

Clerk's Office

N.C. Utilities Commission

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DATE: Wednesday, January 30, 2019

TIME: 9:30 a.m. - 12:43 p.m.

DOCKET NO.: E-100, Sub 101

E-2, Sub 1159

E-7, Sub 1156

ORIGINAL

BEFORE: Chairman Edward S. Finley, Jr., Presiding

Commissioner ToNola D. Brown-Bland

Commissioner Jerry C. Dockham

Commissioner James G. Patterson

Commissioner Lyons Gray

Commissioner Daniel G. Clodfelter

Commissioner Charlotte A. Mitchell

IN THE MATTER OF:

Petition for Approval of Generator

Interconnection Standard

and

Joint Petition of Duke Energy Carolinas, LLC,

and Duke Energy Progress, LLC, for

Approval of Competitive Procurement of

Renewable Energy Program

Volume 5

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T A B L E O F C O N T E N T S
E X A M I N A T I O N S

ANGIE MAIER	PAGE
Prefiled Direct Testimony.....	8
SARA BALDWIN AUCK	PAGE
Continued Cross Examination	20
By Mr. Breitschwerdt	
Redirect Examination By Ms. Beaton.....	39
Examination By Commissioner Mitchell.....	40
Examination By Chairman Finley.....	44
Examination By Commissioner Gray.....	57
Examination By Commissioner Brown-Bland...	58
Examination By Commissioner Patterson.....	61
Examination By Chairman Finley.....	64
Recross Examination By Mr. Breitschwerdt..	64
Cross Examination By Ms. Kells.....	69
Further Redirect Examination	70
By Ms. Beaton	
PAUL BRUCKE	PAGE
Direct Examination By Mr. Smith.....	73
Prefiled Direct Testimony of Paule Brucke.	75
Cross Examination By Mr. Dodge.....	97
Cross Examination By Mr. Brietschwerdt....	100
Examination By Commissioner Mitchell.....	126
Cross Examination By Ms. Kells.....	134

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24

Cross Examination By Mr. Dodge.....	136
PANEL OF CHRISTOPHER NORQUAL, LUKE O'DEA, AND MICHAEL R. WALLACE	PAGE
Prefiled Direct Testimony of	140
Robert J. Duke	
Prefiled Direct and Rebuttal Testimony ...	153
Of Christopher Norqual	
Prefiled Rebuttal Testimony of	201
Luke O'dea	
Prefiled Rebuttal Testimony of	228
Michael R. Wallace	

E X H I B I T S

IDENTIFIED/ADMITTED

1 Duke Progress Auck Cross - 1.....	25/72
2 SBA Direct Examination - 1	- /72
through 10	
3 SBA Rebuttal Examination - 1.....	- /72
6 NCSEA Exhibits PB-1 and PB-2.....	75/139
Norqual Exhibit -1.....	153/153
9 NCCEBA Direct - 1.....	222/ -

1
2
3
4
5
6
7
8
9
10
11
12
13
14
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P R O C E E D I N G S

CHAIRMAN FINLEY: Good morning. Let's come back on the record. Mr. Olson, I want to hear from you, please, about sponsoring your witness.

MR. OLSON. Thank you very much. May it please the Commission, I'm Kurt Olson. I'm here today representing the North Carolina Pork Council. Consistent with the Commission's January 23rd order excusing our witness Angie Maier from appearing at this hearing, the Pork Council now respectfully requests that her direct testimony, consisting of 11 pages and filed on November 19, 2018, be received into the record of this docket.

CHAIRMAN FINLEY: Ms. Maier's direct prefiled testimony of 11 pages of November 19, 2018, is copied into the record as though given orally from the stand.

MR. OLSON: Thank you very much.

CHAIRMAN FINLEY: You're welcome.

(Whereupon, the prefiled direct testimony of Angie Maier was copied into the record as if given orally from the stand.)

NOV 20 REC'D

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

Clerk's Office

DOCKET NO. E-100, SUB 101

N.C. Utilities Commission

In the Matter of:)	DIRECT TESTIMONY OF
Petition for Approval of Revisions to)	ANGIE MAIER ON BEHALF OF
Generator Interconnection Standard)	NORTH CAROLINA PORK
)	COUNCIL

DIRECT TESTIMONY

1 **Q. PLEASE STATE YOUR NAME, BUSINESS AFFILIATION AND**
2 **BUSINESS ADDRESS FOR THE RECORD.**

3 A. My name is Angie Maier. I am the Director of Governmental Affairs and
4 Sustainability for the North Carolina Pork Council. The Pork Council has its principal
5 place of business 1401 Sunday Drive, Suite 116, Raleigh, North Carolina 27607.

6 **Q. PLEASE EXPLAIN THE PORK COUNCIL'S INTEREST IN THIS**
7 **DOCKET.**

8 A. The matter under consideration in this docket is *North Carolina's Interconnection*
9 *Procedure, Forms and Agreements for State-Jurisdictional Generator Interconnection*
10 and proposed revisions to that standard (the "interconnection standard" or "standard").
11 Part VII of HB 598, which was enacted by the General Assembly last year, provides that
12 any standards for interconnection "shall include an expedited review process for swine . .
13 . waste to energy projects of two megawatts (MW) or less and other measures necessary
14 and appropriate to achieve the objectives" of the swine waste set-aside in North
15 Carolina's Renewable Energy and Energy Efficiency Portfolio Standard, N.C. Gen. Stat.
16 § 62-133.8 *et seq.* (the "REPS"). *See*, S.L. 2017-192, Part VII (amending N.C. Gen. Stat.
17 § 62-133.8(i)(4)). The Pork Council participated in the development of the proposed

1 revisions to the interconnection standard that are designed to implement this statutory
2 mandate and is now participating in this docket to assure, to the extent it can, that those
3 provisions are adopted consistent with the General Assembly's intent.

4 **Q. WHAT IS THE PORK COUNCIL'S UNDERSTANDING OF WHY THE**
5 **GENERAL ASSEMBLY ENACTED PART VII OF HB 589?**

6 A. The answer to that question has multiple parts and requires a somewhat detailed
7 explanation. The short answer is that the General Assembly recognized there were
8 problems getting swine waste-to-energy projects through the interconnection process and
9 these problems were inhibiting the policies and objectives underlying the swine waste
10 set-aside provisions in the REPS.

11 a. State Policy. North Carolina's Renewable Energy and Energy Efficiency Portfolio
12 Standard, the REPS, requires that a certain percentage of the electricity sold in the State
13 at the retail level be derived from swine waste used as a feedstock to generate the
14 electricity. This requirement, known as the "swine waste set-aside," was added to the
15 REPS as part of a State policy to advance the development and use of new technologies
16 to manage the waste by-product from pork production. The set-aside has a dual,
17 interrelated purpose: first, the set-aside is designed to facilitate the development and use
18 of new waste management technologies to supplant or supplement the traditional waste
19 management methods used in pork production; and second, the set-aside is designed to
20 provide a new revenue stream to pork producers through the sale of electricity directly or
21 the sale of biogas that is then used to produce electricity. It was anticipated that this new
22 revenue stream would assist producers adopting the new technologies with the steep

1 capital investment needed to put the new waste management technologies in place. I
 2 should also add that the swine waste set-aside also advances other goals and objectives
 3 underlying the REPS including the use of in-state, indigenous resources to produce
 4 energy (electricity and renewable biogas), and the addition of a new renewable energy
 5 source to the State's energy portfolio.

6 *b. Problems Implementing the State Policy.* The swine waste set-aside in the REPS
 7 establishes minimum target levels for the amount of electricity derived from swine waste
 8 sold at retail in the State. The first target date was 2012. At that time, 0.07 percent of the
 9 electricity sold at retail in the State by the electric power suppliers (the public utilities,
 10 coops and municipal utilities) was to have been derived or generated from the use of
 11 swine waste feedstocks. This amount was to escalate to 0.20 % in 2018 and remain at the
 12 level thereafter. These goals have not been achieved, and in each year since 2012, the
 13 electric power suppliers have sought and been granted waivers of the set-aside
 14 requirements from the Commission. The new compliance target levels are 0.02% for
 15 2018 increasing to 0.20% in 2024 and thereafter. Notably, Duke Energy Carolinas
 16 ("DCE"), Duke Energy Progress ("DEP") and Virginia Electric Power Company d/b/a
 17 Dominion Energy North Carolina ("Dominion") have represented to the Commission that
 18 they will meet the 2018 compliance target requirement. The other electric power
 19 suppliers have asked for and have been granted a waiver of the 2018 requirement. As
 20 long as the requirements of the swine waste set-aside are not being met, the intended
 21 benefits of the set-aside – the adoption of new waste-management technologies, the
 22 benefits that flow from the adoption of these technologies, the secondary revenue stream

1 to finance the new technologies and the addition of a new, viable indigenous energy
2 resource to the State's portfolio – also are not being met.

3 *c. The Role of Interconnection.* While variations exist, the prototypical swine waste-to-
4 energy project envisioned the on-site conversion of the swine waste to methane by
5 anaerobic digestion, the use of that methane to fuel an on-site generator and the on-site
6 production of electricity some of which would be used to off-set on-site load, but the
7 majority of which would be added to the electrical grid. The same process would be
8 typical of a centralized generation location except that the swine waste would have to be
9 gathered at local farms and then transported to the generation site. In either case, the site
10 has to be connected to the grid so the output – the electricity – can be added and the
11 producer paid for the generation. These scenarios implicate interconnection.

12 *d. Problems arising from interconnection.* There have been several recognized problems
13 with interconnection that along with other factors, have stunted efforts to reach the swine
14 waste set-aside goals in the REPS. First, North Carolina has seen a significant growth in
15 renewable energy projects in the last several years, mostly solar projects, and these
16 projects also need to be connected to the grid. This unprecedented growth has resulted in
17 long lines of projects or queues waiting to be evaluated for interconnection. It is not
18 uncommon for a project that enters the queue to have to wait several years before being
19 evaluated for interconnection. These delays have disrupted projects under development
20 and have been a deterrent to project developers and investors thinking about new
21 projects. Second, although there is a “fast track” process in the current interconnection
22 standard under which projects of a certain capacity seeking to interconnect at certain
23 locations will receive expedited consideration, typical swine waste projects do not qualify

1 for the fast track process as currently designed. In lay terms, and as I understand it, the
2 fast track process is available only where the electricity is produced in an “inverter”
3 system. Swine waste-to-energy projects are not inverter-based systems but rather use
4 rotary generators to produce the electrical current. Since the swine waste projects do not
5 qualify for a fast track evaluation, the projects are placed in the general interconnection
6 queue along with a multitude of other projects waiting evaluation. The long lines or
7 queues of projects waiting to be evaluated for interconnection and the unavailability of a
8 fast-track scheme for swine waste projects has meant that projects using swine waste to
9 produce electricity have lingered for long periods of time in the interconnection queues.
10 That has had an adverse impact on compliance with the swine waste set-aside as it has
11 been difficult to get swine waste projects on-line. The difficulty has not gone unnoticed
12 and has deterred the development of other projects.

13 *e. Related Issues.* It also is worth mentioning that the pork producers adopting or
14 considering swine waste projects typically are not engaged in the renewable energy
15 business *per se*. Their core business is farming and producing hogs and while they have
16 typically retained consultants to assist with project development, there clearly has been a
17 knowledge gap that has led to misunderstandings about the interconnection process, the
18 costs of interconnection and the effect of project modifications on the process. In
19 addition, unlike other renewable energy projects, a swine waste project typically has
20 limited flexibility when it comes to interconnection. The project site will nearly always
21 be at the farm. The distance to the point of interconnection is fixed as are the costs of
22 getting to that point of interconnection. Also, substantial investment and related project
23 development costs must be incurred just to get to the point where interconnection is an

1 issue. Any complication disclosed during the interconnection evaluation generally will
 2 have to be absorbed as significant capital costs have already been incurred before the
 3 interconnection evaluation is conducted.

4 *f. Part VII of HB 589.* In enacting Part VII of HB 589 the General Assembly again
 5 underscored its support for the policies and benefits underlying the swine waste set-aside.
 6 Recognizing that long interconnection queues were one factor inhibiting project
 7 development and thus compliance with the set-aside, the General Assembly directed that
 8 standards for interconnection should include an expedited review process for swine and
 9 poultry waste to energy projects of two megawatts (MW) or less. To address other
 10 factors inhibiting swine waste projects, the General Assembly also directed that any
 11 revisions to the interconnection standard should include "other measures necessary and
 12 appropriate to achieve the objectives of" the swine waste set-aside. Together, these
 13 mandates evidence strong support for the swine waste set-aside and the policy objectives
 14 underlying that part of the REPS by addressing and hopefully minimizing a recognized
 15 impediment to compliance with the set-aside.

