



434 Fayetteville Street
Suite 2800
Raleigh, NC 27601
Tel (919) 755-8700 Fax (919) 755-8800
www.foxrothschild.com

KAREN M. KEMERAIT
Direct No: 919.755.8764
Email: kkemerait@foxrothschild.com

March 29, 2021

Ms. Kimberley A. Campbell, Chief Clerk
North Carolina Utilities Commission
430 N. Salisbury Street
Raleigh, NC 27603

***RE: Petition for Approval of Revisions to Generator
Interconnection Standards
NCUC Docket No. E-100, Sub 101***

Dear Ms. Campbell:

On behalf of the Carolinas Clean Energy Business Association, Strata Solar, LLC and Strata Solar Development, LLC, we submit the attached Joint Comments in the above-referenced docket.

Should you have any questions concerning this filing, please do not hesitate to contact me.

Sincerely,

A handwritten signature in blue ink that reads 'Karen M. Kemerait'.

Karen M. Kemerait

KK:bs

cc: All parties of record
Enclosures

A Pennsylvania Limited Liability Partnership

California Colorado Delaware District of Columbia Florida Georgia Illinois Minnesota Nevada
New Jersey New York North Carolina Pennsylvania South Carolina Texas Virginia Washington

STATE OF NORTH CAROLINA UTILITIES COMMISSION RALEIGH

DOCKET NO. E-100, SUB 101

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

In the Matter of)	JOINT COMMENTS OF CAROLINAS
Petition for Approval of Revisions)	CLEAN ENERGY BUSINESS
to Generator Interconnection)	ASSOCIATION, STRATA SOLAR, LLC,
Standards)	AND STRATA SOLAR DEVELOPMENT,
		LLC

I. INTRODUCTION

The Carolinas Clean Energy Business Association (“CCEBA”) and Strata Solar, LLC and Strata Solar Development, LLC (collectively, “Strata”) file these joint comments pursuant to the *Order Seeking Comments Regarding Generator Inspection Provisions of the North Carolina Generator Interconnection Standards* issued by the Commission on March 9, 2021 (“Order Seeking Comments”). In the Commission’s Order Seeking Comments, the Commission requested comments from the parties as to their concerns regarding the inspection of Uninspected Facilities. By Order entered on March 16, 2021, the Commission extended the time for all parties to file comments until March 28, 2021.

Both CCEBA and Strata have been and will continue to be active participants in the process before the Technical Standards Review Group (“TSRG”). The position related to inspection of Distributed Energy Resources (“DER”) Generating Facilities asserted by Duke Energy Progress, LLC (“DEP”) and Duke Energy Carolinas, LLC (“DEC”) (collectively, “Duke”) in Duke’s Interconnection Fee-Related Work and Post-Commercial Operation Inspection Report for Calendar Year 2020 (“Duke 2020 Report”) is both premature and inaccurate. CCEBA and Strata submit these comments to clarify

the record and assist the Commission in setting reasonable expectations for the participants in the ongoing TSRG process.

II. ARGUMENT

CCEBA's members along with Strata are committed to ensuring the safety and reliability of Duke's grid. CCEBA and Strata believe that the stakeholders have been working, and will continue to work, together with Duke to resolve the issues before the TSRG, including the appropriate response to ensure the safety and reliability of the grid. CCEBA's and Strata's primary objection to recent developments in the TSRG is that Duke imposed a new policy on solar developers when it stated that it intends to require a self-inspection regime upon all Generating Facilities with Interconnection Agreements that predate the Commission's *Order Approving Revised Interconnection Standard and Requiring Reports and Testimony* issued on June 14, 2019 ("June 14, 2019 Order").

There are three main problems with Duke's new proposal. First, a mandatory self-inspection program is not authorized by the Commission in its June 14, 2019 Order or any other order. Duke's inaccurate interpretation of the June 14, 2019 Order would essentially impose new terms and requirements on contracts and financing structures which were not required or anticipated at the time they were negotiated. Second, the scope of Duke's proposed inspection regime is not only unnecessary due to the parties' mutual commitment to the safety and reliability of the grid, but it imposes unneeded costs upon solar developers' Generating Facilities. Third, Duke overestimates the available supply of inspectors and Professional Engineers willing to conduct inspections in a self-inspection program. Duke's proposed self-inspection program will likely result in higher costs and delays to solar developers, with a negligible impact on the safety and reliability

of the grid. CCEBA and Strata believe that the latter two issues warrant further discussion among the stakeholders in the TSRG process.

A. The June 14, 2019 Order Does Not Authorize a Mandatory Inspection Process, and the Parties Did Not Intend the TSRG to Impose Mandatory Inspections.

1. The June 14, 2019 Order is clear that the revised 2019 Interconnection Standard does not apply to facilities with existing Interconnection Agreements.

In Duke's Interconnection Fee-Related Work and Post-Commercial Operation Inspection Report ("Duke Inspection Report") filed on March 1, 2021, Duke contends that CCEBA has "after having been directly engaged in a year plus collaborative engagement . . . now asserted the position that Duke does not have the right to inspect Uninspected Facilities that fully executed Interconnection Agreements prior to the 2019 NCIP's June 14, 2019 effective date." Duke's characterization of CCEBA's position as a "new legal position" is simply incorrect. CCEBA's position, along with the position of Strata and other stakeholders, is in no way a new legal position. CCEBA's position conforms to the Commission's mandate in the June 14, 2019 Order. In fact, Duke's assertion in the Duke Inspection Report is the new position—a position that is contrary to the express language of the Commission's June 14, 2019 Order. The June 14, 2019 Order makes it clear that Duke has no authority to impose a self-inspection requirement on solar facilities with Interconnection Agreements executed prior to June 14, 2019. The June 14, 2019 Order clearly provides:

Finding of Fact 1

With the exceptions noted below, the revisions to the NC Interconnection Standard presented in the Stipulated Redline are reasonable, and it is appropriate to apply them

to new and pending Interconnection Requests, as provided for in Section 1.1.3 of the NC Interconnection Standard.

