simplified" IEEE 1453 methodology. It is likely that, if Xcel applied either the new IEEE 1453 standard pursuant to the January 2017 Settlement Agreement, or even the simplified standard now being applied to projects, to the Schiller project, estimated interconnection costs would drop below the original **[PROTECTED DATA BEGINS PROTECTED DATA ENDS]** cost and the project would be financially feasible. Xcel refuses to restudy the project under either the new IEEE 1453 standard or even its proposed simplified form, citing its policy of applying the standard only to new projects. Yet at the same time Xcel applied the "simplified" standard when restudying the Linden Project and many other existing projects, so it can certainly do so here.

There is no legitimate reason for Xcel to refuse to work with SunShare to develop creative solutions to allow the Schiller Project to proceed. Xcel has previously stated that it is "not opposed to alternative approaches to the interconnection process or to spending additional time and

resources to achieve more accurate indicative cost estimates at the outset."[46] Thus, if application of the simplified IEEE 1453 standard to the project does not provide the least cost interconnection estimate, then Xcel should be willing to work with SunShare to apply the full IEEE 1453 standard as ordered by the Commission and IE, or to conduct the same study variations as what the IE ordered for the Linden Project, with participation from SunShare's engineers.

C. Xcel Should Consider In Its Restudy Whether Storage Technologies and/or Smart Inverters Can Further Reduce Interconnection Costs, and Allow Their Use If So.

Xcel should also be willing to evaluate the use of additional technologies, such as smart inverter functionalities and storage, to provide for greater implementation of solar on the grid. Any of these approaches would occur without risk to Xcel. As SunShare explained in its response to Xcel's Appeal of the Linden Project,[47] Advanced Functionality Inverters (AFIs) have the capacity to correct flicker, voltage fluctuation, and steady state overvoltage issues, which in turn can support the grid and allow for increased PV penetration.

This dispute and the Linden Project dispute show that it is time for Xcel to allow for the use of AFIs and promote a more stable and advanced grid. Although the Commission previously determined over two years ago that Xcel should not be required to utilize AFIs, significant progress has been made since then. In 2016, UL announced its Advanced Inverter Testing Program, to be implemented under a new UL 1741 Supplement A (SA), which has now been released.[48] The new

[46] Xcel Energy's Appeal from the Independent Engineer Report at 19, MPUC Docket No. E-002/M-13-867 (Apr. 7, 2016), eDocket ID 20164-119858-02

[47] *See* SunShare, LLC's Response to Xcel Energy's Appeal of the Independent Engineer Report of December 18, 2018 at 33, Docket No. E-002/M-19-29 (Jan. 17, 2019).

[48] *See UL Launches Advanced Inverter Testing and Certification Program*, UL (Sept. 8, 2016), https://industries.ul.com/news/ul-launches-advanced-inverter-testing-and-certification-program.

IEEE 1547-2018 standard (that was issued in April of last year)[49] and UL 1741 SA, address these capabilities, and smart inverter functionality is currently being utilized (and in fact required) in other states, including Hawaii and California. Most, if not all inverters, are now smart inverters, and come equipped with voltage control functionalities. Thus, although "full implementation of IEEE 1547-2018 will take a few more years, it is not too soon for states to begin adopting the new standard."[50] Wider implementation of AFIs remains an ongoing topic for 2020 introduction in the broader Commission-led review regarding distributed generation interconnection practices, and allowing the use of AFIs for the Schiller Project will further inform this review. SunShare therefore respectfully requests that the Commission require Xcel to consider whether the use of AFIs or storage technologies could reduce interconnection costs and increase capacity for the Schiller Project, and to allow for their use if so.

D. Xcel Should Be Restricted to Charging Its Wholesale Costs for the Interconnection.

Lastly, SunShare respectfully requests that the Commission order certain relief similar to that ordered by the IE for the Linden Project, as compensation for the significant delays Xcel has caused in allowing the Schiller Project to move forward. As stated, SunShare estimates that Xcel's conduct regarding the Schiller Project has, to date, caused approximately $153,080 in damages. Importantly, this does not include lost profits, staff hours, or other types of harm that SunShare has certainly suffered. It is therefore reasonable for the Commission to follow the IE's relief issued for the Linden Project, and to prohibit Xcel from charging any profit, overhead, or bond costs, any other markups, or labor to Xcel's interconnection work.

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[49] *See* Brian Lydic, *Smart Inverter Updates: New IEEE 1547 Standards and State Implementation Efforts*, Interstate Renewable Energy Council (July 23, 2018), *available at* https://irecusa.org/2018/07/smart-inverter-update-new-ieee-1547-standards-and-state-implementation-efforts/

[50] *Id.*

IV. REQUEST FOR RELIEF

Accordingly, for the reasons set forth above, SunShare respectfully requests that the Commission issue the following relief:

1. Find that Xcel violated, *inter alia*, Sections 9 and 10 of its electric tariff book, S*RC program rules, existing settlement agreements, and/or Commission Orders;

2. Require Xcel to immediately restore the Schiller Project to its prior position in the interconnection queue, without impact to the construction timeline, and to complete required interconnection upgrades by September 2019;

3. Require Xcel to study the Schiller Project using appropriate and least-cost industry standards, including Xcel's "simplified" IEEE 1453 methodology, and if interconnection costs are still prohibitively expensive, the current IEEE 1453 methodology recognized by the IE as the appropriate standard;

4. Allow SunShare's engineers to participate in developing and running the studies;

5. As part of the restudy, require Xcel to analyze whether the use of smart inverter functionalities and storage can address flicker and steady state voltage concerns and reduce interconnection costs, and if so, allow for the use of those functionalities;

6. Prohibit Xcel from charging its overhead, profit, bond costs, other markups, or labor to SunShare to complete the interconnection work, recognizing the significant delays caused by Xcel to date;

7. In recognition that Xcel wrongfully removed the Schiller Project from the queue, and likely allowed other projects to proceed, prohibit Xcel from charging any costs to SunShare to upgrade its grid that would not have been necessary had Xcel not wrongfully removed the project; and

8. Grant any other further relief in SunShare's favor that the Commission thinks appropriate.

V. REQUEST FOR EXPEDITED PROCEEDINGS

SunShare also respectfully requests that the Commission hear and decide this matter on an expedited basis, including under Minnesota Rules 7829.1200 and 7829.1700-1900, the Commission's authority to vary time limits and other rules under Minnesota Rules 7829.1275 and 7829.3200, and the Commission’s inherent authority to enforce the statutes and rules it is charged

with administering. An expedited process is warranted because the material factual allegations underlying this action are not in dispute and, as alleged above, Xcel has already caused significant delays for the Schiller Project, indeed cancelling it altogether. Expedited review and relief is warranted to ensure that the Schiller Project can be constructed in 2019, before the next winter.

In particular, SunShare requests that the Commission immediately enter an order requiring Xcel to respond in writing to this Complaint within the typical ten-day period required for IE appeals under Xcel's tariff, to order Xcel to complete its restudy of the project in March 2019, and to require Xcel to complete any interconnection upgrades by September 2019. However, notwithstanding the similarities between this dispute and Xcel's appeal of the IE report for the Linden Project, SunShare respectfully requests that the Commission proceed separately for the Linden Project appeal, to ensure that that dispute is also reviewed and decided on expeditiously.

Respectfully Submitted,

Dated: March 5, 2019

STINSON LEONARD STREET LLP

/s/ Andrew Gibbons

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Attorneys for Complainant SunShare, LLC

STATE OF MINNESOTA
BEFORE THE PUBLIC UTILITIES COMMISSION

*Verified Formal Complaint and Petition for Expedited Relief by SunShare, LLC Against Northern States Power Company d/b/a Xcel Energy for Violations of Its Section 9 and 10 Tariff and Related Solar*Rewards Community Program Rules and Commission Orders*	MPUC Docket No. _____ **VERIFICATION OF DAVID AMSTER-OLSZEWSKI**

I, David Amster-Olszewski, am the CEO of SunShare. I have personal knowledge regarding the facts contained in this Verified Formal Complaint and Request for Expedited Relief, and I hereby verify under penalty of perjury that those factual matters are true and accurate to the best of my knowledge, information, and belief.

Dated: March 5, 2019

/s/ David Amster-Oslzewski
David Amster-Oslzewski

ATTACHMENT A IS TRADE SECRET IN ITS ENTIRETY

(1 page)

ATTACHMENT B IS TRADE SECRET IN ITS ENTIRETY

(52 pages)

ATTACHMENT C IS TRADE SECRET IN ITS ENTIRETY

(12 pages)

ATTACHMENT D IS TRADE SECRET IN ITS ENTIRETY

(53 pages)

ATTACHMENT E IS TRADE SECRET IN ITS ENTIRETY

(4 pages)

ATTACHMENT F IS TRADE SECRET IN ITS ENTIRETY

(3 pages)

RESOLUTION OF THE SUNSHARE DISPUTE AT THE LINDEN INTERCONNECTION SITE
CONFIDENTIAL VERSION
DELIVERED BY EMAIL TO PARTIES
SITE SRC#s - 039909; 039910; 039911; 039913; 039914

Dockets 13-867, 15-786

Date of Dispute Initiation 3/16/18
Date of Final Report Release 12/24/18

I. LINDEN INDEPENDENT ENGINEER DISPUTE

On March 16, 2018, SunShare, a Solar Garden Developer who is active in the Xcel Community Solar Gardens/Solar Rewards Community (CSG/SRC) Program in Minnesota, filed a complaint against Xcel Energy (Xcel), regarding a series of unresolved interconnection issues at its proposed Linden Interconnection with the Xcel BEL 062 feeder in rural Scott County, Minnesota. The proposed Linden Interconnection site is roughly 5.6 miles southwest of the Belle Plaine Substation.

The Minnesota Department of Commerce (the Department) assigned this complaint as a formal Interconnection Dispute to the IE on April 18, 2018 and charged him with resolving this case. This Dispute is centered on an interconnection site known as Kane by the Developer and Linden by Xcel. Both Parties have agreed to designate this interconnection as Linden for the purposes of this dispute resolution.

II. THE IE PROCESS AND CHARTER

The Department and the Minnesota Public Utilities Commission (MPUC) created the position of the Independent Engineer (IE) to mitigate disputes between Photovoltaic Developers (PV Developer or Developer) and the utility, Xcel[1], for cases related to the interconnection of PV systems that are performed as part of the CSG/SRC Program.

[1] In this Dispute Case it is noted that Northern States Power (NSP) is the regional operating company of Xcel Energy. These firm names are used interchangeably in Parties Dispute documentation.

This Report is the Resolution of the Dispute between SunShare and Xcel at the proposed Linden Interconnection site.

The IE has been given the Charter to make determinations based on his technical expertise, personal experience, the Tariff, the latest ANSI/IEEE Standards, Submittals, Discovery, industry standards and best practices, as well as hold the safety and reliability of Xcel's system to be of the utmost importance.

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 Program. In addition, the IE is chartered to determine what information is considered to be Confidential, Trade Secret or other classifications of sensitive material, and how to define and use such in this Dispute Case.

The IE notes that the burden of proof is on the utility pursuant to Minnesota Administrative Rule 7835.4500. The IE does not have jurisdiction to overturn MPUC Statutes or Rulings, or to make financial judgements against Parties.

The MPUC changed the Dispute process in a Resolution on November 1, 2016 to accommodate an Intake Form(s), which was designed by Xcel, that the developer fills out and presents to Xcel and the Department. The Intake Form(s) describes the nature and circumstances surrounding that Developer's complaint, as well as the developer's requests for relief. Xcel receives the completed Intake form from the Developer, submits it to the Department who then requests that a given IE take on the Dispute case.

Another change is that the IE must now place the appropriate SRC numbers for the interconnected sites in the Final Report. An additional item added was that the Department and Xcel were to have worked together to provide a standardized format for the Dispute's final report and provide that format to the IE as his report template. The Department and Xcel did not create a standardized format at the time this dispute was

initiated and the Department directed the IE to use his own discretion in creating the format for this report.

The Dispute then proceeds with the expectation of completed determinations in 30 days. Note that this 30-day expectation is a guideline and not a deadline, and that the IE is chartered to take the time necessary to make a complete and thorough determination at that interconnection, irrespective of the 30-day expectation.

This Report uses Yellow Highlights to identify area that the IE would like to specify as important within a wider section of material that was used from Tariffs, Rules or Xcel Documents. The IEs comments regarding his Determinations and the actual Determinations are all in bolded text.