16 **Q. WHAT IS YOUR UNDERSTANDING OF HOW THE PROPOSED**
 17 **REVISIONS TO THE INTERCONNECTION STANDARD UNDER REVIEW**
 18 **WILL IMPLEMENT THE REQUIREMENTS OF PART VII IN HB 589?**

19 **A.** To implement Part VII of HB 589, the revised interconnection standard has
 20 proposed a new Subsection 1.8.3.3. The new section provides that a project entering the
 21 interconnection queue that will use swine waste resources as feedstock to generate
 22 electricity must be advanced to the front of the interconnection queue ahead of all other

1 non-animal waste projects in the queue except for projects that are then already in the
2 “study process”. *See*, NC Interconnection Standard *proposed* Section 1.8.3.3. A project
3 would be considered “in the study process” if the project sponsor has completed a
4 “Section 4.2” interconnection scoping meeting with the utility or has executed and
5 returned a System Impact Study Agreement to the utility. In essence then, upon entering
6 the interconnection queue an eligible swine waste resource project would be advanced to
7 the front of the queue and positioned to be the next project studied for interconnection.
8 The project would not supplant any project already in the interconnection study process
9 but it would be the next project in line for study.

10 **Q. HOW WILL THIS REQUIREMENT APPLY?**

11 A. As the Pork Council understands it, the requirement for accelerated review will
12 apply system-wide or utility-wide. That is, a swine waste resource project entering the
13 queue will be reviewed and studied for interconnection before all other non-animal waste
14 projects in the queue even though those other projects may have lower queue numbers
15 and even though they may be seeking to interconnect at a location that is not the same as
16 the point of interconnection where the swine waste resource project will interconnect.

17 **Q. WHY IS THAT LAST CLARIFICATION OR QUALIFICATION**
18 **NECESSARY?**

19 A. Within a utility’s service area, there may be multiple points of interconnection.
20 At each point of interconnection projects are designated A, B and now C in some
21 instances under proposed Section 1.8.3.3 to indicate the relative position for being
22 studied. An “A” is the next project up for study or review. However, because there are

1 multiple points of interconnection within a utility's service area, there may be multiple
2 "A" projects. And because the utilities have limited resources, the "A" designation does
3 not really mean that the project will be the next one studied or reviewed. Rather, the "A"
4 project with the lowest queue number will be studied first and before any other "A"
5 project at another interconnection point. Stated another way, an "A" project with a
6 higher queue number will have to wait until completion of the studies for all other "A"
7 projects with lower queue numbers. To effectuate the General Assembly's desire to
8 accelerate review of projects using swine waste resources to generate electricity,
9 however, queue numbers cannot be determinative. The only real question is whether projects
10 ostensibly in front of the swine waste resource project are already in the study process.

11 **Q. CAN YOU ILLUSTRATE THE POINT YOU ARE MAKING WITH A**
12 **HYPOTHETICAL EXAMPLE?**

13 **A. Yes. A swine waste resource project seeking to interconnect at Substation X is**
14 **required to be studied for interconnection before all other projects at that substation**
15 **location except those that are already in the study process. That same swine waste**
16 **resource project at Substation X is to be studied before all non-animal waste resource**
17 **projects at Substation Y even though the projects are at different points of**
18 **interconnection and even though the projects at Substation Y may have lower queue**
19 **numbers. The only exception would be where the non-animal waste resource project at**
20 **Substation Y is already in the study process. On a system-wide basis (not a circuit or**
21 **substation basis) a swine waste resources project entering the interconnection queue is to**
22 **be move to the front of the queue and the next up to be reviewed and studied. The only**
23 **caveat, the swine waste resource project does not move in front of other animal waste**

1 resource projects in the queue nor does it supplant any project already in the study
2 process. That is the result required by Part VII of HB 589. We also believe it is the
3 intended meaning of proposed Section 1.8.3.3 in the interconnection standard under
4 review.

5 **Q. ARE THERE OTHER REVISIONS OR MODIFICATIONS TO THE**
6 **INTERCONNECTION STANDARD THAT ARE NECESSARY OR ADVISABLE**
7 **TO IMPLEMENT PART VII OF HB 598?**

8 A. Part VII of HB 589 also requires the interconnection standard to include any
9 “*other measures necessary and appropriate to achieve the objectives of*” the swine waste
10 set-aside. *See*, S.L. 2017-192, Part VII (amending N.C. Gen. Stat. § 62-133.8(i)(4)).
11 This is very broad language and arguably would support a number of other changes to the
12 interconnection standard as long as the changes were “necessary and appropriate to
13 achieve the objectives of” the swine waste set-aside. Although specific language has not
14 proposed, the Public Staff has recommended that the electric service providers be
15 required to designate a “technical interconnection specialist” to assist persons planning to
16 interconnect an animal waste resource facility. The Public Staff also has recommended
17 that the electric service providers publish the identity of that contact on their “website”
18 and make the name of the person known to the Pork Council. *See*, NC Interconnection
19 Standard (proposed) at 24 – 25 (preamble language to Section 1.8.3.3). The Pork Council
20 supports these recommendations. Indeed, one common comment from pork producers
21 who have sought to participate in swine waste set-aside is the complexity of the
22 interconnection process and a general feeling that available information on

1 interconnection requests is either not specific to their projects or simply difficult to
2 obtain.

3 **Q. DO YOU HAVE ANY RELATED MATTER THAT YOU WOULD LIKE**
4 **TO BRING TO THE ATTENTION OF THE COMMISSION?**

5 A. Not at this time. I would however, like to thank the Commission for this
6 opportunity to express the Pork Council's point of view on this very important matter.
7 The Pork Council also appreciates the past efforts of the electric power suppliers,
8 particularly DEC and DEP to assist swine waste project developers in addressing
9 interconnection issues within the confines of the existing interconnection standard.
10 Finally, while Part VII of HB 598 appears to establish a preference related to the
11 interconnection of animal waste-to-energy projects, it is fundamentally aimed at
12 advancing State policies that have stagnated under the existing system. The goals and
13 objects of the set-aside provisions in the REPS can be achieved only if projects succeed
14 and this success seen by others thinking about undertaking similar projects or ventures.
15 To date, there has been very limited success turning swine waste into electricity
16 interconnected to the grid and this has resulted in fewer attempts at these projects. In
17 fact, given the recognized difficulties there has been a movement to alternatives like
18 converting swine waste into renewable natural gas for distribution and sale to others who
19 will turn that gas into electricity. We have seen a downturn in project development
20 involving the original scenarios of on-the-farm generation of electricity or the production
21 of electricity at centralized locations. The problems with interconnection to the grid are
22 not the sole reason these types of projects are not being pursued, but it is a factor.

1 Hopefully if the problems previously encountered with interconnection are worked out,
2 there will be a return to these types of projects.

3 **Q. DOES THIS CONCLUDE YOUR TESTIMONY.**

4 **A. Yes.**

1 CHAIRMAN FINLEY: All right, Duke.

2 MR. BREITSCHWERDT: Thank you,

3 Mr. Chairman.

4 Whereupon,

5 SARA BALDWIN AUCK,

6 having previously been duly sworn, was examined

7 and testified as follows:

8 CONTINUED CROSS EXAMINATION BY MR. BREITSCHWERDT:

9 Q. Good Morning, Ms. Auck.

10 A. Good morning. I'm feeling a little better
11 than I was yesterday.

12 Q. A little cold, but glad to be back with you
13 again today. All right. Just to reorient you, the
14 witness, and the Commission for where we were, since we
15 got paused in our discussion middle of the way, I was
16 asking you some questions about IREC's perspective and
17 role in this proceeding; do you recall that?

18 A. I do, yes.

19 Q. And so we were working through, effectively,
20 areas of disagreement between IREC's position and the
21 Public Staff's position in this case; do you recall
22 that?

23 A. Yes.

24 Q. We talked -- just briefly to go through them

1 again, not at a granular level -- but we talked about
2 differences perspective of hosting capacity maps?

3 A. Yes.

4 Q. And fast track screens, 15 percent screen,
5 and the definition of lines section?

6 A. I think we had just started down that track.
7 I don't know if we got too far, but yes.

8 Q. Okay. Well, would you agree -- and I think
9 we were just looking at this as the Chairman paused the
10 hearing for the day -- that the Public Staff's
11 perspective in Witness Williamson's testimony is that
12 the companies are appropriately taking a conservative
13 view of the definition of line section?

14 A. That is my understanding of the Public
15 Staff's position, yes.

16 Q. Okay. And we also discussed the difference
17 in IREC's advocacy for a timeline enforcement mechanism
18 and the Public Staff's position that that would not be
19 appropriate to adopt at this time in North Carolina; do
20 you recall that?

21 A. Yes.

22 Q. All right. And so moving on to things we
23 haven't yet discussed, another area that there is now
24 not alignment between IREC and the Public Staff relates

1 to the fees associated with progressing through the
2 Section 2 and Section 3 study process.

3 Are you familiar with the stipulation that
4 was entered into?

5 A. The one that was filed just before the
6 hearing began?

7 Q. Yes, ma'am.

8 A. Yes.

9 Q. And so are you -- would you agree that,
10 through that stipulation, that the Public Staff is now
11 accepting or agreeable to the proposed fees that were
12 addressed in Witness Riggins' rebuttal testimony?

13 A. That is my understanding of their position,
14 yes.

15 Q. And, at this point, IREC has not taken a
16 position, but is it still your position that the
17 adjustment and fees that Duke is recommending is not
18 appropriate at this time?

19 A. I would say, as expressed in our testimony,
20 we are indifferent on the fees at this point. Our
21 position is really just that there be sufficient and
22 granular data to support the increase fees, such that
23 we can compare the costs of the activities happening on
24 interconnection with the costs that are incurred. And,

1 you know, one of the key areas there is maintaining an
2 optimal level of efficiency of all the activities that
3 are happening to process interconnection. So there is,
4 kind of, you know, striking the balance of the cost
5 increases with maintaining a level of efficiency. So,
6 again, our position is not that you should not incur or
7 be granted additional fee increases if they are
8 appropriate. We just don't have the data information
9 before us to make that determination.

10 Q. And did you have an opportunity to review
11 Witness Riggins' rebuttal testimony?

12 A. I did, yes.

13 Q. And he provided additional data to support
14 those fees; is that correct?

15 A. He did provide additional data, yes.

16 Q. Okay. Thank you. So I think -- just to
17 summarize this area of our discussion today, I think
18 the point that -- would you agree that the Public Staff
19 and IREC have presented the Commission with differing
20 perspectives on utility investments, such as hosting
21 capacity maps and modifications to North Carolina
22 interconnection procedures that would benefit
23 North Carolina consumers?

24 A. I agree that we hold different positions

1 within this proceeding, yes. I would like to clarify
2 that IREC is a nonprofit public-interest organization.
3 We have a national perspective on these issues, and as
4 with any proceeding, there are differences of opinion
5 on positions. Certainly respect the Public Staff's
6 position and the fact that they do represent ratepayers
7 as a whole. IREC represents, uniquely, customers that
8 want clean energy and have an interest in those
9 positions.

10 Q. Okay. So I think, turning to page 6 of your
11 rebuttal testimony, if you could, you were speaking in
12 that section about your perspective. And on line 1,
13 you specifically said that IREC does not represent the
14 distributed energy resource development community in
15 this proceeding; is that correct?

16 A. Give me just a moment to get to the page.

17 Q. No problem.

18 A. And you said page 6?

19 Q. Yes, ma'am. Line 1.

20 A. Line 1. Thank you.

21 (Witness peruses document.)

22 Okay. I'm with you there. And yes, I agree
23 that is there.

24 Q. Thank you. And so when you referenced the

1 development community, what exactly did you mean?

2 A. We are referring to renewable energy
3 developers and the providers of clean energy services.

4 Q. Okay. So large developers, small developers
5 targeting residential customers?

6 A. I would say any and all developers that are
7 working with customers, yes.

8 MR. BREITSCHWERDT: Okay. Mr. Chairman,
9 at this time, I would like to approach or have
10 Mr. Jirak approach and have a cross exhibit. If I
11 could mark this as IREC or Duke Energy --

12 CHAIRMAN FINLEY: Hold on a second. Let
13 me get it from him. Let me look at it before you
14 start marking it.

15 (Pause.)

16 CHAIRMAN FINLEY: All right. Now let's
17 mark it.

18 MR. BREITSCHWERDT: Thank you. Premark
19 this as Duke Progress Auck Cross Examination
20 Exhibit 1, please.

21 CHAIRMAN FINLEY: Shall be so marked.

22 MR. BREITSCHWERDT: Thank you.

23 (Duke Progress Auck Cross Examination
24 Exhibit Number 1 was marked for

1 identification.)

2 Q. So, Ms. Auck, looking at what we presented
3 here today, in the bottom left there is a source of
4 information, and it's a website link; do you see that?

5 A. I do, yes.

6 Q. And that web link goes to IREC website?

7 A. Correct.

8 Q. And it goes to a web page that says
9 "support-irec" or to identify who are the support of
10 IREC; is that a fair characterization?

11 A. That is correct, yes.

12 Q. And so, if the Commission were to go to
13 IREC's website, this image here would show up of the
14 IREC corporate sponsors; is that accurate?

15 A. That is correct, yes.

16 Q. And appreciate that you're a public interest
17 organization, but is it accurate that these corporate
18 sponsors are contributing to IREC's work in helping to
19 fund IREC's work in this proceeding and other
20 proceedings across the country?

