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.

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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.

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- 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

Issues Matrix for the SunShare Linden IE Report

Row #	Page in IE Report	Issue/Statement in the IE Report	Response in Xcel Energy Appeal	Section/Page in Xcel Energy Appeal
1	Page 2	The IE Report cites to Minn. R. 7835.4500 stating that Xcel Energy has the burden of proof.	The burden of proof standard cited by the IE does not apply to the Solar*Rewards Community program.	Sec. VI, pages 31-32
2	Pages 2-3	The IE did not use the template for the IE report, stating that the Department and Xcel Energy had not created one.	The template was developed together by the Department and Xcel Energy and it was attached to the Services Agreement.	Sec. V, page 31
3	Pages 2-4	The IE is chartered to determine what will be considered Public, Confidential, and Trade Secret. Information regarding CSG location, nameplate capacity and generation data is public information for the purposes of this Report.	The Services Agreement and the NDA control treatment of confidential information; the IE is not the decision maker. Third-party information on GSC name, address, and capacity is confidential information.	Sec. V, page 30; Att. O
4	Pages 5, 10-12	Xcel Energy internal emails are inappropriately labeled as Attorney Eyes Only.	The NDA defines what information can be labeled as Attorney Eyes Only, including internal emails as an example.	Att. O
5	Pages 9-10	"Xcel responded to 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."	Agreed upon search terms and other parameters were used to search for responsive emails; all materials were provided to the IE but marked either confidential or Attorney Eyes Only.	Sec. V, page 30

Row #	Page in IE Report	Issue/Statement in the IE Report	Response in Xcel Energy Appeal	Section/Page in Xcel Energy Appeal
6	Pages 23, 35	Xcel Energy should provide to SunShare all inputs used in the Revision 3 study and SunShare can ask Xcel Energy and the contractor any questions it may have. Xcel Energy should share with SunShare all the inputs for the prior five studies.	All study inputs were included in an attachment to each study provided to SunShare and to the IE.	Sec. IV.B.1, page 13
7	Page 23	The Revision 3 study was inaccurate as it did not carry over essential information from Revision 2. Various models were inaccurate and have been redone over and over.	Revision 3 study (June 2017) was conducted correctly and the results are accurate. In the written study report, some information from the prior April 2017 study report was not repeated.	Sec. IV.B.1, pages 11-14
8	Pages 23-24	There was an ampacity error regarding the 750 AL underground cable in Revision 3. This is indicative of the many errors and ongoing inaccuracies in Xcel Energy studies.	The ampacity rate for the underground cable was included in a table in the study report, but it did not impact the study results.	Sec. IV.B.1, page 13
9	Page 24	Xcel Energy must explain why a 792 foot section was undergrounded.	Xcel Energy has previously provided this information to SunShare and the IE.	Sec. IV.C, pages 21-22
10	Page 26	"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."	The IE dispute is controlled by Section 9 Tariff, Sheets 68.11-68.13, the Services Agreement, and the NDA. Xcel Energy is not aware of a "Charter."	Sec. III, pages 7-8; Att. O

Row #	Page in IE Report	Issue/Statement in the IE Report	Response in Xcel Energy Appeal	Section/Page in Xcel Energy Appeal
11	Pages 27, 43	"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." Xcel Energy needs to perform flicker with 2%, 3%, and 4% full on / full off, under different scenarios.	The IEEE 1453-based voltage fluctuation methodology was developed in an inclusive, transparent process and a White Paper was filed with the Commission. Xcel Energy has applied the IEEE 1453-based approach consistently since April 2017.	Sec. IV.A, pages 9-11
12	Pages 27, 43	Xcel Energy must perform a flicker study at the Linden site within one month to determine the actual level of flicker found there. SunShare's engineers are allowed to be present side-by-side with Xcel. The results should be fully available to SunShare in writing. This should show the actual base line of flicker prior to construction of the Linden interconnection. A flicker study should be performed after commissioning is complete and energized.	The flicker study requested by the IE is unusual, labor-intensive, and lacks clarity. The IE does not offer any review of industry practice or standards to support the proposed flicker study. This requested study would not result in increased capacity because the limiting factor is steady state voltage.	Pages 1-2; Sec. IV.B.1, pages 11-15; Sec. IV.B.3, pages 19-21
13	Page 28	"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."	366 AL overhead conductor is a standard Xcel Energy conductor for distribution upgrades. It is commonly used in the utility industry. The IE did not review industry practice, but instead misinterpreted Section 9 Tariff, Sheet 68.11 to widely allow other than standard Company equipment.	Sec. IV.D, pages 23-25

Row #	Page in IE Report	Issue/Statement in the IE Report	Response in Xcel Energy Appeal	Section/Page in Xcel Energy Appeal
14	Page 30	"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."	The 24-month clock for mechanical completion is extended during Force Majeure events, an IE dispute, and if the Company has not met certain timeframes. Program rules do not allow granting a new 24-month deadline.	Sec. IV.E.1, page 26
15	Page 31	"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." "The IE determines that it is reasonable that these revised costs shall continue through to the completion of the project, staying below the $1M cap." "SunShare shall further be granted relief through Xcel not adding its typical profit, overhead or bond costs, or any other markups to this project's cable, poles, and associated lines 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."	According to the Services Agreement, the IE cannot award costs or issue monetary relief. The IE applied the $1 million material upgrade limit to actual interconnection costs, when the limit in fact applies to the indicative cost estimate. The Company's Section 10 tariff requires that any interconnection customer pay the actual costs of interconnection.	Sec. IV.E.2, pages 27-28
16	Pages 33-34	"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." "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."	366 AL overhead conductor is a standard Xcel Energy conductor for distribution upgrades. The IE did not review common industry practice and misinterpreted Section 9 tariff to widely allow other than standard Company equipment.	Sec. IV.D, pages 23-25

Row #	Page in IE Report	Issue/Statement in the IE Report	Response in Xcel Energy Appeal	Section/Page in Xcel Energy Appeal
17	Page 34	"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 for the Linden Interconnection."	336 AL conductor is a Company standard for building overhead distribution lines. The IE cannot issue monetary relief in violation of the Services Agreement. Underground cable would need to be used where required.	Sec. IV.D, pages 23-25; Sec. IV.E.2, page 27; pages 2, 12, 21-22
18	Page 35	"The IE notes that SunShare paid for each of the Studies."	SunShare paid for only one study.	Sec. IV.B.1, page 14
19	Pages 36-37, 44	Xcel Energy needs to perform a Revision 4 study with needed clarifying information. The prior studies were not accurate or correctly performed.	Revision 3 study (June 2017) was conducted correctly and the results are accurate in all material aspects. Revision 2 study (April 2017) results were accurate, but the program-specific $1 million material upgrade limit was not applied.	Sec. IV.B.1, pages 11-15; pages 3, 32
20	Pages 36-37	"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."	The increase in project capacity between studies is nuanced and involves transition to 2% individual flicker threshold, adoption of IEEE 1453-based method, application of the $1 million material upgrade limit, and refinements in the study model (e.g., field conductor verification).	Sec. IV.B.1, pages 14-15

Row #	Page in IE Report	Issue/Statement in the IE Report	Response in Xcel Energy Appeal	Section/Page in Xcel Energy Appeal
21	Page 42	The January Settlement Agreement refers to the use of IEEE 1453, not an IEEE 1453 simplified method. Therefore SunShare is not bound to the IEEE 1453 simplified method, particularly in light of the January Settlement Agreement.	The binding Settlement Agreement gives two options to study the Linden project: **[PROTECTED DATA BEGINS:** [redacted] **PROTECTED DATA ENDS]**	Sec. IV.A, page 11
22	Pages 41-43	The IE recommends that the Section 10 Interconnection tariff, which is poorly written and misleading, be updated with the IE's suggested changes on flicker and additional items.	The current language is based on a prior stakeholder process with public input and Commission approval.	Sec. IV.B.2, page 18
23	Pages 44-47	Several other findings related to flicker, including that the 1.5% and 75% drop criteria is not be used in any variation of the Revision 4 Linden Study.	The cited drop criteria is relevant only at location voltage regulation equipment and it is essentially equivalent to the 2 % full on/full off value in terms of modeling impacts.	Sec. IV.B.2, pages 17-18
24	Pages 44-45	SunShare's engineers may be present during the entire modeling process for the Revision 4 study and shall be allowed to actively participate in the input evaluation, run of the software model, and output evaluation. Xcel Energy shall work with SunShare to determine all inputs for the Revision 4 model.	The IE did not provide examples of other jurisdictions or the industry practice to make the unusual conclusion that the interconnection technical review is a joint responsibility of the Company and SunShare.	Sec. IV.B.3, page 19

XCEL ENERGY COMMUNITY SOLAR GARDEN
DISPUTE RESOLUTION SERVICES AGREEMENT

THIS Xcel Energy Community Solar Garden Independent Engineer Dispute Resolutions Services Agreement ("Agreement") between Northern States Power Company, d/b/a Xcel Energy ("Xcel Energy"), SunShare, LLC, Lake Nokomis 08 LLC, Lake Nokomis 09 LLC, Lake Nokomis 10 LLC, Lake Nokomis 11 LLC, and Lake Nokomis 12 LLC, (jointly, "Applicant"), each a "Party" and together the "Parties" and Sam Wheeler, the Independent Engineer ("IE"), is effective as of the date this Agreement is signed by the IE ("Effective Date").

WHEREAS, on August 6, 2015, the Minnesota Public Utilities Commission ("Commission") in its ORDER ADOPTING PARTIAL SETTLEMENT AS MODIFIED in Docket No. E-002/M-13-867 required the establishment of a dispute resolution process wherein an independent engineer selected or approved by the Minnesota Department of Commerce ("Department") would resolve interconnection disputes between Community Solar Garden applicants and Xcel Energy;

AND WHEREAS, on December 15, 2015, in the same docket, the Commission issued its ORDER APPROVING TARIFFS AS MODIFIED AND REQUIRING FILING provided additional guidance regarding the standard for reviewing interconnection disputes, and on November 1, 2016 issued its ORDER RESOLVING INDEPENDENT-ENGINEER APPEALS AND ESTABLISHING PROCEDURES FOR FUTURE DISPUTES;

AND WHEREAS, on December 18, 2015, and on December 1, 2016, Xcel Energy filed its modified tariffs as required by the Commission, the current version of which is attached as Attachment "A", which contain provisions related to the IE dispute resolution process;

AND WHEREAS, the November 1, 2016 Commission order, among other things, required Xcel Energy to work with the Department of Commerce and developers to develop a standardized format for independent-engineer reports, and the resulting required "Intake Form for Independent Engineer Review" and "Standard Format for Independent Engineer Review" is set forth in Attachment "B";

AND WHEREAS an interconnection dispute has arisen between the Parties pertaining to SRC numbers: SRC039909, SRC039910, SRC039911, SRC039913, and SRC039914, ("SRC Applications in Dispute");

AND WHEREAS the Applicant submitted its interconnection dispute to the Department, as more fully set forth in the Intake Form in Attachment "C", and which has referred the dispute the IE;

AND WHEREAS the Parties desire to have the IE resolve their interconnection dispute and the IE has agreed, per this Agreement and consistent with the Tariff to provide a determination to Parties in the form of a Final written report;

NOW, THEREFORE, upon execution of this Agreement by all Parties and the IE, it is agreed as follows:

1. Role and Responsibilities of the Independent Engineer

a) The IE is an impartial third party who does not represent either of the Parties.

b) The IE does not offer legal advice and has no duty to assert or protect the legal rights of any Party, to raise any issue not raised by the Parties themselves Parties may request attendance by individuals other than those listed as contacts in this document, with prior approval of the IE. The IE may request, at his sole discretion, a list of all attendees at any proceedings during this dispute. The IE has no duty to ensure the enforceability or validity of any settlement agreement reached pertaining to the outcome of this IE review. The Parties acknowledge that a prior settlement agreement was shared with Commerce by Xcel Energy prior to this dispute initiating, and that Commerce directed the dispute to proceed to the IE. The IE may, at his sole discretion, determine whether, or to what extent, the prior settlement resolves the issues set forth in the Intake Forms. The Parties agree that the prior settlement between them and counter-signed by Xcel Energy on January 3, 2017 shall not be modified by the IE.