III. CONFIDENTIALITY AND CLASSIFICATION OF DOCUMENTS

The IE is chartered with determining what will be considered Public, Confidential and Trade Secret classifications of information, out of the various information Parties present him. The IE is also charged with how specific cases of those types of information are used in this Report. The IE has determined that Confidential, Trade Secret, and Attorney Eyes-Only will be treated as discussed in the paragraphs below:

a. Information to be considered Confidential or Trade Secret must be marked as such by the Party producing such information. The Services Agreement is seen below:

> Linden Services Agreement – Section 3. b), page 5:
> Any party who believes that information it is providing is Confidential Information must mark it as "Confidential Information" and provide the basis for the designation, along with any additional levels of confidentiality.

b. Xcel has noted on numerous occasions that other developers have provided information used by Xcel (and presented to this IE), that Xcel considers to be

confidential. This information includes the name of the developer, location of their interconnection, and ratings, capacities, and nameplate information of their equipment. However, the IE notes that the Tariff makes such information public as noted below:

> MINNESOTA XCEL TARIFF 9, Section O., page 1ST Revised Sheet 78
>
> O. Disclosure of Community Solar Garden Information. The Community Solar Garden Operator acknowledges and agrees that the Company may publicly disclose the Community Solar Garden Location, Community Solar Garden Operator, nameplate capacity and generation data of the Community Solar Garden.

This Section in Tariff 9 indicates that it is acceptable for Xcel to share publicly the information that Xcel had initially redacted in its response to IR 011. And, as noted above, Xcel can publicly release information including other developer's names, their interconnection locations, ratings, capacity and equipment nameplate information. Xcel has noted that this specific information is competitive and is considered to be Confidential and Attorney Eyes-Only. Xcel has noted to the IE that it cannot release such information, when in reality it can by Tariff. SunShare noted on several occasions in telephone conference between Parties and the IE, that it did not consider this type of information to be Confidential.

The IE determines that the information such as noted in Tariff 9, Section O. above is public information for the purposes of this Report.

c. Information presented by Parties that is available on the worldwide web or previously released by Parties, either in an unclassified way or by other common media, is considered to be Public information regardless of how it was identified by Parties in this Dispute Case. Information released as Confidential cannot be reclassified as a higher level after a previous release as Confidential. This also

includes Attorney Eyes-Only. Once released, no information can be reclassified, after the fact, at a higher level.

d. Information such as emails, letters, and meeting notes provided by Parties that has not been specifically marked as Confidential or Trade Secret is considered to be Public information.

e. In this particular Dispute Case, Xcel responded to the IEs IR 011, with the entire response labeled as Attorney Eyes-Only. After careful examination, the IE determined that due to the content of the emails provided by Xcel, this response from Xcel was not appropriately labeled as Attorney Eyes-Only. Xcel refused to relabel the response as Confidential when requested to do so by the IE. Later, Xcel did agree to provide the IE requested information as Confidential under the IE's terms in a telephone conference on November 5, 2018, but notified the IE, via Email that Xcel would not issue the emails as promised on the day that information was due to the IE, November 14, 2018. The IE requested a review of this situation by the Department, on November 15, 2018.

IV. LINDEN INTERCONNECTION IE DISPUTE - ADMINISTRATIVE HISTORY

On March 16, 2018, SunShare, a Solar Garden Developer who is active in the Xcel CSG/SRC Program, filed a complaint against Xcel Energy, regarding a series of unresolved issues at its proposed Linden Interconnection with the Xcel BEL 062 feeder in rural Minnesota.

On April 18, 2018, the Department notified the IE by email that he was formally assigned to resolve the Linden Interconnection Dispute Case. SunShare's Intake Forms were also issued to the IE at the same time.

On April 26, 2018, the IE and Parties initiated a formal Service Agreement and concluded those negotiations with a signed Dispute Resolution Services Agreement (Contract) and a separate Non-Disclosure Agreement (NDA), which were executed by Parties on June 13, 2018 and June 18, 2018 respectively. This Dispute covers only the SunShare Linden interconnection to the Xcel BEL 062 Distribution Feeder which is fed from its Belle Plaine Substation, in the town of Belle Plaine, in rural Scott County, Minnesota. In some cases, information that is outside the Linden case itself is referenced if it provided historical, or technical relevance to the Linden interconnection case.

After the Service Agreement was signed by Parties, Xcel sent their Initial Submissions to the IE on June 28, 2018 as responses to SunShare's March 16, 2018 Intake Form. Upon signing of the Dispute Resolution Service Agreement for the March 16, 2018 Linden Interconnection Dispute, Xcel included information in their initial submission documents to the IE that a previous Settlement had been reached on January 3, 8regarding the Linden site between Xcel and SunShare. Xcel requested that the IE review that previous Settlement in order to determine if the March 16, 2018 Dispute initiated by SunShare was valid and should proceed at all, based on this previous Settlement. Xcel noted that the IE would agree with Xcel that the Settlement of January 3, 2017 would invalidate the present Linden Dispute. At the same time, SunShare noted that the IE would see that the Settlement did not, in any way, limit SunShare from pursuing any future disputes at the Linden interconnection.

On August 7, 2018, the IE completed his review of the January 3, 2017 Settlement Agreement and issued a ruling[2] that determined that, based on the nature and wording of that previous Settlement, it did not preclude the possibility of future Disputes at the Linden site.

[2] Email notification from the IE to Parties, June 13, 2018, notifying them of IE decision on January 3, 2017 Linden Settlement.

IE DECISION FOR THE JANUARY 3, 2017 SETTLEMENT AGREEMENT AS IT RELATES TO THE JUNE 13, 2018 LINDEN INTERCONNECTION DISPUTE

Sam Wheeler – IE – 8/7/18

Parties,
At the sole discretion of the IE, the January 3, 2017 Linden Settlement Agreement[1] has been reviewed, as requested by both Parties (Xcel Energy and SunShare). This Settlement Agreement review is the initial step in resolving if the June 13, 2018 Linden IE Dispute Service Agreement[2] is valid and can or cannot move forward.

Upon review of the Settlement Agreement itself, Tariff Sections 9 & 10[3], sets of Information Requests Xcel has sent to the IE, and the various Linden Computer Model reports, both pre- and post-Settlement, the IE has reached the following conclusions:

- Post-Settlement Agreement Computer models have had significant errors in them which have created differences between Disputes.
- Errors in Xcel's Computer models have led to differences in the cost estimates associated with each model's output, which represent differences between Disputes.
- While some cabling and distribution routings modelled by Xcel are similar between pre- and post-Settlement Agreement models, there are significant differences in distribution routes, and associated equipment.
- The January 3, 2017 Settlement Agreement between Xcel and SunShare does not contain language that excludes this Dispute.
- SunShare's complaints as found in their IE Dispute Intake Form[4], regarding the Linden Interconnection that have occurred after the Settlement Agreement are different in content from the original Dispute.

The IE determines that the Settlement Agreement does not preclude the Linden Dispute from moving forward and it shall proceed without hindrance. The IE will proceed with that Dispute as originally presented to him by The Department.

Sam Wheeler, IE
August 8, 2018

[1] SETTLEMENT AGREEMENT – Signed by SunShare December 22, 2016, countersigned by Xcel January 3, 2017.
[2] IE DISPUTE SERVICE AGREEMENT – The Linden IE Dispute Contract – it was signed by Xcel, SunShare, and the IE and fully executed on June 13, 2018.
[3] Minnesota Electric Rate Book, Sections 9 and 10. Latest edition.
[4] SunShare Intake Form – March 16, 2018, Required form initiating a request for a Dispute with The Department.

SunShare made a special request at the same time that the IE was reviewing the January 3, 2017 Settlement, that the IE allow them to commence construction immediately of the 3 MW portion of the 5 MW capacity that SunShare had originally requested from Xcel at the Linden site rather than wait for a final Dispute set of Determinations from the IE. The additional 2 MW of unapproved MWs would be decided at the time of the final IE decision on the Linden Dispute. SunShare also requested that this decision be made at the time of this request prior to the final settlement of the wider Linden Dispute. On June 13, 2018, simultaneous to, and outside of the Linden Dispute, SunShare sent a 1/3 interconnection fee payment to Xcel with a request to proceed with construction on the 3 MW portion of the Linden interconnection, with the proviso that the additional two (2) MWs of requested capacity would be considered by the IE. Xcel noted that it was not appropriate within the bounds of the Tariff, to accept the payment check noting and quoting Tariff Section 9, that the Interconnection Agreement could not move forward in the midst of a dispute. Xcel requested that the Department intervene on this matter. On July 24, 2018, the Department intervened and ruled that the IE was not to consider this request from SunShare. The IE noted and acknowledged this ruling from the Department to Parties in writing on July 24, 2018 noting that he would not consider or rule on this topic.

On August 14, 2018, SunShare submitted a Second Intake Form that requested that the IE review and rule on two additional and separate complaint issues. Xcel responded to SunShare's Second Intake Form on September 21, 2018, arguing that the first issue on the Intake Form was not valid and should not be considered by the IE, but was open to the second issue on the second Intake Form being considered by the IE.

Issue Number 1 on SunShare's Second Intake Form (Intake Form Number 2) is that the IE rule that Xcel should allow SunShare to activate/install Advanced Function Inverters (AKA – Smart Inverters) for the purpose of reducing or eliminating Flicker. Xcel felt that Flicker could be problematic. In this case, the Department also intervened at the request of Xcel, who, in August 15, 2018, sent an email to both the IE and the Department, objecting to this issue as noted on the Second Intake Form and noting that

use of Smart Inverters had not yet been adopted by the MPUC for use by developers in the State of Minnesota. On September 4, 2018, the Department instructed the IE not to consider this request from SunShare. The IE noted and acknowledged this ruling from the Department to Parties on September 4, 2018 noting that he could not consider or rule on this topic.

Issue Number 2 on SunShare's Intake Form Number 2, was a request by SunShare that the IE consider the way that Xcel has implemented the use of IEEE 1453 in Minnesota. The Department left this matter to the IE to resolve and in an August 15, 2018 Email to the IE, Xcel noted that it did not object to this Intake Form Number 2, Issue Number 2[3]. The IE notified Parties that he would review and consider this issue in the Linden Dispute Case of September 21, 2018.

On August 16, 2018 the Department informed the IE that Parties were involved in possible settlement discussions for the Linden Interconnection and ordered the IE to stand down on the Linden Dispute during those settlement discussions. The IE was instructed not to talk with Parties until further notice from the Department. On September 4, 2018, the Department instructed the IE to restart the Linden Dispute as the attempted settlement between Parties did not succeed.

On September 6, 2018 the IE was incapacitated due to medical issues and forced to put the Linden Dispute on hold. The IE notified the Department of this fact on that same day. The Department notified Parties of the IE's Status that same day. The IE returned to the case on October 3, 2018 and issued a set of new IRs and clarifications to previous IRs to both Parties.

On October 3, 2018 the IE presented his IR 011 to Xcel and to SunShare requesting emails, correspondence, letters, etc., relating to Xcel's staff who had direct involvement in the Linden Interconnection Project. During the IE's medical leave, Xcel responded to

[3] Email from Xcel to IE and SunShare, dated August 15, 2018, noting that while Xcel objected to SunShare's Second Intake Form's Issue Number 1, it did not object to Issue Number 2.

the IE on September 17, 2018 with a limited series of emails related to the Linden Case, but the emails provided were not the information requested of Xcel, rather information that Xcel internally determined that it was willing to release. Xcel noted that the information was burdensome, would take too long to produce, and was not appropriate for the IE to request. Two (2) additional requests were made by the IE which further clarified the IEs requested information. In spite of the IE noting Xcel's objections to providing the requested IRs, Xcel again noted its objections and added additional reasons why the IE was overstepping his authority in requesting such information. Xcel delayed responses and once again went to the Department for intervention. The information request response was once again only a partial fulfillment of the IE's request and was marked as "Attorney Eyes-Only".