Ordering Paragraph 1

That the Stipulated Redline version of the NC Interconnection Standard, with additional modifications as discussed in this Order, and attached as Appendix A to this Order, shall be, and hereby is, adopted as the generator interconnection standard for North Carolina, except that provisions related to production profile information are delayed pending the Commission's review of the information required in Ordering Paragraph 4 below. *The changes approved in this Order will be effective upon issuance of this Order, except that they will not apply to Facilities that have a fully executed Interconnection Agreement as of the date of this Order.* All Facilities will be subject to this Order for the processing of Material Modifications and ownership transfers.

(Emphasis added.) Ordering Paragraph 1 can only be read to state that changes to the NC Interconnection Standard apply only to facilities that meet one of two conditions: (1) they do not have an executed Interconnection Agreement as of the date of the Order (June 14, 2019), or (2) changes to the facility trigger a Material Modification, as defined in the June 14, 2019 Order, or ownership of the facility is transferred.

This exemption for facilities with executed Interconnection Agreements is repeated in the red-lined changes to the 2015 Interconnection Standard which were adopted in the June 14, 2019 Order. The relevant portions of those redline revisions provide:

1.1.3 The 2019 revisions to this interconnection Standard shall not apply to Generating Facilities having a fully executed Interconnection Agreement as of the effective date of the 2019 revisions to this Standard, unless the Interconnection Customer proposes a Material Modification, transfers ownership of the Generating Facility, or application

of the 2019 revisions to the Commission's interconnection standard are agreed to in writing by the Utility and the Interconnection Customer. This Standard shall apply if the Interconnection Customer does not have a fully executed Interconnection Agreement for the Generating Facility as of the effective date of the 2019 revisions. Revised fees and new deposits will apply to new Interconnection Requests and future transactions involving existing Interconnection Requests occurring after the effective date of the 2019 revisions.

6.5. Commissioning and Post-Commissioning Inspections

6.5.1 Commissioning tests of the Interconnection Customer's installed equipment shall be performed pursuant to applicable codes and standards. If the Interconnection Customer is not proceeding under Section 2.3.2, the Utility must be given at least ten (10) Business Days notice, or as otherwise mutually agreed to in writing by the Parties, of the tests and may be present to witness the commissioning tests.

6.5.2 In the case of any Generating Facility that was not inspected prior to commencing parallel operation, the Utility shall be authorized to conduct an inspection of the medium voltage AC side of each Generating Facility (including assessing that the anti-islanding process is operational). The Interconnection Customer shall pay the actual cost of such inspection within 30 Business Days after the Utility provides a written invoice for such costs.

6.5.3 The Utility shall also be entitled, on a periodic basis, to inspect the medium voltage AC side of each Interconnected Generating Facility on a reasonable schedule determined by the Utility in accordance with the inspection cycles applicable to its own distribution system. The Interconnection Customer shall pay the actual cost of such inspection within 30 Business Days after the Utility provides a written invoice for such costs.

6.5.4 The Utility shall also be entitled to inspect the medium voltage AC side of an Interconnected Generating Facility in the event that the Utility identifies or becomes aware of any condition that (1) has the potential to either cause disruption or deterioration of service to other customers served from the same electric system or cause damage to the Utility's System

or Affected Systems, or (2) is imminently likely to endanger life or property or cause a material adverse effect on the security of, or damage to the Utility's System, the Utility's Interconnection Facilities or the systems of others to which the Utility's System is directly connected. The Interconnection Customer shall pay the actual cost of such inspection within 30 Business Days after the Utility provides a written invoice for such costs.

Duke contends that the inclusion of Sections 6.5.2, 6.5.3, and 6.5.4 (that provide for inspections of Generating Facilities that were not inspected prior to commencing parallel operation) in the NC Interconnection Standard contradicts CCEBA's position. Duke argues that because "Duke fully implemented an inspection program for all new generator Interconnection Customers commencing parallel operation in approximately March 2017 . . . the only projects for which Section 6.5.2 applies is [sic], by definition, operating projects with Interconnection Agreements prior to June 14, 2019." *See* Duke Inspection Report, p. 5. However, Duke's argument is contrary to the plain and unambiguous language of the revised NC Interconnection Standard and the June 14, 2019 Order itself. Sections 6.5.2 through 6.5.4 are, by definition, revisions as a result of added requirements made to the NC Interconnection Standard, as approved by the June 14, 2019 Order. In the June 14, 2019 Order, the Commission dictated that "[t]he changes approved in this Order will be effective upon issuance of this Order, except that they will not apply to Facilities that have a fully executed Interconnection Agreement as of the date of this Order." The approved redline changes to the NC Interconnection Standard likewise state that the revisions only apply "if the Interconnection Customer does not have a fully executed Interconnection Agreement for the Generating Facility as of the effective date of the 2019 revisions." This language could not be clearer.

The Commission had good reason to exclude Generating Facilities with Interconnection Agreements that predated the June 14, 2019 Order from the inspection provisions in Sections 6.5.2, 6.5.3, and 6.5.4. Interconnection Agreements are binding contracts that Independent Power Producers deliver to investors and finance partners. They set the expectations for the financial structures of the projects and the design of their Operations and Maintenance programs. Imposition of a new and repeating inspection regime at the expense of the owner/operator is an after-the-fact material change to these Interconnection Agreements.

2. The TSRG is not a rulemaking body, and legal representatives were not included in the process.

Duke's contention that CCEBA only recently asserted its position after participating in the TSRG process for over a year is misleading. It is important to recognize that the TSRG process is not a rule-making process, and it was purposefully limited to non-attorney participants. In the original announcement sent by Duke on February 7, 2018 and revised on March 6, 2018, Duke stated:

The meeting is intended to be a forum where, for the benefit of mutual learning and understanding, Duke Energy engineers and DER *technical* personnel can discuss Duke Energy interconnection *technical* standards, current and developing industry DER *technical* standards, developing DER technologies, and other *technical* matters pertinent to interconnection of DER to the Duke Energy system. These *technical* standards and growing knowledge base form the "Good Utility Practice" that the Companies' engineers are applying in the Interconnection study process in North Carolina and South Carolina today.

In order to assure an effective meeting, and a good basis for future meetings, Duke is taking steps to organize the meeting with just enough structure to maintain an effective forum for discussion while allowing plenty of input and discussion from *DER industry technical representatives*

and engineers, and state regulatory staffs. Duke is organizing the meeting in a format and structure which resembles that of the Massachusetts *Technical Standards Review Group*.