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

d) In the event that either Party appeals the IE's Final written report, the Commission may make its own independent determination on whether any issue was, or was not, appropriate for the IE review under this Services Agreement.

e) Once a dispute is submitted, the IE will determine what additional information is needed from Parties, when that information is needed, and what form that requested information will be provided to the IE by Parties .

f) To resolve the issues being disputed by Parties, pertaining to the SRC Application(s) in Dispute, the IE shall rely on industry codes, standards and references, as well as Commission orders, rules and tariffs, and other relevant sources that he may determine to be appropriate.

g) The IE shall allow the Parties a reasonable amount of time to respond to all issues that will be decided by the IE. It shall be in the IE's sole discretion to determine what issues set before him, will be addressed. Depending on the time allowed by the IE for response to the IE's information requests, or other issues as determined by the IE, additional time may be added to the overall time required to address this Dispute. If there are disputes regarding the jurisdiction of the IE to consider a particular issue, the IE may rule on that issue, and any party disagreeing with this ruling on authority or jurisdiction may appeal it to the Commission pursuant to the appeal process referenced in Paragraph 4f as part of any appeal of the IE's Final written report in this matter.

h) It shall be in the IE's sole discretion to determine whether to hold an initial conference, an administrative conference and/or a hearing.

i) It shall be in the IE's sole discretion to determine the form and content of any briefings that are required, including, but not limited to, issue briefings, pre-hearing briefings or post-hearing briefings.

j) While there is an "expectation" that the IE will issue his Final written report within 30 days of the dispute being submitted to him, this expectation is a guideline, not a deadline. For protection of both Parties and the ability of the IE to fully, fairly and adequately address all disputed issues, this guideline may vary based on; the large number if disputed issues, length of time that Parties are allowed to provide IE requested data and information, additional requests by the IE for clarification of Parties information submissions, Disputes or Disputed issues being put on hold, or other circumstances as deemed necessary by the IE. The IE may choose to provide proposed or summary rulings to Parties in advance of the Final written report, but he is not obligated to do so. If the IE does provide a proposed or summary ruling in advance of the Final written report, he shall clearly label this as such, and shall clearly state in that document that this does not trigger the timeline for filing an appeal to the Commission.

k) The IE will provide a copy of the Final written report via email to the Parties.

l) The IE shall copy both the Applicant and Xcel Energy on all emails and communications it sends to either party.

m) The dispute resolution services performed pursuant to this Agreement shall be performed by the IE and IE's staff, and shall not be assignable, delegable, or transferable.

n) The IE shall provide a fully signed copy of this Agreement to the Parties and the Department within 5 days of the Effective Date of this Agreement.

o) The IE shall provide the Department with a copy of his Final written report upon request.

p) The IE must comply with all applicable terms of this Agreement.

2. Role and Responsibilities of the Parties

a) The Parties shall provide the name and contact information required by Paragraph 8 of this Agreement of a person who shall act as the point of contact ("PoC") for this dispute. The PoC shall act as a single-point of contact for the IE, and shall provide the IE with access to all pertinent documents, data, information, drawings, individuals, departments, etc. as requested by the IE, as well as act as the delivery person and contact in the event of Invoice problems or issues for IE Invoices.

b) All costs, fees and expenses borne by the IE shall be distributed evenly (50%/50%) between Xcel Energy and the Applicant. The IE shall be compensated at the rate of hourly rate, which is [redacted]. The Independent Engineer's invoices shall briefly describe the work performed and expenses incurred during the invoice period. A check for the IE's invoiced amount shall be mailed to the IE's address or direct deposited if such a payment service is available. Upon request, the IE shall provide all information necessary for payment including, but not limited to, taxpayer identification information and account information.

c) The Parties shall reimburse the IE for all reasonable and necessary expenses incurred or paid by the IE in connection with, or related to, the performance of the services. Unless otherwise specified in writing, the procedure for reimbursement shall be as follows:

• The IE will submit a monthly invoice to the Parties, itemizing the expenses incurred.

• Expenses may include:

- Telephone and internet costs associated with the services performed.
- Expendables such as office supplies, postage, shipping, shipping insurance, shipping packaging and labels, etc.
- If necessary, customary travel expenses, such as airfare, train, rental car, cab, parking, hotel, meals and baggage.
- If federal, state, county, municipal, or other taxes are withheld per local ordinance, the amount of these taxes shall be charged to Parties as an expense item.
- Additional research materials and resources that may be needed to fully determine and clarify rules, code and standards' compliance or technical issues.

d) Upon Contract signing, the IE will invoice Parties for work provided prior to the Contract signing for work and expenses performed by the IE prior to the Contract's signing.

e) Parties shall each provide an upfront retainer fee of $5,000.00, to the IE within 5 business days of the completion and signing of this Contract document. Once the upfront retainer fee is available to the IE, the Dispute will proceed. In the event that the retainer is not fully used up at the end of the Dispute, the IE shall return the balance to Parties using the 50/50 split. The IE may apply the retainer to his final invoices or for unpaid invoices during the course of the Dispute.

f) The Parties may not request information from each other. The Applicant and Xcel Energy are free to rely on the information previously exchanged between them. They may rely on public record sources, declarations of fact and expert witnesses, and sources developed through research or investigation. However, they may suggest to the IE information that is relevant to resolution of the dispute and the IE, in his sole discretion, shall determine whether such information should be requested.

.) If an appeal of the IE's Final written report is not filed, Xcel Energy shall file a copy of the IE's Final written report in the above-referenced docket (or such docket as designated by the Commission) within 2 business days of the expiration of the appeal period. If Confidential Information is included in the Final written report, Xcel Energy must file both a public and non-public version of the Final written report. If Xcel Energy does not file the Final written report as required by this paragraph, the Department may file the Final written report as it deems appropriate.

.) The Parties shall attempt to resolve the dispute in good faith and agree to provide whatever information the IE determines is necessary for him to reach a written determination.

i) The Parties must comply with all applicable terms of this Agreement.

3. Confidential Information

a) For the purposes of this Agreement, Confidential Information means trade secret and security information under Minnesota Statutes Chapter 13, Critical Energy Infrastructure Information under Federal Energy Regulatory Commission ("FERC") Regulations, or any other information that is classified by statute, rule or regulation as private, confidential or non-public. The terms of any Non-Disclosure Agreement ("NDA") signed by the IE or Parties may be broader or narrower than this definition, but, to the extent there is a conflict between any NDA and the terms of this Agreement, the terms of this Agreement control.

b) 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.

c) The use and exchange of Confidential Information in this IE review shall be subject to an NDA between the Parties and the IE. If a Party disputes the Confidential designation by the other Party, then the IE, in his sole discretion, is responsible for determining what, if any, information marked by a Party as Confidential Information falls within the definition provided by this Agreement.

d) If the IE relies or expects to rely on any Confidential Information as a basis for his decision, it must be shared with the opposing Party and referenced in his decision. In any case where any Confidential Information must be shared, the information shall be disclosed and labeled as "Confidential Information" and not made public. The IE shall, to the extent possible, use general terms with regard to Confidential Information so that disclosure or public redaction is not required.

e) If the IE determines that it is necessary to include Confidential Information in his Final written report, the IE shall include the information and mark it as Confidential Information. If the IE uses Confidential Information in his Final written report, it shall prepare both a public and non-public version of the Final written report.

f) Confidential Information will not be used, except for the exclusive purposes of the IE dispute resolution process, nor be disclosed outside of this IE dispute resolution process to any person, firm or entity without written authorization of the PoC for the Party who provided the information.

g) Note that all materials used by the IE may be subject to review and examination by the Commission or the Department under the laws, rules and regulations of the State of Minnesota and this IE dispute resolution process. Nothing in the NDA can conflict with the terms of this Agreement or hinder, obstruct or otherwise impair the IE's ability to perform his roles and responsibilities under the terms of this Agreement. If the IE signs an NDA he must provide a copy of the NDA to the Department within 5 business days.

4. Procedural Provisions

a) Both the Applicant and Xcel Energy shall be included on all emails and communications to and from the IE. An exception shall be made in the event that the IE cannot reach Parties via email. Examples would be inclement weather, an internet or power outage or other emergency occurrence. In this case, the IE may contact both parties individually, using telephone or cell phone to communicate such a situation. The IE shall provide both Parties with the same situational information. Once the situation has ended, Parties

will be contacted via Email with a description of the situation and the intended information. Parties shall provide an emergency contact number for their primary PoC person for this purpose, as well as a secondary contact in the event that the primary PoC is not available.

b) The procedures for resolving the Parties' dispute shall be as set forth in this Agreement. Any procedural issues requiring resolution by the IE that are not addressed in this Agreement shall be resolved by the IE. To resolve the procedural issues the IE may reference the following specified rules of the Commercial Arbitration Rules of the American Arbitration Association (as amended and effective October 7, 2013), collectively, the "Pertinent AAA Rules": R-10, 19- 22,24-36,39, 41-43,52(b, d, and e), 54, and E-6-9. This dispute is not being administered by the American Arbitration Association. Accordingly, wherever the Pertinent AAA Rules refer to the Arbitrator, this shall mean the IE for purposes of this Agreement. Wherever the Pertinent AAA Rules refer to the American Arbitration Association, this shall mean either the IE, Department or Commission as applicable for purposes of this Agreement. Wherever the Pertinent AAA Rules refer to the arbitration, this shall mean this dispute resolution process for purposes of this Agreement. Nothing in this Agreement sets or determines the standard of review the Commission will use in addressing any such appeal. This IE Review shall not be considered to be an arbitration under state or federal law.

c) Each Contesting Party shall bear its own costs and attorneys' fees incurred in connection with the resolution of this dispute.

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

e) The IE must provide a Final written report to the Parties once one is ready. Said report shall be final and binding on the Parties, unless modified by timely appeal to the Commission. If Confidential Information is included a public and non-public copy must be provided.

f) The Final written report of the IE may be appealed to the Commission by either Party making a filing in the above-referenced docket (or such docket as designated by the Commission) within 10 business days of the delivery of the IE's Final written report. A Final written report delivered after 4:30 pm (central standard or central daylight savings time, as applicable) shall be considered delivered on the next business day.

g) Responses to any such appeal are due 10 business days from the date of the filing of the appeal. No reply to the response will be allowed.

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

6. **Good Faith.** All participants in the IE dispute resolution process shall agree to act in good faith in all aspects of the process with the view of resolving the dispute.

7. **Immunity.** The IE shall have the same common law immunity as judges and arbitrators from suit for damages or equitable relief and from compulsory process to testify or produce evidence based on or concerning any action, statement, or communication in or concerning the IE dispute resolution process. The Parties understand that there is no attorney/client relationship between the IE and any Party to this Agreement, and each Party acknowledges that it will seek and rely on legal advice solely from its own counsel and not from the IE. The Parties agree, on behalf of themselves and their counsel, that they will not call or subpoena the IE in any legal action or administrative proceeding of any kind to produce or to testify to any notes or documents related to the IE dispute resolution process.

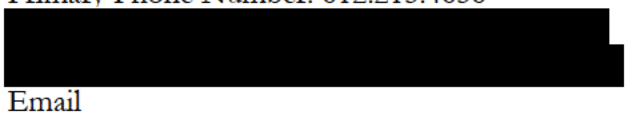
8. **Contact Information.** For purposes of this Agreement, the following contact information should be used:

Applicant:

Name: David Amster-Olszewski

Xcel Energy:

Name: James R. Denniston
Primary Phone Number: 612.215.4656



Email address(es): James.R.Denniston@xcelenergy.com; Jessica.K.Peterson@xcelenergy.com; Leena.L.Kurki@xcelenergy.com and SRCMN@xcelenergy.com
Mailing address: 414 Nicollet Mall, Minneapolis, MN 55401

Independent Engineer:

Name: Sam Wheeler

9. **Termination/Survival.** IE's Roles and Responsibilities under this Agreement as to a given issue in dispute will terminate upon provision of his decision to the Parties or the Parties reaching a settlement agreement. However, the Parties and the IE's responsibilities regarding

any Confidential Information shall survive and continue indefinitely or until modified by a subsequent agreement.

10. Entire Agreement; Execution in Counterparts; Electronic Signatures. This Agreement contains the entire understanding and agreement between the Parties with respect to the IE dispute resolution process and supersedes all previous communications, negotiations and agreements, whether oral or written, between the Parties with respect to the same. This Agreement may be executed in counterparts, each of which taken together constitutes the entire Agreement. There may be one or more duplicative originals or copies of this Agreement. A copy shall have the same effect as an original. Electronic signatures shall have the same effect as an original hand-written signature.

IN WITNESS WHEREOF, the Parties and IE, intending to be legally bound as of the Effective Date, have executed this Agreement.