After examining the nature of Xcel's response to the IEs IR 011, the IE concluded that the information provided by Xcel was not actually properly classified as "Attorney Eyes-Only". The IE determined that the information supplied by Xcel does not qualify as "Attorney Eyes-Only" for a number of reasons, including but not limited to the following:

a. Contrary to Xcel's claims, the emails, letters, drawings, and correspondence requested by the IE are directly pertinent to the Linden Dispute Case and are specifically covered by SunShare's Intake Forms (March 16, 2018 and August 14, 2018) for the Linden Interconnection Dispute Resolution.

b. The IE, in previous Dispute Cases requested internal emails related to other Dispute cases without additional levels of confidentiality, beyond "Confidential" from Xcel.

c. The IE noted that in a telephone conference call held on November 5, 2018 with Parties, the IE noted to Xcel that it had redacted information presented in IR 011, that Xcel had previously released as Confidential. The IE asked Xcel who had actually performed the IR 011 response redacts. Xcel noted that Xcel's legal staff had, and that no engineers were involved. Xcel went on to say that Xcel

performed rather random redactions, without fully understanding the nature of the material being redacted because they were in a hurry and had other work to do[4]. In this same telephone conference call, Xcel requested that the IE allow Xcel to perform additional redactions to the initial redactions of its response to the IE's IR 011, after the fact. The IE declined this request. Also, in this same telephone conference call, Xcel told the IE and SunShare that it would release the IR 011 response to SunShare no later than November 14, 2018. On November 14, 2018, Xcel sent an email to SunShare and the IE, noting that it would not release the IR 011 information as it promised it would.

d. The classification of a document as "Attorney Eyes-Only" generally is used in situations where an entity's competitive information is at some risk of loss of competitive advantage. In this case, Xcel had redacted competitive information from the documents supplied to the extent that information previously, and openly, released to the IE and the Developer as Confidential or another less severe classification, was now redacted. Since, proverbially, one cannot put the genie back in the bottle, the IE rejects the notion that the information provided by Xcel in IR 011 is classified as "Attorney Eyes-Only", but does recognize this information as "Confidential" and that it should be viewable by SunShare employees who signed the June 13, 2018 NDA between Parties, with the exception that the names of other Developers, and the names of CONFIDENTIAL {[redacted])} CONFIDENTIAL employees should be redacted from the already redacted Xcel IR 011 responses and reissued to SunShare. Having said that, the IE demonstrates that it is noteworthy that the Tariff Section 9 states:

> MINNESOTA XCEL TARIFF 9, Section O., page 1ST Revised Sheet 78
> O. Disclosure of Community Solar Garden Information. The Community Solar Garden Operator acknowledges and agrees that the Company may publicly disclose the Community Solar Garden Location, Community Solar Garden

[4] Telephone Conference call held on November 5, 2018, between Parties and the IE to discuss the fact that Xcel had marked its IR 011 responses as Attorney Eyes-Only, and their reasoning behind that fact.

Operator, nameplate capacity and generation data of the Community Solar Garden.

This Section in Tariff 9 indicates that it is acceptable for Xcel to share publicly the information that Xcel had initially redacted in its response to IR 011 publicly. And, as noted above, Xcel can include other developer's names, their interconnection locations and nameplate capacity/output. Xcel has noted that this specific information is competitive and is considered to be Confidential and Attorney Eyes-Only. Xcel has noted to the IE that it cannot release such information, when in reality, by Tariff, it can. Xcel's premise that Attorney Eyes-Only is appropriate for this IR 011 response is further undermined. The IE requested that the Department review this situation and require that Xcel release its response to IR 011 as a Confidential rather than an Attorney Eyes-Only response, per the NDA. The Department responded that the IE should write his final report as he desired, and that Xcel would be allowed to redact the document after the IE released his final report. The IE notes that this approach was taken without a thorough review of the circumstances, the Services Agreement or the NDA.

V. SUNSHARE'S COMPLAINT

On March 16, 2018, SunShare submitted a formal Complaint[5] to the Department, using the required Intake Form prescribed by the MPUC. The Intake form notes five (5) issues, with a number of sub-issues within those five (5) main issues. SunShare's specific complaints are as follows:

[5] Minnesota Public Utilities Commission (MPUC), December 1, 2015, ORDER FINDING JURISDICTION AND REFERRING COMPLAINT TO INDEPENDENT ENGINEER, Docket 15-786. Note that all references to Tariffs in this Report regard the MPUC's Electric Ratebook MPUC No. 2, Tariff Sections 9 and 10.

MARCH 16, 2018 SUNSHARE INTAKE FORM NUMBER 1, ISSUE NUMBER 1
SUNSHARE'S ARGUMENT

Xcel Energy has required the use of a 750 AL underground line at a cost of $107,405.00 due to Xcel's claim that there is currently an underground line at that location. Xcel's position is that a new underground line must be used because there is currently one there. We have asked Xcel for justification that this is the case, such as an easement, but have not received anything. Also, we note that 750 AL is a substantial line, and we cannot tell from Xcel's studies why such a large line is required given the size of the current line. Lastly, Xcel ran their study, which limited the project from 5 MW AC to 3 MW AC, with the 750 AL line's ampacity rated at 255A, whereas it is actually 630A. SunShare notes that Xcel has refused to re-run their study using the correct ampacity. We are concerned that Xcel may have more erroneous inputs to their study software, and would like all inputs to be reviewed by the IE. Study Revision 3 was originally performed with the 3 MW limitation determined by Rev 3.1 built in as noted in Study Rev 3, Section 3.0 – "Overall Application Proposed Size: 5MW. However, only 3MW allowed per previous studies".

MARCH 16, 2018 SUNSHARE INTAKE FORM NUMBER 1, ISSUE NUMBER 1 - REQUEST FOR RELIEF

- Order Xcel to share all inputs used in their study of the Linden project;
- We respectfully request that, if appropriate, the IE start the review by requiring that Xcel re-study the aforementioned projects using the correct inputs, as determined by the Independent Engineer, for ampacity as well as other incorrect inputs that are found once Xcel shares the inputs used;
- Require that Xcel share with the Independent engineer and us the actual easement or other reason why the line has to be underground and cannot be aboveground or located elsewhere; and

- If the Independent Engineer discovers that industry standards could require less costly equipment than what Xcel proposes, require that Xcel either use a less costly alternative, or that Xcel pay for the excess cost and not count that against the $1M upgrade threshold. Since Xcel has not provided complete information, we are unable to take a position one way or another on this issue.

MARCH 16, 2018 SUNSHARE INTAKE FORM NUMBER 1, ISSUE NUMBER 2
SUNSHARE'S ARGUMENT

It appears that Xcel energy applied 1.5% and 75% on/off voltage parameters in the study for this project. We believe these parameters are more restrictive than necessary, and that the percentage on the former should be higher, and the percentage on the latter should be significantly lower, and that Xcel's parameters are more restrictive than is necessary for the safe and reliable operation of the system. We believe that this may have led Xcel to use more robust and costly equipment than may otherwise be necessary under industry best practices, and/or may have unnecessarily restricted the capacity in MW for the project.

MARCH 16, 2018 SUNSHARE INTAKE FORM NUMBER 1, ISSUE NUMBER 2 – REQUEST FOR RELIEF

- We respectfully request that the IE start the review requiring Xcel to re-study the aforementioned projects using the correct inputs for voltage, as determined by the Independent Engineer;

- We request that the IE rule that less restrictive voltage parameters are necessary for implementation of the IEEE 1453 studies, and specify what the industry standards are and should be applied;

- If the Independent Engineer discovers that industry standards could require less costly equipment than what Xcel proposes, require Xcel to use that equipment,

or use their proposed equipment and pay for the difference in cost; and

- If the Independent Engineer discovers that industry standards could allow for more MW than Xcel proposes, require Xcel to approve the installation of up to 5 MW AC at this site.

MARCH 16, 2018 SUNSHARE INTAKE FORM NUMBER 1, ISSUE NUMBER 3
SUNSHARE'S ARGUMENT

Xcel has been delayed in sharing information about the project most recently, since July 14th of 2017, which is approximately 9 months ago (approximately 270 days). Delayed in sharing studies performed, answering questions about study inputs, re-studying the projects with correct conductor parameters, etc. Prior to July 14th of 2017, the Linden project was similarly delayed, for different reasons.

MARCH 16, 2018 SUNSHARE INTAKE FORM NUMBER 1, ISSUE NUMBER 3 – REQUEST FOR RELIEF

- Due to Xcel's many delays spanning over the course of years for this project, we request that the Independent Engineer rule that the project's 24 month clock to complete construction be reset upon the Engineer's final ruling, and if this case is disputed by Xcel at the PUC, then reset upon a final PUC ruling on the case;

- In order to prevent further delay for this project, the program, and the queue (as Xcel has pointed out is a concern of theirs), we respectfully request that the Independent Engineer start the review process by asking Xcel to immediately begin detailed design for this project using the 3 MW AC size and design parameters in Xcel's current IA, such that it is not objectionable to Xcel. While the Independent Engineer's final ruling may adjust some of the equipment used and add 2 MW, we believe that the general structure of the design will likely remain the same, along with the majority of the upgrades, and that it would be far more expeditious to adjust existing or in-process detailed designs at the completion of the IE review than to have to start the detailed design process only after the IE review is complete. There is precedent in this occurring for SunShare projects in the past where the quantity for Xcel reconductoring was questioned by us, and it worked well and allowed the queue and program to proceed faster than if Xcel were doing no detailed design during the IE review;
- We request that the Independent Engineer rule that should construction on

Xcel's upgrades have to occur in the winter, Xcel should bear the added costs of winter construction vs summer construction, as it would be unfair for SunShare to have to bear those costs if they are created because Xcel was found to have delayed the projected upgrades. We note that SunShare offered to Xcel that we would pay Xcel to begin the detailed design on April 4, 2018, and Xcel rejected that offer. If Xcel's rejection of that offer leads to construction going past December 2018, we see it unreasonable for SunShare to be charged the added costs; and

- We request that the Independent Engineer recommend to the Commission that they waive the $1M cap for distribution upgrades for the Linden project, so that 5 MW can be installed at the site. We ask that the recommendation for this waiver be made to compensate SunShare for the years of delays it has suffered with this project as a result of Xcel delays and inaccurate studies.

MARCH 16, 2018 SUNSHARE INTAKE FORM NUMBER 1, ISSUE NUMBER 4 SUNSHARE'S ARGUMENT

It appears that Xcel is utilizing more robust equipment than is required by industry standards for a project the size of Linden in the cost estimates included in its Interconnection Agreement, and is erroneously passing the full cost onto us. We'd like the true industry standards to be reviewed regarding the use of 336 AL versus other alternatives such as 4/0 Penguin, 4/0 Oxlip, or other comparable but less expensive equipment. It is hard for us to be certain, given the limited and imperfect information provided by Xcel, so we would like a 3rd party review.

MARCH 16, 2018 SUNSHARE INTAKE FORM NUMBER 1, ISSUE NUMBER 4 – REQUEST FOR RELIEF

- If any less-expensive conductors are deemed appropriate by the Independent Engineer, have Xcel re-study the aforementioned projects using the correct inputs, as determined by the Independent Engineer or allow Xcel to use their proposed equipment and pay for the difference in cost.

MARCH 16, 2018 SUNSHARE INTAKE FORM 1, ISSUE NUMBER 5
SUNSHARE'S ARGUMENT

Xcel performed inaccurate studies in mid-2017 which need to be reviewed and redone due to errors pointed out to Xcel over the past 8 months. After repeated requests Xcel has not sent us all studies performed on these projects (only 3 of 4 have been sent as of the date of submission of this form, despite repeated requests for all studies), thus prohibiting a complete engineering review. Xcel delayed sending us 2 of the 4 studies for over half a year (with the last study still not shared).

Given the number of engineering issues we have discovered with this project, and lack of clarity from Xcel over the past approximately 8 months, we wish to give the Independent Engineer a full mandate to review the studies performed by Xcel for accuracy and validity, the Interconnection Agreements and costs/equipment proposed by Xcel, accuracy of system size reduction from 5 MW to 3 MW AC required by Xcel, and all relevant tariffs and PUC rulings to determine if Xcel is indeed providing all required information to us.

MARCH 16, 2018 SUNSHARE INTAKE FORM 1, ISSUE NUMBER 5 -
REQUEST FOR RELIEF

- Have Xcel share with the Independent Engineer and us what all of their inputs into the studies were;

- Review the studies for accuracy. For example, on study R2, page 16 references ~13,000ft of 336 upgrades, but pages 4&5 reference 18,000ft of 336 upgrades. We have seen many more issues that need to be reviewed;

- We also request that the Independent Engineer review any other questionable areas that may arise during his review which we may not be aware of at this time because we have not been sent all of the information we have requested of Xcel;

• Require Xcel to share all 4 studies and any relevant information (and any others performed by Xcel or its subcontractors on the Linden projects) with the Independent Engineer and us;

• Review the accuracy and validity of Xcel's reduction in system size from the 5 MW AC applied-for to 3 MW AC to determine if the project can be 5 MW AC using lower cost industry standard equipment rather than Xcel-desired equipment, as it is Xcel's equipment selection that pushes the cost of interconnection over $1M for 5 MW AC; and

• Require Xcel to specify exactly what upgrades would be required for the installation of 4 MW AC, and then 5 MW AC. Specifically, which upgrades for the additional MW's would drive the cost over the $1M cap? If any less-expensive conductors are deemed appropriate by the Independent Engineer, have Xcel re-study the aforementioned projects using the correct inputs, as determined by the Independent Engineer or allow Xcel to use their proposed equipment and pay for the difference in cost.

