**STATE OF NORTH CAROLINA**
**UTILITIES COMMISSION**
**RALEIGH**

DOCKET NO. E-100, Sub 101

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| In the Matter of: | ) |
| | ) |
| Petition for Approval of Revisions to | ) |
| Generator Interconnection Standards | ) |

# COMMENTS OF STRATA SOLAR, LLC

Pursuant to the Order Requiring Response and Requesting Comments issued September 8, 2016, and the Order Granting Petition to Intervene and Allowing Comments issued September 21, 2016, Intervenor Strata Solar, LLC ("Strata") provides these Comments as to certain of the questions posed in Appendix A to the Commission's Order Requiring Response and Requesting Comments. Strata's comments focus on those questions concerning the Settlement Agreement referenced in that Order which are directly relevant to it and its affiliates' operations.

As noted in its Petition to Intervene, Strata is a large and active developer of utility-scale solar farms, both in North Carolina and nationally. Strata affiliates are the developers of nine of the advanced stage projects which are the subject of the Settlement Agreement, and those affiliated entities are parties to that Agreement as well.

Strata offers these comments on the Questions from Appendix A:

1. **How does Duke define a "utility-scale" solar generator?**

   N/A

2. **(a) Please identify exactly which customers have experienced degradation of electric service due to utility-scale solar facilities.**

Strata Solar and other responsible solar developers take grid reliability and customer service quality extremely seriously. Strata understands the need for solar facilities to operate in harmony with the grid and it is constantly looking for ways to not only maintain, but to improve the safety, reliability, and affordability of the power grid.

There are approximately 300 solar farms in North Carolina, however, Strata is only aware of one electric service customer that has experienced issues related in any way to interconnected solar facilities. That customer was the Campbell Soup facility near Maxton, North Carolina.

The solar facility involved in that situation was Strata's 20 MW Holstein farm. Strata engineers have been heavily involved in troubleshooting with both Duke Energy and Campbell Soup in an effort to identify the causes of the problem and to implement solutions to avoid reoccurrence. Analysis of the events involving the Campbell Soup facility determined that:

i. The root cause of the problem at Campbell Soup was transformer inrush, which is not unique to solar facilities.
ii. The distribution system impact study did not evaluate stability or transient issues (other than flicker) that would have identified this problem.
iii. A Circuit Stiffness Review ("CSR") would not have identified this problem.
iv. Once the problem was understood, there were fairly basic mitigation measures put in place to avoid this issue, and current/electric power inrush from the solar farm has not subsequently caused any problems.
v. Those mitigation measures could have been built in to the original design of this solar farm.
vi. Based on conversation with Campbell Soup personnel, Strata understands that Campbell Soup experienced power quality problems at this location before Strata's Holstein solar farm was brought online.
vii. Since this problem was addressed, Campbell Soup has experienced additional service interruptions unrelated to the presence of the Holstein solar farm.

**(b) How did DEC or DEP become aware of the problem(s)?**

Strata does not know how Duke Energy became aware of the problem at the Campbell Soup facility, but Duke Energy notified Strata of the situation on or about February 15, 2016, and Strata immediately began working with Duke Energy on troubleshooting and finding solutions.

**(c) Have the problems been resolved, and if so, how?**

Yes. Strata personnel worked closely with Duke Energy to troubleshoot and diagnose the issues relating to the Campbell Soup facility. Strata personnel also met with Campbell Soup's operations staff to better understand the issues and find solutions that were acceptable to Campbell Soup.

On one such occasion an electrical event (most likely a lightning strike) caused Strata's Holstein solar facility to trip offline, as would be expected. Campbell Soup's facility was able to ride through that event and stay online. But, three minutes later, the operational protocols of the substation interconnection reconnected the solar facility to the grid, and it was the reconnection that tripped Campbell Soup offline.

The issues at Campbell Soup were caused by the inrush of current that occurred when the entire 20 MW of transformers at the solar facility was brought back online simultaneously. The inrush caused transient distortions that tripped Campbell Soup's facilities offline. Transients are not unique to solar farms. Those same kinds of distortions can be caused by bringing any large generator online quickly or even by starting up large industrial processes.

The solution to these issues was to stagger the re-energization of the solar farm gradually, in smaller phases, rather than bringing the full 20 MW back online all at once.

Strata has implemented a protocol with Campbell Soup and Duke Energy whereby it manually re-energizes each of the nine transformers on site, one transformer at a time. Strata also now coordinates with Campbell Soup personnel to delay re-energization if a particularly sensitive operation is underway at this Campbell Soup facility.

This revised protocol has been effective and successful and Strata is not aware of any further service interruptions at Campbell Soup related to this (or any other) solar facility since this protocol was implemented. Strata understands, however, that Campbell Soup has since experienced additional service interruptions that were caused by other unknown issues unrelated to Strata's Holstein facility.

If this issue had been identified during the system impact study process, the Holstein solar farm could have been designed to perform this staggered/phased re-energization without the need for manual intervention. Strata understands, however, that a CSR would not have prevented the incidents at the Campbell Soup facility.

**(d) If not, what is the plan for resolving these service issues?**

The current solution resolved the issues which caused the problems at Campbell Soup, however, Strata is evaluating alternative technologies that would eliminate the manual energization process and even eliminate the transformer inrush issue altogether. Design changes to implement a permanent solution are underway and will be coordinated with Duke Energy and Campbell Soup before implementation.