(Emphasis added). *See* DEC/DEP Interconnection TSRG – Structure and inaugural meeting agenda, attached as **Exhibit A**, pp. 1-2. In order to ensure that the focus would be on *technical* issues, rather than legal or business matters, Duke specifically stated: “Attorneys and non-technical business representatives of the DER Industry are asked not to attend, in order to help maintain the open dialogue format for technical discussions.” *See* Exhibit A, p. 2. Duke further emphasized that it “expects that attendees to the meeting understand that the meeting is strictly a discussion forum and not a decision-making venue.”

Representatives of the DER industry participated in TSRG as technical representatives, and they discussed technical issues. Solar developers’ participation in the voluntary pilot programs and their discussion of technical issues cannot be construed as a waiver of legal rights. Likewise, solar developers’ discussion of technical issues in TSRG cannot be construed as an agreement to amend hundreds of pre-existing contracts in a way that fundamentally alters the legal and economic assumptions behind them.

CCEBA questioned Duke’s authority to require self-inspection of facilities with Interconnection Agreements executed prior to June 14, 2019 only after it became clear to legal and business representatives—who had been excluded from the process by Duke—that the TSRG discussions had not been limited to technical issues and had been expanded to legal issues. Of concern, Duke’s planned mandatory self-inspection program at the expense of owners of pre-existing Generating Facilities was introduced during the

TSRG process. *See* April 15, 2020 draft “Utility-scale PV Periodic Inspection Program” distributed by Duke, attached as **Exhibit B**, which notes that “[a]ll existing in-service utility-scale PV facilities in DEC and DEP are required to perform self-inspection and demonstrate the generating facility’s compliance with applicable standards and codes.”

When Duke’s draft self-inspection proposal was developed in 2020, CCEBA representatives raised concerns about the mandatory program. When those concerns were placed in writing by CCEBA’s counsel in a letter to Duke’s legal representatives, CCEBA expected that the open dialogue with Duke about the self-inspection proposal would continue so that the parties could try to reach agreement about the stakeholders’ concerns. Rather than continuing with the discussions, Duke instead immediately presented the issue to the Commission and stated that Commission input might be necessary. However, CCEBA and Strata remain committed to resolving this issue through constructive discussion with Duke.

B. The Scope of the Duke Inspection Regime is Unnecessary Due to the Parties’ Mutual Commitment to the Safety and Reliability of the Grid.

CCEBA and Strata share Duke’s commitment to a safe and reliable electric grid. However, to be clear, inspections of Uninspected Facilities will not result in an appreciable improvement to safety, power quality, and reliability of the grid. Even without a mandatory self-inspection program, substantial incentives already exist for DER facilities to produce safe and reliable power. CCEBA’s member organizations, along with Strata, only prosper economically if they are reliable partners with the utilities and have a historic record of constructing and operating safe and reliable Generating Facilities.

DER generator owner-operators are thus already incentivized to be reliable grid contributors. Moreover, CCEBA and Strata representatives involved in the TSRG approached their work in the TSRG with the commitment to be reliable grid contributors. As a result, most of the time and energy of the TSRG has been focused on IEEE 1547 (IEEE standard for Interconnection and Interoperability of Distributed Energy Resources with Associated Electric Power Systems Interfaces). Similarly, IEEE P2800 (IEEE Draft Standard for Interconnection and Interoperability of Inverter-Based Resources (IBR) Interconnecting with Associated Transmission Electric Power Systems) will be a focus standard for transmission-connected facilities. Those are the areas that TSRG should continue its focus because improvements in compliance with those standards will improve reliability and power quality of the grid.

Duke has not presented evidence of widespread problems at DER facilities which would impact the safety, power quality, and reliability of the power grid. Duke has involved Advanced Energy in pilot programs to determine what kind of issues an inspector might identify. The results of that pilot study were addressed in Duke's Pilot Inspection Overview dated January 21, 2020 (attached as **Exhibit C**). Advanced Energy's findings showed that the majority of "issues" identified consisted of differences between installed equipment and the then-applicable Duke internal construction standards, which change over time and which were not in place when the pilot facilities were first commissioned. While specific equipment and methods implemented at DER facilities may differ from Duke standards and methods, there is little if any evidence to indicate that DER facilities have negatively impacted SAIDI, SAIFI, MAIFI, or any other

accepted power quality and reliability metrics in use by Duke Energy today.¹ During any of the eleven TSRG meetings which have been held to-date, going back to April of 2018, Duke has not brought to the meetings any concerns, reports, or experiences of actual power quality or reliability impact events resulting from DER facility internal construction standards or methods.

CCEBA submits that the issues identified by Advanced Energy which have the greatest potential to impact power quality and reliability were related to Inverter Settings (see **Exhibit C** at slide 5), an area of focus over the last several years in the DER industry. It is again in this area that CCEBA suggests the parties should return to the TSRG process for a collaborative discussion of where improvements to Inverter Settings and potential voluntary inspection programs might improve grid reliability and performance.

C. Duke Overestimates the Available Supply of Inspectors and Professional Engineers Able to Conduct a Self-inspection Program.

Finally, as a practical matter, CCEBA and Strata submit that Duke has overestimated the number of third-party inspectors that are willing or able to perform work in Duke's proposed mandatory self-inspection regime. When requests for proposals for the pilot program were issued, response was limited, with only Advanced Energy participating. With Advanced Energy acting as Duke's "Owner's Engineer," there is a

¹ IEEE 1366-2012, IEEE Guide for Electric Power Distribution Reliability Indices

question as to the appropriateness of a DER owner/operator hiring Advanced Energy for this work.

This scarcity of third-party inspectors should come as no surprise, as Duke's regime requires that inspections and compliance be sealed by a Professional Engineer. The involvement of Professional Engineers in distribution facility inspections is rare, even in the operations of the utilities themselves. Utility maintenance programs which require inspections of utility facilities are usually conducted by non-degreed field personnel with experience and technical knowledge. DER owner/operators likewise rely on such personnel to conduct their own internal inspections as part of any reliability-centered maintenance programs or other necessary inspections.