21 A. That is inaccurate. Would you like me to
22 explain?

23 Q. Did these corporate sponsors not provide
24 funding to IREC?

1 A. They do provide funding to IREC. They
2 constitute, in addition to the individual donors that
3 give IREC money, 3 percent of our total organizational
4 budget. Within the regulatory program, we maintain a
5 firm and hard line that any corporate monies that come
6 in the door for IREC are solely for general and
7 overhead purposes. They support our events, they
8 support our awards, and they provide an overhead --
9 excuse me, they provide support for our overhead, which
10 is often difficult to get support through grants to
11 support that type of activity. Again, 3 percent of our
12 total organizational budget comes from corporate
13 sponsors, individual donors. And the hard line that we
14 have within the regulatory program is that none of
15 their support can and will be used to directly advocate
16 for their positions. We make that extremely clear in
17 all of the materials that we provide them when they
18 decide to contribute to IREC, and I actually do not
19 engage in the solicitation of those resources as part
20 of my job in order to maintain a buffer between any of
21 their specific interests and requests and what's
22 happening within our regulatory proceedings.

23 Q. But you would agree with me that the
24 companies here, the corporations, the corporate

1 sponsors are renewable energy developers, battery
2 storage companies that are targeting residential and
3 commercial customers; is that correct?

4 A. Yes, some of them are, and others are more
5 broadly just supporting renewable energy and clean
6 energy activities, such as Intersolar North America.

7 Q. Which is a conference that's held?

8 A. Yes.

9 Q. So Sunrun, for example, is the number one
10 residential solar installer in the country; is that
11 correct?

12 A. That is my understanding, but I'm not certain
13 of their current position in that.

14 Q. Would you accept that that's what their
15 website says?

16 A. I have not looked at their website, so I
17 would not know.

18 Q. Okay. And SunPower, Sunnova, Borrego Solar,
19 all residential solar installers -- national
20 residential solar installers; would you agree with
21 that?

22 A. Yes. Although, my understanding is Borrego
23 Solar also does community solar and large-scale solar.

24 Q. And would you agree with me that positions

1 that IREC has taken in this proceeding would advance
2 the interests of companies such as Sunrun, SunPower,
3 Sunnova, and Borrego Solar?

4 A. I would disagree with that assessment. The
5 position that IREC has taken in this proceeding are
6 based on our mission and they are representative of our
7 position that we would take in any state. The fact
8 that these organizations support IREC at a very nominal
9 level does not influence our position in this
10 proceeding or in any other proceeding.

11 Q. Okay. All right. If you turn to page 7 of
12 your testimony, please, your rebuttal testimony, line
13 16.

14 A. (Witness peruses document.)
15 Page 7, line 16?

16 Q. Yes, ma'am.

17 A. Yes.

18 Q. So there you say -- you make the statement
19 that -- and I'm partway through the line, "Utilities
20 should not discriminate against owners of distributed
21 energy resources."

22 Did I read that correctly?

23 A. Yes.

24 Q. And that's just a general policy statement

1 that you are making; there is no evidence in this
2 proceeding that Duke Energy or Dominion Energy has
3 discriminated against owners of solar or other
4 distributed energy resources in
5 North Carolina, correct?

6 A. Correct. That is a general policy statement.

7 Q. And moving back a page or two, you also state
8 that it's IREC's observation that interconnection has
9 been a source of contention -- sorry, this is at page
10 5, line 4 of your testimony.

11 A. Direct or rebuttal? Sorry.

12 Q. Excuse me. This is in your direct testimony.

13 A. Okay.

14 (Witness peruses document.)

15 Yes.

16 Q. And I will read it to you. "It's IREC's
17 observation that interconnection has been a source of
18 contention among North Carolina customers, developers,
19 utilities -- and utilities, despite admirable
20 collaborative efforts amongst parties."

21 Did I read that correctly?

22 A. Yes.

23 Q. And is it fair to say that you characterize
24 this as IREC's observations versus your own personal

1 knowledge because you're new to the North Carolina
2 interconnection process and were not personally
3 involved in the stakeholder process that was held by
4 Advanced Energy back in 2017?

5 A. I would disagree with that statement. As the
6 regulatory director, I oversee -- or I oversaw as the
7 regulatory director -- that position has not changed
8 now that I'm vice president -- I oversee our engagement
9 in all proceedings, I review all of our comments, I
10 consult daily with our attorneys, and I am aware keenly
11 of the activities that are happening in all of our
12 states. So while it was not me personally in the room,
13 I was there by proxy through my attorneys. So IREC has
14 had a longstanding position and participation in
15 North Carolina.

16 Q. And your attorney is Ms. Beaton, who is here
17 today from a law firm in California?

18 A. Ms. Beaton is one of our attorneys, yes. We
19 have others.

20 Q. I'm sorry. Excuse me.

21 A. That's okay. We have had other attorneys
22 that represent us in the same law firm.

23 Q. She was the primary participant on behalf of
24 IREC in the North Carolina stakeholder process?

1 A. That is correct. We also engaged
2 Lauren Bowen with SELC as our pro hac vice
3 representation for local counsel, who is also here.

4 Q. So I want to focus on the same sentence that
5 we just walked through, but specifically your statement
6 that interconnection has been a source of contention
7 for North Carolina customers versus developers and
8 utilities.

9 Is that -- so I think the question I would
10 like to ask is, you know, throughout your testimony,
11 you speak about study process delays, clogged queues,
12 disputes, and generally the contentiousness among
13 stakeholders.

14 Would you agree with me that that testimony
15 is specifically focused on large utility-scale solar
16 development, and not on Duke's processing of
17 residential and commercial customers under the
18 expedited Section 2 study process?

19 A. I would agree that the disputes and the
20 contention that we have observed have largely been
21 focused on the large scale, but it is also our
22 observation that, through the workgroup process and
23 some of the interactions, as well as some of the filed
24 testimony, that there still remains some conflict

1 across all levels of the interconnection process, not
2 just in the large scale.

3 Q. So what specific evidence for
4 residential/commercial customers progressing through
5 the Section 2 study process did IREC discover? What
6 observations did you -- are you aware of for
7 residential/commercial customers of Duke Energy going
8 through that process that have been adversely impacted
9 or in some way disadvantaged by the way Duke's studying
10 those projects?

11 A. I mean, the first point of evidence would be
12 the fact that there are still a number of smaller
13 projects that are in the queue that is currently
14 clogged. There are a lot of customers that are having
15 time delays and/or enduring processes that are not as
16 efficient because of the 98 percent failure rate of the
17 fast track screens and having to go to the supplemental
18 review process that may be unnecessary, given the fact
19 that they are -- they should have passed the fast track
20 screens.

21 Q. Just so we are clear, that's the fast track,
22 which is Section 3, which is 20kw to 2 megawatts, which
23 is not residential or small commercial customers going
24 through the Section 2 expedited study process; is that

1 correct?

2 A. Well, okay, if you want to clarify, I think
3 small commercial customers tend to go in the 20kw up to
4 2 megawatt range, small to medium-size commercial.
5 That may not be impacting residential, the issue you
6 just spoke of, quite as much, but I do think that the
7 small commercial to medium-size commercial are affected
8 by that.

9 Q. Okay.

10 A. In addition to -- sorry to interrupt you. In
11 addition to public entities like schools, and community
12 centers, and hospitals, organizations that may not be
13 able to endure as much of the cost and time delays,
14 because they may be nonprofit or publicly funded. So
15 there are a range of customers that fall into that
16 small commercial customer class, just to clarify.

17 Q. Okay. Just to clarify, so Section 2
18 projects, residential customers putting solar on their
19 roofs, very small commercial customers that are putting
20 solar on their roof or adjacent to their house, they
21 are going through the Section 2 process, no evidence
22 there has been delays or inefficiencies in that
23 process, correct?

24 A. I can't think of any at that point, but

1 subject to check.

2 Q. Subject, okay. And then for Section 3, the
3 extent of the evidence that IREC is presenting is that
4 those projects are being adversely impacted by being
5 required to go through the supplemental review process;
6 is that correct?

7 A. And, in general, are enduring less efficient
8 and less cost-effective processes.

9 Q. And you were here for Witness Gajda's
10 testimony yesterday discussing the need to take those
11 projects through supplemental review to ensure they are
12 safely and reliably interconnected?

13 A. I heard Witness Gajda's testimony, yes.

14 Q. Are you generally familiar with the number of
15 projects that Duke has interconnected through the
16 Section 2 and Section 3 fast track process over the
17 last few years?

18 A. Generally familiar. I have heard a lot of
19 numbers thrown out the last two days, and I have a head
20 cold, so I would want to refer to a specific number.

21 Q. That's all right. Would you accept, subject
22 to check, that Duke processed 4,300 Section 2 projects
23 in 2018?

24 A. Subject to check, yes, that sounds familiar.

1 Q. And that was 20 -- an increase of 2,500
2 interconnection requests from 2017. It was largely
3 driven by the House Bill 589 Solar Rebate Program?

4 A. Subject to check, sure.

5 Q. And specific to the fast track process, Duke
6 was able to successfully process 200 interconnection
7 requests, or approximately 200, through the fast track
8 supplemental review process during 2018?

9 A. Two hundred out of how many?

10 Q. Two hundred total.

11 A. Two hundred total. Again, subject to check.

12 I don't have those numbers in front of me.

13 Q. And that was an increase of 100 -- of
14 approximately 100 from 2017?

15 A. Sure, subject to check.

16 Q. Okay. At this time, I would like to have a
17 short discussion about the dispute resolution process
18 and IREC's proposals.

19 IREC has advocated for an ombudsperson in
20 this proceeding; is that correct?

21 A. That is correct.

22 Q. And that's, I think, on page 4 of your
23 rebuttal testimony you testify that an ombudsman person
24 would be the best alternative dispute resolution

1 proposal for the Commission, because they would have a
2 dedicated staff and resources to monitor and help
3 resolve interconnection issues; is that your testimony?

4 A. That is correct, yes.

5 Q. And just so we are clear, you're recommending
6 that this ombudsperson would be hired by the
7 North Carolina Utilities Commission, and it would be
8 somewhat housed here in the Dobbs Building, and they
9 would be essentially an employee of the Commission; is
10 that correct?

11 A. Yeah. I mean, IREC didn't go into the
12 details as to where the person would be hired or who
13 would be their overseer, but the idea would be that,
14 yes, the Commission would have the authority to hire an
15 ombudsperson to oversee interconnection disputes in
16 order to provide a neutral party that is neither
17 utility nor developer, and that the process of
18 reviewing disputes could be maintained in a neutral
19 fashion.

20 Q. So it would be not an employee of the
21 utility, not an account manager of the utility as it
22 exists today in Duke Energy's process, it would be
23 someone --

24 A. Correct.

1 Q. -- that is hired by the Commission?

2 A: Correct.

3 Q. And the dedicated staff and resources that
4 you reference in your testimony, those would be also
5 provided by the Commission; is that your testimony?

6 A. Yes, that's the idea, uh-huh.

7 Q. And just one question about the Technical
8 Standards Review Group. When your counsel was asking
9 you some questions on direct about the TSRG, and
10 whether or not IREC would have a role in participating
11 or was invited to participate, I believe Ms. Beaton
12 referenced Mr. Gajda's testimony yesterday suggesting
13 that -- that Duke, when they formed the TSRG, did not
14 include IREC because, in referencing Mr. Gajda's
15 testimony, that IREC didn't have the engineering
16 experience or capabilities to participate; do you
17 recall that discussion?

18 A. I recall it, yes.

19 Q. So, in reviewing that and discussing it with
20 Mr. Gajda, would it be fair to recharacterize his
21 testimony as focusing on engineers and participants in
22 the development community in North Carolina -- so
23 individuals' specific focus on developing projects in
24 North Carolina and South Carolina, which is the focus

1 of the TSRG?

2 A. That is my understanding of how the TSRG is
3 currently set up, yes.

4 Q. And IREC is not currently -- doesn't have a
5 role in developing projects -- solar projects,
6 principally utility-scale, in North Carolina or
7 South Carolina, correct?

8 A. That is correct.

9 MR. BREITSCHWERDT: No further
10 questions, Mr. Chairman.

11 CHAIRMAN FINLEY: Redirect?

12 MS. BEATON: Yes.

13 REDIRECT EXAMINATION BY MS. BEATON:

14 Q. Ms. Auck, just on the same topic that Duke's
15 counsel was just discussing, do you think that the TSRG
16 run -- that is currently run by Duke could benefit from
17 IREC's engineering expertise, even though IREC does not
18 develop projects in North or South Carolina?

19 A. Yes, I do believe that IREC's engineering
20 expertise would be useful in those conversations.

21 Q. Can you explain why?

22 A. Sure. As I said, IREC represents a unique
23 perspective in this proceeding, and our engineering
24 expertise is not just specific to the issues that have

1 been laid out in this hearing and in this proceeding,
2 but more broadly, as the TSRG or any other workgroup
3 designed to navigate some of these complex technical
4 issues, having a third party that is neither utility
5 nor developer in the room that also brings the national
6 perspective could bring a lot of value to the
7 discussion, and we have participated in similar
8 fashions in other states, and it has been proven to be
9 useful per the feedback that we received both from
10 those commissions as well as other stakeholders.