Applicant (SunShare, LLC, Lake Nokomis 08 LLC, Lake Nokomis 09 LLC, Lake Nokomis 10 LLC, Lake Nokomis 11 LLC, and Lake Nokomis 12 LLC)

By: David Amster-Olszewski
Printed Name: David Amster-Olszewski
Its: CEO
Date: 6/12/18

Northern States Power Company, d/b/a Xcel Energy

By: Kelly Bloch
Printed Name: Kelly Bloch
Its: RVP Distribution Operations
Date: 6/13/18

Independent Engineer (Sam Wheeler)

By: Samuel E Wheeler
Printed Name: SAMUEL E WHEELER
Date: 6/13/18

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

SOLAR*REWARDS COMMUNITY PROGRAM
(Continued)

Section No. 9
1st Revised Sheet No. 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.

b. The applicant shall initiate such a request by submitting via email any such dispute to the Department. The Company must be copied on this email for this request to be effective. The submission of a such a dispute to the independent engineer may take place before the applicant is Expedited Ready, after being Expedited Ready but before a signed Interconnection Agreement, or after the Interconnection Agreement is signed but only related to issues occurring prior to initial energization of the Generation System. L

c. Such a dispute which is submitted before the applicant is Expedited Ready or after the Interconnection Agreement is signed shall not affect Study Queue position.

d. A dispute which is submitted after an Interconnection Agreement is signed is limited to disputes on the actual costs incurred by the Company to interconnect the Community Solar Garden. A condition precedent to filing such a dispute is that the applicant must have first paid the amount in controversy. Such a dispute must be brought within 60 days of the date the bill is mailed or electronically sent by the Company under Section 10, Sheet 117, par. V.2.b.iii. L

(Continued on Sheet No. 9-68.12)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

SOLAR*REWARDS COMMUNITY PROGRAM
(Continued)

Section No. 9
1st Revised Sheet No. 68.12

9. Requests for Independent Engineer to Resolve Material Disputes Affecting Interconnection Application (Continued)

e. A dispute which is submitted after an application is Expedited Ready but before the Interconnection Agreement is signed may impact processing in the Study Queue for the applicant and for those behind the applicant in queue. If the issues presented to the independent engineer are in the Company's judgment so significant that they may impact the results of the engineering indicative cost study or impact as a practical matter how the Company studies the application or those in queue behind the applicant, then the Company may send notice to the applicant and to those behind the applicant in queue that it will not sign an Interconnection Agreement until the dispute raised to the independent engineer is resolved. Similarly, if the consequence of the independent engineer's determination (or any determination as affirmed or reversed by the Commission if any such appeal is taken) is that the scope of assumptions in the Engineering Scoping Cost study must be redone, then such studies will be redone and the Interconnection Agreement Time Line will be reset accordingly for all applications impacted by this determination. L

f. Once a dispute is submitted and an independent engineer selected (i.e., the contract between the applicant, Company and independent engineer has been signed), the Company shall file a notice in Docket No. E-002/M-13-867 that includes (1) the filing and date, (2) the developer, (3) the engineer assigned, and (4) a brief summary of the disputed issues. N N N N T

g. Once a dispute is submitted, the independent engineer will determine what additional information is needed from the applicant and/or the Company and when that information is needed. Both the applicant and the Company shall be included on all emails and communications to and from the independent engineer. The independent engineer should address only those issues necessary to resolve the dispute between the parties. The independent engineer may request additional information from parties necessary to resolve the dispute before the independent engineer. The independent engineer will make a determination of the issues in a written report which provides a description of the pertinent facts, the conclusions and basis for the conclusions. N N N

h. There is an expectation that the independent engineer will issue its written determination on such a dispute within 30 calendar days of the dispute being submitted to it. As part of this program, the Company shall work with the Department and developers to develop a standardized format for independent engineer reports, including the independent engineer's credentials and licensure, and once that is developed the most current version of the standardized format should be used as the format for independent engineer reports. The independent engineer will provide a copy of the independent engineer report with its written determination via email to both the applicant and the Company. Once an independent engineer report is issued, the Company shall file it with the Commission within ten business days. T N N N N NT T N N

(Continued on Sheet No. 9-68.13)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

SOLAR*REWARDS COMMUNITY PROGRAM
(Continued)

Section No. 9
1st Revised Sheet No. 68.13

9. Requests for Independent Engineer to Resolve Material Disputes Affecting Interconnection Application (Continued)

i. The applicant or the Company may appeal to the Commission the determination of the independent engineer by making a filing in Docket No. 13-867 (or such other docket as designated by the Commission) within 10 business days of the delivery of the independent engineer's written determination. A report delivered after 4:30 pm (central standard or central daylight savings time, as applicable) shall be considered to be delivered on the next business day. If an appeal is filed, notice shall be given to those on the E-002/M-13-867 service list, and the Commission will open a new docket. When a party appeals an independent engineer's report, each party must identify the documents submitted to the independent engineer in the record necessary for the Commission's record. Such an appeal should include all information relied upon by that party. Responses to any such appeal are due 10 business days from the date of the filing of the appeal. No reply to the response will be allowed.

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10. Capacity Screen

a. Any Community Solar Garden applicant may enter into a reasonable and customary non-disclosure agreement with the Company to receive distribution infrastructure and load analysis on a per feeder basis, and study results for previously studied projects. A response to such an information request must be fulfilled within 15 business days of the request. Information requests may include feeder specific voltage, concurrent minimum and peak loading analysis, existing distributed generation under operation, amount of distributed generation in the interconnection queue or Study Queue, terminated maximum distance substation, and any other pertinent information for the purposes of interconnection.

b. The response to the distribution infrastructure and load analysis on a per feeder basis will consist of the following:

i) Substation name
ii) Distance from Substation
iii) Substation transformer nameplate capacity
iv) Substation transformer minimum daytime load
v) Substation transformer maximum load
vi) Feeder name
vii) Feeder Voltage
viii) Feeder minimum daytime load
ix) Feeder maximum load
x) Presence of a voltage regulator
xi) Presence of a reclosure
xii) Distributed resources in operation per feeder and substation
xiii) Distributed energy resources in the interconnection queue or Study Queue per feeder and substation
xiv) Conductor size and material

(Continued on Sheet No. 9-68.14)

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 _[insert date]_____, by:
[provide personal name, company name, address, email address and telephone number]

Issue Number 1	
Succinct description of engineering issue.	
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.	
Specific action requested from the Independent Engineer.	
Explanation of and support for the position (include additional sheets if needed).	

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. <u>Summary of Findings</u>. 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 ___.

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

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 3/16/18 (Section 9 tariff required email sent on 3/15/18), by:David Amster-Olszewski, SunShare, LLC and Lake Nokomis 8-12 LLC's [redacted]

Issue Number 1	
Succinct description of engineering issue.	Xcel Energy has required the use of a 750 AL underground line at a cost of $107,405 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 required 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 [redacted] AC, with the 750 AL line's ampacity rated at 255A, whereas it is actually 630A. 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.
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.	Utility Garden Name / Utility Award Level / Utility SRC Linden01 — Lake Nokomis 08 LLC — [redacted] Linden02 — Lake Nokomis 09 LLC Linden03 — Lake Nokomis 10 LLC Linden04 — Lake Nokomis 11 LLC Linden05 — Lake Nokomis 12 LLC
Specific action requested from the Independent Engineer.	• 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.
Explanation of and support for the position (include additional sheets if needed).	Xcel's correspondence with SunShare, and materials it has shared (as well as those it has not), which are in Xcel's possession.

Issue Number 2	
Succinct description of engineering issue.	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.
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.	See above
Specific action requested from the Independent Engineer.	• 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 [redacted] MW AC at this site.
Explanation of and support for the position (include additional sheets if needed).	Xcel's correspondence with SunShare, and materials it has shared (as well as those it has not), which are in Xcel's possession.

Issue Number 3	
Succinct description of engineering issue.	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.
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.	See above
Specific action requested from the Independent Engineer.	• 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 [redacted] 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 [redacted] 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 [redacted] 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.
Explanation of and support for the position (include additional sheets if needed).	Xcel's correspondence with SunShare, and materials it has shared (as well as those it has not), which are in Xcel's possession.

Issue Number 4	
Succinct description of engineering issue.	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.
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.	See above
Specific action requested from the Independent Engineer.	• 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.
Explanation of and support for the position (include additional sheets if needed).	Xcel's correspondence with SunShare, and materials it has shared (as well as those it has not), which are in Xcel's possession.

Issue Number 5	
Succinct description of engineering issue.	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 [redacted] AC

	required by Xcel, and all relevant tariffs and PUC rulings to determine if Xcel is indeed providing all required information to us.
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.	See above
Specific action requested from the Independent Engineer.	• 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 [redacted] applied-for to [redacted] AC to determine if the project can be [redacted] 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 [redacted]; and • Require Xcel to specify exactly what upgrades would be required for the installation of [redacted] and then [redacted] Specifically, which upgrades for the additional MW's would drive the cost over the $1M cap?
Explanation of and support for the position (include additional sheets if needed).	Xcel's correspondence with SunShare, and materials it has shared (as well as those it has not), which are in Xcel's possession.

NON-DISCLOSURE AGREEMENT

Applicable to Confidential Information used in an Xcel Energy Community Solar Garden Dispute Resolution Service Agreement

THIS NONDISCLOSURE AGREEMENT ("Agreement"), entered into and made effective as of the 13th day of JUNE, 2018 (the "Effective Date"), is by and between Northern States Power Company, a Minnesota corporation with its principal place of business at 414 Nicollet Mall, Minneapolis, Minnesota 55401 ("Xcel Energy") and the following community solar garden applicants: **SunShare, LLC, Lake Nokomis 08 LLC, Lake Nokomis 09 LLC, Lake Nokomis 10 LLC, Lake Nokomis 11 LLC, and Lake Nokomis 12 LLC,** (jointly, "Applicant") and the following individual engineer or engineering entity: Sam Wheeler ("Independent Engineer") relating to the following community solar garden applications (as identified by site name and SRC#):

SRC #s SRC039909, SRC039910, SRC039911, SRC039913, and SRC039914
Solar Garden Name - Linden

All parties are herein referred to individually as a "Party," and collectively as the "Parties."

This paragraph details the Purpose of this Agreement. Pursuant to the Services Agreement associated with the above SRC numbers, Xcel Energy and Applicants have agreed to submit interconnection disputes materially affecting the above identified applications to the Independent Engineer. So that the Independent Engineer may prepare a determination in the form of a Final written report with findings pursuant to the terms of the Services Agreement, Xcel Energy and Applicant shall consistent with the Service Agreement provide Independent Engineer at his written request with certain information, including, but not limited to: (1) trade secret information as defined in Minnesota Statutes Chapter 13 ("Trade Secret Material"); (2) in Xcel Energy's case, security information as defined in Minnesota Statute Chapter 13 and Critical Energy Infrastructure Information as defined in Federal Energy Regulatory Commission (FERC) regulations ("Security Information"). In the case that Critical Energy Infrastructure Information or other similar federal classifications of critical information are identified in this particular Dispute, Xcel will be required to provide validation that this information is properly identified as such with FERC or other federal agencies. (3) any other information that is classified by statute, rule or regulation as private, confidential or non-public (items 1, 2 and 3, collectively, the "Confidential Information"). If any Party is asked by the Independent Engineer to provide information that is confidential to a third party – such as information that is confidential to another developer, the Party being asked to provide this information shall use reasonable efforts to secure the permission of that third party to release such information under the terms of this NDA, but such third party confidential information can not be released without the permission of that third party. The disclosing Party must mark its Confidential Information exchanged or submitted pursuant to the Services Agreement as "Confidential Information" and provide the basis for the designation.

Consistent with Section 3 of the Services Agreement, the use and exchange of Confidential Information shall subject to this Agreement. As a practical matter, under the terms of this Agreement, there are the following types of information:

1. Public information. This is information which may be publicly shared.
2. Confidential Information which has been previously exchanged between the companies.

3. Confidential Information which has not been previously exchanged between the companies.
4. "Attorney Eyes Only", in the unlikely event that this undefined classification of information, which is a subset of Confidential Information, is found by Parties to be needed, and which shall be marked by the disclosing Party as "Attorney Eyes Only" where a Party is willing to share such information with the Independent Engineer and the Attorneys for the other Party, terms for further disclosure will need to be determined based on whether the Independent Engineer relies on or expects to rely on such information as a basis for his decision or wants the other Party to respond to such information. Furthermore, where appropriate and necessary other employees or consultants of the other Party may receive access to this information by providing the dislosing Party with additional appropriate assurances, to be determined, related to the review of this information.

In consideration of these premises and of the mutual covenants and agreements hereinafter set forth, the Parties agree as follows:

1. It is expected that the Confidential Information of Applicant will typically consist of the location(s) and size(s) of applications submitted for dispute resolution under the Service Agreement. It is expected that Xcel Energy during the course of processing Applicant's application(s) already has received this Confidential Information and that numerous employees or agents of Xcel Energy already have access to such information outside the scope of the Services Agreement. It is expected that Xcel Energy will continue to treat such Confidential Information of Applicant which is disclosed during the course of the review under the Service Agreement similar to how Xcel Energy treats such information outside the scope of the Services Agreement. Further, and importantly, to help ease the exchange of information during this Independent Engineer review, some documents may be labeled as non-public but there may be no specific designation as to what specific information within such a document is non-public. To help assure proper protection of non-public information, the Independent Engineer may, at his sole discretion, choose to prepare a draft Final written report marked in its entirety as being non-public and give the other Parties a reasonable period of time, at his sole discretion, to identify the specific information in that draft Final written report that should be non-public, and should encourage SunShare and Xcel Energy to agree on what should be non-public in the final version of the Final written report. Or, the Independent Engineer may choose another process to help address confidentiality issues. In this way, when the Final written report is issued there will likely be concurrence as to what information should be redacted from the public version of the Final written report, and what information has been properly marked as being non-public in the non-public version of the Final written report.

2. The Applicant or Xcel Energy may also mark for "Attorney Eyes Only" certain *other* Confidential Information which it believes should be treated in a confidential manner such as inside company emails which it has not shared outside of its company. This *other* Confidential Information may be viewed by attorneys for the other party and by the Independent Engineer. The disclosing party should provide two versions of such documents: 1.) the unredacted version which is for "Attorney Eyes Only" and is marked as "Attorney Eyes Only"; and , 2.) a redacted version which excludes the confidential "Attorney Eyes Only" portions and which may be shared with other employees of the receiving party. In the event the Independent Engineer notifies the Parties that it either: 1.) intends to rely on the "Attorney Eyes Only" version of the information as part of its conclusions in its written report; or, 2.) wants the receiving party to respond to the points raised in the unredacted

"Attorney Eyes Only" version of the information, then the Parties will then determine details on how to allow other employess or contractors to access such information so that the receiving party can submit an informed response. If after two business days from such notification the Parties are unable to agree on such a process, then the Independent Engineer shall determine that process.