Moreover, Duke does not require such professionally-certified inspections for any of its other partners—whether electric membership corporations (“EMCs”), municipal providers, or large industrial customers. Rather, Duke relies on the existing incentives for those entities to maximize their own internal reliability and production. Similarly, DER owner/operators are incentivized to maximize their reliability and production. Imposing the costs of a repeating mandatory self-inspection over and above the operations and maintenance processes already implemented by DER facilities is unduly burdensome to DER owner/operators and fundamentally alters the economic assumptions on which such facilities are operated and financed.

III. CONCLUSION

CCEBA and Strata appreciate the Commission's willingness to consider these important issues. CCEBA and Strata respectfully request that the Commission restate the clear terms of the June 14, 2019 Order—that the revisions to the NC Interconnection

Standard do not apply to facilities with executed Interconnection Agreements prior to June 14, 2019. CCEBA and Strata further request that the Commission direct the parties to continue discussions about voluntary inspections in the TSRG or in a short stakeholder process. CCEBA and Strata remain committed to the continued provision of safe, high-quality, and reliable power to North Carolina's consumers, and look forward to continued discussions with Duke about the issue of inspections.

Respectfully submitted, this 29th day of March, 2021.

/s/ John D. Burns

John D. Burns
Carolinas Clean Energy Business Association
811 Ninth Street, Suite 120-158
Durham, NC 27705
Telephone: 919-306-6906
E-mail: Counsel@CarolinasCEBA.com
Attorney for CCEBA

Karen M. Kemerait

Karen M. Kemerait
Fox Rothschild LLP
434 Fayetteville Street, Suite 2800
Raleigh, NC 27601
Telephone: 919-755-8764
E-mail: KKemerait@foxrothschild.com
Attorney for Strata Solar, LLC and Strata Solar Development, LLC

CERTIFICATE OF SERVICE

I hereby certify that a true and exact copy of the foregoing Joint Comments have been duly served upon counsel of record for all parties to this docket by either depositing a true and exact copy of same in a depository of the United States Postal Service, first-class postage prepaid, and/or by electronic delivery as follows:

This the 29th day of March, 2021.

/s/ Karen M. Kemerait

Karen M. Kemerait
Fox Rothschild LLP
434 Fayetteville St., Suite 2800
Raleigh, NC 27601
Telephone: (919) 755-8764
E-mail: KKemerait@foxrothschild.com

Duke Energy Carolinas / Duke Energy Progress Interconnection TSRG (Technical Standards Review Group) – Structure and inaugural meeting agenda

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Original TSRG announcement sent 2/7/2018 (revised 3/6/2018)

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To the North Carolina Clean Energy Business Association, the North Carolina Sustainable Energy Association, the South Carolina Solar Business Alliance, the North Carolina Public Staff, and the South Carolina Office of Regulatory Staff:

TO: Brian O'Hara (bohara@stratasolar.com); Daniel Brookshire (daniel@energync.org); Sowers, B.-southerncurrentllc (bsowers@southerncurrentllc.com); McLawhorn, James-psncuc <james.mclawhorn@psncuc.nc.gov>; Lucas, Jay (jay.lucas@psncuc.nc.gov); Johnson, Sarah <sjohnson@regstaff.sc.gov>; Hipp, Dawn <dhipp@regstaff.sc.gov>

CC: Karen Kemeraite (Karen.Kemeraite@smithmoorelaw.com); Ledford, Peter-energync <peter@energync.org>; Jirak, Jack <Jack.Jirak@duke-energy.com>; Brett Breitschwerdt (bbreitschwerdt@mcguirewoods.com); Dulin, Rebecca Jean (Rebecca.Dulin@duke-energy.com); Pittman, Jenny <jpittman@regstaff.sc.gov>; Barnes, Conitsha B <Conitsha.Barnes@duke-energy.com>; Tsai, David <David.Tsai@duke-energy.com>; Somers, Bo <Bo.Somers@duke-energy.com>

Duke Energy is organizing an interconnection technical standards group (TSRG) review meeting to be held in Raleigh on Wednesday April 11, with the intent of making this a regularly scheduled meeting thereafter. This meeting is intended to bring together Duke Energy engineers with technical personnel of distributed energy resource (DER) developers and installers actively involved in Interconnection projects in Duke Energy Carolinas and Duke Energy Progress, in both North Carolina and South Carolina.

Duke Energy Interconnection TSRG -- Overview

The meeting is intended to be a forum where, for the benefit of mutual learning and understanding, Duke Energy engineers and DER technical personnel can discuss Duke Energy interconnection technical standards, current and developing industry DER technical standards, developing DER technologies, and other technical matters pertinent to interconnection of DER to the Duke Energy system. **These technical standards and growing knowledge base form the**

“Good Utility Practice” that the Companies’ engineers are applying in the Interconnection study process in North Carolina and South Carolina today.

In order to assure an effective meeting, and a good basis for future meetings, Duke is taking steps to organize the meeting with just enough structure to maintain an effective forum for discussion while allowing plenty of input and discussion from DER industry technical representatives and engineers, and state regulatory staffs. Duke is organizing the meeting in a format and structure which resembles that of the Massachusetts Technical Standards Review Group.

Structure

In order to establish an effective meeting structure and agenda, Duke Energy will develop topics of growing technical interest and significance in North Carolina and South Carolina, and will also solicit topics from DER industry representatives prior to the meeting, with the meeting discussion confined to the topics set forth in the agenda. Specifically, Duke intends to seek one technical representative each from the North Carolina Clean Energy Business Association (NCCEBA), the North Carolina Sustainable Energy Association (NCSEA), and the South Carolina Solar Business Alliance (SCSBA), to provide input to the agenda, and with voluntary involvement on agenda input from representatives from the North Carolina Public Staff and the South Carolina Office of Regulatory Staff, as they see fit. This meeting will be for engineers and other technical staff. Attorneys and non-technical business representatives of the DER Industry are asked to not attend, in order to help maintain the open dialogue format for technical discussions.