AUGUST 14, 2018 SUNSHARE INTAKE FORM NUMBER 2, ISSUE NUMBER 2

SUNSHARE'S ARGUMENT

Tariff Section 10 states that the maximum value of allowable Flicker is 4%, which was written in the mid-2000's prior to the mass entrance of AFIs into the renewable energy market. In a previous dispute at the Glazier project, the IE determined that it is reasonable that Xcel use a value of 2.0% for Flicker in both "aggregate" and "individual" PV systems for interconnection modeling.

However, following this IE ruling on the Glazier/Foxtrot/Blue Heron/Cold Spring site, the PUC required that Xcel provide an assessment of the impacts from voltage fluctuation and flicker, if any, on its system within three months of the operation (and annually thereafter) of the Glazier project, which was designed and interconnected using a 2.0% assumption in models. This was done to provide more insight on the practical impacts to the PUC for future consideration. In the compliance report, both the short-term and

long-term flicker severity calculated from measured data was approximately half of the planning levels from the relevant Standard. Therefore, we believe that the 2% assumption is too conservative given the actual performance data tracked at the direction of the PUC, since the measured data at a project designed with the 2.0% assumption experienced flicker much lower than allowable limits.

Per the Glazier Compliance Report: "Figure 8 depicts the short-term flicker severity cumulative distribution for Pst which shows Pst-99% = 0.47 and Pst-95% = 0.41. These values are below the Pst planning level of 0.9, which indicates no violation in short term flicker severity is observed." "Figure 9 depicts the long term flicker severity cumulative distribution for Pst which shows Pst-99% = 0.35 and Pst-95% = 0.31. These values are below the Pst planning level of 0.7, which indicates no violation was observed."

AUGUST 14, 2018 SUNSHARE INTAKE FORM 2, ISSUE NUMBER 2 – REQUEST FOR RELIEF

- We respectfully request the IE rule that the allowable flicker be increased from 2% to 4% and to recommend to the PUC that Xcel be required to track voltage at the Linden/Kane site again within the first 3 months and annually thereafter to report back to the PUC, since the measurements from an operational project designed with the 2.0% limitation had significantly less measured flicker than allowed.

VI. IE DETERMINATIONS – SUNSHARE LINDEN DISPUTE CASE

After review of this case and both Parties arguments, the IE feels that SunShare's complaints contain a number of repetitions and similar aspects that could be combined into a more succinct set of decisions by the IE. As is seen below, Requests for Relief that involve a single issue/single answer Request for Relief are answered by the IE under a given bullet pointed Request for Relief. Other Requests for Relief that are wider issues are discussed under a given bullet point and then referred over to Report Sections VII. or VIII., for a wider determination that combines repetitious Requests for Relief into more comprehensive, topical determinations. Both SunShare's and Xcel's Arguments used in this Section are generally, but not exclusively pulled from the SunShare Intake Forms and from Xcel's responses to SunShare's Intake Forms.

MARCH 16, 2018 SUNSHARE INTAKE FORM NUMBER 1, ISSUE NUMBER 1

SUNSHARE'S ARGUMENT

Xcel Energy has required the use of a 750 AL underground line at a cost of $107,405.00 due to Xcel's claim that there is currently an underground line at that location. Xcel's position is that a new underground line must be used because there is currently one there. We have asked Xcel for justification that this is the case, such as an easement, but have not received anything. Also, we note that 750 AL is a substantial line, and we cannot tell from Xcel's studies why such a large line is required given the size of the current line. Lastly, Xcel ran their study, which limited the project from 5 MW AC to 3 MW AC, with the 750 AL line's ampacity rated at 255A, whereas it is actually 630A. SunShare notes that Xcel has refused to re-run their study using the correct ampacity. We are concerned that Xcel may have more erroneous inputs to their study software, and would like all inputs to be reviewed by the IE. Study Revision 3 was originally

performed with the 3 MW limitation determined by Rev 3.1 built in as noted in Study Rev 3, Section 3.0 – "Overall Application Proposed Size: 5MW. However, only 3MW allowed per previous studies".

XCEL'S ARGUMENT

The section of 792 feet of underground line is needed to replace an existing 1/0 AL underground line in the same location. This section of underground cable corresponds with existing property lines. In these situations, small sections of underground cable are typically customer-driven and either paid by the property owner or negotiated as part of an easement. Since Xcel Energy was aware of the underground cable, it was included in all the indicative cost estimates provided.

The 750 AL-type conductor is required because the existing underground line (1/0 AL) must be replaced with a conductor of lower impedance to resolve steady state overvoltage and voltage fluctuation violations. Reverse power flow across an impedance can lead to high voltage and/or voltage fluctuation issues. To resolve the voltage issues, the impedance of the conductor serving the DER facility needs to be reduced. In order to reduce the impedance, the existing small conductor (i.e., 1/0 AL) must be replaced with a larger, lower impedance conductor (i.e., 750 AL). The requirement of 750 AL conductor is not related to thermal rating or current (Amp) constraints.[22] We have already explained to SunShare that the 255A rating was noted in error instead of the correct 630A. In the load flow studies indicating voltage constraints, however Xcel notes in its Initial Submission to the IE, that it normally uses overhead line segments when it performs indicative cost estimates, regardless of whether the actual cable in the field is buried or overhead. In the case of the Linden Interconnection Xcel notes that it used a buried cable section which matches actual field conditions. No explanation was given as to why Xcel normally uses an overhead section regardless of the actual field condition in its indicative cost estimates was given. Xcel admits that the ampacity of the 750 AL cable section is 630A, not 255A as noted on its own one-line diagrams, but that the 255A does not affect the Study results.

MARCH 16, 2018 SUNSHARE INTAKE FORM NUMBER 1, ISSUE NUMBER 1 - REQUEST FOR RELIEF – IE DETERMINATIONS POINT BY POINT

- Order Xcel to share all inputs used in their study of the Linden project;

The IE determines that it is reasonable for Xcel to provide any and all inputs used in the Xcel Revision 3 model to SunShare immediately, as of the release of this Report by the IE, with an explanation of those inputs and Xcel's reasoning for each. SunShare will be allowed to fully review these inputs to determine if they were valid or not, and consider them as part of the IE's wider determinations found throughout this Report. Xcel shall provide those inputs to SunShare in writing so that SunShare may review them in its own facilities. SunShare may contact Xcel and/or CONFIDENTIAL {[redacted]} CONFIDENTIAL directly for answers or explanations to any questions it may have.

- We respectfully request that, if appropriate, the IE start the review by requiring that Xcel re-study the aforementioned projects using the correct inputs, as determined by the Independent Engineer, for ampacity as well as other incorrect inputs that are found once Xcel shares the inputs used;

The IE notes that there is a lack of transparency related to Xcel not providing SunShare with copies of the various models Xcel has performed, as well as not providing the inputs used in those models to SunShare. CONFIDENTIAL {[redacted]} CONFIDENTIAL as is normal and appropriate engineering practice. The IE also noted these issues prior to receiving the Xcel response to IE IR 011. CONFIDENTIAL {[redacted]} CONFIDENTIAL of Xcel is to be commended for calling out these issues, but Xcel did not go on to correct them or redo these problems as identified.

There is also an error found in the ampacity of the Linden model Revision 3 regarding the ampacity of a 750 AL cable in Revision 3 of that Study[7]. The 750 AL cable which actually has a rating of 630A is identified on Xcel's Linden modeling maps as rated at 255A. Xcel claims that this error does not affect the results, but the IE feels that this is indicative of the many errors and ongoing inaccuracies in Xcel's studies throughout the project. As a consumer of Xcel's information and Studies, SunShare, like any consumer, has a right

[6] Xcel responses to IE IR 011, Attachment A. Pages 228 to 244. CONFIDENTIAL [redacted] } CONFIDENTIAL.

[7] Xcel Initial Submissions to the IE, dated June 28, 2018, pages 12 through 16.

to accurate information, particularly when it pays for it. This lack of transparency reduces developer confidence in Xcel performed Studies. These issues as noted by the IE are combined with a number of other Requests for Relief as found in this Report.

See IE's Determination in Section VII. IE DETERMINATIONS RELATED TO A REVISIED LINDEN STUDY 4, of this Report, below.

- Require that Xcel share with the Independent engineer and us the actual easement or other reason why the line has to be underground and cannot be aboveground or located elsewhere; and

Xcel has only provided SunShare with vague speculation as to why the 792 foot,1/0 underground line section was buried in the first place, but no substantive historical reason. Xcel has noted that it could be an easement or special agreement with a landowner, but was not specific as to the full extent of the 1/0 buried cable situation. Therefore, the IE determines that it is reasonable that Xcel provide SunShare with the actual, specific reasons why the 1/0 cable segment was originally buried, and provide it immediately in writing to SunShare.

SunShare did request additional information on the status of this cable section and did not receive a full answer from Xcel, CONFIDENTIAL { [redacted] **} CONFIDENTIAL.**

- If the Independent Engineer discovers that industry standards could require less costly equipment than what Xcel proposes, require that Xcel either use a less costly alternative, or that Xcel pay for the excess cost and not count that against the $1M upgrade threshold. Since Xcel has not provided complete information, we are unable to take a position one way or another on this issue.

In the Initial Submission to the IE, Xcel had changed its indicative cost estimate from the actual buried line section to an overhead section which reduces the overall cost of the materials in the Linden Interconnection. This results in the costs being reduced by $60,831.00 and the overall project material threshold cost now falling below the $1M material limit to

[8] Xcel response to IE IR 011 Attachment A, pages 228 to 244. Email exchanges of question and answers between Xcel employees.

$998,121.00[9]. Xcel went on to redo the estimate for the Linden estimate in its Initial Response to SunShare's first Intake Form, such that the project cost is projected to be slightly under the $1M threshold cap. The Xcel estimated total now stands at $989,121.00. Xcel goes on to say that it will use this value for estimates of project costs up front, but notes, that as the project progresses, the cost could vary widely from the current $989,121.00 material cost.

See IE's Determination in Section VII. IE DETERMINATIONS RELATED TO A REVISIED LINDEN STUDY 4, of this Report, below.

MARCH 16, 2018 SUNSHARE INTAKE FORM NUMBER 1, ISSUE NUMBER 2

SUNSHARE'S ARGUMENT

It appears that Xcel energy applied 1.5% and 75% on/off voltage parameters in the study for this project. We believe these parameters are more restrictive than necessary, and that the percentage on the former should be higher, and the percentage on the latter should be significantly lower, and that Xcel's parameters are more restrictive than is necessary for the safe and reliable operation of the system. We believe that this may have led Xcel to use more robust and costly equipment than may otherwise be necessary under industry best practices, and/or may have unnecessarily restricted the capacity in MW for the project.

XCEL'S ARGUMENT

Although invited to the Technical Stakeholder Group, SunShare did not attend any of its meetings, and now questions the simplified IEEE 1453 methodology developed through that inclusive and thorough process. We do not believe the IE should re-visit the IEEE 1453 methodology. This methodology was thoroughly vetted in a transparent manner, filed with the Commission without objection, and has been consistently applied to all solar garden applications since April 2017. It would be discriminatory against all other

[9] Xcel's Initial Response to the IE, dated June 28, 2018, page 17, Table 1.

developers to favor SunShare with a modification to this standard by using a different methodology here. In any event, if the IE determines that the IEEE 1453 methodology should not be used, the only alternative would be to use the 2.0% full on/full off individual and aggregate under IEEE 141[10].

It is noteworthy that the IE rejected the notion that the aforementioned Settlement Agreement invalidated the Linden Dispute of March 16, 2018, on August 7, 2018, which in turn negated that the possibility Xcel's Flicker argument could revert to IEEE 141.

The standard governing interconnection, IEEE 1547-2018, was revised and published in April of 2018. The revised standard contains a section on limitation of voltage fluctuations induced by DER which includes requirments[11] on Rapid Voltage Change (RVC). The IEEE 1547-2018 approach is based on the recommended practices from IEEE 1453-2015. While the revised standard IEEE 1547 provides additional requirements on a range of power quality characteristics, the scope is limited to the DER and associated interfaces[29]. This scope excludes the voltage regulation equipment compatibility consideration for which the 1.5% with 75% drop criteria is based on[12].

MARCH 16, 2018 SUNSHARE INTAKE FORM NUMBER 1, ISSUE NUMBER 2 – REQUEST FOR RELIEF - IE DETERMINATION POINT BY POINT

- We respectfully request that the IE start the review requiring Xcel to re-study the aforementioned projects using the correct inputs for voltage, as determined by the Independent Engineer;

  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.

[10] This Footnote number reference is as found in the original text of Xcel's response to the IE.
[11] Spelling error is as found in original Xcel Document, no discredit, simply indicating a typo situation.
[12] Xcel's Initial Response to the IE, dated June 28, 2018, to SunShare's Intake Form dated March 16, 2018, page 20, paragraph 2.