3. The Confidential Information of Xcel Energy shall be kept confidential pursuant to this Agreement, and shall be treated by the receiving Party as constituting non-public, trade secret, proprietary and Confidential Information and shall only be used for the Purpose identified above and then only in a manner consistent with this Agreement. The receiving Party agrees to limit access to the Xcel Energy Confidential Information to the receiving Party's directors, officers, employees, consultants or attorneys ("Agents") who have executed an Agent Acknowledgment and Agreement, in the form attached hereto as Exhibit A.

4. The receiving Party agrees to maintain Confidential Information within the United States of America consistent with the terms, conditions and protections of this Agreement. In the event the Receiving Party desires to disclose Confidential Information to entities or persons outside the United States of America or to foreign nationals without green cards residing in the United States of America, it must obtain specific, prior written consent from the disclosing Party.

5. Notwithstanding anything herein to the contrary, the receiving Party may disclose the Confidential Information in the event the receiving Party becomes legally compelled or required to disclose the Confidential Information to any court, administrative agency, or other governmental or regulatory authority, provided that receiving Party shall give the disclosing Party prompt notice so that the disclosing Party may at its own expense seek a protective order or other appropriate remedy prior to disclosure and/or waive compliance with this Agreement. Note that the Independent Engineer is exempt by Contract from being called to testify or appear in any case.

6. Each Party shall be responsible for controlling access to the Confidential Information disclosed to it.

7. No Party receiving the Confidential Information solely as a result of the Purpose of this Agreement shall copy or duplicate it in any way, in whole or in part, except to the extent necessary for reasonable use with respect to the Purpose.

8. Confidential Information exchanged solely as a result of the Purpose of this Agreement shall be maintained in a secure location accessible only to those Agents authorized by this Agreement to review the Confidential Information for the Purpose.

9. To the extent that a Party, or any other entity or individual receiving the Confidential Information, makes reference to that Confidential Information during any aspect of a proceeding before the Minnesota Public Utilities Commission ("Commission") or other tribunal, including but not limited to comments, motions, briefs, arguments, direct testimony, cross-examination, rebuttal, or proposed offerings of proof, any public reference to such Confidential Information shall either be solely by title or its exhibit reference, or in such a manner as to assure confidentiality and compliance with this Agreement and relevant Minnesota Statutes, including but not limited to the Data Practices Act, MPUC rules and policy. The Parties furthermore agree to comply with all MPUC rules and policy pertaining to the protection of non-public, protected and trade secret information, including any applicable protective orders entered in any such proceeding.

10. Confidential Information exchanged solely as a result of the Purpose of this Agreement shall remain the sole property of the disclosing Party, and one year from the Effective Date this Confidential Information exchanged solely as a result of the Purpose of this Agreement shall be destroyed or returned to the disclosing Party. The receiving Party shall certify and confirm in writing that all such Confidential Information has either been destroyed or returned to disclosing Party.

11. The Parties agree that the failure of the receiving Party and its Agents (and any other person authorized by the Agreement to review the Confidential Information) to comply with the terms of this Agreement shall be cause for the disclosing Party to (a) seek injunctive relief or a protective order to enforce the Agreement, in which event receiving Party agrees that there is not an adequate remedy at law for any breach of this Agreement, and therefore that disclosing Party shall be entitled to specific performance and injunctive relief restraining any breach of this Agreement in addition to any other rights or remedies which disclosing Party may have; (b) seek such other damages or remedies as may be available before the Commission or in any court; and (c) provide trade secret information to receiving Party in the future only upon terms which provide additional assurances to disclosing Party that such trade secret information will not be improperly disclosed. Provided, however, that the provisions in (b) relating to other damages or remedies shall not be applied against the Independent Engineer.

12. This Agreement and the rights and obligations hereunder, may not be assigned or delegated. Any assignment or delegation in violation of this provision shall be void.

13. The terms of this Agreement are subject to the terms of the Services Agreement. The present Agreement, in conjunction with with Services Agreement, constitutes the entire agreement between the Parties with respect to protecting the Confidential Information at issue in the Services Agreement.

14. Under the Services Agreement, the Independent Engineer will make a determination, in the form of a Final written report, regarding which information it has relied upon in making its conclusions. For any such information relied upon in the Final written report which any Party has marked as being Confidential, the Independent Engineer in its Final written report can make a conclusion, supported by reasoning, that such information is in fact not Confidential. Any Party may challenge the conclusion as to whether such information is not Confidential by submitting a timely appeal to the Commission pursuant to the process detailed in the Xcel Energy tariff. During the pendency of any such appeal on the confidentiality issue to the Commission, the information shall be treated as Confidential pursuant to the terms of this Agreement, and thereafter its status of being confidential or non-confidential shall be determined by the Commission. If no timely appeal has been submitted on the confidentiality issue within 10 business days as provided for in the Section 9 tariff on Sheet 68.13, par. 9.i ., then the information which is concluded in the Final written report to be non-confidential may be treated as non-confidential. For example, if a Party files an appeal to the Commision on issues which do not include the confidentiality issue, and no other appeal is filed, then the information will no longer be treated as confidential information. To preserve the ability of any Party to protect Confidentiality designations, any Final written report of the Independent Engineer which contains information which has been designated as Confidential, must be issued in two versions: 1.) a Confidential version which specifically marks all information which a Party has designated as being Confidential which the Independent Engineer has relied upon in reaching the conclusions in its Final written report; and, 2.) a public, redacted, version of the Final written report which has removed all of the marked Confidential information.

15. This Agreement shall be governed, construed and interpreted by and otherwise enforced in accordance with the laws and substantive laws of the State of Minnesota without regard to conflicts of laws principles.

16. The undersigned have authority to enter into and bind each Party to this Agreement. This Agreement may be signed in counterparts, each of which shall be deemed to be an original and all which shall constitute one and the same document.

17. A manually signed copy of this Agreement delivered by e-mail shall be deemed to have the same legal effect as delivery of an original signed copy of this Agreement. No legally binding obligation shall be created with respect to a Party until such Party has delivered or caused to be delivered a manually signed copy of this Agreement.

18. Any notice or request relating to a violation or enforcement of this Agreement shall be made to the contacts listed in paragraph 8 of the Services Agreement. Any notice, request, consent, or other communication required or authorized under this Agreement to be given by one Party to the other Party or Parties shall be in writing. It shall either be personally delivered, mailed or e-mailed. Any such notice, request, consent, or other communication shall be deemed to be given when personally delivered, mailed or e-mailed.

Northern States Power Company:

By: Kelly Bloch

Printed Name: Kelly Bloch

Title: Regional V.P Distribution Operations

Date: 6/13/18

Applicant

SunShare, LLC, Lake Nokomis 08 LLC, Lake Nokomis 09 LLC, Lake Nokomis 10 LLC, Lake Nokomis 11 LLC, and Lake Nokomis 12 LLC

By: David Amster-Olszewski

Printed Name: David Amster-Olszewski

Title: CEO

Date: 6/12/18

Independent Engineer:

By: Samuel E Wheeler

Printed Name: SAMUEL E WHEELER

Title: INDEPENDENT ENGINEER

Date: 6/13/18

In the Matter of an Independent Engineer Review as Authorized by the Minnesota Public Utilities Commission in Docket No. E002/M-13-867

Independent Engineer Review requested by SunShare LLC and Lake Nokomis LLC for the following SRC# listed:

Linden [PROTECTED DATA BEGINS [redacted] *PROTECTED DATA ENDS]*

Xcel Energy's Initial Response

June 28, 2018

INTRODUCTION

Northern States Power Company (Company or Xcel Energy) provides this response to the Independent Engineer regarding the Linden project dispute identified above.

SunShare LLC and Lake Nokomis LLC (SunShare) have initiated an Independent Engineer (IE) review of the Linden project, which consists of *[PROTECTED DATA BEGIN* [redacted] *PROTECTED DATA ENDS]*. SunShare's main request is that the IE examine whether the distribution system upgrades required for the Linden project's interconnection are reasonable and whether there is need to limit project capacity due to the $1 million material upgrade limit.

The Solar*Rewards Community program has achieved operational and programmatic maturity since it was launched in December 2014. While the program experienced some significant changes during its inception, it now functions with steady practices and processes, which is evidenced by the fast growing capacity of operational gardens. Currently, more than 100 community solar garden projects with a combined capacity exceeding 360 MW are connected to Xcel Energy's distribution system.

Success of the Solar*Rewards Community program is due in part to Xcel Energy's use of standard requirements and equipment for constructing its distribution system in order to achieve operational safety and efficiency. A cost-effective distribution

network cannot be built on a project-by-project basis using numerous variations in equipment and standards. However, this is exactly what SunShare is requesting: special treatment to circumvent standard requirements of the Solar*Rewards Community program and Xcel Energy's general interconnection process.

SunShare has developed several solar garden sites under the Solar*Rewards Community program and has already signed interconnection agreements for **[PROTECTED DATA BEGINS** [redacted] **PROTECTED DATA ENDS].**[1] Their interconnection to Xcel Energy's distribution system was studied and designed under the Company's standard interconnection and Solar*Rewards Community program requirements. Each of these projects included standard equipment options that are now being challenged for the Linden project, such as utilizing 336 AL overhead wires.

Further, SunShare previously submitted an IE review for this Linden project in April 2016. SunShare and Xcel Energy entered into a Settlement Agreement for the Linden project in January 2017. SunShare is now initiating a second IE dispute on the same project on the same issue: the Linden project is not receiving the full capacity requested because of extensive reconductoring and other upgrades required, exceeding the $1 million material upgrade limit.

We believe that the issues raised by SunShare in this dispute have already been resolved by the Settlement Agreement. When the Linden project was re-studied with new voltage fluctuation standards, **[PROTECTED DATA BEGINS** [redacted] **PROTECTED DATA ENDS]**, the allowed capacity increased from **[PROTECTED DATA BEGINS** [redacted] **PROTECTED DATA ENDS]**.

Although our position is that the Settlement Agreement has resolved the Linden project issues, we provide below our detailed response to SunShare's second dispute, as it is specified in the Intake Form. We include the following attachments with our response:

[1] We provide an example of one of these interconnection agreements as Attachment N.

Attachment A	SunShare's Intake Form
Attachment B	Prior Settlement Agreement
Attachment C	SunShare's First IE Dispute for Linden
Attachment D	Project Timeline
Attachment E	One-Line Diagram
Attachment F	Interconnection Agreement (IA) Packet version 2.19.16
Attachment G	Interconnection Study version 5.6.16 (redacted as provided to SunShare under prior NDA)
Attachment H	IA Packet version 5.18.16
Attachment I	IA Packet version 6.22.16
Attachment J	Study version 4.14.17 (redacted as provided to SunShare under prior NDA)
Attachment K	IA Packet version 7.14.17
Attachment L	Study version 6.27.17 (redacted as provided to SunShare under prior NDA)
Attachment M	Email Correspondence
Attachment N	Example of Signed IA for Another SunShare Project
Attachment O	Prior NDA for Disclosing Studies to SunShare

Please note, portions of Attachments A and C as well as Attachments B and D through O in their entirety have been marked as "Non-Public." The information in this filing designated as non-public, protected data is either Trade Secret pursuant to Minnesota Statute § 13.37, subd. 1(b) or is "security information" as defined by Minn. Stat. § 13.37, subd. 1(a). This information, including information as it relates to SunShare, is Trade Secret and is subject to efforts from SunShare and Xcel Energy to maintain its secrecy. This information derives independent economic value, actual or potential, to Xcel Energy, its customers, suppliers, and competitors, from not being generally known to, and not being readily ascertainable by proper means by, other persons who can obtain economic value from its disclosure or use. The engineering information so designated contains information regarding the Company's feeders and other system components. This information is also "security information" as defined by Minn. Stat. § 13.37, subd. 1(a). Xcel Energy believes the information could be manipulated to reveal the location and size of facilities serving our customers. The public disclosure or use of this information creates an unacceptable risk because those who want to disrupt the electrical grid for political or other reasons may learn which

facilities to target to create the greatest disruption. Reliability is essential to our customers and communities, and grid security is of utmost importance in today's world. Public disclosure of this type of information would have a detrimental effect by potentially providing valuable information not otherwise readily ascertainable and from which could be obtained economic value. Accordingly, we do not publicly share this type of information. Additionally, Section 11 of the Settlement Agreement requires that **[PROTECTED DATA BEGINS** [redacted] **PROTECTED DATA ENDS]**. For these reasons, pursuant to Minn. Stat. § 13.37, subd. 2, we have marked the applicable data referenced above as being non-public, protected data.

RESPONSE

I. PROGRAM AND IE DISPUTE GOVERNANCE

The Solar*Rewards Community program is implemented through Xcel Energy's Section 9 Tariff at Sheets 64 through 99.[2] Many of these provisions refer to and supplement the Section 10 Tariff for interconnection issues.[3] While the Section 10 Tariff is a pre-existing distributed generation interconnection tariff, the provisions in the community solar garden Section 9 Tariff modify the interconnection rules and requirements. Before a solar garden can move into commercial operation, the applicant must sign two agreements: a Section 10 Interconnection Agreement (at Sheets 113-134 of the Section 10 Tariff) and a Section 9 Standard Contract for Solar*Rewards Community (at Sheets 69-99 of the Section 9 Tariff).