The meeting will be hosted by Duke Energy, in Raleigh, on Wednesday April 11 from 9:00 AM to 4:00 PM, with a break from 11:30 AM to 1:00 PM. In order to assure productive discussions, this meeting is intended to be an in-person meeting only with a maximum group size of 25 individuals. A telephone conference line will be arranged primarily to allow members of the North Carolina Public Staff and the South Carolina Office of Regulatory Staff to be able actively listen and/or participate as they see fit without having to attend in-person. For the sake of transparency and information, the call-in line will also be available for others, but on a “listen-only” basis (in order to respect the intent of an effective meeting format, especially if there are many callers).

Of the group, Duke is reserving the following:

- Three “primary” positions for the DER industry technical representatives to support agenda development (one each from NCCEBA, NCSEA, and SCSBA)
- Up to six “secondary” positions for other DER industry technical representatives (as collectively determined by NCCEBA, NCSEA, and SCSBA)
- Three “primary” positions for the Duke Energy engineers involved in agenda development
- Up to seven “secondary” positions for the Duke Energy engineers/technical staff
- Up to three positions for technical representatives from the North Carolina Public Staff
- Up to three positions for representatives from the South Carolina Office of Regulatory Staff

Since Duke Energy is solely accountable and responsible for maintaining adequate customer reliability and power quality, Duke Energy expects that attendees to the meeting understand that the meeting is strictly a discussion forum and not a decision making venue, and Duke Energy maintains the final decision over technical standards employed for the purposes of DER interconnection to its distribution and transmission system.

With this in mind, please note that there is no special significance to the ten Duke positions vs. nine developer positions. Honestly I need for my full staff to attend (we make 5), plus one engineer each from DEC/DEP Transmission Planning, plus one engineer each from DEC/DEP Distribution Capacity Planning, plus one engineer from Duke's regulated DER development group.

Pre-Meeting Logistics

Duke Energy has asked NCCEBA, NCSEA, and SCSBA to identify primary technical representatives (to participate in agenda input and attend the meeting). This is currently underway, with two or three planning to participate in the March 19 agenda development call. We will also invite North Carolina Public Staff and the South Carolina Office of Regulatory Staff to this agenda development call, but of course they are free to attend or not attend as they see fit.

The developers are asked to make Duke (John Gajda) aware of the names and contact information for all of their representatives as soon as they are available, so they can be appropriately invited to the meeting.

We will work to complete an agenda during the March 19 call or soon thereafter, and the TSRG meeting will occur on April 11.

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Additional information

Meeting minutes will be taken by Duke Energy personnel. Review of the minutes, and discussion if necessary, will be coordinated by Duke Energy within the TSRG membership.

Duke Energy intends to post final agendas and minutes publicly on its website. As of April 2018 the website is not yet available; this time around final agendas and minutes will be distributed via email to TSRG members and will then be considered available for public distribution.

TSRG members – roster

Duke Energy	DER Interconnection developers	Regulatory
John Gajda* John.Gajda@duke-energy.com Director, DER Technical Standards	Paul Brucke* Brucke Engineering paul@bruckeengineering.com	James McLawhorn (NC Public Staff) james.mclawhorn@psncuc.nc.gov
Anthony Williams* Anthony.Williams@duke-energy.com Principal Engineer, DER Technical Standards	Chris Sandifer* chrissandifer@embarqmail.com	Jay Lucas (NC Public Staff) jay.lucas@psncuc.nc.gov
Brant Werts* Brant.Werts@duke-energy.com Lead Engineer, DER Technical Standards	Reigh Walling WESC rwalling@wesconsult.com	Tommy Williamson (NC Public Staff) Tommy.Williamson@psncuc.nc.gov
Kevin Chen Kevin.Chen@duke-energy.com Lead Engineer, DER Technical Standards	Gabe Cantor Strata Solar gcantor@stratasolar.com	Dustin Metz (NC Public Staff) Dustin.Metz@psncuc.nc.gov
Jonathon Rhyne Jonathon.Rhyne@duke-energy.com Engineer III, DER Technical Standards	Luke O'Dea Cypress Creek luke.odea@ccrenew.com	Sarah Johnson SC Office of Regulatory Staff sjohnson@regstaff.sc.gov
Bill Quaintance William.Quaintance@duke-energy.com Principal Engineer, DEP Transmission Planning	Chuck Ladd (Ecoplexus) cladd@ecoplexus.com	Robert Lawyer SC Office of Regulatory Staff rlawyer@regstaff.sc.gov
Orvane Piper Orvane.Piper@duke-energy.com Senior Engineer, DEC Transmission Planning	Rob Smith Yes Solar Solutions rsmith@yessolarsolutions.com	Dawn Hipp SC Office of Regulatory Staff dhipp@regstaff.sc.gov
Jim Umbdenstock Jim.Umbdenstock@duke-energy.com Lead Engineer, DEP Distribution Capacity Planning	Jason Epstein Southern Current jepstein@southerncurrentllc.com	
Jeff Daugherty Jeff.Daugherty@duke-energy.com Lead Engineer, DEC Distribution Capacity Planning	Bruce Magruder Keytech Engineering bruce.magruder@keytechengineering.com	
Sherif Abdelrazek Sherif.Abdelrazek@duke-energy.com Senior Engineer, Duke Energy, Regulated DER Project Development		

* denotes a member on the “agenda development committee”

April 2018 TSRG meeting agenda

Location: Duke Energy building, North Carolina Regional Headquarters, 411 Fayetteville Street, Raleigh, NC 27601, conference room: NCRH-1173

9 AM to 4 PM

Final AGENDA (dated 4/9/2018)

- 0900-0915 John Gajda -- Safety & housekeeping (including FERC & CPRE statements)
- 0915-0930 Introductions & roster
- 0930-0945 John Gajda -- TSRG structure, intent, procedures, etc.
- 0945-1000 John Gajda/Sarah Wambles – organizational changes (distribution interconnection study team)
- 1000-1035 Duke (Kevin Chen): DER site inspection/commissioning update
- 1035-1045 break
- 1045-1125 Duke (Anthony Williams): Update on transformer energization impact study criteria
- 1125-1200 Duke (Jonathon Rhyne): Update on the development of next generation DER “interface” (“IR3”)
- 1200-1330 Lunch (all on their own)
- 1330-1415 Developers: open discussion on status and plans for Duke Energy documented technical standards
- Anthony Williams (Duke Energy) to kick off with a summary list of existing externally documented technical standards, and comments about planned standards
 - Developer input on existing standards, planned standards, etc.
 - Developer input on rooftop solar requirements & the White Book
- 1415-1500 Developers: open discussion on voltage impacts & mitigations in distribution studies. Developers would like to better understand the current study methodology and policies and how this has most recently evolved. In addition, developers would like to discuss mitigations options for voltage impacts in general.
- 1500-1510 break
- 1510-1555 Developers: open discussion on Material Modifications
- inverter changes, transformer changes during open IRs
 - changes for facilities already in operation
 - related documentation
 - developers to provide input on common equipment failures and experiences with operating facilities
 - energy storage
 - energy storage as an impact mitigation
- 1555-1630 Date for next meeting & open discussion/agenda item laundry list for next meeting (actual agenda will be negotiated closer to next meeting)