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, adopted, or its contents validated in anyway by the MPUC, the IE find its contents and results to be unsubstantiated. This does create a vacuum since there are ongoing errors and problems throughout the Xcel models, and the actual flicker levels at the proposed Linden site are not known, The IE determines that it is reasonable that Xcel perform a new revision of the Revision 3 Study as well as perform flicker tests at the Linden site with the flicker values of 2.0% full on/full off, as well as higher possible flicker levels, and corrections to the Revision 3 model and Study. These revisions and changes shall be as seen in the IE's full Determination on Study Revisions and Flicker related issues as found below in Section VII. IE DETERMINATIONS RELATED TO A REVISIED LINDEN STUDY 4, and Section VIII. IE DETERMINATIONS RELATED TO FLICKER FIELD STUDIES, of this Report, below.

- We request that the IE rule that less restrictive voltage parameters are necessary for implementation of the IEEE 1453 studies, and specify what the industry standards are and should be applied;

It is noted that Flicker is a variable electrical system parameter that can vary significantly at different locations on a power system, as well as at the same site across any of a variety of conditions. As noted in the previous bullet point Request for Relief, the IE, therefore, determines that it is reasonable that Xcel perform a Flicker Study at the proposed Linden Interconnection site within one month after this Ruling is issued, and determine the actual level of Flicker found there. Xcel shall allow SunShare's engineer(s) to be present during this test and be fully involved in the setup and monitoring process as well as observing the results after an IEEE recommended one week testing period, side-by-side with Xcel.

These results shall be made fully available to SunShare in writing. This test shall be used in order to establish the actual base line level of Flicker prior to construction/connection of the Linden interconnection. Assuming the Linden Interconnection is actually built and interconnected with the BEL 062 distribution line, the Flicker test will be performed again after commissioning is completed and the Linden PV farm is energized. The one-week test will once again be attended by SunShare engineer(s) with the full cooperation of Xcel. Once again, SunShare's engineer(s) shall be allowed to participate in this testing and observe, comment on, and fully participate in this testing.

If the results of both the original baseline Flicker test and the post-commissioning Flicker test indicate that a 4% Flicker level will do no harm to the local interconnection or wider Xcel distribution system, 4% will be allowed to be the maximum Flicker level for the Linden Interconnection.

It is noteworthy that the latest edition of IEEE 1547 is edition 2018, and it now eliminates a section that refers to the 1.5%, 75% drop criteria referred to previously in this Dispute, and now uses a wider-emissions criteria[13].

See the IE's full Determination on Flicker related issues as found below in Section VIII. IE DETERMINATIONS RELATED TO FLICKER FIELD STUDIES, of this Report.

- If the Independent Engineer discovers that industry standards could require less costly equipment than what Xcel proposes, require Xcel to use that equipment, or use their proposed equipment and pay for the difference in cost; and

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.

See the IE's full Determination on Study Revisions and Flicker related issues as found below in Section VII., IE DETERMINATIONS RELATED TO A REVISIED LINDEN STUDY 4, and Section VIII. IE DETERMINATIONS RELATED TO FLICKER FIELD STUDIES, of this Report, below.

- If the Independent Engineer discovers that industry standards could allow for more MW than Xcel proposes, require Xcel to approve the installation of up to 5 MW AC at this site.

If the Revision 4, revised software model for Linden reveals that higher levels of solar output are acceptable, under the observation of SunShare's engineer(s), the highest level of MW output up to 5 MW shall be allowed for the Linden interconnection by Xcel.

See the IE's full Determination on Study Revisions and Flicker related issues as found below in Section VII., IE DETERMINATIONS RELATED TO A REVISIED LINDEN STUDY 4, and Section VIII. IE DETERMINATIONS RELATED TO FLICKER FIELD STUDIES, of this Report, below.

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[13] IEEE 1547-2018 APPENDIX G, Section G2 page 123 & G3 page 125.

MARCH 16, 2018 SUNSHARE INTAKE FORM NUMBER 1, ISSUE NUMBER 3

SUNSHARE'S ARGUMENT

Xcel has been delayed in sharing information about the project most recently, since July 14th of 2017, which is approximately 9 months ago (approximately 270 days). Delayed in sharing studies performed, answering questions about study inputs, re-studying the projects with correct conductor parameters, etc. Prior to July 14th of 2017, the Linden project was similarly delayed, for different reasons.

XCEL'S ARGUMENT

• Immediately beginning detailed design for [PROTECTED DATA BEGINS 3 MW PROTECTED DATA ENDS] of the project – this is not allowed by our Section 9 and Section 10 Tariffs, which require that a project is designed as a whole, not in pieces. The Commission has also ruled that Xcel Energy is not required to do this as noted above in the discussion on the Novel IE review. Also, an interconnection agreement must be signed by both parties and 1/3 of the interconnection costs be paid before detailed design and construction;

• Requiring Xcel Energy to pay any additional costs if the project must be constructed during winter – this is not allowed by Xcel Energy's tariff nor does the Company have control over when the solar garden is built; and

• Waiving the $1 million material upgrade limit – the material upgrade limit is defined in Section 9 Tariff, Sheet 68.4. The limit has been applied consistently throughout the program.

MARCH 16, 2018 SUNSHARE INTAKE FORM ISSUE NUMBER 3 – REQUEST FOR RELIEF – IE DETERMINATION POINT BY POINT

- Due to Xcel's many delays spanning over the course of years for this project, we request that the Independent Engineer rule that the project's 24 month clock to complete construction be reset upon the Engineer's final ruling, and if this case is disputed by Xcel at the PUC, then reset upon a final PUC ruling on the case;

It is reasonable that Xcel reset the Linden Interconnection Project's 24-Month Clock upon completion of this Dispute or upon completion of appeals to the PUC by either Party. SunShare has seen significant delays in this project and the clock should be adjusted to accommodate these delays. CONFIDENTIAL [redacted] **.} CONFIDENTIAL The Tariff does not specifically say that the clock is a fixed concept, and in fact has been used flexibly by Xcel, as is appropriate in any construction project. Developers and the utility require such adaptability in construction projects, and Xcel is clearly using that flexibility at this time across CSG/SRC projects.**

- In order to prevent further delay for this project, the program, and the queue (as Xcel has pointed out is a concern of theirs), we respectfully request that the Independent Engineer start the review process by asking Xcel to immediately begin detailed design for this project using the 3 MW AC size and design parameters in Xcel's current IA, such that it is not objectionable to Xcel. While the Independent Engineer's final ruling may adjust some of the equipment used and add 2 MW, we believe that the general structure of the design will likely remain the same, along with the majority of the upgrades, and that it would be far more expeditious to adjust existing or in-process detailed designs at the completion of the IE review than to have to start the detailed design process only after the IE review is complete. There is precedent in this occurring for SunShare projects in the past where the quantity for Xcel reconductoring was questioned by us, and it worked well and allowed the queue and program to proceed faster than if Xcel were doing no detailed design during the IE review;

  The IE cannot rule on this Request for Relief, due to the Department's rejection of SunShare's Request for Relief in this matter on July 24, 2018.

- We request that the Independent Engineer rule that should construction on Xcel's upgrades have to occur in the winter, Xcel should bear the added costs

[14] Xcel response to IE IR 011, Attachment A. Email chain, pages 183 and 184. CONFIDENTIAL [redacted] } CONFIDENTIAL.

of winter construction vs summer construction, as it would be unfair for SunShare to have to bear those costs if they are created because Xcel was found to have delayed the projected upgrades. We note that SunShare offered to Xcel that we would pay Xcel to begin the detailed design on April 4, 2018, and Xcel rejected that offer. If Xcel's rejection of that offer leads to construction going past December 2018, we see it unreasonable for SunShare to be charged the added costs; and

The IE notes that the Department's intervention in this Dispute on July 24, 2018, on the matter of SunShare beginning construction of the site while this Dispute is in progress has prevented SunShare from proceeding with payment for the interconnection or construction of the site until the Dispute is completed. The IE cannot overrule the Department in this matter.

- We request that the Independent Engineer recommend to the Commission that they waive the $1M cap for distribution upgrades for the Linden project, so that 5 MW can be installed at the site. We ask that the recommendation for this waiver be made to compensate SunShare for the years of delays it has suffered with this project as a result of Xcel delays and inaccurate studies.

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 in this interconnection. While the IE does not have the authority to wave the $1M material limit cap perse, 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 [15]. 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.

[15] Ibid.

MARCH 16, 2018 INTAKE FORM NUMBER 1, ISSUE NUMBER 4
SUNSHARE'S ARGUMENT

It appears that Xcel is utilizing more robust equipment than is required by industry standards for a project the size of Linden in the cost estimates included in its Interconnection Agreement, and is erroneously passing the full cost onto us. We'd like the true industry standards to be reviewed regarding the use of 336 AL versus other alternatives such as 4/0 Penguin, 4/0 Oxlip, or other comparable but less expensive equipment. It is hard for us to be certain, given the limited and imperfect information provided by Xcel, so we would like a 3rd party review.

XCEL'S ARGUMENT

Xcel has noted that 13,000+ feet of 336 cable is required to upgrade its distribution system to accommodate the Linden Interconnection. Xcel has rejected SunShare's proposals that would have Xcel use alternatives to the 336 AL cable it normally stocks, and uses. SunShare had proposed 2/0 and 4/0 cables as alternatives due to much lower costs. Xcel notes that it does not normally stock 2/0 and 4/0 overhead cable and uses cable classes such as and 336 to reduce purchasing, stocking and handling costs as well as to standardize and reduce the number of types of fittings and line hardware in its inventory.

MARCH 16, 2018 SUNSHARE INTAKE FORM NUMBER 1, ISSUE NUMBER 4 – REQUEST FOR RELIEF – IE DETERMINATION POINT BY POINT

- If any less-expensive conductors are deemed appropriate by the Independent Engineer, have Xcel re-study the aforementioned projects using the correct inputs, as determined by the Independent Engineer or allow Xcel to use their proposed equipment and pay for the difference in cost.

Xcel notes that utility distribution line crews depend on using consistent equipment for safety and handling reasons, and safety is a major concern in the interconnection Tariff's umbrella rules. Xcel does not feel that it should have to purchase equipment that it presently does not use or inventory. The IE notes that Tariff Section 9, Section 9, a., Sheet 68.11, states that equipment alternatives may be allowed if they do not restrict renewable generation and are technically feasible.

Xcel did produce its Distribution Line Construction manuals for both overhead and underground construction as IR responses, and they do not list 2/0 or 4/0 overhead cables. However, it is noted that the Tariff does allow substitute materials and equipment to be used if they are technically equivalent and appropriate for renewable energy projects.

SunShare has proposed two types of 4/0 OH cables for use on the Linden interconnection, that are not within Xcel's normal conductor usage. SunShare has noted that these cables are less expensive than the model of cable presently used by Xcel.

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. This includes brands, model numbers, pricing or other criteria, so long as the conditions of Tariff Section 9. are met. That Section is shown below, and the significant text is shown in yellow by the IE for clarity:

Minnesota Xcel Tariff 9, Sheet 68.11
9. Requests for Independent Engineer to Resolve Material Disputes Affecting Interconnection Application (Continued)

a. Any applicant may submit interconnection disputes materially affecting the application to an independent engineer selected or approved by the Department to ensure neutrality. The independent engineer shall be available on a standing basis to resolve disputes on the study process, including material disputes related to the Company's determination of application completeness, timeliness of application and study processing, and the cost and necessity of required study costs and distribution system upgrades. The applicant requesting such an independent engineer review shall share 50% of the costs of the independent engineer. The safety and reliability of the Company's system should be given paramount consideration in any analysis. The review of the independent engineer must consider industry standards for interconnection, including the current version of the National Electric Safety Code, National Electric Code as adopted in Minnesota, FERC rules, NERC rules, Minnesota rules and Minnesota Interconnection Standards and must consider, on a case-by-case

basis, the Company's standards for building, safety, power quality, reliability and long-term stable operations for building facilities even where such standards are more restrictive than the minimum requirements set forth in the codes, standards and rules. Continuity and consistency of using Company standards is paramount for employee safety. 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. Xcel would continue to have the burden of proof to show that it is reasonable for its ratepayers to pay for the costs of the more restrictive standards. This engineering review specifically excludes appeals relating to Co-Location Determination addressed in par. 4 above, and excludes disputes not related to the interconnection application such as disputes after interconnection has been achieved.