Each Minnesota utility is required to file tariffs for any service performed.[4] Xcel Energy's tariffs govern our legal relationship with our customers[5] and this relationship

[2] The Section 9 Tariff is available at the following link, and Sheets 64-99 apply to the Solar*Rewards Community program: https://www.xcelenergy.com/staticfiles/xe/PDF/Regulatory/Mc_Section_9.pdf
[3] The Section 10 Tariff is available at the following link: https://www.xcelenergy.com/staticfiles/xe/PDF/Regulatory/Mc_Section_10.pdf
[4] Minn. Stat. § 216B.05, Subd. 1.
[5] *Hoffman,* 764 N.W. 2d 34, 39 (2009).

cannot be varied or enlarged by either contract or tort.[6] 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.

Section 9 Tariff, Sheets 68.11-13 govern the IE dispute process. Besides these tariff provisions, the Commission in its November 1, 2016 Order addressed seven separate IE dispute appeals and established some new procedures for future interconnection disputes.[8] Order Point 11.h directed Xcel Energy to work with the Department of Commerce (Department) and developers to create a standardized format for independent-engineer reports. The Department and Xcel Energy created a format for the IE report along with an Intake Form that is used to specify the scope of the IE dispute. The IE report template, Intake Form, and revised IE process were discussed at the S*RC Workgroup on March 15, 2017.[9] In this meeting, the S*RC Workgroup did not express any concerns regarding the IE report template and Intake Form or suggest any changes to them.

Per these documents, IE's authority is limited to resolving interconnection disputes, such as disputes related to Xcel Energy's determination of application completeness, timeliness of application and study processing, and the cost and necessity of required study expenses and distribution system upgrades. The IE may review only those issues specified in the Intake Form and necessary to resolve the dispute between the parties. For each issue, the IE has to decide whether the issue is within his authority. The IE report template includes additional direction, for example, the IE must direct the applicant to use the Intake Form if it was not used to initiate the IE review.

[6] *Keogh v. Northwestern R. Co.*, 260 U.S. 156, 163 (1922). *See also G&T Trucking Co. v. GFI America, Inc.,* 535 N.W.2d 658, 660 (Minn. Ct. App. 1995).
[7] *Northern States Power Company v. City of Oakdale*, 588 N.W.2d 534, 537-538 (Minn. Ct. App. 1999).
[8] 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] The IE report template, Intake Form, and S*RC Workgroup meeting minutes are available at the following links:
https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId={2984B8B4-C3CB-43E0-921C-84D305F87EC3}&documentTitle=20175-131814-01; and
https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId={30402F62-0000-CE18-82A6-7183E9F7AED3}&documentTitle=20183-141108-01

II. PRIOR SETTLEMENT AGREEMENT

The Linden project was already subject to an IE dispute, which was submitted by SunShare to the Department for dispute resolution process on April 13, 2016. SunShare's Submission for this prior dispute is included as Attachment C. At that time, SunShare had a number of disagreements or active IE disputes in various stages of the resolution process. In the case of the Linden project, an IE was assigned, but the dispute was then put on hold until SunShare and Xcel Energy reached an agreement regarding active IE disputes and disagreements. This Settlement Agreement, executed by SunShare on December 22, 2016 and by Xcel Energy on January 3, 2017, covered **[PROTECTED DATA BEGINS** [redacted] **PROTECTED DATA ENDS]**, including the Linden project. A copy of the Settlement Agreement is included as Attachment B.

SunShare is now initiating a second IE dispute on the same Linden project on the same issue: the project is not receiving full **[PROTECTED DATA BEGINS** [redacted] **PROTECTED DATA ENDS]** because the necessary distribution upgrades exceed the $1 million material upgrade limit. The Linden project was studied several times under the evolving voltage fluctuation criteria – the most recent study was conducted in June 2017 under the current simplified IEEE 1453 methodology. The end result was the same: the Linden project needs to be curtailed, and under the Company's standard equipment requirements and current voltage fluctuation methodology the available capacity is **[PROTECTED DATA BEGINS** [redacted] **PROTECTED DATA ENDS]**.

The Settlement Agreement is clear that the first Linden dispute has been finally and fully resolved, which means that SunShare should not be able to question a second time whether the standard equipment and reconductoring used by Xcel Energy (336 AL, for example) is appropriate. According to the Settlement Agreement, "**[PROTECTED DATA BEGINS** [redacted]

[redacted] **PROTECTED DATA ENDS]**."[10] In addition, by execution of the Agreement, "**[PROTECTED DATA BEGINS** [redacted] **PROTECTED DATA ENDS]**."[11] Finally, the Agreement states that "**[PROTECTED DATA BEGINS** [redacted] **PROTECTED DATA ENDS]**."[12]

At the time the Settlement Agreement went into effect, Xcel Energy had conducted a Linden project study dated May 6, 2016 and delivered to SunShare two IA packages dated May 18, 2016 and June 22, 2016, which are included as Attachments G, H and I respectively. Both IA packages listed the following upgrades:

Table 1: Distribution Upgrades[13]

Item	#	Unit Cost	Total Cost
OH - Total ft. of new 336 Al for tap to interconnection points	200	50/ft	$10,000.00
OH - Total ft. of rebuild to 336 Al	14500	55/ft	$797,500.00
UG - Install new UG Mainline	700	100/ft	$70,000.00
OH - Total ft. of new tap level OH for taps to meter poles	450	30/ft	$13,500.00
Mobilization Cost	1	10000/ea	$10,000.00
Replace existing recloser with VSR capable recloser	1	40000/ea	$40,000.00
Install new Capacitor Bank	1	25000/ea	$25,000.00
Install Primary Pole	6	5000/ea	$30,000.00
		Total	$996,000.00

The distribution upgrade costs were estimated as $996,000 in both IA packages, and the total indicative project cost was estimated as $1,107,900 in the updated June 2016 IA. The total capacity allowed was **[PROTECTED DATA BEGINS** [redacted] **PROTECTED DATA ENDS]**. Most importantly, the IAs already listed all equipment upgrades needed, including Xcel Energy's requirement of 14,500 feet of

[10] Settlement Agreement, Section 6, p. 2-3.
[11] Settlement Agreement, Section 8, p. 3.
[12] Settlement Agreement, Section 10, p. 3.
[13] These distribution upgrades are listed in the May 2016 IA Package at p. 2 and in the June 2016 IA Package at p. 2.

336 AL reconductoring and 700 feet of underground line. SunShare accepted the standard equipment requirements by executing the Settlement Agreement on December 22, 2016.

The Settlement Agreement specified that the Linden project will be **[PROTECTED DATA BEGINS** [redacted] **PROTECTED DATA ENDS]**. Xcel Energy then studied the Linden project with its most recent voltage fluctuation methodology based on IEEE 1453, which is less restrictive than the prior standard and benefitted the Linden project. The Settlement Agreement also provided that **[PROTECTED DATA BEGINS** [redacted] **PROTECTED DATA ENDS]**. The July 14, 2017 IA based on this IEEE 1453 study reduced the length of 336 AL reconductoring to 13,622 feet, but otherwise required the same upgrades as the prior June 22, 2016 IA subject to the Settlement Agreement. The only difference was that the upgrades now allowed for more capacity – **[PROTECTED DATA BEGINS** [redacted] **PROTECTED DATA ENDS]** – due to less restrictive, IEEE 1453-based voltage fluctuation criteria.

Xcel Energy believes the IE should determine that the Linden project dispute has already been resolved by the prior Settlement Agreement. If not in agreement, we believe the IE should at least determine that Issues # 1 and #4 – requiring approximately 14,500 feet of 336 AL overhead line and approximately 700 feet of underground line – were resolved by the Settlement Agreement.

III. RESPONSE TO SUNSHARE'S ENGINEERING ISSUES

A. Material Upgrade Limit of $1 Million

The $1 million material upgrade limit, specific to the Solar*Rewards Community program, has been in place since August 6, 2015 for co-located gardens and applies to the Linden project.[14] For common interconnection upgrades, such as three-phase line

[14] See, Section 9 Tariff, Sheets 68.4 – 68.5. When the Commission limited the size of co-located gardens to 1 MW, it removed the material upgrade limitation for applications filed after September 6, 2016. See ORDER

extension on existing feeders or reconductoring/building a line, Xcel Energy is not required to interconnect solar garden sites where the indicative cost estimate is more than $1 million in distribution upgrades.[15] Xcel Energy's engineering studies identify the necessary distribution upgrades, and if the indicative cost estimate exceeds $1 million, specify what amount of reduced capacity is allowed up to the $1 million limit.

Xcel Energy's estimates of the distribution upgrade costs and the equipment required have been subject to several prior IE disputes. The Commission confirmed in its November 1, 2016 Order that Xcel Energy's application of the $1 million material upgrade limit has been appropriate where it is based on Xcel Energy's indicative cost estimate.[16] In the IE dispute with Novel that was considered as part of that Order, the indicative cost estimate for distribution upgrades was $1,079,500, and therefore the project could not go forward. Novel argued that the indicative cost estimates should not be used to apply the $1 million material upgrade limitation. Novel had requested that a more specific or other estimate be used, or that a developer should have the ability to pay a reasonable cost for Xcel Energy to perform a detailed site review to develop a more refined cost estimate for purposes of determining whether the $1 million cap has been exceeded. But the Commission did not accept these arguments, noting in part that this would require significant changes to our tariff. The Commission applied the $1 million cap based on the indicative cost estimate to bar the project from proceeding. Accordingly, there is no requirement that we undertake a more detailed cost estimate during this IE review.

In the November 1, 2016 Order, the Commission confirmed the IE's conclusion in the Raser dispute that Xcel Energy provides a first-look, indicative cost estimate for the Interconnection Agreement, and declined to establish a certainty level for this estimate. In the Raser site report, the IE stated about their role: "In Minnesota the present policy of distribution upgrade cost estimate[s] are non-binding and do not

APPROVING VALUE-OF-SOLAR RATE FOR XCEL'S SOLAR-GARDEN PROGRAM, CLARIFYING PROGRAM PARAMETERS, AND REQUIRING FURTHER FILINGS, September 6, 2016. The applications at hand for the Linden project were all filed prior to this date.

[15] For details, see Section 9 Tariff, Sheet 68.4.

[16] ORDER RESOLVING INDEPENDENT-ENGINEER APPEALS AND ESTABLISHING PROCEDURES FOR FUTURE DISPUTES, November 1, 2016, Order Points 8 and 10.

include an accuracy requirement. The IE concludes that any change to this policy is outside of his jurisdiction."[17]

In the Kingelhutz and Rice Brunansky IE report, the IE analyzed Xcel Energy's requirements and costs for distribution upgrades. The IE concluded that Xcel Energy's unit cost for distribution upgrades using 336 AL mainline construction was within a reasonable range, and also determined that Xcel Energy's estimates of distance and the length required for reconductoring were accurate.[18] The Commission accepted the IE's finding, stating "that Xcel's unit cost for distribution upgrades is within reasonable range, its indicative cost estimate is reasonable, and its reconductoring footage is accurate."[19]

B. Issues Disputed by SunShare

SunShare's Intake Form, dated March 16, 2018 and included as Attachment A, specified the following issues for this dispute:

1. Justification for the 750 AL underground line ($107,405), verification of industry standard, and using the 225A ampacity rate instead of the actual 630A;
2. Adjustment to the Company's voltage fluctuation methodology, specifically to the 1.5% and 75% on/off voltage parameters, so that they are less restrictive;
3. Confirmation that Xcel Energy has delayed sharing project information and answering various questions presented by SunShare. Requested resetting the 24-month mechanical completion clock, beginning detailed design of **[PROTECTED DATA BEGINS** [redacted] **PROTECTED DATA ENDS]** immediately, requiring Xcel Energy to bear any extra costs of winter construction, and waiving the $1 million material upgrade limit;
4. Justification for the use of 336 AL conductor instead of other less expensive alternatives (4/0 Penguin, 4/0 Oxlip) and verification of industry standard; and

[17] See the IE Report for Novel Energy's Raser project, dated June 16, 2016 and filed in this docket on June 23, 2016 by Xcel Energy.
https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId={6648C2F9-B79C-49B6-A19F-919B326814AD}&documentTitle=20166-122516-01
[18] See the IE Report for Minnesota Solar LLC's Klingelhutz and Rice Brunansky projects, dated July 29, 2016 and filed in this docket on August 5, 2016 as Attachment A to Xcel Energy's Appeal.
https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId={9564598F-4EE2-4040-94B8-AAF60E02A08E}&documentTitle=20168-123966-02
[19] See Commission's November 1, 2016 Order, Order Point 10.

5. Review of Xcel Energy's engineering studies for Linden project for accuracy and confirmation if the project size can be increased to **[PROTECTED DATA BEGINS** [redacted] **PROTECTED DATA ENDS]** using lower cost industry standard equipment. Review of "any other questionable areas that may arise during his review which we may not be aware of."[20]

C. Engineering Studies

Xcel Energy has provided SunShare four sets of proposed Interconnection Agreements for the Linden project between February 19, 2016 and July 14, 2017, which are listed in Table 2 below. Table 2 also provides a quick reference to the timing of the IAs and studies, updated indicative costs, allowed capacity, and voltage fluctuation criteria used in the analyses.