11 With that said, IREC is a nonprofit
12 organization, so the extent of our ability to engage in
13 any state proceeding and any ongoing work or process is
14 always subject to our availability, and budget, and
15 bandwidth, and resources, which are inherently more
16 limited.

17 MS. BEATON: I have no further
18 questions.

19 CHAIRMAN FINLEY: All right. Questions
20 by the Commission?

21 EXAMINATION BY COMMISSIONER MITCHELL:

22 Q. Good morning. Just a few questions.

23 A. Sure.

24 Q. On the issue of the ombudsman, I think your

1 testimony references several other states that have
2 taken this approach: Minnesota, California,
3 Massachusetts; did I get that right?

4 A. Yes. California doesn't have an
5 ombudsperson, per se. They've actually had -- within
6 the utilities, they have had folks that are in charge
7 of similar functions, but they have now created a
8 new -- I would call a more, kind of, centrally located
9 and stakeholder-oriented process to resolve disputes
10 and review similar conflicts involving interconnection.

11 Q. But does it involve the third-party neutral?

12 A. So this new technical workgroup is overseen
13 by the Commission. So, in the sense that the
14 Commission is the neutral overseer, and it is a diverse
15 group of stakeholders that are participating, all with
16 engineering and technical backgrounds.

17 Q. Okay. Well, then, taking California out for
18 a minute.

19 A. Sure.

20 Q. Massachusetts and Minnesota, who is that
21 ombudsperson? I mean, you don't have to give me the
22 name of the individual, but, you know, who is that --
23 who is that person?

24 A. I mean, generally characterized, they are

1 either individuals or entities that have been retained
2 to review and oversee the processes through, I think,
3 either RFP process or through a solicitation process.
4 I'm not familiar with how they work.

5 Q. Do they have specialized knowledge of the
6 interconnection process?

7 A. Yeah, in both cases.

8 Q. Okay. Okay. Changing topics on you quickly.
9 Hosting capacity maps. Can you explain -- you know,
10 there has been discussion about information on the
11 distribution system versus information on the
12 transmission system, and we have heard much testimony
13 on hosting capacity maps over the past couple of days,
14 but can you give us sort of your take on how the
15 information provided in a hosting capacity map would
16 differ from what is provided, for example, in the CPRE
17 process at this point in time?

18 A. Sure. So the way that I see hosting capacity
19 maps is it's really the Google maps for the developers
20 and the customers that are trying to navigate the
21 process. Before they even leave the house, they want
22 to understand where the traffic patterns are or they
23 want to understand where the congestion is, and that
24 informs their path. They may not go out to a certain

1 place during the day if it's trafficy, or they may
2 choose to take a different route. So this is
3 information that folks can get in advance of deciding
4 to pursue a project.

5 The hosting capacity maps also function in a
6 really important way to provide greater transparency
7 into what's happening at the distribution level. At
8 the transmission level, we do have much more granular
9 data available. The wholesale markets, just generally
10 because of the oversight by FERC, we have more
11 information and more understanding of what is happening
12 at the transmission level. The distribution level is,
13 relatively speaking, a black box in most cases. We
14 don't have a good sense until we dig in and ask for
15 things through data requests and through testimony.
16 Only then do we start to kind of unveil and begin to
17 see and visualize the distribution system.

18 In North Carolina, in particular, I think,
19 you know, historically, the context for these
20 discussions has been more centralized or more centered
21 on the large-scale projects, but going forward, the
22 policy changes that the State has made is going to
23 result -- they are going to result in more
24 smaller-scale projects, more projects on the

1 distribution system. So having that granularity, the
2 transparency, and the understanding of the distribution
3 system through the hosting capacity maps would provide
4 a really important tool in the toolbox for
5 interconnection customers, the utilities, the
6 Commission, and other stakeholders as they try to
7 navigate and avoid continued disputes, backlogs, and
8 other congestion.

9 Q. Okay. Thank you.

10 EXAMINATION BY CHAIRMAN FINLEY:

11 Q. All right. Ms. Auck, a question on this
12 ombudsman.

13 Your funds are limited, the Commission's
14 funds are limited. If we hire the ombudsman, do you
15 have any funds to help us out to pay for it?

16 A. I wish I did.

17 Q. And we take a look at this DEC/DEP Auck Cross
18 Examination Exhibit Number 1, you indicated that the
19 entities on that list are a small portion of the
20 funding of our organization?

21 A. Correct, yes.

22 Q. Can you give me a bigger picture as to where
23 your funding comes from?

24 A. Yeah, absolutely. And thank you for asking.

1 So I actually have the actual percentages with me just
2 so I don't misspeak. I will pull those up. So
3 organization-wide we have 30 percent funding from
4 federal funds; 49 percent from foundations; 7 percent
5 from state; 7 percent from other organizations;
6 4 percent from program revenue, which is largely our
7 workforce and credentialing program which offers
8 trainings, and they charge for those trainings; and
9 then sponsors, events, and donations, including those
10 corporate sponsors, are 3 percent; and our overall
11 organizational budget last year was \$3 million, and
12 this year is closer to \$2.7 million.

13 Q. How many employees do you have?

14 A. We have, at the moment, I want to say eight
15 full-time employees, and we have some part-time, as
16 well as contractors that work for us.

17 Q. And how many state proceedings have you
18 participated in the last year or so?

19 A. Last year, we were active as intervenors
20 in -- I think at our peak, 15 proceedings. We also
21 provided technical support and responded to various
22 random Commission requests in approximately seven other
23 states.

24 Q. All right. You were asked by Duke some

1 questions about pages 5 and 6 of your rebuttal
2 testimony.

3 In your perspective and interest in this
4 case, when you say you represent the interest of
5 North Carolina consumers who seek access to a wide
6 range of affordable and sustainable distributed energy
7 resources, and then on page 6 you say that your
8 interests are unique because they are the interest of
9 consumers seeking access to affordable clean energy,
10 right?

11 A. Yes; that's correct, sir.

12 Q. And you understand that the -- as was brought
13 up yesterday, that the Public Staff, by statute,
14 represents the using and consuming public, and by
15 statute, the North Carolina Attorney General represents
16 basically the same group?

17 A. I do understand that, yes. Thank you.

18 Q. Is the constituency that you represent
19 broader or narrower than those interests?

20 A. I would say they are a bit narrower, insofar
21 as we are not representing all ratepayers in the way
22 that the Public Staff, or all taxpayers and citizens as
23 the AG's office does. Again, our perspective is that
24 we represent the consumers in North Carolina who would

1 like clean energy and have a vested interest in seeing
2 streamlined rules, regulations, and policies that
3 enable them to adopt clean energy in whatever form
4 makes the most sense for them in the most affordable
5 and efficient manner. I would also add to that that,
6 in addition to our consumer focus, we do have the
7 national perspective that is unique in this particular
8 proceeding.

9 Q. All right. You know, we have lots of public
10 hearings here. We have, actually, members of the
11 public and people who come in and pay the bills, and
12 one of the things -- we do have people who say they are
13 interested in more renewable energy, more solar and
14 more wind, and make up a strong case for that. But we
15 also have customers who come in and say, "I can't pay
16 my bill. If I pay my electric bill, I can't pay for my
17 medicine, I can't pay for my groceries."

18 What concern do you have for those type of
19 people who can't pay the bills that they've got?

20 A. I absolutely have deep sympathy and concern
21 for those consumers; and really, you know, I think, as
22 we continue to focus, as an organization, on
23 efficiencies, and on affordability, and on the
24 cost-effectiveness of clean energy, our aim long term,

1 and as soon as possible, that all consumers can benefit
2 from clean energy. That there isn't a discrepancy
3 between haves and have nots. Our vision, as an
4 organization, is that we have clean energy, but we also
5 have a paradigm where societies' values and interests
6 are respected and kept in mind.

7 Q. Are any of the recommendations that you make
8 in this case inconsistent with those that the
9 developers are making in this case?

10 A. Been a lot of issues covered. So I would
11 like to say we have certainly taken different positions
12 than the developers. I would want to refer back to my
13 testimony and their testimony to hone in on any more
14 specifics, in terms of discrepancies, but they have
15 also brought up -- pardon me. They've also brought up
16 other issues that we do not have a position on and do
17 not have a stake in the ground on, so to speak.

18 Q. One of the things that you promote is
19 national rules, and standards, and best practices,
20 right?

21 A. Correct, yes.

22 Q. And what Duke says and Dominion say in
23 response to that is that one size doesn't necessarily
24 fit all, and one of the things they say is, with

1 respect to interconnecting -- interconnection projects,
2 especially the medium-sized ones, that they are sort of
3 ahead of the curve, if you will. That they are
4 confronting problems that perhaps other states, like
5 Massachusetts or wherever, haven't yet confronted and
6 that, therefore, it's a little bit inappropriate to
7 suggest that we look to those other states for guidance
8 here.

9 What is your response to that?

10 A. My response would be this: As we develop
11 national best practices gleaned from the multitude of
12 states in which we work and our understanding of the
13 national landscape, we absolutely understand that every
14 state has its own market, it's own unique circumstances
15 that must be tailored to some extent. We consider our
16 work to be sort of the template, the basis for jumping
17 off. And again, as I said, I think yesterday, helping
18 states avoid from having to start at ground zero and
19 reinvent the wheel, and also facilitating a faster
20 learning process for folks.

21 In response to where Duke is currently, I do
22 not think that they are in alignment with other states
23 and other utilities with respect to how they are
24 processing fast track and the supplemental review, and

1 I think that the lack of transparency around the
2 supplemental review screens is an impediment to
3 mid-scale projects as well as large-scale projects.

4 Again, coming back to the concept of a living
5 laboratory that was used quite frequently throughout
6 the last couple of days, in any laboratory setting,
7 without data, and transparency, and tracking, and
8 reporting, you are never going to be able to understand
9 whether or not your experiment is working. So it's
10 really important that, as North Carolina, Duke, and the
11 other utilities work to address the multitude of
12 challenges that you-all are facing, that there is
13 sufficient transparency and accountability, as well as
14 tracking and reporting, so that, as you-all are
15 learning, there is an opportunity for all of the other
16 stakeholders to learn as well.

17 Q. Have you ever, in your testimony before
18 another state agency, recommended that something
19 North Carolina's doing is better than what they are
20 doing, and used a template that -- what North Carolina
21 is doing for their state?

22 A. Sure. I mean, we have definitely pointed to
23 North Carolina's progress made in 2015 in adopting the
24 vast majority of the recommendations on interconnection

1 reform, including the kind of the FERC SGIP template to
2 start with, and we definitely point to the Carolinas,
3 as a whole, as leaders in the southeast on
4 interconnection. You guys are far ahead of the other
5 states in the region on a lot of fronts. So we
6 definitely commend the efforts that have been made to
7 date. We are not trying to walk in the room and just
8 downplay the work that has gone into all of this. We
9 know it is burdensome for all to continue this
10 conservation, but the reality is that interconnection,
11 whether we love it or not, is the foundation upon which
12 clean energy markets are built. So it is going to be
13 important to continue to focus on these issues. They
14 will not go away just by turning the other cheek, so to
15 speak.

16 Q. You do recognize that North Carolina has
17 unique legislative statutes and the Commission has
18 unique rules and regulations, administrative rules and
19 regulations that we have to follow in this area?

20 A. Of course, absolutely.

21 Q. Are you aware that -- I think it was in a
22 recent renewable portfolio standard tracking case,
23 where the Commission addressed the issue of recovery of
24 interconnection costs, and the Commission sort of

1 directed Duke to make sure that those costs are
2 recovered by the interconnection providers as opposed
3 to the general body of ratepayers?

4 A. I am familiar with that, yes.

5 Q. Do you have any problem with that concept?

6 A. I do not have a problem with that concept.
7 IREC does not take a position on that. That is really
8 for every state to determine what makes the most sense.
9 We do think that there are broader benefits to
10 investments in clean energy that the public, as a
11 whole, and all ratepayers benefit from, and there are
12 ways to balance the cost and benefits, but it is really
13 up to every state to decide how to handle that.

14 Q. And with respect to the fee issue, now you
15 have the Public Staff and the Company in agreement, and
16 the Public Staff is supposed to look at those.

17 Does that help you any in your position in
18 this case that the Public Staff is now on board there?

19 A. Sure. I mean, I think, again, our main point
20 made on the fees -- again, our point was made before
21 the stipulation -- is that the categories assigned to
22 the fees were not the same categories as assigned to
23 the different costs incurred. So, in an ideal world,
24 we would like to see a little bit more of a kind of

1 side-by-side comparison so that they could just be,
2 again, open and transparent. And from that point, we
3 can determine if costs are being under-recovered, that
4 they be adjusted in accordance with however the
5 Commission deems fit.

6 Q. All right. I have a few questions that staff
7 wants me to ask you, additional questions. On page 16.

8 A. 16 of my direct?

9 Q. I'm not sure. You state that Duke should not
10 be allowed to determine that the fast track projects
11 that fail on mutual screens need to go straight to the
12 Section 4 study process and bypass supplemental review.
13 You state that, without the results of the supplemental
14 review, projects that are not viable may proceed
15 unnecessarily to full study, and some projects that are
16 viable may be abandoned after failing the fast track
17 screens.