In addition to controlling our relationship with customers, once approved by the Commission, filed tariffs have the force of law and we are obligated to follow them.[7] *If Xcel Energy is following the processes and rules as set forth in its tariff, then its conduct is appropriate.*

Noting these above sections of the Tariff, and the practical pricing issue of cable, the IE determines that it is reasonable for Xcel to use 336 OH cable for the entire project, but Xcel will take their mark-up including; profit and bond cost off of the price of the materials for this interconnection to make up for the problems and delays that have occurred with the Xcel modeling of the Linden Interconnection.

See IE's Determination in Section VII. IE DETERMINATIONS RELATED TO A REVISIED LINDEN STUDY 4, of this Report, below.

MARCH 16, 2018 SUNSHARE INTAKE FORM NUMBER 1, ISSUE NUMBER 5

SUNSHARE'S ARGUMENT

Xcel performed inaccurate studies in mid-2017 which need to be reviewed and redone due to errors pointed out to Xcel over the past 8 months. After repeated requests Xcel has not sent us all studies performed on these projects (only 3 of 4 have been sent as of the date of

submission of this form, despite repeated requests for all studies), thus prohibiting a complete engineering review. Xcel delayed sending us 2 of the 4 studies for over half a year (with the last study still not shared).

Given the number of engineering issues we have discovered with this project, and lack of clarity from Xcel over the past approximately 8 months, we wish to give the Independent Engineer a full mandate to review the studies performed by Xcel for accuracy and validity, the Interconnection Agreements and costs/equipment proposed by Xcel, accuracy of system size reduction from 5 MW to 3 MW AC required by Xcel, and all relevant tariffs and PUC rulings to determine if Xcel is indeed providing all required information to us.

XCEL'S ARGUMENT
Xcel has not shared any arguments related to this Complaint issue.

MARCH 16, 2018 SUNSHARE INTAKE FORM NUMBER 1, ISSUE NUMBER 5 – REQUEST FOR RELIEF - IE DETERMINATIONS POINT BY POINT

• Have Xcel share with the Independent Engineer and us what all of their inputs into the studies were;

The IE determines that it is reasonable that Xcel share all of the inputs to each of the five (5) Studies performed by Xcel as requested from SunShare. The IE notes that SunShare paid for each of the Studies, and that since none of the Studies have ultimately been accurate, SunShare should have full access to all related information for its own historical and research uses.

• Review the studies for accuracy. For example, on study R2, page 16 references ~13,000ft of 336 upgrades, but pages 4&5 reference 18,000ft of 336 upgrades. We have seen many more issues that need to be reviewed;

The IE notes that none of the Studies performed by Xcel for SunShare were entirely accurate and that the Studies had to be changed due to inaccuracies in data, changing external conditions and Xcel's errors. The IE has reviewed each of the Studies and noted inaccuracies and errors. The IE determines that

Study Revision 3 be redone with the needed clarifying information that, by Xcel's own admission, was not carried forward by Xcel from Study Version R2 into Study Version R3. The IE will call the new Study "Revision 4" for the purposes of this Report and that this new Revision 4 includes all clarifying information from Revision 2 and 3 and any current pertinent information.

See the IE's full Determination on this Request for Relief as found below in Sections VII. IE DETERMINATIONS RELATED TO REVISION 4 STUDY and VIII. IE DETERMINATIONS RELATED TO FLICKER FIELD STUDIES, of this Report.

• We also request that the Independent Engineer review any other questionable areas that may arise during his review which we may not be aware of at this time because we have not been sent all of the information we have requested of Xcel;

See the IE's full Determination on this Request for Relief as found below in Sections VII. IE DETERMINATIONS RELATED TO REVISION 4 STUDY and VIII. IE DETERMINATIONS RELATED TO FLICKER FIELD STUDIES, of this Report.

• Require Xcel to share all 4 studies and any relevant information (and any others performed by Xcel or its subcontractors on the Linden projects) with the Independent Engineer and us;

In reality, Xcel has performed five (5) Studies for the Linden Interconnection to date, and the IE sought and obtained all five (5) Xcel/Xcel contractor performed Studies for his own research and these have also been fully shared (Xcel's redacted copies) with SunShare in the form of IRs. This Request for Relief is completed.

Table 1 below shows the Xcel/Xcel Contractor Studies for the Linden Interconnection that were historically performed and the increase in SunShare's MW generation capacity that was added over time as each successive Study was performed. The Table 1 is an indication that Xcel's Studies were not accurate or correctly performed.

• Review the accuracy and validity of Xcel's reduction in system size from the 5 MW AC applied-for to 3 MW AC to determine if the project can be 5 MW AC using lower cost industry standard equipment rather than Xcel-desired equipment, as it is Xcel's equipment selection that pushes the cost of interconnection over $1M for 5 MW AC; and

See the IE's full Determination on this Request for Relief as found below in Sections VII. IE DETERMINATIONS RELATED TO REVISION 4 STUDY and VIII. IE DETERMINATIONS RELATED TO FLICKER FIELD STUDIES, of this Report.

• Require Xcel to specify exactly what upgrades would be required for the installation of 4 MW AC, and then 5 MW AC. Specifically, which upgrades for the additional MW's would drive the cost over the $1M cap?

See the IE's full Determination on this Request for Relief is found below in Sections VII. IE DETERMINATIONS RELATED TO REVISION 4 STUDY and VIII. IE DETERMINATIONS RELATED TO FLICKER FIELD STUDIES, of this Report.

TABLE 1 - XCEL STUDIES PERFORMED FOR THE PROPOSED SUNSHARE LINDEN INTERCONNECTION						
Study Provider	**Study Number**	**Study Title**	**Study Completion Date**	**Date Presented to SS**	**Notes**	**Details**
CONFIDENTIAL [redacted]} CONFIDENTIAL	Initial Site Study Project – CONFIDENTIAL {[redacted]} CONFIDENTIAL	DG Study – BEL Site	February 17, 2016	Not presented to SS until ordered by IE	Initial Linden Interconnection Study States 0.3 MW allowed out of 5 MW requested	
CONFIDENTIAL [redacted])} CONFIDENTIAL	Study Revision 0 Project – NA	Belle Plaine Substation Feeder 062 PV Correction Study	May 6, 2016	May 6, 2016	Linden 1ST Study Redo Study says 2.3 MW allowed out of 5 MW requested	
CONFIDENTIAL [redacted])} CONFIDENTIAL	Study Revision 1 Project – CONFIDENTIAL [redacted]} CONFIDENTIAL	Belle Plaine Substation PV Connection Study Feeder BEL 062	January 11, 2017	Not presented to SS until ordered by IE	Linden 2ND Study Redo Study says 1.7 MW allowed out of 5 MW requested	18,480 feet of 336 reconductor needed
CONFIDENTIAL [redacted])} CONFIDENTIAL	Study Revision 2 Project – SRC039909, 10, 11, 13, 14	Belle Plaine Substation	April 14, 2017	April 14, 2017	Linden 3RD Study Redo Study says 3.0 MW allowed out of 5 MW requested	18,480 feet of 336 reconductor to 336
CONFIDENTIAL [redacted])} CONFIDENTIAL	Study Revision 3 Project – SRC039909	BEL 062, Belle Plaine Substation Distributed Generation Study	June 27, 2017	June 27, 2017	Linden 4TH Study Redo Study says 3 MW allowed out of 5 MW requested	13,600 ft of 336 + 792 feet of 750 AL reconductor needed

Xcel admits that it has used the wrong input values in each of the Studies noted in the above, resulting in restudies that have consistently caused additional MW capacity to be reapplied to SunShare's original 5 MW of Flicker in multiple revisions of the computer model, since the initial model was run in August of 2015. This trend has continued through the IE process.

AUGUST 14, 2018 SUNSHARE INTAKE FORM NUMBER 2, ISSUE NUMBER 2
SUNSHARE'S ARGUMENT

Tariff Section 10 states that the maximum value of allowable Flicker is 4%, which was written in the mid-2000's prior to the mass entrance of AFIs into the renewable energy market. In a previous dispute at the Glazier project, the IE determined that it is reasonable that Xcel use a value of 2.0% for Flicker in both "aggregate" and "individual" PV systems for interconnection modeling.

However, following this IE ruling on the Glazier/Foxtrot/Blue Heron/Cold Spring site, the PUC required that Xcel provide an assessment of the impacts from voltage fluctuation and flicker, if any, on its system within three months of the operation (and annually thereafter) of the Glazier project, which was designed and interconnected using a 2.0% assumption in models. This was done to provide more insight on the practical impacts to the PUC for future consideration. In the compliance report, both the short-term and long-term flicker severity calculated from measured data was approximately half of the planning levels from the relevant Standard. Therefore, we believe that the 2% assumption is too conservative given the actual performance data tracked at the direction of the PUC, since the measured data at a project designed with the 2% assumption experienced flicker much lower than allowable limits.

Per the Glazier Compliance Report: "Figure 8 depicts the short-term flicker severity cumulative distribution for Pst which shows Pst-99% = 0.47 and Pst-95% = 0.41. These values are below the Pst planning level of 0.9, which indicates no violation in short term flicker severity is observed." "Figure 9 depicts the long term flicker severity cumulative distribution for Pst which shows Pst-99% = 0.35 and Pst-95% = 0.31. These values are below the Pst planning level of 0.7, which indicates no violation was observed."

XCEL'S ARGUMENT

The compliance report referenced by SunShare is specific to the Glazier project site characteristics and the analysis should not be used to draw any general conclusions about the appropriate voltage fluctuation standard that should be applied to all Solar*Rewards Community project sites. The Glazier analysis uses IEEE 1453-2015 evaluation procedures for data monitoring and assessment. SunShare is misinterpreting the concepts used in the IEEE 1453 standard and Glazier report as well as their application. Xcel also argues that its January 3, 2017 Settlement Agreement with SunShare states that SunShare is obligated to use the IEEE 141 Flicker chart method at 2% full on/full off or the IEEE 1453 method under certain conditions, and is still obligated to do so at this present time. Xcel also notes that the IEEE 141 method is now "moot" and has been replaced by its Simplified IEEE 1453 methodology.

AUGUST 14, 2018 SUNSHARE INTAKE FORM NUMBER 2, ISSUE NUMBER 2 – REQUEST FOR RELIEF – IE DETERMINATION POINT BY POINT

- We respectfully request the IE rule that the allowable flicker be increased from 2% to 4% and to recommend to the PUC that Xcel be required to track voltage at the Linden/Kane site again within the first 3 months and annually thereafter to report back to the PUC, since the measurements from an operational project designed with the 2.0% limitation had significantly less measured flicker than allowed.

It is noted that SunShare's claim that Tariff Section 10, SubSection 4., allows Flicker levels to be as high as 4%. That Section of Tariff 10 is found on page 145 and 146, and is seen in the box below:

4 . Interconnection Issues and Technical Requirements (Continued)

If the Generation System creates voltage changes greater than 4% on the electric power system, it is the responsibility of the Interconnection Customer to correct these voltage sag/swell problems caused by the operation of the Generation System. If the operation of the interconnected Generation System causes flicker, which causes problems for others customer's interconnected to Xcel Energy, the Interconnection Customer is responsible for correcting the problem.

iii) Flicker - The operation of Generation System is not allowed to produce excessive flicker to adjacent customers. See the IEEE 1547 standard for a more complete discussion on this requirement.

The stiffer the electric power system, the larger a block load change that it will be able to handle. For any of the transfer systems, the Xcel Energy voltage shall not drop or rise greater than 4% when the load is added or removed from Xcel Energy. It is important to note, that if another interconnected customer complains about the voltage change caused by the Generation System, even if the voltage change is below the 4% level, it is the Interconnection Customer's responsibility to correct or pay for correcting the problem. Utility experience has shown that customers have seldom objected to instantaneous voltage changes of less than 2% on the electric power system, so most Area EPS Operators use a 2% design criteria.

The IE notes that the above section of the Tariff is poorly written and misleading, and notes that when Xcel originally wrote this section of the Tariff, renewables did not yet have as widespread a presence on the grid as they do now. Many technical issues that renewables have created were previously unknown or not widely known. This Tariff should, but does not, clearly or succinctly lay out the layers of voltage requirements and voltage fluctuations that can exist relative to renewable interconnections. Rather this Tariff interchangeably uses the terms "flicker" and "voltage variation" as if they are the same thing, which is sometimes, but not always the case, as well as numeric values that are not explained.

The Tariff should describe the ANSI/IEEE C84.1 Voltage Standards[16]; how the Xcel 4% maximum voltage fluctuation limit, used by this Tariff, fits underneath the ANSI C84.1 Standard; and how flicker is a subset of many possible types of voltage fluctuations, including Rapid Voltage Change (RVC) which is another form of voltage variation that can include flicker.