[20] SunShare's Intake Form, included as Attachment A, p. 5.

Table 2: Linden Project Engineering Studies

Version	IA Package Date	Study Date	Attachment to Response	Indicative Cost Estimate	[PROTECTED DATA BEGINS	Change	Flicker Analysis
Original Study	Feb. 19, 2016	Feb. 8, 2016	F	$ 113,000		N/A	1.5% ind. / 2% aggr.
Revision 1	May 18, 2016	May 6, 2016	G, H	$ 1,176,100		Reduced Reconductoring length, and showed maximum allowable capacity given $1 million distribution cap.	1.5% ind. / 2% aggr.
Updated IA – no restudy	June 22, 2016	N/A	I	$ 1,107,900		New Telemetry Costs	1.5% ind. / 2% aggr.
Internal Analysis	N/A	Jan.11, 2017	N/A	N/A		Sample Study (no change to project)	2% ind. / 2% aggr.
Revision 2	N/A	April 14, 2017	J	N/A		IEEE 1453	IEEE 1453 Simplified Approach
Revision 3	July 14, 2017	June 27, 2017	K, L	$1,107,116	PROTECTED DATA ENDS]	Reduced Reconductoring length	IEEE 1453 Simplified Approach

Attachments F-L include the IA packages and interconnection studies provided to Sunshare in a chronological order. Attachments G, J and L are non-public in their entirety, but still have redactions. These attachments as presented here (with the redactions) were previously shared with SunShare under the NDA set forth in Attachment O. We have not included two of the studies listed above as attachments to this response. The Original Study is no longer applicable as it did not show the maximum allowable capacity up to the material upgrade limit. The Internal Analysis has also been omitted from this response since it was utilized solely as a sample case for internal Company review.

We provide summaries of the studies conducted for the Linden project site below.

1. First Study: Original Study, February 2016

The first IA package based on the Original Study was provided to SunShare on February 19, 2016. The Linden project was approved at a total capacity of **[PROTECTED DATA BEGINS** [redacted] **PROTECTED DATA ENDS]** due to extensive rebuilding and reconductoring that was required to support the requested **[PROTECTED DATA BEGINS** [redacted] **PROTECTED DATA ENDS]** of generation. Achieving **[PROTECTED DATA BEGINS** [redacted] **PROTECTED DATA ENDS]** capacity would have required 19,000 feet of overhead line reconductoring at a cost that exceeded the $1 million material upgrade limit. SunShare initiated the first IE dispute in April 2016.

2. Second Study: Revision 1, May 2016

The IA package based on the second study, Revision 1, was provided to SunShare on May 18, 2016. The amount of reconductoring needed was reduced from 19,000 feet to 14,500 feet to conform to the $1 million material upgrade limit. The study also calculated how much capacity was allowed until the $1 million limit was reached, which was **[PROTECTED DATA BEGINS** [redacted] **PROTECTED DATA ENDS]**. The IA package also listed other upgrade requirements, such as the underground mainline and replacing a recloser.

3. Updated IA, June 2016

The indicative cost estimate for the Linden project's interconnection was updated in June 2016 to reflect changes in telemetry. Xcel Energy adjusted telemetry requirements from SCADA to less expensive cellular technology for all projects under the Solar*Rewards Community program. This was not a re-study and only the indicative cost estimate was adjusted down from $1,176,100 to $1,107,900. A new IA package was provided to SunShare on June 22, 2016.

4. Internal Analysis, January 2017

In January 2017, Xcel Energy conducted an internal review to determine how to deal with a modeling error that affected a large number of studies. A sample of impacted

studies, including the Linden project, was selected for this internal analysis. During a time of very high volumes of interconnection studies early in the Solar*Rewards Community program, the Company noticed that a consultant had made a modeling error performing power flow analysis. The consultant had erroneously used a substation bus send-out voltage of 1.0 per unit rather than the 1.03-1.05 per unit that is typically set in the field. The modeling discrepancy meant that overvoltage conditions would likely be present in the field, although not shown in study results, which was confirmed by the internal review of re-running a sample of studies. When the studies were re-run with the corrected bus send-out voltage and applying the reactive power limit, the result was that the allowed capacity was reduced significantly. This is also what the Internal Linden study results showed.[21]

However, Xcel Energy made a program-wide decision not to reduce capacity for the previously studied projects impacted by the modeling error. Instead, the Company determined that relaxing the reactive power requirement was the best path forward. As a result, most projects, including Linden, were allowed to keep the previously allocated capacity even after the substation bus send-out voltage was corrected. This Internal Linden study should therefore be disregarded, because it was conducted for internal evaluation only and shows results that the Company decided not to act upon.

5. Third Study: Revision 2, April 2017

Xcel Energy and SunShare entered into a Settlement Agreement regarding the Linden project on January 3, 2017. Concurrently, from January to March 2017, the Company worked to develop an IEEE 1453-based voltage fluctuation methodology, as directed by the Commission. This IEEE 1453-based methodology was filed with the

[21] We provide additional technical detail for the reactive power flow issue: The Company used a study criteria that limited the amount of reactive power flow from the transmission system to no greater than 80 percent of the standard capacitor bank size for a given system voltage (footnote: 1200 kVAR standard cap bank for 15 kV feeder class and 2400 kVar for 35 kV voltage class). This criterion was aimed at upholding power factor obligations at the transmission and distribution (T&D) interface and aligns with the common reactive power is compensation scheme currently employed in the Company's Minnesota service territory. If this condition were violated, the modelers were instructed to add another capacitor bank on the feeder near the substation in order to compensate for the reactive power locally. Adding capacitor banks onto the distribution system leads to an increase in voltage, which can decrease the amount of headroom available for DER-related voltage rise.

Commission on April 26, 2017 (see footnote 23 below). The third study was conducted to apply the new, less restrictive IEEE 1453-based voltage fluctuation standard. Before the third study was provided to SunShare, Xcel Energy noticed that the consultant had made an error in not applying the $1 million material upgrade limit when determining the extent of reconductoring possible under program rules. The Interconnection Agreement was not updated and the study was not provided to SunShare at this time.

6. Fourth Study: Revision 3, June 2017

The fourth study used the IEEE 1453-based voltage fluctuation criteria, which increased the allowed project capacity from **[PROTECTED DATA BEGINS** [redacted] **PROTECTED DATA ENDS]**. The required overhead reconductoring was reduced from 14,500 feet to 13,622 feet. The updated IA was provided to SunShare on July 14, 2017. The indicative cost estimate for distribution upgrades was $1,058,952 with the underground line included. As is explained below in more detail, we agree to use overhead line only for estimating the indicative cost, which will reduce the cost estimate for distribution upgrades to $998,121. However, the detailed design will determine whether an overhead or underground line will be required for Linden project's interconnection, and if required, the costs for the underground line will be part of the actual costs charged to SunShare.

D. Response to Issue #1: Required Use of Underground Line 750 AL

SunShare is disputing the need to use 792 feet of underground line and the requirement to use 750 AL. SunShare is also questioning the ampacity rate of 255A used for 750 AL, when the correct rate is in fact 630A.

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, ampacity does not play an active role in the analysis. Since the impedance analysis was correct and the ampacity rating does not affect load flow calculations, there was no need to make changes to the study.

The underground cable is not a cost driver for the Linden project: the price difference between installing 792 feet of 750 AL underground cable and 792 feet of 366 AL overhead cable is $60,831. However, we recognize that we typically assume overhead line for estimating indicative costs for distribution upgrades for a solar garden project, even in situations where we are aware that local permitting rules require an underground line. Therefore, we are adjusting the indicative cost for the Linden project so that an overhead line (336 AL) is used for the indicative cost estimate instead of an underground line. This change will bring the indicative distribution upgrade costs for the Linden project down from $1,058,952 to $998,121, which now puts it within the $1 million distribution material upgrade limit. (Without this adjustment, the **[PROTECTED DATA BEGINS** [redacted] **PROTECTED DATA ENDS]** previously offered to SunShare would need to be further limited to comply with the $1 million cap.) The actual interconnection requirements will be determined in detailed design, which will specify whether an overhead or underground line is required. Table 3 below shows the adjusted distribution indicative cost estimate for the Linden project without the underground line.

[22] The thermal rating of the conductor is directly tied to the ampacity of the conductor. Violations of the conductor ampacity lead to increased conductor temperatures. The increase temperatures experienced by the conductor due to these violations lead to conductor annealing and reduced reliability performance.

Table 3: Updated Indicative Cost Estimate without Underground Line

Distribution Infrastructure	Qty/ft	Materials	Construction Labor	Construction Equipment	Subtotal
Wood Pole(s)					
Distribution Wood Poles	10	$12,650	$7,593	$17,026	**$37,269**
Forecast					**$37,269**
Overhead Line					
Rebuild: 336 Al	14414	$820,540	$27,779	$5,304	**$853,623**
New: 336 Al	300	$17,078	$578	$110	**$17,766**
Forecast					**$871,389**
Underground Line					
Rebuild: 750 Al	0	$0	$0	$0	**$0**
New: 750 Al	0	$0	$0	$0	**$0**
Forecast					**$0**
Reclosers					
Hydraulic	0	$0	$0	$0	**$0**
Electronic	1	$40,000	$11,177	$4,510	**$55,687**
Forecast					**$55,687**
Switches/Fuses					
Disconnects/Fuses	2	$7,590	$5,001	$2,643	**$15,233**
Gang Operated Switch	0	$0	$0	$0	**$0**
Forecast					**$15,233**
Stepdown Transformers					
OH Stepdown Transformer	0	$0	$0	$0	**$0**
Forecast					**$0**
Distribution Transformers					
DistributionTransformer	0	$0	$0	$0	**$0**
Forecast					**$0**
Mobilization					
Mobilization	N/A		$14,422	$4,121	**$18,543**
Forecast					**$18,543**
Assumed Construction Season: Winter					
Grand Total					**$998,121**

E. Response to Issue #2: Application of 1.5% and 75% on/off Voltage Parameters

Xcel Energy's current methodology to evaluate voltage fluctuation, based on IEEE 1453, was implemented in April 1, 2017. The process to develop the simplified IEEE 1453-based methodology was comprehensive and transparent, including extensive research on industry standards, peer utility reviews, and stakeholder input through a Technical Stakeholder Group.[23] Beginning April 1, 2017, Xcel Energy has applied the

[23] A white paper detailing the voltage fluctuation methodology was filed with the Commission on April 26, 2017. See https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId={4AB296FE-9034-4C69-827F-11C90D12AB0D}&documentTitle=20174-131247-01

following voltage fluctuation limits for studying Distributed Energy Resource interconnections, including the Solar*Rewards Community program:

- All feeder DG facilities tripping - ≤ 5 percent at any point on the medium voltage system including all existing, reviewed, and approved DG prior to the next-in-queue review. Additional study may be required when exceeding the 4 percent level in order to determine appropriate ramp rate limiting, random delays, or other inverter functions to mitigate the risks associated with exceeding service voltage limits.
- Single facility DG full-on to full-off - ≤3 percent at any point in the medium voltage system.
- Passing cloud fluctuation due to voltage regulation limit - ≤1.5 percent[24] at the regulator. A single PV trip ≤ 75 percent cloud caused power drop and no perception based flicker limit will be imposed.

SunShare is disputing the IEEE 1453-based voltage fluctuation methodology, specifically the application of the third bullet point above.

When the Solar*Rewards Community program was launched in December 2015, the Company used the "GE flicker curve" approach (IEEE 141-1993) for evaluating voltage fluctuation for interconnection studies. Initially, the Company applied a standard that allowed for 1.5 percent fluctuation on an individual system basis and 2.0 percent fluctuation on an aggregate system basis. Voltage fluctuation thresholds and methodology became a subject of several IE disputes as some developers requested that the Company apply higher thresholds or use IEEE 1453-based approach. In August 2016, the Company agreed to increase the voltage fluctuation thresholds to 2.0 percent fluctuation on an individual and aggregate basis.[25] At that time, the Commission also ordered the Company to work with interested parties to develop a plan for transitioning to IEEE 1453-based methodology to evaluate voltage fluctuation.[26]

[24] The 1.5% with 75% output drop for passing cloud cover equates to 2% using the full-on to full-off method.
[25] See Letter Regarding Voltage Fluctuation Settlement Offer, filed on August 23, 2016. https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId={037EF705-CFA9-4C0A-AE11-4A9AC5C3FC13}&documentTitle=20168-124362-01
[26] In its September 20, 2016 hearing, the Commission ordered that "Xcel shall work with other interested parties to develop a plan for transition to incorporating the standard of IEEE 1453 into its modeling of

As a result, the Company initiated a comprehensive analysis and review of the IEEE 1453 methodology. The Company developed a white paper detailing a simplified approach towards the adoption of IEEE 1453, which was peer reviewed by a number of utility companies across the country. The white paper was also the basis for discussions in the stakeholder process.