18 Do you have any specific North Carolina
19 examples that either of those two scenarios have
20 happened?

21 A. I don't have specific examples, primarily
22 because we have not been able to get more of that
23 granular information with respect to which projects are
24 failing the supplemental review and which are going on

1 to study, so I don't have that information.

2 Q. All right. And the issue about the ombudsman
3 and whether -- ombudsperson would help avoid formal
4 complaints.

5 How many formal IC complaints have been filed
6 here in North Carolina, if you know, that my be helped
7 by this ombudsman process?

8 A. So I'm aware of the handful of formal
9 complaints, and I'm not remembering off the top of my
10 head if it's five, six, or four, something in that
11 range. It was a handful that they were larger, more
12 formal complaints filed before the Commission. I think
13 we do not have a number, to my knowledge, of the number
14 of more informal disputes and back and forths that have
15 not been filed before the Commission, so I don't know
16 that number.

17 Q. All right. And then you compare Ohio,
18 Illinois, and Virginia fees to the North Carolina fees.
19 Why did you pick those three states?

20 A. Those are the states that we were able to
21 track down the fee amounts for. So just providing them
22 for comparison.

23 Q. And what about the megawatts and the queue
24 for those states; how do they compare with

1 North Carolina's queue?

2 A. You know, I don't have that information. I
3 would have to look it up. And, in some places, it's
4 hard to find. So I'm not sure I could get all the data
5 for all the states.

6 Q. And on page 56, and I'm not sure whether
7 that's --

8 A. Well, I think my direct was the longest, so I
9 think it's probably the direct.

10 (Witness peruses document.)

11 Okay.

12 Q. Okay. In response to Duke indicating that
13 some of these increased fees go to the cost of the new
14 systems, like sales force, you discuss SDG&E's cost
15 savings from upfront investment.

16 How are these cost savings determined?

17 A. So, pardon me, let me make just sure I'm at
18 the right place here. So I believe, in one of our data
19 requests, we were asked to provide more information
20 about how those costs were determined, and we don't
21 have any additional information. It was filed in this
22 EPRI report, so EPRI might know, and I would encourage
23 you to ask them.

24 Q. Well, will do. And let's make it clear, we

1 have the stipulation in the partial settlement. I
2 think you said that you -- you commented on that, and
3 again, refresh my recollection, where do you stand on
4 the things that are agreed to in that settlement
5 stipulation?

6 A. Yeah. So the main one is the -- let me
7 refresh my memory, sir, with my notes here. Make sure
8 I'm not speaking out of turn.

9 MS. BEATON: Ms. Auck, do you have a
10 copy of the stipulation in front of you, or do you
11 need a copy?

12 THE WITNESS: I would love a copy.
13 Thank you.

14 MS. BEATON: May I approach?

15 THE WITNESS: Great. Thank you. So I
16 think our main position, in response to the
17 stipulation, is that we are very appreciative of
18 Duke's recognition that they need to take a closer
19 examination of their fast track screens and their
20 supplemental review. As we understand it, in the
21 stipulation, their proposal was to consult
22 independently with EPRI on those screens, and our
23 position would be that we do believe, at this
24 juncture, there is sufficient evidence to support

1 an independent review wherein both the Commission
2 and staff, as well as the stakeholders that have
3 been involved in this proceeding, would have the
4 opportunity to review any findings from that review
5 process and comment on them as appropriate. But
6 certainly would not be opposed to having the
7 opportunity to consult with EPRI, or the national
8 labs, or other relevant stakeholders to inform that
9 process. On the other matters, I don't think we
10 have a firm position on much of the other
11 components of the stipulations at this juncture.

12 CHAIRMAN FINLEY: Thank you, Ms. Auck.
13 Other questions? Mr. Gray.

14 EXAMINATION BY COMMISSIONER GRAY:

15 Q. Just out of curiosity, which federal agency
16 provides the federal funds for IREC?

17 A. Primarily, the Department of Energy. We have
18 also received -- sorry to interrupt you -- we have also
19 received funding from the Weatherization Assistance
20 Project which -- program, sorry, not project -- and I
21 cannot honestly recall if they are housed in the
22 Department of Energy or if they are housed in the
23 housing agency.

24 Q. And does the work from DOE require lobbyists

1 in Washington?

2 A. The work actually prohibits lobbying. IREC
3 does not do any legislation, we do not do any campaign
4 work, we do not involve ourselves in elections. We are
5 prohibited from both by our 501(c)(3) status, as well
6 as our internal guidelines. We are -- we do not do any
7 lobbying.

8 Q. So how do you get your federal money?

9 A. We apply to grants that are all publicly
10 noticed requests for proposals, and then submit those
11 grants, and then we receive them when we win.

12 Q. Do you receive any money from the
13 Environmental Protection Agency?

14 A. Not to my knowledge, no.

15 Q. Thank you.

16 CHAIRMAN FINLEY:

17 Commissioner Brown-Bland has a question.

18 EXAMINATION BY COMMISSIONER BROWN-BLAND:

19 Q. Ms. Auck, a moment ago you mentioned that,
20 without data, it's hard to determine if the procedures
21 or program is successful. And I think we could all
22 agree that also mean -- I mean, any program, or
23 process, or procedure can always be looked at for
24 places where there can be tweaks and improvement, and

1 data can help inform those places to make those tweaks
2 or improvements, right?

3 A. Agree.

4 Q. But at least Duke -- and maybe to a lesser
5 extent Dominion -- but Duke does focus on one data
6 point, and that is the number of interconnections they
7 have done over a short period of time, which, according
8 to the evidence, is far more than anyplace else in the
9 continental United States.

10 A. For the large-scale systems, yes, that's
11 correct.

12 Q. And so what do you say about that data point
13 as a measure of the success, and is that the only
14 measure we should be concerned about?

15 A. I would say it is absolutely a testament to
16 the fact that Duke has stepped up to process a lot more
17 interconnection applications that are of that larger
18 scale, by nature, more challenges, more technically
19 complex. I don't think it's the only metric of
20 success. I do think that the number of smaller-scale
21 projects and distributed generation projects that are
22 able to move through a process much more expeditiously
23 would be a metric. The number of timelines that are
24 met and the member of metrics or milestones along the

1 process that are upheld would be another metric of
2 success, and there are certainly others. Again, I
3 think important to keep in mind that, as the landscape
4 shifts here in North Carolina, more attention will need
5 to be paid to the efficiencies and the timeline
6 adherence of the smaller to mid-scale projects, as
7 those would be likely to grow over time, as Duke
8 agrees, based on the policy changes.

9 Q. And one more question. In your
10 representation of that portion of the public who's
11 interested in clean air, cleaner fuel sources, and
12 those kinds of things, inasmuch as you do not
13 represent, according to your testimony this morning,
14 the entire public or same clients that the AG and the
15 Public Staff represent, is it the case that you -- in
16 making your representations, you are not responsible
17 for balancing all of those many varying interests, but
18 you focus primarily just on those who are interested in
19 renewables and clean energy? If you could put that in
20 your words.

21 A. Sure. Yeah. You know, again, our
22 organizational mission really drives our positions and
23 where we focus. It is the unenviable position of the
24 Commission to balance all the diverse interests and the

1 voices that are in this room and make those decisions
2 based on where those balance points are.

3 **EXAMINATION BY COMMISSIONER PATTERSON:**

4 Q. I just want to go back to your resume.

5 A. Okay.

6 Q. I'm just an old PR guy myself, so I was
7 impressed that you have developed policy positions, you
8 write grants, and hold fundraisers to develop program
9 budgets, develop commissions projects, reports, blogs,
10 articles, podcasts, media relations, presentations at
11 state and national organizations, et cetera, et cetera,
12 et cetera, and you even develop core curriculum at Salt
13 Lake Community College. What I didn't see is any
14 training in engineering, or grid design, or anything
15 like that.

16 How do you expect us to take you terribly
17 seriously based on that sort of hole in your resume
18 there?

19 A. Well, thank you for the ego boost of all my
20 skills. I had forgotten what I had in there, so. Two
21 things. I am not an engineer. I am not a lawyer. I
22 have 15 years of experience working on clean energy
23 policy across the country and in Utah. I have hired an
24 engineer who works on my behalf and under my direction,

1 and his testimony and his resume speak to his
2 engineering expertise. I do not pretend to have his
3 expertise in my own brain, though I will say, as
4 someone who has been working on clean energy issues for
5 the length of time that I have, I have a pretty good
6 understanding of the technical issues that come in the
7 door and the arguments that are often --

8 Q. Yeah. I looked at his resume too. He has no
9 practical experience in that regard.

10 A. In what sense? Sorry, can you clarify?

11 Q. In terms of design of grid systems and that
12 sort of thing.

13 A. As a utility engineer?

14 Q. Right.

15 A. He was not a utility engineer, correct.

16 Q. Thank you.

17 A. He was an electrical engineer by training and
18 worked for a manufacturer of smart inverters for many
19 years in which he was applying that engineering
20 expertise.

21 Q. He's competent in those areas, I'm certain.

22 The other thing, have you done a marketing
23 study in North Carolina aimed at those potential
24 customers that you represent?

1 A. We have not conducted a marketing study in
2 North Carolina, no. I will say we do receive
3 individual donations from folks across the country. I
4 would need to go back to our donor profiles to see how
5 many of them are from North Carolina, but I do know
6 there are some representative of this state.

7 Q. I am asking about the ones who want the
8 rooftop solar and those kinds of customers, not your
9 donors. I have a fair idea who they are.

10 A. Sure. So what is your question? I'm sorry.

11 Q. The customers, the companies, the small
12 companies, the homeowners, and those people who may
13 want those small systems, have you done a marketing
14 study aimed at that group of customers?

15 A. No, Commissioner, we have not.

16 Q. Thank you. One other question.

17 Did you actually prepare your prefiled
18 testimony?

19 A. I was involved in the preparation of my
20 prefiled testimony.

21 Q. Thank you. That's all I wanted.

22 A. I oversaw it, yes.

23 Q. Yeah.

24 CHAIRMAN FINLEY: Ms. Auck, one more

1 question.

2 EXAMINATION BY CHAIRMAN FINLEY:

3 Q. Are you familiar with the levelized cost of
4 energy project that DOE has sponsored -- recently
5 sponsored?

6 A. I am not familiar with that, no.

7 Q. So, as far as you know, your organization has
8 not participated in that project?

9 A. As far as I know, no.

10 Q. Okay. Thanks.

11 CHAIRMAN FINLEY: Questions on the
12 Commission's questions?

13 MR. BREITSCHWERDT: Just a few.

14 RECROSS EXAMINATION BY MR. BREITSCHWERDT:

15 Q. Ms. Auck, Commissioner Mitchell asked you
16 about the position that IREC has taken on hosting
17 capacity maps; do you recall that?

18 A. I do, yes.

19 Q. And you provided an explanation, which I
20 think I followed, but you were talking about customers
21 leaving the house and navigating the system.

22 Is that -- did I understand that correctly?
23 Can you explain -- or maybe restate what you said
24 there?

1 A. Sure, yes. It was an analogy of the Google
2 Maps being the equivalent -- you know, we have the
3 ability, with our smart phones, to, you know, set a
4 destination and determine, is there traffic? What is
5 the best route to get there? Are we going to encounter
6 some sort of construction delays? And using that
7 information, we make informed decisions. In that same
8 way, a hosting capacity map or a heat map, if you
9 wanted to start, kind of, one step back from a
10 hosting -- full-blown hosting capacity map, provides
11 customers and developers the information that they
12 would need to determine whether or not their project is
13 going to be triggering or likely to trigger more
14 time-intensive studies, or might endure a more costly
15 process, because it's perhaps in a highly concentrated
16 zone of development already. So it just provides one
17 more piece of information before they walk in a door,
18 before they file for a \$500 pre-application report, or
19 before they take the time to work through an
20 application process, they can actually make that
21 determination at the outset.

22 Q. So I think the key point there is the concept
23 of leaving the house. I mean, for the small
24 residential customers, small commercial customers, they

1 are not actually going to move their location, correct?

2 A. Correct. They may decide not to pursue a
3 project.

4 Q. So if they want to pursue that, that
5 substantive customers could pursue a pre-application
6 request or -- and what we have in North Carolina, which
7 may be somewhat unique, is an informal free
8 pre-application inquiry that small customers can reach
9 out to the utility and get that preliminary
10 information; are you familiar with that?

11 A. Sure. The one thing I failed to mention in
12 my last comment was hosting capacity analysis. If the
13 full-blown analysis is provided, can inform customers
14 as to whether or not they may want to modify the system
15 that they are seeking, either adding storage,
16 incorporating smart inverter technologies, integrating
17 some other complementary technology, or reducing the
18 size of their project. So it can inform them in that
19 way. They cannot move their house, I agree with you,
20 but they may be able to modify the system that they are
21 thinking of installing if they have the information at
22 the outset.