The Tariff does not say that the maximum level of flicker allowed is 4%. The Tariff does not say that a 4% flicker level is not allowed either. In fact, the Tariff would allow a maximum flicker level to be 4% if the voltage fluctuation was entirely made up of flicker, which would be unusual, but could happen. Indeed, the Tariff refers to IEEE 1547 for further information on flicker. This is mentioned by Xcel, but without explanation. Further, IEEE 1547 states that IEEE 1453 shall be used for issues related to flicker. Xcel has presented its own version of IEEE 1453 to the MPUC. The MPUC has not offered its adoption of Xcel's "Simplified IEEE 1453". But the Tariff is explicit that IEEE 1547, which requires the use of IEEE 1453, must be used by Xcel. Xcel has stated that if its simplified IEEE 1453 is not used, SunShare must revert to the old GE Flicker Chart which it has historically used for flicker calculations.

Xcel also notes that the GE Flicker Chart (IEEE 141) method is a moot point, but will contractually hold SunShare to the IEEE 141 methodology if the IEEE 1453 Simplified method is not accepted by the IE, based on the January 3, 2017 Settlement Agreement[17]. Why would Xcel hold SunShare to a Standard that is in Xcel's own words "moot"? This begs the question, is Xcel holding SunShare to that contract language because it serves some special or higher purpose, or simply because it can? The IE concludes that Xcel is attempting to hold SunShare to a moot Flicker evaluation system simply because it can. If the CSG/SRC Program is to succeed and move forward technologically, Xcel must meet its Codes and Standards obligations and be flexible enough to take advantage of such cases. It is noteworthy that the January 3, 2017 Settlement Agreement refers to the use of IEEE 1453, not an IEEE 1453 Simplified method, which are utterly different methods. Nowhere in the Settlement Agreement is there any reference to this Simplified IEEE 1453 method, only the IEEE 1453. This is a clear and obvious distinction. Therefore, Xcel's argument that SunShare is bound to use its IEEE 1453 Simplified Flicker methodology is without merit, particularly in light of the language of the January 3, 2017 Settlement Agreement.

[16] ANSI C84.1 Service Voltage Limits, a Standard used to determine voltage minimum and maximum levels at the various voltages used by utilities and customers.
[17] January 3, 2017 Linden Settlement Agreement between Xcel and SunShare. Attachment B, Xcel's initial Response to the IE, June 28, 2018.

Therefore, the IE further recommends that the MPUC order that the Section 10 Interconnection Tariff be updated with the IE's suggested changes above in Tariff 10, Section 4, (Flicker, Voltage Section noted above).

The IE also notes that the Xcel Glazier Flicker Report does indeed demonstrate that the Pst levels at Glazier do not exceed the 0.7 upper limit and that the distribution system may tolerate higher levels of Flicker, it is unclear how much more. Having said that, that Study only applied to Glazier.

Since Xcel was also mandated, by the MPUC, to perform a wider examination of Flicker at both the Glazier site and the wider Xcel system for its Compliance Filings in 2016, the IE notes that it is reasonable that Xcel perform such a Voltage Flicker Study on the Linden Interconnection immediately upon the delivery of this Report to the Department, and prior to the Linden Interconnection's construction, and provide that data to SunShare within a one-month period. Xcel shall note the equipment used, the locations, the results of the monitoring at those locations, and the conclusions of the monitoring, following the conditions as are noted in Section VIII., of this Report.

As noted previously in this Report, Xcel did file the "COMPLIANCE – TRANSITION TO INCORPORATING THE STANDARDS OF IEEE 1453", and an associated White Paper titled "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 Passing of Clouds", in 2017. It is noteworthy that while Xcel did file these documents with the MPUC without objection, the MPUC provided no comment, review, acceptance, or formal adoption, since it was a Compliance Filing.

Since the MPUC has not reviewed, or adopted Xcel's Simplified Flicker Study, the IE has no choice but to consider that the content of the Xcel 1453 Simplified methodology Study cannot be substantiated.

Since there is a gap in the Flicker Standards and the actual existing flicker levels are unknown, it is reasonable that Parties will follow the IE's full Determination on this Request for Relief as it is found below in Section VIII. IE DETERMINATIONS RELATED TO FLICKER FIELD STUDIES, of this Report.

VII. IE DETERMINATIONS RELATED TO A REVISED LINDEN STUDY 4

It is noteworthy that the standard Xcel Statement of Work (SOW) form used in this and other Xcel CSG/SRC Program interconnection projects, states specifically that "The Engineering Scoping Study includes: prepare steady-state model for minimum and maximum loads, prepare accurate load flow models, develop model impedances, and loads from generation site to transmission system,…" [18]. It is also noteworthy that as noted previously the Revision 3 Study, as well the four (4) previous versions of the Linden Study, CONFIDENTIAL {[redacted][19],} CONFIDENTIAL and that the various Studies particularly the Revision 3 Study contains errors that were presented to SunShare as a finished product. The computer-generated model's maps shown in Revision 3's Study that Xcel presented to SunShare were not accurate and did not demonstrate an accurate or complete product.

Therefore, the IE determines that it is reasonable that Xcel perform another Study of the Linden Interconnection to fully correct the errors in the Revision 3 Study. This "Revision 4" shall have, but not be limited to, the following features that correct problems found in Xcel's Revision 3 Study:

1) **SunShare's selected engineer(s) shall be permitted to be present during the development of the Revision 4 Linden model and shall be present at SunShare's discretion during the entire modeling process and shall be allowed to actively participate in the input evaluation, run of the software model, and output evaluation of the Revision 4 model and Study Report document.**

2) **If any variation of the Revision 4 Study addresses the use of 750 AL UG cable (at the joint determination of Parties), the 255A rating used in Revision 3 for the 750 AL buried cable shall be corrected to 630A in Revision 4.**

3) **The 1.5% with 75% drop criteria is not to be used in any variation of the Revision 4 Linden Study, since the IEEE 1453-2018 has excluded it. Voltage**

[18] Xcel Study for the Linden SunShare Interconnection, boilerplate explanation within the Study document, dated
[19] Xcel response to IE IR 011, Attachment A, pages 228 through 244. CONFIDENTIAL {[redacted]} CONFIDENTIAL.

regulators shall be modeled with a 2% full on/full off value, or higher if there is no demonstrable result outside of the IEEE 1453 maximum Pst Flicker values.

4) **Xcel shall work with SunShare to determine all of the inputs of the Revision 4 model.**

5) **Xcel shall run variations of the Revision 4 model taking into consideration the results of the first, pre-construction Flicker Study performed as part of IE Determination found in Section VIII. of this Report below, with the following inputs, up to the point that the Section XI. Study monitoring indicates is appropriate:**

   a. **3 MW PV generation plant output**

      i. **2.0% full on/full off flicker**

         1. **Variation of the Study using 336 OH cables instead of the 750 AL UG segment**

      ii. **3.0% full on/full off flicker**

         1. **Variation of the Study using 336 OH cables instead of the 750 AL UG segment**

      iii. **4.0% full on/full off flicker**

         1. **Variation of the Study using 336 OH cables instead of the 750 AL UG segment**

   b. **4 MW PV generation plant output**

      i. **2.0% full on/full off flicker**

         1. **Variation of the Study using 336 OH instead of the 750 AL UG segment**

      ii. **3.0% full on/full off flicker**

         1. **Variation of the Study using 336 OH cables instead of the 750 AL UG segment**

      iii. **4.0% full on/full off flicker**

         1. **Variation of the Study using 336 OH cables instead of the 750 AL UG segment**

   c. **5 MW PV generation plant output**

      i. **2.0% full on/full off flicker**

1. **Variation of the Study using 336 OH cables instead of the 750 AL UG segment**

ii. **3.0% full on/full off flicker**

1. **Variation of the Study using 336 OH cables instead of the 750 AL UG segment**

iii. **4.0% full on/full off flicker**

1. **Variation of the Study using 336 OH cables instead of the 750 AL UG segment**

This list of Study content requirements are the minimum variations and may be added to by SunShare should it feel that circumstances justify additional cases, within reason. This Study shall be completed within three (3) weeks of the completion of the Flicker Study noted below. As noted previously by the IE, all costs associated with this additional modelling shall be born by Xcel, per MPUC Order on November 1, 2016.[20]

VIII. IE DETERMINATIONS RELATED TO FLICKER FIELD STUDIES

It is noted that Flicker is a variable electrical system parameter that can vary significantly at different locations on a power system. Xcel has taken a one size fits all approach to flicker, while in reality, flicker itself can be a site by site phenomenon.

Depending on the power rating level of a given Flicker source, Flicker is sometimes irrelevant if the feeder capacity and load is larger than the flicker source, or because of other system situations. Other loads can be affected, or not, depending on the particular system the flicker source is feeding into or taking capacity from. Again, flicker's effects can vary widely depending the variety of situations found on a given power system.

The MPUC has taken no position on the Xcel Flicker compliance filing which is clearly demonstrated by the fact that Xcel's Flicker White paper and Simplified IEEE 1453 methodology were never reviewed, accepted, or adopted by them.

[20] ORDER RESOLVING INDEPENDENT-ENGINEER APPEALS AND ESTABLISHING PROCEDURES FOR FUTURE DISPUTES, November 1, 2016, https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId={F33D5481-A3F9-4ED3-B585-D9367132CD3E}&documentTitle=201611-126177-02 9, MPUC Orders, dated November 1, 2016, Order Point 4., page 15, noting that Xcel will pay the cost of study re-dos, when errors in their studies are identified.

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.

As noted in Section II. IE PROCESS & CHARTER, of this Report, 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 Program. Since a dilemma exists in the area of flicker and flicker has not been measured on the BEL 062 feeder, the IE determines that it is reasonable that Xcel perform a Flicker Study at the proposed Linden Interconnection site to be completed within one month after this Determination is issued by the IE. This flicker Study will be used to scientifically validate the actual level of flicker found there at the time of the Study.

As part of this Study, Xcel shall allow SunShare's engineer(s) to be present, side-by-side with Xcel, during this test and be fully involved in the setup and monitoring process as well as observing the results after the IEEE 1453 recommended testing period. The results shall be made fully available to SunShare in writing, immediately upon completion of that monitoring which shall be completed with three (3) weeks of the release by the IE of this Report. This test shall be used in order to establish the actual base line level of Flicker prior to construction/connection of the Linden interconnection. Depending on the results, and an agreement between Parties, these monitoring results shall be used in the VII. IE DETERMINATION RELATED TO A REVISION 4 STUDY, as noted previously by the IE.

Assuming, then, that the Linden Interconnection is actually built and interconnected with the BEL 062 distribution line, a second Flicker test will be performed at the same site(s) after commissioning is completed and the Linden PV farm is energized. This second Flicker test will also have full participation by SunShare engineer(s) and full cooperation by Xcel, as the first Flicker test did. Depending on the results of the second flicker Study, the levels of flicker emissions from the Linden site can be accurately assessed and corrective adjustments can be implemented by Xcel and SunShare.

IX. IE QUALIFICATIONS

Sam Wheeler has a degree in Electrical Engineering (University of Colorado, 1980) and has extensive experience with commercial, industrial, and utility electric power. During his 35+ years of experience in the electric power industry, he worked extensively on both sides of the electricity meter, in both industrial/commercial and utility sides of electric power. Specialties include backup and primary generation, distributed generation interconnections with utilities, distribution system design, device coordination, energy usage, consumption, conservation, renewables, power quality, industrial processes, as well as cost estimating, project management and product/service development.

He has direct, long term, experience with the NFPA 70, the NEC, IEEE C2 2017 - The NESC and IEEE 1547, IEEE 1453 as well as various State and Utility industry level Interconnection and Grid-Tie Rules. He is a member of the National Fire Protection Association (NFPA), which authors the NEC.

Experience

He has experience with industrial and utility systems and has a strong background (25+ years) in all aspects of electric power. He has worked in nearly every commercial, industrial, and utility environment, including:

- Auto plants – Johnson Controls, Toyota
- Aircraft plants - Boeing
- Data Centers - Charles Schwab, FISERV, IBM, NCAR
- HVAC plants - Trane
- Oil/Chemical refineries – Anadarko, Colorado Refining, Diamond Shamrock, Sinclair
- Research – DOE, The World Bank, NREL
- Water/waste water plants - various Municipalities
- Utilities - Aquila, ECNZ (NZ), MECO, HECO, HELCO, XCEL, NEXTERA, UNITED POWER (Australia), WEL Energy (NZ).
- Renewable grid power plants – Hawaiian Electric, Microgy

Education

- University of Colorado – B.S. Electrical Engineering, 1980
- Certified Power Quality Engineer (CPQE) – Association of Energy Engineers (AEE), 1999

Associations

- National Fire Protection Association (NFPA) – Member in good standing.
- Guest lecturer and former Adjunct Professor at the Colorado School of Mines in the Electrical Engineering Department.