The Technical Stakeholder Group was open for participation by all developers, as announced in two S*RC Working Group meetings,[27] and convened on January 30, February 24, and March 15, 2017. All applicants in the Solar*Rewards Community program were invited. Active participants included the Department, Commission Staff (as observer), other utilities, Fresh Energy, MN SEIA, and solar developers. Stakeholders provided wide-ranging input on voltage fluctuation thresholds, other issues relying on engineering judgment, and challenges in transitioning to full IEEE 1453 methodology using time series data. Based on the feedback, the Company, for example, increased the aggregate limitation threshold from 4 to 5 percent with the use of inverter ramp rate limiting functions. The developers represented at the Technical Stakeholder Group supported the Company's simplified IEEE 1453 approach with the change to 5 percent aggregate level – a change that was initially suggested by a solar developer.

The Company explained the proposed IEEE 1453-based methodology in an S*RC Working Group meeting on March 15, 2017. The Company summarized the methodology in an April 26, 2017 informational filing to the Commission, which included the final white paper and summaries of the three Technical Stakeholder Group meetings.[28] No objections were filed to this filing or white paper.

The process to develop the simplified IEEE 1453 methodology was comprehensive, transparent and inclusive. It was based on an extensive review of industry research

voltage fluctuations and flicker for solar PV." See ORDER RESOLVING INDEPENDENT-ENGINEER APPEALS AND ESTABLISHING PROCEDURES FOR FUTURE DISPUTES, Order Point 2, November 1, 2016.
[27] At December 14, 2016 and January 12, 2017 meetings.
[28] See https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId={4AB296FE-9034-4C69-827F-11C90D12AB0D}&documentTitle=20174-131247-01

surrounding the IEEE 1453 methodology as well as its underlying IEC 61000-4-15 2010 and IEC 61000-3-7 2008 standards. And it included both industry peer review and local stakeholder input. 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 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% full on/full off individual and aggregate under IEEE 141, **[PROTECTED DATA BEGINS** [redacted] **PROTECTED DATA ENDS]**.

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 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. The Company is analyzing the new interconnection standard for any possible interactions with current interconnection technical requirments, including voltage fluctuation criteria.

F. Response to Issue #3 – Review of Any Delays in Sharing Project Information and Answering Questions

A timeline for the Linden project is provided in Attachment D. SunShare submitted **[PROTECTED DATA BEGINS** [redacted] **PROTECTED DATA ENDS]** applications for the Linden project in May 2015. These applications were deemed

[29] IEEE 1547-2018 defines two interfaces: power and interoperability.

complete in August 2015, and SunShare paid the engineering study fees in November 2015. The first engineering scoping study (basis for Interconnection Agreement ver_2.19.16) granted **[PROTECTED DATA BEGINS** [redacted] **PROTECTED DATA ENDS]** of capacity. SunShare initiated an IE dispute on April 13, 2016. A subsequent study (basis for Interconnection Agreement ver_5.18.16 and ver_6.22.16) granted **[PROTECTED DATA BEGINS** [redacted] **PROTECTED DATA ENDS]** of capacity, up to the $1 million material upgrade limit. SunShare withdrew the IE dispute as Xcel Energy and SunShare entered into a Settlement Agreement in January 2017 that included the Linden IE dispute. The Settlement Agreement specified that the Linden project **[PROTECTED DATA BEGINS** [redacted] **PROTECTED DATA ENDS]** as discussed above.

During January–March 2017, as ordered by the Commission, Xcel Energy worked with developers to establish an IEEE 1453-based voltage fluctuation methodology, which became effective on April 1, 2017. This IEEE 1453-based approach is less restrictive than the 2% full on/full off method based on the flicker curve and therefore offers a developer more capacity (or less distribution costs). Therefore the Linden project was re-studied under the new IEEE 1453-based approach. The latest study (basis for Interconnection Agreement ver_7.14.17) allowed **[PROTECTED DATA BEGINS** [redacted] **PROTECTED DATA ENDS]** of capacity. According to program rules, the deadline for SunShare to execute and pay the IA was on August 14, 2017. (See Section 9 Tariff, Sheet 68.7, "… payments and providing appropriate letter of credit for unpaid balance must be completed within 30 days of the Company notice to applicant of this payment which is due or the application will be removed from the Study Queue and the applicant will be required to start a new Community Solar Garden application if it later determines it wants to proceed." The notice to the applicant is in the cover letter dated July 14, 2017 in Attachment K.)

SunShare requested extra time to review Interconnection Agreement ver._7.14.17, and we did not receive any additional communications from SunShare until more than three months later on October 31, 2017. This email was a response to Xcel Energy's prior email note (on the same date) that the required timeframe for executing and paying the IA had been far exceeded. In fact, SunShare was entitled to no capacity at that point in time as it was beyond the 30-day timeframe as set forth in our tariff.

Following the tariff, SunShare should have submitted a new application if it wanted to proceed. But if new applications were to be submitted, under current program rules the co-located sites could not exceed 1 MW in capacity. If SunShare had followed the tariff and submitted a new application, then it would have been held to that 1 MW limit.

From here on, SunShare sent Xcel Energy multiple sets of detailed engineering questions delaying the process further.

SunShare sent the first set of extensive questions in November 2017 and Xcel Energy responded in December 2017. The second set of questions was sent in January 2018 and responded by Xcel Energy in February 2018. SunShare sent the third set of questions in February 2018 and Xcel Energy responded in March 2018, requesting also that the IA be signed and paid by March 16, 2018 or otherwise the Linden project will be cancelled. On March 14, 2018, SunShare sent their fourth set of questions and also requested extension for executing the IA. On the same day, Xcel Energy emailed that it would not grant an extension, and on March 15, 2018 Xcel Energy responded to the fourth set of questions. On March 16, 2018, SunShare initiated this IE dispute. Emails between Sunshare and Xcel Energy referenced above are included as Attachment M.

Xcel Energy has worked with SunShare to move these projects forward and agreed to settle the first IE dispute in order to do so. We have re-studied the Linden project with less restrictive IEEE 1453-based voltage fluctuation standards. We have extended SunShare's deadline to execute and pay the IA from August 2017 to March 16, 2018, and during this time answered numerous detailed questions and provided additional information to SunShare.

SunShare's claim that Xcel Energy has caused delays for the Linden project is misplaced and contradicts the facts.

We do not believe the IE should take any of the following actions requested by SunShare:

- Resetting the 24-month clock for Mechanical Completion – the deadline for Mechanical Completion is already extended and tolled day-for-day while the

project is in the IE review.[30] Section 9 Tariff does not allow starting a new 24-month period for Mechanical Completion;

- Immediately beginning detailed design for **[PROTECTED DATA BEGINS** [redacted] **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.

None of the SunShare's requests above are allowed by Xcel Energy's tariff. By tariff, SunShare should be entitled to no capacity, since it did not timely execute the July 2017 IA. Xcel Energy's actions, if anything, have allowed SunShare to get significantly more capacity than what it otherwise would have been allowed. SunShare should not be further rewarded with more time to achieve Mechanical Completion than it is entitled to.

G. Response to Issue #4: Industry Standards and Use of 336 AL

Sunshare believes Xcel Energy is using more robust equipment than is required by industry standards for the size of Linden project. The Company has quoted the use of 13,622 feet[31] of 336 AL overhead lines for the interconnection of the project. The Company uses select standard conductor sizes to reduce both the costs and required inventory size. Any non-standard equipment would be more expensive to source/inventory and would create unnecessary complications during construction,

[30] See Section 9 Tariff, Sheets 76-76.1.
[31] Per the discussion and Table 3 above in Section III.D, with the removal of the underground line from the indicative cost estimate, we have added 792 feet of overhead line, bringing the length of the overhead line in the indicative cost estimate to 14,414 feet.

maintenance and outage recovery. Alternatives, such as 4/0 Penguin and 4/0 Oxlip suggested by SunShare or other comparable equipment, are not standard mainline conductor for the Company.

As explained above, in a different IE dispute, the IE and the Commission confirmed that Xcel Energy's unit cost for distribution upgrades (that included using 336 AL for mainline construction) was within a reasonable range.[32]

H. Response to Issue #5 – Review whether the Project Size Can be Increased to [PROTECTED DATA BEGINS [redacted] PROTECTED DATA ENDS] by Using Lower Cost Industry Standards and Review of Any Other Questionable Areas

The Linden project is located in a rural area of **[PROTECTED DATA BEGINS** [redacted] **PROTECTED DATA ENDS]**. In order to reach the garden site from Xcel Energy's current distribution infrastructure, poles and wires must be placed in less than optimal terrain with forests and hills. Although some costs can be reduced by installing lines on poles owned by other utilities, reconductoring costs will be higher than for a typical project. The Linden project site location has played a significant part in the interconnection, increasing costs and reducing project capacity.

Section 9 Tariff, Sheet 68.11 specifies that the IE review must consider industry standards for interconnection as well as the Company's standards for building, safety, power quality, reliability and long-term stable operations for interconnection facilities. In addition, the tariff expects that the standards used by the Company (and the IE) should not vary from the standards which the Company uses for constructing, maintaining, or repairing its distribution network for its own retail customers. Finally, the tariff emphasizes that continuity and consistency of using Company standards is paramount for employee safety.

Xcel Energy uses standard requirements and equipment for constructing its distribution system in order to achieve operational safety and efficiency. This goal is

[32] The IE Report for Minnesota Solar LLC's Klingelhutz and Rice Brunansky projects; ORDER RESOLVING INDEPENDENT-ENGINEER APPEALS AND ESTABLISHING PROCEDURES FOR FUTURE DISPUTES, November 1, 2016, Order Point 10.

recognized in the tariff provisions above. An efficient distribution network cannot be built on a project-by-project basis using numerous variations in equipment and standards. This would create serious complications and risks during construction, maintenance and outage recovery. Any non-standard equipment would also be more expensive to source and inventory and could create operational issues for crews unfamiliar with, or not expecting, the non-standard elements.

The IE process has been modified to include an Intake Form and a template for the IE report, as discussed earlier in Section I. The IE may review only those issues specified in the Intake Form and necessary to resolve the dispute between the parties. The IE's authority is limited in scope to those issues that are identified by the Applicant. SunShare's request that the IE "review any other questionable areas" is outside the IE's jurisdiction.

CONCLUSION

When the Linden project was studied under the Solar*Rewards Community program rules and Xcel Energy's interconnection standards, the allowed capacity was limited to **[PROTECTED DATA BEGINS** [redacted] **PROTECTED DATA ENDS]**. More than 100 solar gardens with a total capacity exceeding 350 MW have been interconnected under these same rules and standards, including **[PROTECTED DATA BEGINS** [redacted] **PROTECTED DATA ENDS]** completed or in construction/design by SunShare. For all projects, the indicative cost estimate was based on using 336 AL for mainline construction. The Commission has confirmed in prior IE disputes that Xcel Energy's application of the $1 million distribution material upgrade limit has been appropriate based on its indicative cost estimate, and the Commission has not accepted arguments that a more specific estimate should be used.

Respectfully Submitted,

Xcel Energy
Date: June 28, 2018

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 _3/16/18 (Section 9 tariff required email sent on 3/15/18)_____, by:[PROTECTED DATA BEGINS [redacted] PROTECTED DATA ENDS] SunShare, LLC and Lake Nokomis 8-12 LLC's, [PROTECTED DATA BEGINS [redacted] PROTECTED DATA ENDS]

Issue Number 1	
Succinct description of engineering issue.	Xcel Energy has required the use of a 750 AL underground line at a cost of $107,405 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 required 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 [PROTECTED DATA BEGINS [redacted] PROTECTED DATA ENDS] with the 750 AL line's ampacity rated at 255A, whereas it is actually 630A. 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.
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.	PROTECTED DATA BEGINS Utility Garden Name / Utility Award Level: Linden01 – Lake Nokomis 08 LLC; Linden02 – Lake Nokomis 09 LLC; Linden03 – Lake Nokomis 10 LLC; Linden04 – Lake Nokomis 11 LLC; Linden05 – Lake Nokomis 12 LLC; [redacted] PROTECTED DATA ENDS
Specific action requested from the Independent Engineer.	• 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.
Explanation of and support for the position (include additional sheets if needed).	Xcel's correspondence with SunShare, and materials it has shared (as well as those it has not), which are in Xcel's possession.

Issue Number 2	
Succinct description of engineering issue.	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.
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.	See above
Specific action requested from the Independent Engineer.	• 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 [redacted] MW AC at this site.
Explanation of and support for the position (include additional sheets if needed).	Xcel's correspondence with SunShare, and materials it has shared (as well as those it has not), which are in Xcel's possession.

Issue Number 3	
Succinct description of engineering issue.	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.
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.	See above
Specific action requested from the Independent Engineer.	• 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 [redacted] 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 [redacted] 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 [redacted] 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.
Explanation of and support for the position (include additional sheets if needed).	Xcel's correspondence with SunShare, and materials it has shared (as well as those it has not), which are in Xcel's possession.

Issue Number 4	
Succinct description of engineering issue.	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.
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.	See above
Specific action requested from the Independent Engineer.	• 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.
Explanation of and support for the position (include additional sheets if needed).	Xcel's correspondence with SunShare, and materials it has shared (as well as those it has not), which are in Xcel's possession.