23 Q. And just thinking through what a hosting
24 capacity map looks like, that would be a green line,

1 red line, some level of -- how is a residential
2 customer going to know that a green line represents
3 they can add storage or not, or a red line says they
4 can -- they can't increase it by 2 x their 5kw system,
5 but they can increase it by 2 kilowatts?

6 A. Right. So there is two things. There's the
7 heat map, which is just the density and the total
8 capacity that's installed on the system. That does not
9 provide any analysis on what additional capacity might
10 be able to go on the system. So that's kind of map A,
11 or kind of first-step map. The hosting capacity
12 analysis actually applies a more rigorous analytical
13 methodology to be able to analyze different grid
14 conditions to say, within this set of parameters,
15 determined by the algorithms and the methodology, this
16 amount of PB could go online, this amount of PB plus
17 storage, and I refer to my testimony and the exhibits
18 that we provided in that testimony that talks about how
19 the California maps are functioning in that way.

20 Q. And that would be the more significant
21 investment in the distribution system analysis that we
22 talked about yesterday, likely costing millions of
23 dollars?

24 A. I don't know the comparison of cost between a

1 heat map and a hosting capacity analysis, but per my
2 comments yesterday, I think that we don't have
3 sufficient cost data on what hosting capacity analyses
4 actually costs. We have one data point from SDG&E to
5 point two, which is 400k and not millions.

6 Q. All right. Chairman Finley asked you a few
7 questions about the Company's fee proposals, and you
8 questioned the granularity of those fee proposals.

9 Isn't it true there is also indirect costs
10 associated with the studying of Section 2, Section 3
11 projects, the sales force platform that Duke is rolling
12 out to make it more efficient for customers, the
13 customer portals the Company's presenting, and that
14 those costs should also be recovered?

15 A. I would grant you that there are indirect
16 costs and, as appropriate, those costs should be
17 covered.

18 Q. And the way the companies develop their
19 categorization of fees is reflective including both
20 those direct and indirect costs, correct?

21 A. I can't speak to how the Company developed
22 their categorization, but.

23 Q. Briefly, you spoke with
24 Commissioner Brown-Bland about the Company providing

1 data, or the importance of data and transparency to the
2 process.

3 Would you agree that Duke Energy, throughout
4 the discovery process throughout this proceeding, has
5 provided extensive data on the metrics, and the time
6 frames, and the processing of small Section 2 projects,
7 Section 3 projects, as well as, when requested, Section
8 4 projects to IREC?

9 A. I would agree that, through the data request
10 process that has been, you have definitely provided
11 lots of good information.

12 Q. Thank you. That's all I have.

13 CHAIRMAN FINLEY: Ms. Kells?

14 CROSS EXAMINATION BY MS. KELLS:

15 Q. Thank you. Sorry. I changed my mind here.
16 Just following up on some of Counsel Perdue's (phonetic
17 spelling) questions about the hosting capacity and heat
18 capacity maps and hosting capacity maps.

19 Would it be true that there would be an
20 initial investment to set up the heat map or the
21 hosting capacity map, and then there would also be a
22 cost component to continually maintaining those over
23 time?

24 A. I don't know that I could answer that, only

1 because we don't provide the maps. We don't -- you
2 know, I'm not familiar with whether or not there are
3 ongoing maintenance costs for those maps. My
4 assumption would be that, yes, there would be an
5 initial outlay of expenses and then over time there
6 would need to be some sort of maintenance or ongoing
7 inputs that go into those, but I can't speak to the
8 cost.

9 Q. Would it make sense to you that there would
10 need to be an ongoing maintenance to those sorts of
11 maps? For instance, in a scenario where one customer
12 looked at a heat map or a hosting capacity analysis and
13 maybe made a decision based on that, and a year later
14 the system has changed, and so an interconnection
15 customer who comes along a year later, five years
16 later, whatever, if they are looking at that original
17 map, it wouldn't be useful; would that make sense to
18 you?

19 A. I would agree with that. The value of the
20 maps definitely hinges -- and their ability to be used
21 in a more realtime basis does hinge on their ability to
22 be updated more frequently than a year, yes.

23 MS. KELLS: That's all. Thank you.

24 FURTHER REDIRECT EXAMINATION BY MS. BEATON:

1 Q. One question, Ms. Auck. Following up on
2 Duke's counselor's questions about
3 Commissioner Brown-Bland's questions about data
4 transparency. You indicated that Duke has been happy
5 to share substantial information with IREC through
6 responses to our data requests.

7 Do you think it is important to provide that
8 sort of transparency publicly as opposed to on request?

9 A. Yes, I do. I do agree that it's very
10 important to provide that data publicly and not just
11 through data requests.

12 Q. And can you explain why it's important to
13 have that information on how Duke is complying with the
14 interconnection process publicly available?

15 A. Sure. Along the same lines of what I was
16 mentioning earlier, if we are in a living laboratory,
17 being able to have publicly available access to data,
18 such that the Commission and other stakeholders can
19 really start to better understand what is working, what
20 is not. And where there are opportunities for
21 improvement, it is our position that transparency is
22 really integral to make improvements over time and
23 address more immediate concerns as well.

24 MS. BEATON: No further questions.

1 CHAIRMAN FINLEY: All right. Thank you,
2 Ms. Auck. Without objection, we will receive into
3 evidence her direct and rebuttal exhibits and the
4 Duke Cross Examination Exhibit Number 1.

5 (Exhibit SBA Direct Examination Exhibit
6 Numbers 1 through 10, Exhibit SBA
7 Rebuttal Examination Exhibit Number 1,
8 and Duke Progress Auck Cross Examination
9 Exhibit Number 1 were received into
10 evidence.)

11 CHAIRMAN FINLEY: You may be excused,
12 and I hope you make your flight.

13 THE WITNESS: Thank you, Commissioner.
14 Thank you Chairman Finley. Appreciate your time.

15 CHAIRMAN FINLEY: Stay warm.

16 THE WITNESS: We all need to stay warm.
17 It's cold everywhere.

18 CHAIRMAN FINLEY: All right. NCSEA?

19 MR. SMITH: Calling Paul Brucke to the
20 stand.

21 Whereupon,

22 PAUL BRUCKE,
23 having first been duly sworn, was examined
24 and testified as follows:

1 DIRECT EXAMINATION BY MR. SMITH:

2 Q. Mr. Brucke, could you please state your full
3 name and business address?

4 A. Paul Brucke, 109 East Poplar Avenue,
5 Carrboro, North Carolina 27510.

6 Q. And with respect to your full-time day-to-day
7 job, by whom are you employed and in what capacity?

8 A. I am a consulting engineer. I am employed by
9 a company which I own, Brucke Engineering.

10 Q. Did you cause to be prefiled in this docket
11 direct testimony consisting of 16 pages and also
12 including Exhibits PB-1 and PB-2?

13 A. Yes, I did.

14 Q. Do you now have any changes to make to your
15 direct testimony?

16 A. Yes. I have two minor changes to my
17 testimony. On page 1 of my testimony where I stated my
18 educational and professional experience, on line 17 I
19 stated that I am licensed in 20 U.S. states and the
20 U.S. Virgin Islands. Since filing this testimony, I've
21 become licensed in Pennsylvania, which makes 21 states.

22 Concerning my testimony on Duke's TSRG, I
23 stated, on page 13, line 14, that there were three
24 previous meetings since filing this testimony. There

1 has been an additional, which makes four.

2 Q. Thank you. Do you have any other changes to
3 make to your testimony?

4 A. No, I do not.

5 Q. Subject to those updates, are the answers you
6 gave in your prefiled direct testimony true and correct
7 to the best of your knowledge?

8 A. Yes, they are.

9 Q. And again, subject to those updates, if I
10 asked you the same questions again here today, would
11 your answers be the same?

12 A. Yes, I would.

13 MR. SMITH: Mr. Chairman, we ask that
14 Mr. Brucke's prefiled direct testimony consisting
15 of 16 pages be admitted into the record as if given
16 from the stand, and furthermore, that his prefiled
17 exhibits PB-1 and PB-2 also be entered into the
18 record.

19 CHAIRMAN FINLEY: Well, at this point,
20 we will have Mr. Brucke's prefiled testimony of
21 16 pages of November 19, 2018, copied into the
22 record as if given orally from the stand, and I'm
23 gonna mark his two exhibits as premarked in the
24 file.

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(NCSEA Exhibit PB-1 and PB-2 were marked
as premarked in the file.)
(Whereupon, the prefiled direct
testimony of Paule Brucke was copied
into the record as if given orally from
the stand.)

1 **I. INTRODUCTION**

2 **Q PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.**

3 A. My name is Paul Brucke. My business address is 109 East Poplar Avenue,
4 Carrboro, NC 27510.

5 **Q BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?**

6 A. I am the Principal Engineer at Brucke Engineering PLLC. Brucke Engineering
7 PLLC provides technical support and engineering for solar photovoltaic (“solar
8 PV”) projects to developers, contractors, owners, investors, and utilities.

9 **Q. PLEASE STATE YOUR EDUCATIONAL AND PROFESSIONAL**
10 **EXPERIENCE.**

11 A. I received a Bachelor of Science in Electrical Engineering from Clemson University
12 in 1997. I have 20 years of electrical engineering experience with 10 years of
13 experience in the solar industry. I was employed as head engineer for two solar
14 developers: Strata Solar and Cypress Creek Renewables. Additionally, I have
15 worked for a large consulting engineering firm, Black & Veatch, as a consulting
16 engineer on solar PV projects. I am a licensed Professional Engineer in North
17 Carolina and 20 other U.S. states and in the U.S. Virgin Islands. I am a Senior
18 Member of the Institute of Electrical and Electronics Engineers (“IEEE”) and a
19 member of the IEEE 1547 Revision Working Group. I have provided
20 interconnection support for over 20 gigawatts (“GW”) of projects with project sizes
21 ranging from below 1 megawatt (“MW”) to greater than 100 MW. I have
22 experience with interconnecting projects to electric utilities throughout the U.S. I

1 was involved with the interconnection of the first 1 MW and 5 MW QF projects
2 connected to both Duke Energy Carolinas, LLC (“Duke Energy Carolinas” or
3 “DEC”) and Duke Energy Progress, LLC (“Duke Energy Progress” or “DEP”)
4 (DEC and DEP collectively, “Duke”) around 2011 and have been involved in the
5 North Carolina solar industry since that time. A copy of my resume is attached to
6 this testimony as **Exhibit PB-1**.

7 **Q. ON WHOSE BEHALF ARE YOU TESTIFYING?**

8 A. I am testifying on behalf of the North Carolina Sustainable Energy Association
9 (“NCSEA”), an intervenor in this proceeding.

10 **Q. HAVE YOU TESTIFIED PREVIOUSLY BEFORE IN FRONT OF THE**
11 **NORTH CAROLINA UTILITIES COMMISSION?**

12 A. No.

13 **Q. WHAT IS THE BASIS OF YOUR TESTIMONY?**

14 A. My testimony consists of my professional technical opinions based upon my
15 experience with Duke and other utilities, review of the North Carolina
16 Interconnection Procedures, Duke’s various presentations, and other
17 documentation regarding interconnection criteria and restrictions.

18 **II. INTERCONNECTION SCREENS**

19 **Q. ARE YOU FAMILIAR WITH ANY SCREENS USED BY DUKE IN THE**
20 **INTERCONNECTION PROCESS?**

1 A. Yes, I am familiar with three screens used by Duke: Circuit Stiffness Review
2 (“CSR”), the line voltage regulator (“LVR”) screen, and the method of service
3 guidelines.

4 **A. Circuit Stiffness Review**

5 **Q. WHAT IS CIRCUIT STIFFNESS REVIEW?**

6 A. The Circuit Stiffness Review was a screen that Duke introduced in 2016 where the
7 the short circuit ratio at the Point of Interconnection (“POI”) and at the substation
8 was calculated.

9 **Q. HOW DID DUKE USE THE CIRCUIT STIFFNESS REVIEW?**

10 A. Duke used the CSR to determine the relative strength of the grid compared to the
11 size of an interconnecting generator (the “stiffness factor”¹).

12 **Q. HOW DID DUKE CALCULATE THE STIFFNESS FACTOR?**

13 A. Duke calculated the stiffness factor as the ratio of the available short circuit current
14 at either the substation or POI to the rated current of the generator or generators. At
15 the substation, the cumulative generation capacity of all generators connected to
16 that substation was used for the calculation. At the POI, the capacity of the
17 generation requesting interconnection was used for the calculation.

18 **Q. HAS DUKE MODIFIED ITS CIRCUIT STIFFNESS REVIEW SINCE THE
19 SCREEN WAS INTRODUCED?**

20 A. Yes. Originally Duke announced that projects with a stiffness factor below 25 at
21 the POI or the substation would not be allowed to interconnect. Duke revised their

¹ Stiffness Factor is also known as “short circuit ratio” in industry terms.

1 approach to use CSR as a screen such that projects with a stiffness ratio below 25
2 would be subject to “Advanced Study” and would undergo an analysis of impacts
3 to the distribution system from energization of the project’s transformers. Typical
4 stiffness factors at the POI range from 10 to 100. Stiffness factors at the substation
5 depend on the cumulative generation connected to that substation and with the
6 current level of penetration it is common for a project to see a stiffness factor below
7 25 at the substation.