Utility-scale PV Periodic Inspection Program

Self-inspection Plan



Revision 0

Last revised: 4/15/2020

Utility-scale PV Periodic Inspection Program

Self-inspection Plan

For Distribution Connected Utility-scale Solar Generating Facilities (≥ 1 MW)
in DEC and DEP

Summary

This document defines a self-inspection plan for all existing in-service utility-scale PV facilities in DEC and DEP, which can be economically implemented by the Interconnection Customers and can help Duke Energy (Duke) maintain a database of DER compliance to applicable standards and codes.

Background

Approximately 300 utility-scale solar generating facilities interconnected to Duke's distribution grid before the implementation of an interconnection commissioning process in mid-2016. Many of these facilities have never been inspected by Duke and could be a risk to the safety, reliability, and power quality of the distribution grid. To address these concerns, Duke is establishing a periodic inspection program to ensure the safety, reliability, and power quality of all utility-scale PV facilities. All existing in-service utility-scale PV facilities in DEC and DEP are required to perform self-inspection and demonstrate the generating facility's compliance with applicable standards and codes. This program includes the utility-scale PV facilities that were commissioned under Duke's interconnection commissioning process to ensure they are continuing to adhere to applicable standards, codes, and utility requirements.

Objectives

1. Continuously improve the safety, reliability, power quality, and contractual compliance of utility-scale PV facilities in North Carolina and South Carolina.
2. Continuously ensure the operational compliance of utility-scale PV facilities according to IEEE Std 1547.
3. Encourage Interconnection Customers to maintain and operate utility-scale PV facilities safely and reliably.
4. Maintain accurate DER facility data necessary for power system modeling, planning, and operations.
5. Provide Interconnection Customers with flexibility in choosing inspection service providers.
6. Manage a high volume of utility-scale PV facilities effectively and efficiently.

Self-inspection Plan Description

Definition

Self-inspection Instruction Manual – A comprehensive document to help the Interconnection Customers understand the requirements of self-inspection and inspection report. It includes a sample report and a report template.

Self-inspection Notification Package – The package includes: self-inspection process document, self-inspection instruction manual, Duke-approved SLD on file, tables of Duke approved equipment and expected inverter settings, etc.

Full-scale Audit Inspection – Duke may choose to inspect an interconnected Generating Facility. The scope of such inspection may include all the requirements of the self-inspection, plus the periodic commissioning test.

Immediate safety issues – These are the construction quality problems that violate industry codes and standards, and are imminently likely to endanger life or property or damage either the utility's system or customer's generating facilities.

Potential reliability or power quality issues – These are the construction quality problems that may develop over time into something with the potential to either cause disruption or deterioration of service to other customers.

Scope of Work

The self-inspection together with the inspection report shall cover the following subjects:

- DER as-built installation evaluation
- Interconnection equipment settings check
- Access to Duke interconnection facilities
- Overhead construction and equipment installation
- Pad-mounted construction and equipment installation

Self-inspection Process

1. Periodic inspection is required as continuous compliance needs to be verified. Different components in a Generating Facility may require different self-inspection cycles.

- a. The self-inspection and report on construction quality and site maintenance is required every 5 years for the Generating Facilities with all previously identified construction quality issues addressed and without new construction (5-year cycle).

Utility-scale PV Periodic Inspection Program

Self-inspection Plan



Revision 0

Last revised: 4/15/2020

- b. The self-inspection and report on interconnection equipment settings is required annually (1-year cycle).
 - c. The proof of clear access to Duke Interconnection Facilities is required annually (1-year cycle).
 2. Duke will maintain a database of compliance risk of all interconnected Generating Facilities under the scope of the periodic inspection program. The facilities with high risk score will be selected for self-inspection first. The following criteria will be applied to determine the compliance risk score of an interconnected Generating Facility:
 - a. Major site reconstruction or inverter replacement due to Duke's system upgrade, or natural disasters (hurricane, earthquake, tornado, storm, etc.)
 - b. Number of years in service since the last successful inspection and cease-to-energize test
 - c. Results of last inspection or self-inspection
 - d. Complaints received from other retail load customers
 - e. Reported and investigated DER operational issue that is triggered by cause inside the Generating Facility
 - f. Revenue meter data screening results
 - g. Random selection
 3. The Interconnection Customers will be notified by a Duke representative when their Generating Facilities are selected for self-inspection. Along with the notice, a self-inspection notification package shall be provided to each customer. Notices may be delivered to customers on a quarterly or semi-annual schedule to spread the report submissions throughout the year.
 4. The self-inspection is at the Interconnection Customer's expense, and the customer can choose any qualified resource on the market to perform self-inspection following the Duke Energy *INSTRUCTION MANUAL for SELF-INSPECTION of DISTRIBUTION CONNECTED UTILITY-SCALE SOLAR*. The customer is required to submit the self-inspection report within 60 calendar days of the notice. Duke will send reminder to the Interconnection Customer 14 days before the self-inspection report due date.
 5. Duke or a designated engineering services company acting in place of Duke will collect the self-inspection report and perform an engineering review.

Corrective Action Process

Interconnection Customers shall complete the self-inspection and submit the inspection report following the *INSTRUCTION MANUAL*. All identified deficiencies in the inspection report must be addressed in a timely manner at the Interconnection Customer's expense.