Issue Number 5	
Succinct description of engineering issue.	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 [redacted] MW to [redacted] MW AC

	required by Xcel, and all relevant tariffs and PUC rulings to determine if Xcel is indeed providing all required information to us.
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.	See above
Specific action requested from the Independent Engineer.	• 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 [redacted] MW AC applied-for to [redacted] MW AC to determine if the project can be [redacted] 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 [redacted] MW AC; and • Require Xcel to specify exactly what upgrades would be required for the installation of [redacted] MW AC, and then [redacted] MW AC. Specifically, which upgrades for the additional MW's would drive the cost over the $1M cap?
Explanation of and support for the position (include additional sheets if needed).	Xcel's correspondence with SunShare, and materials it has shared (as well as those it has not), which are in Xcel's possession.

IE Dispute
Previous Settlement Agreement
Attachment B: 1 of 1

PUBLIC DOCUMENT – NOT PUBLIC DATA HAS BEEN EXCISED

Attachment B to this response is marked as "Non-Public" pursuant to Minn. Stat. §13.37, subd. 1(b). This information is subject to efforts to maintain its secrecy. This information derives independent economic value, actual or potential, claimed by the customers, from not being generally known to, and not being readily ascertainable by proper means by, other persons who can obtain economic value from its disclosure or use.

Attachments B is marked as "Not-Public" in its entirety. Pursuant to Minn. Rule 7829.0500, subp. 3, the Company provides the following description of the excised material:

1. **Nature of the Material:** Attachment B includes a Settlement Agreement between Xcel Energy and SunShare.
2. **Authors:** The settlement information was prepared by Xcel Energy and SunShare and signed by all parties.
3. **Importance:** The terms of this Settlement Agreement require non-public treatment.
4. **Date the Information was Prepared:** Attachment B was prepared in December 2016 and signed by all parties by January 3, 2017.

[PROTECTED DATA BEGINS

PROTECTED DATA ENDS]

STATE OF MINNESOTA
BEFORE THE PUBLIC UTILITIES COMMISSION
121 Seventh Place East, Suite 350
St. Paul, MN 55101

SunShare, LLC Submission to the Independent Engineer Dispute Resolution Process Outlined in the Commission's August 6, 2015 Order	PUC Docket 13-867 Submitted April 13, 2016

SunShare submits this summary and attached Exhibits to the Department of Commerce's independent engineer dispute resolution process.

I. Background

On May 7, 2015, SunShare submitted applications for [redacted] co-located community solar gardens (CSGs) at the "Linden" project site. We received the engineering study scope of work statement on September 18, 2015, and paid the $22,000 engineering study fee on November 8, 2015 (*see* Exhibit A, SOW Statement and Proof of Payment). We received engineering study results for the project site on February 19, 2016 (*see* Exhibit B, Linden Study Report, dated February 19). The indicative cost estimate for all [redacted] was $1,137,500 in distribution upgrades; no substation upgrade cost estimates for the [redacted] cumulative project was provided.

In its engineering study report, Xcel stated that:

> Greater than [redacted] MW of PV cannot be accommodated due to extensive rebuilding/reconductoring that would be required to support that amount of generation. The existing infrastructure could support a maximum of [redacted] of PV at the garden site . . . Providing service for greater than 1000 kW would entail a "material upgrade" exceeding the $ 1 million limitation applicable to (1) three-phase line extension on existing feeders and (2) reconductor /build line.

The report provided a $113,000 total (distribution and substation) cost estimate for constructing [redacted] at the site.

On February 26, 2016, two SunShare engineers reviewed the subcontractor studies for the Linden site at Xcel offices. This review revealed that Xcel had not studied the maximum size, nor the [redacted] size (despite the contrary language in its report). Rather, our review confirmed that only two scenarios had been examined by Xcel: if the entire [redacted] were constructed on the site, and if Xcel performed no distribution system improvements (allowing [redacted] Our engineers also discovered that there were additional feeder segments (with different conductor sizes) than had been listed in Xcel's Linden study report.

In a March 2, 2016 meeting between SunShare and Xcel, SunShare requested that Xcel provide us with additional study results demonstrating the capacity that could be accommodated

with partial feeder reconductoring, or at least study the site at smaller increments. Xcel stated that they would be willing to perform restudy of the Linden site at [redacted] increments at an additional study cost. SunShare agreed at the time to this incremental approach.[1] Xcel informed us by phone on March 6 that they would not have the resources to perform this incremental study for Linden until March 28, and that the study would take three weeks at a restudy cost of $8,000.[2]

We requested by email on March 7 that Xcel provide us with a "quick look" using the existing power-flow model for Linden by resetting the nameplate rating for the generator as an input variable, enabling them to determine how much capacity could be built at the site without going over the material distribution-upgrade limit. On a March 25 call between SunShare and Xcel staff, Xcel stated that they were unsure if this quick look would be possible, and said they would get back to us the following week.[3] We have not received an additional update beyond this, nor have we received any preliminary study results for the Linden site for additional capacity beyond [redacted].

We informed Xcel formally by email that we considered their engineering study report incomplete for not including the tariff-required maximum capacity allowable at the site. We also requested that Xcel provide us with a statement of work (SOW) if Xcel believed an SOW was necessary. Xcel delivered the SOW on March 31, with a payment request for an additional $8,000 in study fees.

II. Independent Engineer Jurisdiction and Authority

The Commission's August 6, 2015 Order in docket 13-867, adopting the partial settlement between NSP and several developers, laid out the independent engineer dispute resolution process. Under the Order, the Department of Commerce selects or approves independent engineers to ensure neutrality.[4] The IE is to:

> 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.[5]

The Department of Commerce issued comments in docket 13-867 describing the independent engineer process in further detail. The comments identified the four IEs chosen through the Department's Request for Qualifications process.

Finally, the Department's comments noted that the IE will rely on documentation submitted by the developer and NSP in the dispute, and will issue a written decision after reviewing the

[1] We can provide minutes from this meeting upon IE request.

[2] We can provide minutes from this call upon IE request.

[3] We can provide minutes from this call upon IE request.

[4] Public Utilities Commission August 6, 2015 Order, 13-867, at 27.

[5] *Id*.

documentation. The IE's decision will be binding "unless one of the parties appeals the decision to the Commission within five days."[6]

III. Dispute Regarding Appropriate Study Scope for CSGs Curtailed Due to "Material Upgrade" Limitation

In studying the Linden site, Xcel only studied system impacts at [redacted] and with the distribution system "as-is." In its [redacted] study, Xcel determined that, to mitigate flicker at a 1.5% voltage change threshold, 19,000 feet of feeder line would need to be reconductored. Xcel made no attempt to study intermediate levels of site capacity or measure how much capacity could be accommodated if smaller portions of the feeder were reconductored.

Xcel's Section 9 tariff includes the following language regarding material upgrades:

> The Company will determine whether a "Material Upgrade" to the Company network is needed to accommodate a Community Solar Garden. A Material Upgrade will not be performed . . . . For a material upgrade exceeding the $1 million limitation applicable to (1) three-phase line extension on existing feeders and (2) reconductor/build line, the Company will provide the applicant with an itemized list of the cost inputs, including unit costs and any underlying data and documentation related to those unit costs, that comprise the Company's determination . . . . If a Material Upgrade is needed, the Company will inform the applicant that the Community Solar Garden Site size cannot be accommodated. If the Company believes that it could accommodate a lower capacity at that location compliant with the Material Upgrade threshold, it will so inform the applicant. In such a situation, the applicant would be allowed to resize the applications, and the Community Solar Garden Site would proceed at the lower capacity without a change to its Study Queue position.[7]

Xcel has failed to meet its tariff-imposed requirements by determining the maximum capacity that could be accommodated at the Linden site without triggering the $1 million maximum (instead, Xcel merely provided a study that took the distribution system "as-is").

The tariff language requires Xcel to accommodate lower capacity at a CSG site if that capacity could be accommodated within the $1 million limit. As described by Xcel, the cap is an "aggregate materiality cap of $1 million per site."[8] This description conflicts with Xcel's apparent approach to perform no distribution upgrades at all if the upgrades required to accommodate the full requested capacity would cost more than $1 million.

We believe that more capacity than [redacted] can be accommodated at the Linden site without reaching the material upgrade threshold. For example, Xcel's February 19 study report says that more "than [redacted] at .95 PF can be accommodated if the 19,000' of #2AL and 1/0 AL conductor

[6] *Id.* at 3.

[7] Xcel Energy Minnesota Electric Rate Book, Section 9, Sheets Nos. 68.4-68.5.

[8] Xcel Energy Sept. 8, 2015 Answer to Reconsideration and Clarification Petitions, 13-867, at 4.

is replaced with 336 AL. However this would exceed the $1 million limit imposed by the tariff." The study says nothing about how much PV could be accommodated if only the #2AL ***or*** 1/0AL was reconductored rather than both.

Xcel has thus failed to meet its tariffed requirements by failing to provide us with study results demonstrating the maximum capacity allowable at the Linden site. As Independent Engineer Sam Wheeler determined for two of our other sites in his March 31, 2016[9] ("Becker") and April 13, 2016[10] ("Glazier") reports, we also request that you determine it reasonable for Xcel to perform its infrastructure due diligence prior to re-running its models of the Linden site;[11] that Xcel use a 2% voltage change threshold for flicker in its restudy;[12] that Xcel perform its restudy without charging SunShare an additional fee (as restudy is necessary due to Xcel's own misinterpretation of its tariff);[13] and that Xcel provide SunShare in its new study report with cost estimates within the industry standard of +/-20%.[14]

IV. Requested Relief

SunShare calls upon the independent engineer's good judgment to determine the appropriate relief for this dispute, which may include, *inter alia*:

- Determine that it would be reasonable and justified for Xcel to provide study results for the Linden site that demonstrate the maximum capacity that could be accommodated without exceeding the $1 million upgrade threshold, including distribution and substation cost estimates within +/-20%.

- Determine that it would be reasonable and justified for Xcel to perform its detailed infrastructure due diligence prior to restudying the Linden site, to avoid any further error or delays in completing its Step 4 study requirements.

- Determine that it would be reasonable and justified for Xcel to perform its additional studies using a 2% flicker threshold for the Linden site (rather than 1.5%).

- Determine that it would be reasonable and justified for Xcel to allow SunShare to review all aspects of the data and assumptions underlying the Linden engineering study models prior to

[9] Sam Wheeler March 31, 2016 Independent Engineer Report, *Resolution of the SunShare Flicker Dispute at the Golf/Hassan/St. Michael/Becker Interconnection Site* (Public Version), MPUC Dockets 13-867, 15-786 [hereinafter "Becker Report"].

[10] Sam Wheeler April 13, 2016 Independent Engineer Report, *Resolution of the SunShare Dispute at the Foxtrot/Blue Heron/Cold Spring/Glazier Interconnection Site* (Public Version), MPUC Dockets 13-867, 15-786 [hereinafter "Glazier Report"].

[11] Becker Report at 18; Glazier Report at 18.

[12] Becker Report at 47; Glazier Report at 43.

[13] Becker Report at 18; Glazier Report at 18.

[14] Becker Report at 27; Glazier Report at 26.

re-running the model to add quality control, accuracy, and consistency under our existing permanent NDA (without additional fees or charges).

- Determine that it would be reasonable and justified for Xcel to restudy Linden without charging additional study fees or delaying additional work, as the original study's inadequacies were due to Xcel's misinterpretation of its tariff.

Sincerely,

[redacted]

[redacted]
SunShare, LLC
[redacted]

[redacted]

[redacted]
SunShare, LLC
[redacted]

609 S. 10th Street, Suite 210
Minneapolis, MN 55404

On behalf of SunShare, LLC

TRADE SECRET – MAY ALSO CONTAIN SENSITIVE INFRASTRUCTURE INFORMATION

EXHIBIT A

Engineering Study Scope of Work Statement
and SunShare Proof of Payment

Xcel Energy®

STATEMENT OF WORK REQUESTED

DATE: 18-Sep 2015
WORK REQUESTED BY: SUNSHARE
WORK LOCATION:
ADDRESS: [redacted]

CONSISTING OF:
Engineering Scoping Study, contingent upon Minnesota Public Utility Commission ("Commission") approval of Company proposed tariff provisions submitted to the Commission for review on September 14, 2015 in Commission Docket No. E002/M-13-867. See attached form. If these tariff provisions are not approved by the Commission, the fee below will be refunded.

The facilities installed or removed by Northern States Power Company, a Minnesota corporation ("Xcel Energy" or the "Company") shall be the property of the Company and any payment by customer shall not entitle customer to any ownership interest or right therein. Customer's and Company's rights and obligations with respect to the facilities and services provided through the facilities are subject to additional terms and conditions as provided in the General Rules and Regulations and/or in the Rate Schedules of Xcel Energy's Electric Rate Book for customer's specific service, as they now exist or may hereafter be changed, on file with the state regulatory commission in the state where service is provided.

The undersigned hereby requests and authorizes Northern States Power Company, a Minnesota corporation ("Xcel Energy") to do the work described above, and in consideration thereof, agrees to pay ($ 22000.00 in accordance with the following terms:
payment required prior to start of study

Receipt of the above amount hereby acknowledged on behalf of the Company by 0

Northern States Power Company, a Minnesota corporation ("Xcel Energy")	Customer
Print Full Name and Title	SUNSHARE - LAKE NOKOMIS 8-12 Print Full Name and Title (if applicable)
Signature	Bill Smeaton Signature

FOR XCEL ENERGY USE
Xcel Energy Representative _____ Xcel Energy Work Order # _____

Construction$ 22000.00 Removal $ _____ Total $ 22000.00

Form 17-7012