8 **Q. HAS DUKE EVER HAD SUBSTATIONS OPERATING WITH STIFFNESS**
9 **FACTORS BELOW 25?**

10 A. Yes. Before the CSR was used as a screen by Duke, the utility had multiple
11 substations operating with stiffness factors below 25 with no apparent issues.

12 **Q. IS DUKE CURRENTLY USING CSR AS A SCREEN?**

13 A. Duke is not currently using CSR as a screen. Instead, Duke is performing
14 transformer inrush analysis (Advanced Study) on projects 1 MW and larger.

15 **Q. IS CSR DIRECTLY ADDRESSED IN THE NORTH CAROLINA**
16 **INTERCONNECTION PROCEDURES?**

17 A. No.

18 **Q. WHAT TECHNICAL JUSTIFICATION DID DUKE PROVIDE FOR**
19 **CIRCUIT STIFFNESS REVIEW WHEN IT WAS INTRODUCED?**

20 A. Duke indicated that they had seen power quality issues with projects that had a
21 stiffness ratio of below 25 and cited a 2010 document published by the National

1 Renewable Energy Lab (“NREL”) that suggested that projects with a stiffness ratio
2 below 50 may experience voltage regulation issues.²

3 **Q. WAS THE NREL DOCUMENT RELEVANT TO THE ISSUES DUKE HAD**
4 **SEEN ON THEIR SYSTEM?**

5 A. The NREL document is dated, has little analysis or context and the issues cited by
6 Duke were not voltage regulation issues.

7 **Q. WHAT SPECIFIC POWER QUALITY ISSUES DID DUKE INDICATE**
8 **HAD BEEN SEEN?**

9 A. Duke indicated that an incident involving a 20 MW solar PV project that is
10 interconnected to the distribution system caused a Campbell’s soup plant to lose
11 production.³ This incident was determined to be caused by harmonic distortion
12 caused by the inrush current seen when energizing all the transformers in the
13 project, also known as transformer inrush. Duke also cited two other issues which
14 appeared to be isolated inverter issues or issues with Duke recloser settings.

15 **Q. DO YOU THINK THE LEVEL OF CONCERN EXPRESSED BY DUKE AT**
16 **THAT TIME WAS REASONABLE?**

17 A. No. Duke indicated a high level of concern and made general statements to the press
18 about power quality concerns with solar farm interconnections. However, Duke had

² National Renewable Energy Laboratory, “Evaluating Future Standards and Codes with a Focus on High Penetration Photovoltaic (HPPV) System Deployment,” presented at the 4th International Conference on the Integration of Renewable and Distributed Energy Resources, Dec. 6-10 2010, Albuquerque, NM. Available at nrel.gov/docs/fy11osti/49789.pdf.

³ See, *Duke Energy Carolinas, LLC and Duke Energy Progress, LLC's Response to September 8, 2016 Order Requiring Response and Requesting Comments*, Docket No. E-100, Sub 101, Attachment 1 (September 22, 2016).

1 not diligently investigated the cause of the issues, most of which turned out to be
2 isolated inverter issues that could be mitigated by the inverter manufacturer or
3 issues with the way Duke had configured the protection in their own reclosers at
4 the POI. In at least one of the few cases, Duke had not even contacted the owner of
5 the project to discuss the issues they had seen.

6 **Q. IN YOUR OPINION, WAS IT REASONABLE TO USE CSR AS A SCREEN**
7 **FOR THE TRANSFORMER INRUSH EVALUATION IN THE ADVANCED**
8 **STUDY?**

9 A. Through technical discussions with Duke, both the solar industry and Duke agreed
10 that the transformer inrush issues Duke had seen with the Campbell's soup plant
11 were not necessarily correlated with lower stiffness ratios.

12 **Q. WOULD YOU CONSIDER THE USE OF THE CSR GOOD UTILITY**
13 **PRACTICE?**

14 A. No, I would not consider Duke's original use or revised use of CSR as Good Utility
15 Practice. It is common for utilities to use screens to make the interconnection
16 process more efficient, but failing a screen typically is a trigger for further study,
17 not for denying interconnection outright. Neither the original intended use, nor the
18 revised use of CSR is part of the interconnection process of other utilities, as seen
19 from my experience. Additionally, neither the original nor the revised use of CSR
20 had reasonable technical justifications.

21 **Q. DO YOU CONSIDER IT REASONABLE FOR DUKE TO DETERMINE**
22 **FOR ITSELF WHAT CONSTITUTES GOOD UTILITY PRACTICE WHEN**

1 **Q. ARE THERE CONSEQUENCES ASSOCIATED WITH RECONFIGURING**
2 **LINE VOLTAGE REGULATOR SETTINGS?**

3 A. Yes. Reconfiguration of line voltage regulator settings has consequences to both
4 Duke operations and to the demand response capacity of the distribution system
5 demand response (“DSDR”) system. Regarding Duke operations, Duke would have
6 to keep track of line voltage regulator settings and may need to temporarily
7 reconfigure them when the circuit is in an abnormal configuration (i.e., fed from
8 different substation such that the utility source is on the opposite side of the line
9 voltage regulator than it is in normal operation). It is feasible for Duke to develop
10 policies that can accommodate the necessary temporary line voltage regulator
11 setting reconfigurations.

12 **Q. HAS DUKE QUANTIFIED THE DECREASE IN THE DEMAND**
13 **RESPONSE CAPABILITY OF ITS DSDR SYSTEM ASSOCIATED WITH**
14 **INTERCONNECTING CUSTOMERS BEYOND A LINE VOLTAGE**
15 **REGULATOR?**

16 A. No, Duke has not quantified the amount of decreased capacity that would result
17 with the lowering of the line voltage regulator band center necessary to
18 accommodate interconnection beyond a line voltage regulator in Duke Energy
19 Progress. Duke has contended that any decrease in capacity is unacceptable.

20 **Q. HAS DUKE DEPLOYED THE DSDR SYSTEM IN BOTH THE DUKE**
21 **ENERGY CAROLINAS AND THE DUKE ENERGY PROGRESS SERVICE**
22 **TERRITORIES?**

1 A. Duke has only deployed the DSDR system in the Duke Energy Progress service
2 territory. DSDR has not been deployed in the Duke Energy Carolinas service
3 territory.

4 **Q. IS DUKE APPLYING THE LINE VOLTAGE REGULATOR POLICY IN**
5 **BOTH ITS DUKE ENERGY CAROLINAS AND DUKE ENERGY**
6 **PROGRESS SERVICE TERRITORIES?**

7 A. Yes.

8 **Q. HAS DUKE MADE AVAILABLE TO INTERCONNECTION CUSTOMERS**
9 **INFORMATION ABOUT WHERE IT PLANS TO INSTALL LINE**
10 **VOLTAGE REGULATORS IN THE DUKE ENERGY CAROLINAS**
11 **SERVICE TERRITORY?**

12 A. No.

13 **Q. HAS DUKE ALWAYS HAD A POLICY PROHIBITING THE**
14 **INTERCONNECTION OF A SOLAR PV PROJECT BEYOND A LINE**
15 **VOLTAGE REGULATOR?**

16 A. No. Previously, Duke interconnected projects physically located beyond a line
17 voltage regulator by constructing distribution lines that would allow the Point of
18 Interconnection to be ahead of the line voltage regulator, a process known as
19 “double-circuiting” where two overhead circuits would be run on one set of poles.

20 **Q. DOES DUKE CURRENTLY ALLOW DOUBLE-CIRCUITING TO**
21 **INTERCONNECT AHEAD OF A LINE VOLTAGE REGULATOR?**

22 A. No, this is no longer allowed.

1 **Q. WHY DOES DUKE NO LONGER ALLOW DOUBLE-CIRCUITING?**

2 A. Duke has claimed that allowing double circuits for interconnecting solar PV
3 projects limits Duke's ability to build double circuits to serve future load in the
4 area, so they no longer allow it.

5 **Q. WHAT IS THE IMPACT ON INTERCONNECTION CUSTOMERS OF**
6 **DUKE'S PROHIBITION ON DOUBLE-CIRCUITING?**

7 A. Duke's prohibition of double-circuiting means that a significant number of
8 interconnection customers now have no feasible way to interconnect.

9 **Q. IS IT REASONABLE TO UNIVERSALLY PROHIBIT DOUBLE-**
10 **CIRCUITING?**

11 A. No, it is not reasonable. A universal prohibition of double-circuiting is a
12 convenience for Duke, but Duke could either make a project-specific determination
13 of whether they may require double-circuits to serve future load growth in the area
14 or find other ways to serve potential future load growth should that occur.

15 **Q. WHERE ARE MOST PROJECTS THAT ARE 1 MW IN CAPACITY OR**
16 **LARGER PROPOSING TO INTERCONNECT?**

17 A. Most projects 1 MW in capacity or larger are developed in rural areas of North
18 Carolina.

19 **Q. IS LOAD GROWTH PROBABLE IN THESE RURAL AREAS WHERE**
20 **SUCH PROJECTS ARE PROPOSING TO INTERCONNECT?**

1 A. No. These projects are generally proposing to interconnect in areas of the state
2 where load growth may not be probable. In fact, Duke recognizes that these rural
3 counties are dealing with stagnant or declining populations.⁴

4 **C. Method of Service Guidelines**

5 **Q. WHAT ARE DUKE'S METHOD OF SERVICE GUIDELINES?**

6 A. The Method of Service Guidelines are a set of restrictions on interconnection of
7 distributed energy resources ("DER") based on the DER capacity and the
8 configuration of the system where the DER requests interconnection.

9 **Q. ARE THE METHOD OF SERVICE GUIDELINES ADDRESSED IN THE**
10 **NORTH CAROLINA INTERCONNECTION PROCEDURES?**

11 A. No.

12 **Q. ARE THE METHOD OF SERVICE GUIDELINES TYPICAL OF OTHER**
13 **UTILITY PRACTICES?**

14 A. No, Duke's Method of Service Guidelines are not typical. While other utilities may
15 use screens to make the interconnection request process more efficient, typically
16 screens would be triggers for further study, not outright restrictions. Ideally, Duke
17 would study each project as requested to determine the system impacts and
18 upgrades required.

19 **Q. IN YOUR OPINION, ARE SOME OF THE METHOD OF SERVICE**
20 **GUIDELINES OVERLY RESTRICTIVE?**

⁴ Duke Energy, *North Carolina Grid Improvement Plan Pre-Read Packet for Stakeholder Workshop*, Slide 22 (November 8, 2018) (attached as Exhibit PB-2).

1 A. Yes. The Method of Service Guidelines will certainly restrict interconnection of
2 some projects that would otherwise be allowed if the project were studied. The most
3 restrictive policy in the guidelines is the limitation that aggregate capacity cannot
4 exceed the “nameplate” rating of the substation transformer. Duke has defined the
5 “nameplate” rating for this purpose as the lowest of the typical three ratings on the
6 nameplate of the transformer (typically 60% of the highest rating). Previously,
7 Duke Energy Progress had allowed up to the highest rating on the nameplate of the
8 transformer.

9 **Q. WHAT IS DUKE’S TECHNICAL JUSTIFICATION FOR THE**
10 **TRANSFORMER RATING RESTRICTION.**

11 A. To my knowledge, Duke has not given a reasonable technical justification for this
12 policy.

13 **III. TECHNICAL STANDARDS REVIEW GROUP**

14 **Q. WHAT IS THE TECHNICAL STANDARDS REVIEW GROUP?**

15 A. The Technical Standards Review Group (“TSRG”) is group of Duke engineers and
16 engineers representing the solar industry that Duke has organized. Duke leads
17 meetings of the group to discuss technical standards around the interconnection of
18 DER.

19 **Q. HOW DOES THE TSRG DIFFER FROM THE TECHNICAL WORKING**
20 **GROUP RECOMMENDED BY NCSEA IN ITS INITIAL AND REPLY**
21 **COMMENTS?**

1 A. NCSEA recommended a technical working group, including Duke and other
2 utilities in the state as well as technical representatives from the solar industry, but
3 NCSEA's proposed technical working group would be organized by the North
4 Carolina Utilities Commission or the Public Staff and would hold meetings to
5 develop standards for interconnection. NCSEA recommended that utilities be
6 required to develop consolidated documentation of interconnection policies,
7 procedures and standards, and the recommended technical working group could be
8 convened to discuss the development of such documentation. The meetings that
9 NCSEA envisioned would provide some technical oversight and accountability to
10 Duke. In contrast, while Public Staff engineers are invited and attend Duke's TSRG
11 meetings, the group does not provide for direct oversight or accountability.

12 **Q. HAVE THE TECHNICAL STANDARDS REVIEW GROUP MEETINGS**
13 **BEEN PRODUCTIVE THUS FAR?**

14 A. Duke has held three meetings. While there has been a good exchange of information
15 at the three meetings, no changes to any Duke policy or standard have been
16 implemented. Developers have proposed changes based upon the information being
17 discussed and exchanged, which Duke has then indicated are being evaluated.
18 However, no timeline has yet been indicated for a response to or for incorporation
19 of the proposed changes.