Utility-scale PV Periodic Inspection Program

Self-inspection Plan



Revision 0

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- **Immediate safety issues** shall be corrected immediately. The proof of correction must be provided in the self-inspection report.
- **Potential reliability or power quality issues** require engineering supervision and shall be corrected during operations and maintenance cycles. It is highly recommended to fix these issues and provide proof of correction when submitting in the self-inspection report. At a minimum, the action plan to correct these issues with a definite timeline is required in the self-inspection report. All corrections must be made no later than 6 months from the date of inspection report.

If any action from Duke is deemed necessary due to any issues not identified, or identified but not fully addressed in the self-inspection report, Duke will use the provisions in the section 6.5 of the 2019 NCIP Order to inspect the medium voltage AC side of operating Generating Facilities and invoice the applicable Interconnection Customer for the costs of the inspection. Specifically, the Full-scale Audit Inspection of the Generating Facility will be required at the Interconnection Customer's expense if any of the following conditions is met.

1. The Interconnection Customer failed to respond to the self-inspection notice after reminder.
2. The Interconnection Customer failed to sufficiently, adequately, and independently execute the self-inspection on their own by following the *INSTRUCTION MANUAL*.
3. The Interconnection Customer cannot find other resources to perform the self-inspection and requests Duke to provide inspection of the Generating Facility.

Effective Date

- Q3, 2020 – Pilot the program with selected Uninspected Generating Facilities.
- Full deployment of self-inspection program is expected in 2021.

Version History

Revision 0 (4/15/2020)

- First issuance

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Mar 29 2021

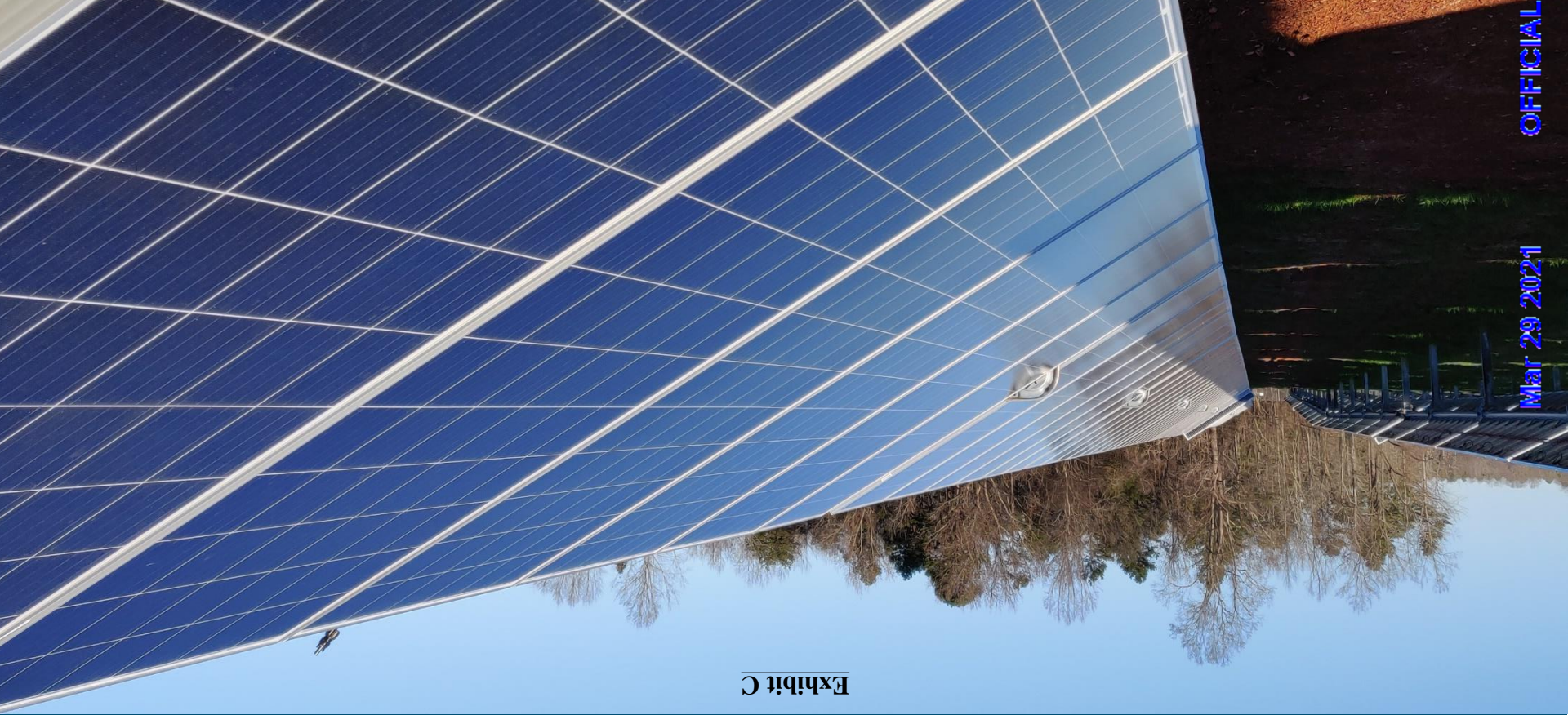


Exhibit C

Periodic Inspection Program Self-inspection Plan

Kevin Chen 1/21/2020

- Periodic Inspection Pilot Overview
- Self-inspection Plan
- Proposal of timeline moving forward
- Q&A, open discussion

Recap AE's presentation in last TSRG meeting

Periodic Inspection Pilot Overview

For Existing Distribution Connected Utility Scale Solar in Carolinas ($\geq 1\text{MW}$)

Periodic Inspection Pilot Overview

- Approx. 300 sites connected to Duke Energy distribution system prior to mid-2016 with limited or no commissioning conducted by Duke Energy. Duke decided to run this pilot to determine the scope and process for a periodic inspection program.
- Pilot sites ranged in capacity from 2-5 MW and entered service 2012-2015, and were inspected from the AC side of the inverters to the point of interconnection (POI).
- The scope includes: expected vs. installed equipment; interconnection construction – safety & reliability issues; inverter settings; commissioning test (cease-to-energize & restart delay, IEEE 1547.1-2005 Clause 7.5).
- Pilot inspection in 2018: 4 sites (3 in DEP, 1 in DEC), 1 of them was tested.
- Pilot inspection in 2019: 5 sites (4 in DEP, 1 in DEC), all of them were tested.
- Inspection report has been delivered to each customer.