Work History

- 2003 – Present: Sam Wheeler, Energy Consultant, Thornton, CO
- 2000 – 2003: Johnson Controls, Denver, CO
- 1997 – 2000: PSCO/Xcel Energies, Denver, CO
- 1994 – 1997: UtiliCorp United (Aquila), Pueblo, CO & Kansas City, MO
- 1989 – 1994: The City of Longmont Electric Department, Longmont, CO
- 1984 – 1989: National Center for Atmospheric Research, Boulder, CO
- 1980 – 1984: Rockwell International, Golden, CO (2 time periods)

Specific Related Experience

- US DOE – As a consultant to the DOE and NREL, acted as a merit reviewer of proposed Wind and PV system-based Inverter and Interconnection technologies and Projects. IEEE, NEC and NESC codes were used as the basis for evaluation.

- Anadarko Petroleum Corporation, CO & WY – As a consultant to major oil and gas company evaluated field PV installations for appropriate ratings and compliance with NEC construction requirements, and API 500 Hazardous Location requirements.

- Altairnano Inc. – As a consultant to a utility class battery system grid equipment company, performed equipment layout, utility grid interconnection design for several large PV fields at PREPA (Puerto Rico), Hawaiian Electric & subsidiary utilities - 15 MW, 20 MW and 40 MW and PSE&G – 60 MW.

- MICROGY, Inc. Golden CO – As a consultant - performed design, construction, and start-up services for a system that produced fuel gas from manure at three dairy farms in Wisconsin. The gas was then burned as fuel in an engine-generator set, and the electricity produced was sold to the local utility, through interconnection systems.

- PSCO/XCEL Energies – Denver, CO – Developer and Manager of XCEL Energies Power Quality and Industrial Services business unit. Provided consulting services, troubleshooting, design, and equipment purchasing services to large commercial and industrial customers of regional utility company. Business unit was very successful and made over $1M in its first year of operation.

END OF DISPUTE RESOLUTION FOR SUNSHARE

LINDEN INTERCONNECTION

PUBLIC VERSION

Solar*Rewards Community
Intake Form for Independent Engineer Review

This Intake Form should be used by an applicant to request an Independent Engineer (IE) Review under the Northern States Power Company Minnesota Tariff Section 9 Solar*Rewards Community Program, and to introduce into the IE Review any additional issues raised by the applicant during the review to be considered as part of the IE Review for the same SRC numbers at issue in the applicant's initial request. To initiate an IE Review, this form should be sent via email to the Minnesota Department of Commerce with a cc sent to SRCMN@xcelenergy.com

Please succinctly identify the engineering issues that you want the IE to resolve. Number each issue, and provide the SRC number and name of the applicant's legal entity associated with each SRC number. Describe the specific action requested from the IE and provide support for your position. Please duplicate the table below for any additional issues you would like to have resolved in this IE Review, and change the Issue Number in the top line of each copy of the table so that the issues are numbered consecutively.

This Intake Form was submitted on 4/12/2018, by:
David Amster-Olszewski, SunShare, LLC and Lake Nokomis 44-46 LLC's, [redacted]

Issue Number 1	
Succinct description of engineering issue.	We received multiple conflicting reports and studies from Xcel in 2016 and 2017 regarding the Schiller/Steinkraus project and were denied a restudy of the project by Xcel. We requested a restudy both to determine the correct interconnection scope and costs for the project under Xcel's standards, as well as under the IEEE 1453 methodology. Xcel would not clarify their studies or conduct a new one to correct their mistakes to give us a valid study and interconnection agreement (IA). In March of 2016 we received a letter that Xcel "determined that the Lester Prairie substation associated with the above facility has reached its maximum capacity for distributed generation" and that Xcel would not be conducting any more studies on the project and would return all program fees. In effect, Xcel said the project was not feasible at all. Then, in August 2016, Xcel studied the Schiller/Steinkraus project again and determined that in fact the project could be installed, and that there was an interconnect cost of [redacted] However, in 2017 Xcel delivered us a new Interconnect Agreement with an increased interconnect cost of [redacted] an increase of nearly 50% of the cost for the project. In the latter IA, Xcel contradicted itself from page to page regarding the amount of line upgrades required.

	Given all of the different information we received, and the incorrect and conflicting data provided, we requested further information and a restudy, which we thought to be reasonable. Xcel refused to restudy the projects and clarify which study was correct and why, and refused to conduct a restudy under IEEE 1453 methodology. Instead Xcel threatened us with cancellation of the project if we did not sign the incorrect IA and proceeded to terminate the project.
SRC number(s) and Solar Garden name(s)to which this issue applies. Also include the name of the applicant's legal entity for each SRC number.	Schiller/Steinkraus. SRC Nos. [redacted] (Lake Nokomis 44 LLC), [redacted] (Lake Nokomis 45 LLC), and [redacted] (Lake Nokomis 46 LLC)
Specific action requested from the Independent Engineer.	In summary, we ask that the Independent Engineer require that Xcel correct and clarify its multiple Interconnect Agreements presented, determine which, if any, of Xcel's prescribed distribution upgrades are correct (Xcel provides 3 contradicting numbers, described below), determine if Xcel is using least-cost industry standard equipment, restudy the project using the IEEE 1453 methodology with 2% flicker if the project qualifies for consideration under Xcel's April 26, 2017 IEEE 1453 filing. We also request that the Independent Engineer rule on whether Xcel's application of IEEE 1453 at 1.5% and 75% on/off is appropriate, or if that standard is overly restrictive. The two IA's contain varying levels of upgrades to the distribution system for the same project, which should not be the case and point to errors in Xcel's engineering and study process. The result is that we do not know which numbers to rely on, and the differences can be calculated in the hundreds of thousands of dollars, making them material to the viability of the project. The first IA states that Xcel must replace 4,900' of #2AI conductor with 336 AL at a cost of $269,500, while the 2nd IA states that Xcel must replace 10,000' of #2AI conductor with 336 AL at a cost of $616,000 (on page 6). Given that both IA's refer to the same project, we cannot tell why the vast differences in required length of distribution line between the two reports. Furthermore, the 2nd IA contradicts itself and later writes in the statement of work (page 10) that 11,200' of #2AI conductor must be replaced. It is impossible to know which estimates from which (and within each) IA's are correct. We first ask the Independent Engineer to review and determine which line upgrade length, if any of the above, is actually correct. If none of the above are correct, we ask the engineer to determine the correct length of reconductoring required. Given that there are so many errors in the line upgrade section, we ask the Independent Engineer if they can review Xcel's other proposed upgrades and power factor determination and determine if there are further errors that must be considered. Secondly, we ask the Independent Engineer to determine whether Xcel is proposing the lowest cost industry standard conductor in their material specs. Xcel has not provided us with enough data to make this

	determination. We ask the Independent Engineer to rule whether Xcel's selection of 336 AL conductors is more restrictive and costly than industry standards. In conclusion of this section, we ask the IE to propose what the fair interconnect scope of work, cost, and power factor should be for this project. If Xcel is requiring conductor or other upgrades that are more restrictive or costly than industry standards, we ask the Independent Engineer to require that Xcel pay any cost difference between the cost-effective industry standard equipment necessary for the project and Xcel's desired equipment. Lastly, Xcel refused us a restudy of the project using the IEEE 1453 methodology. We believe they should not have refused us this request, and that doing so given the Commission had already ruled Xcel to file a compliance filing regarding the implementation of IEEE 1453 was not a good way of implementing their study process. We ask the Independent Engineer to require that Xcel restudy the project and provide new (and accurate) cost estimates using the IEEE 1453 methodology with the proper % voltage variation restrictions as determined by the engineer. We also request that the Independent Engineer rule on whether Xcel's application of IEEE 1453 at 1.5% and 75% on/off applied in Xcel's compliance filing is appropriate, or if that standard is overly restrictive.
Explanation of and support for the position (include additional sheets if needed).	In support of the Independent Engineer's jurisdiction over these matters, on sheet 68.11 of Xcel's Section 9 tariff, the Independent Engineer is given a broad mandate to "resolve disputes on the study process, including material disputes related to the Company's determination of application completeness, timeliness of application and study processing, and the cost and necessity of required study costs and distribution system upgrades." This mandate gives the Independent Engineer a clear authority to determine if Xcel wrongly refused SunShare a restudy of the Schiller/Steinkraus project that should have been performed. The tariff also states that "if the independent engineer determines that a particular piece of equipment or engineering alternative proposed by Xcel is more restrictive than industry standards… the Company may implement that alternative, if the company pays the incremental cost in excess of the amount necessary to implement the industry standard." This sentence empowers the independent engineer to rule on whether the equipment priced by Xcel is in fact more restrictive or costly than industry standards. And if so, that Xcel must pay the difference in the incremental cost if it chooses to install the more costly equipment.

Solar*Rewards Community
Standard Format for Independent Engineer Report

This **Standard Format for Independent Engineer (IE) Report** MUST be used by the IE for purposes of organizing the IE Report. The material highlighted below must be included in the report. The material that is not in bold helps explain the needed content of the IE Report.

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. If, after the initial filing for this IE Review, the applicant requests to raise one or more additional issues to be considered as part of the current IE Review, the applicant needs to complete one sheet of the Intake Form for each such additional issue. 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. If the applicant did not use an Intake Form to initiate the IE Review, the IE shall direct the applicant to complete the Intake Form for each issue presented and provide that to the IE and Xcel Energy.

The top of the report should contain a caption in the following format:

INDEPENDENT ENGINEER REPORT

IN RE DISPUTE RE:
CSG NAMES AND SRN NUMBERS

DEVELOPER NAME:

NAME OF IE:

DATE OF LAST SIGNATURE ON CONTRACT FOR IE REVIEW:

DATE IE DECISION ISSUED:

The IE Report should be structured with the following sections:

A. <u>Summary of Issues</u>. Provide a brief summary of the issues between by the parties. Refer to the completed Intake Forms to make sure that all issues raised by the applicant are addressed. For example:

Issue 1: What is appropriate standard to be used to determine flicker at SRC number _____.
Issue 2: Reasonableness of indicative cost estimate for SRC number ___.

IE should state what, if any, issues have been resolved by the parties during the dispute resolution process and, therefore, will not be addressed by the IE the report. It should also include any issues that will not be addressed by the IE because they exceed the IE's authority or are not necessary to resolve the dispute between the parties.

B. <u>Analysis of Outstanding Issues</u>. For each of the outstanding issues address each of the following areas. For example, in discussion Issue 1 identified above, the following four headings should be used. Then the IE Report would address Issue 2, and also include these same headings.

I. Description of the issue. Describe this issue in detail, including, but not limited to, which solar gardens (identified by name and SRC number) the issue is relevant to. For additional clarity, the Intake Form for a given issue can be attached to the IE Report and referenced here.

II. Summary of party positions and pertinent facts. First, provide a summary of each party's position and the pertinent facts on the issue.

III. List relevant authority. Provide a list of the relevant authority for this issue that the IE relies upon in the IE Report on this issue. Relevant authority may include Minnesota Statutes, Minnesota Rules, MPUC Orders, Tariffs of Northern States Power Company, and engineering standards.

IV. Analysis and conclusions on issue. Explain how the relevant authority applies to the relevant facts and supports the conclusion of the IE on the issue. Explain how this compares to the relief requested by the applicant on this issue. Be clear on what exactly is the conclusion and recommended relief of the IE on this issue.

C. Summary of Findings. Provide a summary of the findings for each issue that was addressed. For example:

I. The appropriate standard for flicker at SRC number is ____.
II. The reasonable indicative cost estimate for SRC number is ___.

D. Independent Engineer Credentials and Licensing. Provide an attachment describing the education, credentials, licenses and significant publications of the IE. This requirement for IE Reports was established by Commission order.

STATE OF MINNESOTA
BEFORE THE PUBLIC UTILITIES COMMISSION

*Verified Formal Complaint and Petition for Expedited Relief by SunShare, LLC Against Northern States Power Company d/b/a Xcel Energy for Violations of Its Section 9 and 10 Tariff and Related Solar*Rewards Community Program Rules and Commission Orders*	)	MPUC Docket No. _____ **VERIFIED FORMAL COMPLAINT AND REQUEST FOR EXPEDITED RELIEF OF SUNSHARE, LLC**

CERTIFICATE OF SERVICE

The undersigned hereby certifies that true and correct copies of **Sunshare, LLC's Verified Formal Complaint** was served today upon the following:

Amanda Rome
Lead Assistant General Counsel
Northern States Power Company, d/b/a Xcel Energy
414 Nicollet Mall
Minneapolis, MN 55401

Dated this 5th day of March, 2019

/s/ Tammy J. Krause
Tammy J. Krause