**3. How is it that Duke's earlier process for evaluating interconnection requests failed to identify and prevent these service issues?**

Until very recently, Strata did not have complete visibility into the full system impact study process used by Duke Energy. We have learned that Duke Energy does not evaluate stability or transient issues as part of its study of distribution level

interconnection requests (whereas they do for transmission level studies). Strata now understands that such a study could have identified this issue and driven design changes at the solar facility to prevent transformer inrush from causing problems at a customer location.

Strata believes that there is some learning curve for all aspects of the industry in this State with regard to interconnection of utility scale solar generators, especially on the weaker segments of a utility's distribution system. There may have been gaps in the interconnection study process previously used, and the use of a circuit stiffness review to screen for the potential need for further such studies may not be inappropriate.

Strata is aware that issues concerning such interconnections have already been experienced and addressed in other parts of the United States and internationally, where the extent of solar penetration is significantly greater than it is currently here in North Carolina. Solutions for issues experienced with weaker grids in more rural areas have been identified and implemented elsewhere. Strata expects that the industry here will derive solutions for such issues based on such other experiences and solutions.

**4. Are any of the solar facilities that DEC or DEP owns, or proposes to own, causing service problems for retail customers?**

N/A

**5. What costs will Duke incur to track the power quality monitoring equipment that it installs pursuant to the settlement agreement, and who will absorb those costs?**

Strata is aware that Duke Energy already installs a sophisticated power quality meter, a SEL-735, on its side of the point of interconnection. It is our understanding from the Settlement Agreement that Strata, as the project developer, will absorb the cost

of additional power quality monitoring equipment to be installed on our side of the point of interconnection for those projects covered by the Settlement Agreement.

**6. Will the monitoring occur "real time," or after the fact?**

N/A

**7. What criteria will Duke use to determine that a given solar installation is causing reliability problems for retail customers and, hence, is subject to disconnection pursuant to the settlement agreement?**

N/A

**8. The amendments to the standard interconnection agreement (Exhibits A, B, and C of the settlement agreement) appear to apply only to those projects that are listed on the signature pages of the settlement agreement. Please confirm that this is so.**

That is Strata's understanding. The Settlement Agreement only applies to those projects listed on the signature pages of that Agreement.

**9. As a result of the service degradation problems that Duke referred to in its August 29, 2016 submittal letter, does Duke anticipate requesting changes to the Commission-approved interconnection standard, process, or contract forms? If yes, in what timeframe?**

Strata believes that any proposed changes to the standard interconnection agreement or interconnection process should be thoroughly evaluated and thoughtfully considered by all affected stakeholders, including the Public Staff, the utilities and the renewable energy development community, through a process administered by the Commission.

Strata also encourages utilities, the Commission, and the Public Staff to take advantage of the considerable technical and business expertise in the solar industry as we look to improve standards, processes, and contract forms. Many of these technical issues have been addressed in other markets with much higher penetrations of solar than North

Carolina. As of 2015 North Carolinians obtained 1.4% of their electricity from solar whereas, for example, Germany was at 7.5%. While the isolated situation that Strata believes led to Duke Energy's decision to implement CSR as a screen is by no means a widespread problem, Strata believes that continuation of the ongoing technical discussions is an excellent means of facilitating the exchange of information and ideas relevant to addressing and avoiding such issues.

Strata understands that the imposition of the CSR as an additional part of the system impact study process is a product of Duke's view that some utility-scale solar generators interconnected to weaker circuits in rural areas may detrimentally impact its normal distribution system operations. Strata also understands that any such incidents are isolated, not widespread, and they are not solely attributable to interconnected solar farms. Strata believes that making judgements about a project's ability to interconnect without causing issues, based solely on a CSR result, would be inappropriate - such an approach would ignore the complexities and unique nature of each grid location. In fact, Strata believes that there are many existing solar facilities operating in North Carolina that would fail a CSR screen, yet they cause no power quality issues. Using CSR results to screen for additional study may be appropriate, but CSR results should not be used to limit interconnections.

The share of electricity being supplied by clean energy sources, such as solar, will continue to grow, and that growth is being driven by market fundamentals including increased efficiency and declining costs. While there are unique factors in every market, including North Carolina, there exists a tremendous amount of experience within the renewable energy industry upon which we can draw to provide insight and guidance as

we continue to foster the growth of clean energy, all while maintaining and improving grid reliability, safety, and affordability.

WHEREFORE, Strata Solar, LLC respectfully requests that the Commission take the points made in these comments into account in assessing how Duke's additional technical studies interrelate with the interconnection standards approved by the Commission in this docket and how the Settlement Agreement will be implemented.

Respectfully submitted, this the 22nd day of September, 2016.

s/ Brian Herndon
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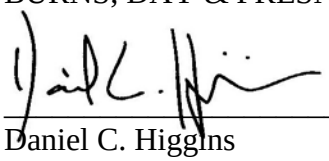
**CERTIFICATE OF SERVICE**

I hereby certify that on this the 22nd day of September, 2016, a true and exact copy of the foregoing document was duly served upon counsel of record for all parties to this docket by either depositing same in a depository of the United States Postal Service, first-class postage prepaid, or by electronic delivery.

BURNS, DAY & PRESNELL, P.A.



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