- AE presented the findings overview at the 9/17/2019 TSRG meeting. And some comments were received.

Expected vs. Installed Equipment

- ✓ 5 sites
- ✗ 4 sites

Inverter Settings

- ✓ 1 site
- ✗ 8 sites
 - Grid protection: 8
 - Reconnect timer: 3
 - Maximum export: 3
 - Power factor: 1

Interconnection Construction

- ✗ All sites had conditions requiring immediate correction
- ✗ All sites had conditions requiring supervision

Commissioning Tests

- ✓ 4 sites passed
- ✗ 2 sites restarted prematurely after grid restoration

*3 sites in 2018 did not have a commissioning test performed

Self-inspection Plan

For Existing Distribution Connected Utility Scale Solar in Carolinas ($\geq 1\text{MW}$)

■ Summary

Define a self-inspection plan for all existing in-service utility scale PV in DEC and DEP, which can be economically implemented by the interconnection customers and can help Duke Energy maintain a database of DER compliance to applicable standards and codes.

■ Objectives

1. Continuously improve the quality, safety, reliability and contractual compliance of utility-scale PV interconnections in North Carolina and South Carolina.
2. Continuously ensure the operational compliance of utility scale DER according to IEEE 1547.
3. Encourage DER customers to maintain and operate DER system safely and reliably.
4. Provide DER customers with flexibilities in choosing inspection service providers.
5. Manage high volume of DER customers in an effective and efficient way.

- A sufficient self-inspection together with inspection report shall cover the following subjects:
 1. Compare and verify the installed system matches the approved/filed documents at Duke.
 - Most recent SLD that reflects the DER facility as built shall be submitted to Duke.
 2. Inverter setting verification and logging.
 - The latest (correct) settings shall be logged and send to Duke for record.
 3. Point of Interconnection access maintenance.
 - Turn in photos to prove the access to Duke's facility is clear.
 4. Check for the immediate safety, reliability issues in a utility scale DER. (minimum requirement)
 - Need proof of correction together with the self-inspection report.
 5. Check for issues that may be prone to deterioration or present a reliability risk.
 - These shall be monitored on an ongoing basis, and corrected through O&M cycles.
 6. Recommend good practice and longevity related items. (Optional)

- **Self-inspection Instruction Manual** – A comprehensive document to help the interconnection customers understand the requirements of the self-inspection. It shall include examples with notes, diagrams and pictures together, and a sample report to set expectations.
- **Self-inspection Notification Package** – The package includes: self-inspection process document, self-inspection instruction manual, Duke approved SLD on file, tables of Duke approved equipment and expected inverter settings, etc.
- **Full-scale Audit Inspection** – The scope of this inspection is similar to the periodic inspection pilot in 2019. The scope of this inspection includes: (1) expected vs. installed equipment; (2) interconnection construction – safety & reliability issues; (3) inverter settings; (4) commissioning test.

1. The customers being selected for self-inspection will be notified by Duke Energy representative. Along with the notice, a self-inspection notification package shall be provided to each customer. Notices could be delivered to customers on a quarterly or semi-annual schedule to spread the report submissions throughout the year.
2. The self-inspection is at customer's cost and a customer can choose any qualified resource on the market to perform the self-inspection following the instruction. The customer is required to submit the self-inspection report (PE stamped) back within 120 days of the notice.
3. The self-inspection report shall include acknowledgment that "All identified deficiencies in the report have been addressed. If any action from Duke Energy is deemed necessary due to any issues not identified in the report or not fully addressed, it will be at customer's cost."

4. AE will help Duke collect the self-inspection report and perform engineering review on it.
 - a. Low quality self-inspection report will be considered as "insufficient inspection". And the DER project will be assigned with a high risk score.
 - b. Not being able to provide self-inspection report will result in "automatic non-compliance". The non-compliant project will be subject to Full-scale Audit Inspection at customer's cost.
5. Periodic inspection is required as continuous compliance needs to be verified. Different components in a DER project will require different inspection cycles.
 - a. Construction quality and site maintenance self-inspection with report is required every 5 years for the DER project with all previously identified construction quality issues addressed and without new construction (5-year cycle).
 - b. The inverter setting compliance self-checking shall be performed annually (1-year cycle), and the inverter setting report shall be submitted to Duke for record.
 - c. The picture of the Duke's POI access road shall be submitted annually together with the inverter setting report (1-year cycle).

6. Duke and AE will maintain a database of compliance risk of all DER projects. The projects with high risk score will be selected for self-inspection first. The following criteria will be considered to determine the compliance risk score of a DER project:
 - a. Quality of the self-inspection report
 - b. DCC DG event notification, or any DER operational issue reported to Duke Energy
 - c. Major site reconstruction or inverter replacement due to system upgrade, equipment wear and tear, or natural disasters (hurricane, earthquake, tornado, storm, etc.)
 - d. Number of years in service since last successful inspection and cease-to-energize test
 - e. Potential impact to critical/sensitive retail load customers
 - f. Revenue meter data screening results
 - g. Random selection (only used as tie-breaker)

7. Duke and AE will help DER interconnection customers meet all requirements through self-inspection. However, the Full-scale Audit Inspection will be required at the customer's cost if any of following conditions is met.
 - a. The DER project is deemed as non-compliance by not responding to the self-inspection notice after reminders.
 - b. The DER project had insufficient self-inspection and the customer failed to address the conditions requiring immediate correction.
 - c. The DER interconnection customer cannot find other resource to perform the self-inspection, and request Duke and AE to inspect the project.

Proposal of Timeline Moving Forward

- 1/21/2020 – Present the initial version of self-inspection plan at TSRG meeting
- Q1 and Q2, 2020 – Collect feedback and refine the self-inspection process document
- Q1, 2020 – Complete the Self-inspection Instruction Manual (under development now)
- Q2, 2020 – Organize training on the topic of self-inspection
- Q3, 2020 – Pilot the program
- Q4, 2020 – Reserved for regular DER end-of-year commissioning
- Full deployment of self-inspection program may be in 2021.

Q&A, Open Discussion