20 **Q. DO YOU BELIEVE IT IS APPROPRIATE FOR THE COMMISSION TO**
21 **REVIEW DUKE'S APPLICATION OF GOOD UTILITY PRACTICE?**

1 A. Yes. As detailed above, the CSR is an example of a restriction that would have
2 originally completed restricted hundreds of MWs of projects from interconnecting
3 with no reasonable technical justification.

4 **IV. MATERIAL MODIFICATIONS**

5 **Q. HOW IS MATERIAL MODIFICATION DEFINED IN THE NORTH**
6 **CAROLINA INTERCONNECTION PROCEDURES?**

7 A. Material Modification is defined in Section 1.5 of the NCIP as a modification “that
8 has a material impact on the cost, timing or design of any Interconnection Facilities
9 or Upgrades.”

10 **Q. DO THE NORTH CAROLINA INTERCONNECTION PROCEDURES**
11 **PROVIDE EXAMPLES OF MODIFICATIONS THAT ARE MATERIAL?**

12 A. Yes. Section 1.5.1 of the NCIP includes several specific modifications to projects
13 that are defined as material.

14 **Q. DO THE NORTH CAROLINA INTERCONNECTION PROCEDURES**
15 **PROVIDE EXAMPLES OF MODIFICATIONS THAT ARE NOT**
16 **MATERIAL?**

17 A. Yes, Section 1.5.2 of the NCIP includes several specific modifications to projects
18 that are defined as not material.

19 **Q. IS THE ADDITION OF ENERGY STORAGE LISTED IN THE NORTH**
20 **CAROLINA INTERCONNECTION PROCEDURES AS A MATERIAL**
21 **MODIFICATION?**

1 A. No. Section 1.5.1 of the NCIP does not specifically identify the addition of energy
2 storage to a planned or existing solar PV project as a material modification.

3 **Q. WHAT IS YOUR UNDERSTANDING OF HOW DUKE INTERPRETS**
4 **WHETHER A MODIFICATION IS MATERIAL?**

5 A. My understanding is that Duke operates from the principle that a modification is
6 material if it would have Duke revisit the system impact study analysis to determine
7 if the modification has a material impact on the cost, timing or design of the
8 interconnection facilities or upgrades.

9 **Q. WHAT ARE THE CONSEQUENCES TO AN INTERCONNECTION**
10 **CUSTOMER OF A MODIFICATION BEING CONSIDERED MATERIAL?**

11 A. For an interconnection customer to proceed with a Material Modification, they must
12 resubmit their project and move to the back of the queue. Considering the length of
13 the queue, the slow speed of processing projects through the queue, and the loss of
14 queue-priority, this is not a practical option for most projects.

15 **Q. WHAT IS YOUR UNDERSTANDING OF DUKE'S POLICY ON ADDING**
16 **ENERGY STORAGE TO A SOLAR PV PROJECT?**

17 A. Duke considers any addition of energy storage to be a Material Modification.

18 **Q. IN YOUR OPINION, IS THIS REASONABLE?**

19 A. No. There are circumstances where the addition of energy storage would have no
20 impact on the cost, timing, or design of the interconnection facilities or upgrades.

21 **Q. WHAT WOULD BE REASONABLE?**

1 A. Specific determinations could be made for each project or a set of guidelines could
2 be developed to define additions that would specifically not be material.

3 **Q. SHOULD IT BE A MATERIAL MODIFICATION IF DC-COUPLED**
4 **STORAGE DOES NOT CHANGE THE GENERATION PROFILE FROM**
5 **WHAT IS TYPICALLY STUDIED FOR A SOLAR PV PROJECT?**

6 A. No. If the addition of storage to a project is DC-coupled such that it does not
7 increase the AC capacity of the project and the project is configured such that it
8 does not generate outside of the time of day that Duke typically considers in the
9 system impact study, then it should not be a Material Modification.

10 **Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

11 A. Yes.

1 BY MR. SMITH:

2 Q. Mr. Brucke, was the summary of your testimony
3 drafted?

4 A. Yes.

5 Q. Now that the summary has been passed out,
6 would you mind reading that into the record?

7 A. Yes. The purpose of my testimony is to offer
8 my technical opinion on interconnection restrictions
9 used by Duke Energy Carolinas and Duke Energy Progress,
10 collectively here Duke, in the interconnection process,
11 specifically, the circuit stiffness review, or CSR; the
12 line voltage regulator policy, or LVR; and the Method
13 of Services Guidelines. I also provide my assessment
14 and recommendations regarding Duke's Technical
15 Standards Review Group, otherwise known as the TSRG,
16 and I provide my assessment of Duke's material
17 modification policy with regards to adding energy
18 storage to a solar generator.

19 CSR is a screen that Duke introduced in 2016
20 where the short circuit ratio at the point of
21 interconnection, or POI, and at substations was
22 calculated. Duke used the CSR to determine the
23 relative strength of the grid compared to the size of
24 any interconnecting generator, also known as the

1 stiffness factor. Originally, Duke announced that
2 projects with a stiffness factor below 25 at the point
3 of interconnection or the substation would not be
4 allowed to interconnect but subsequently revised the
5 policy such that the projects with a stiffness ratio or
6 stiffness factor below 25 would be subject to advanced
7 study. Duke introduced CSR using power quality
8 issues -- citing, excuse me, power quality issues for
9 projects with stiffness ratio below 25. I do not think
10 that Duke's concerns were reasonable, as Duke failed to
11 diligently investigate the cause of the few issues that
12 they had experienced, which generally were not
13 correlated with low stiffness ratios. Furthermore, I
14 do not consider Duke's use of CSR as good utility
15 practice, as it is not a practice utilized by other
16 utilities that I have seen, and Duke did not have a
17 reasonable technical justification for the policy.

18 Regarding Duke's LVR screen, I do not think
19 that this policy is reasonable. Duke's current policy
20 prohibits interconnection of a solar PV project behind
21 a line voltage regulator, even though Duke has
22 indicated that interconnection beyond a line voltage
23 regulator is technically feasible if line voltage
24 regulator settings are reconfigured. I believe that it

1 is feasible for Duke to develop policies that could
2 accommodate line voltage regulator setting
3 reconfigurations. Furthermore, even though Duke has
4 only employed the distribution system demand response,
5 or DSDR, system in the DEP service territory, Duke is
6 applying its LVR policy in both DEC and DEP
7 territories. Further, Duke has not made information
8 available to interconnection customers regarding the
9 location of LVRs.

10 Regarding the Method of Service Guidelines,
11 the Guidelines are a set of restrictions on
12 interconnections of distributed energy resources, or
13 DER, based on the DER capacity and the configuration of
14 the grid at the point of interconnection. Duke's
15 Method of Service Guidelines are not typical and are
16 overly restrictive. While other utilities may use
17 screens, typically, screens are triggers for further
18 study. Ideally, Duke would study each project as
19 requested to determine the system impacts and upgrades
20 required. The most restrictive policy in the
21 guidelines is the limitation that aggregate capacity
22 could not exceed the nameplate rating of the substation
23 transformer. Duke has defined the nameplate rating for
24 this purpose as the lowest of the typical three ratings

1 on the nameplate of the transformer. Previously, DEP
2 had allowed up to the highest rating on the nameplate
3 of the transformer. To my knowledge, Duke has not
4 provided a reasonable technical justification for this
5 policy.

6 The TSRG is a group of Duke engineers and
7 solar industry engineers that Duke has organized. Duke
8 leads meetings of the group to discuss technical
9 standards around the interconnection of DER. The TSRG,
10 as currently situated, is not what NCSEA has
11 recommended. NCSEA recommends a technical working
12 group to be organized by the Commission or the Public
13 Staff. NCSEA further recommends that utilities be
14 required to develop comprehensive documentation of
15 interconnection policies, procedures, and standards,
16 and the recommended technical working group could be
17 convened to discuss these. The meetings that NCSEA
18 envisioned would provide some technical oversight and
19 accountability to Duke. In contrast, while Public
20 Staff engineers are invited and attend Duke's TSRG
21 meetings, the group does not provide for direct
22 oversight or accountability. So far, Duke has held
23 four TSRG meetings where there has been a good exchange
24 of information but no changes to any Duke policy or

1 standard that have been implemented despite reasonable
2 recommendations and proposed changes being offered by
3 developers in the TSRG.

4 I also believe that it is appropriate for the
5 NCUC to have oversight over Duke's application of good
6 utility practice, as the policies I have discussed have
7 restricted hundreds of megawatts of projects from
8 interconnecting without reasonable technical
9 justification.

10 Regarding material modification, Duke's
11 policy for adding energy storage to a solar generator
12 is unreasonable. Material modification is defined as a
13 modification that has a material impact on the cost,
14 timing, or design of any interconnection facilities or
15 upgrades. Duke considers any addition of energy
16 storage to a solar PV project to be a material
17 modification, which I believe is an unreasonable
18 policy, as there are circumstances where the addition
19 of energy storage would have no impact on the cost,
20 timing, or design of the interconnection facilities or
21 upgrades. I believe specific determinations could be
22 made for each project or a set of guidelines could be
23 developed to define additions that would specifically
24 not be material. Finally, I do not believe the

1 addition of DC-coupled storage to a solar PV project
2 should be considered a material modification if it does
3 not increase the AC capacity of the project and the
4 project is configured such that it does not generate
5 outside the time of day that Duke typically considers
6 in the system impact study.

7 This concludes the summary of my testimony.
8 Thank you.

9 MR. SMITH: Mr. Chairman, Mr. Brucke is
10 available for cross examination.

11 CHAIRMAN FINLEY: Public Staff?

12 MR. DODGE: Thank you, Mr. Chairman.

13 CROSS EXAMINATION BY MR. DODGE:

14 Q. Good morning, Mr. Brucke. I'm Tim Dodge with
15 the Public Staff. I just had a couple of questions
16 about your role on behalf of the North Carolina
17 Sustainable Energy Association and some of the
18 discussions related to the interconnection process over
19 the last few years.

20 Did you participate in the 2014, 2015
21 stakeholder discussions on revising the interconnection
22 procedures?

23 A. No. I did not.

24 Q. Okay. But in 2016, with the circuit

1 stiffness review, you were retained at that time to
2 participate in discussions about the circuit stiffness
3 review?

4 A. Yes. But not by NCSEA, by NCCEBA.

5 Q. Okay. Thank you. And so following the
6 settlement that was reached in the circuit stiffness
7 matter, you participated in some additional technical
8 discussions with the utility, Public Staff, and other
9 stakeholders on the circuit stiffness review and other
10 advanced study measures?

11 A. Correct.

12 Q. Okay. And in the 2017 stakeholder process
13 for revising their connection standards, you were an
14 active participant in those discussions, attended
15 several of the meetings?

16 A. Correct.

17 Q. Were you retained by NCSEA?

18 A. By NCSEA, yes.

19 Q. Okay. Thank you. And now to the TSRG, the
20 Technical Standards Review Group that you discussed in
21 your testimony; are you participating in that process
22 on behalf of NCSEA?

23 A. I am.

24 Q. Okay. So you attended all four of the

1 meetings that have been held so far?

2 A. I have.

3 Q. And I wanted to clarify that it's my
4 understanding that the agenda for the Technical
5 Standards Review Group is jointly developed by the
6 parties.

7 Can you describe how the agenda is put
8 together for TSRG?

9 A. Yes. So I have been designated as, I would
10 say, the lead on the industry side to help develop the
11 agenda. So I work with Anthony Williams on the Duke
12 side, and we -- you know, I gather inputs from the
13 industry, and then bring them to Anthony, and we come
14 together on what the agenda for the next meeting will
15 be.

16 Q. And have you brought any agenda items from
17 the industry side together that have been rejected at
18 this time, or that the utility declined?

19 A. I don't believe so, no.

20 Q. Okay. And while you state your testimony,
21 you describe, again, the -- some oversight and some
22 follow up, you do indicate that there has been
23 discussions that have taken place at the four meetings
24 that have been held so far by the Technical Standards

1 Review Group?

2 A. That there have been discussions?

3 Q. Meaningful -- I'm sorry, meaningful
4 discussions.

5 A. Meaningful discussions, yes. And a good
6 exchange of information.

7 MR. DODGE: Thank you. That's all I
8 have.

9 CHAIRMAN FINLEY: Duke?

10 MR. BREITSCHWERDT: Thank you,
11 Mr. Chairman.

12 CROSS EXAMINATION BY MR. BRIETSCHWERDT:

13 Q. Good morning, Mr. Brucke. How are you?

14 A. Good. Good morning.

15 Q. Good to see you again. So just real briefly,
16 I want to run through your resume, if we could.

17 A. Sure.

18 Q. I don't know that we need to turn to it, but
19 looking at it, it looks as if you have been working for
20 the solar industry in North Carolina for about a
21 decade; is that fair?

22 A. That's correct.

23 Q. February 2009 through 2013 you were the lead
24 engineer for Strata Solar; is that right?

1 A. The dates again? If you are reading it from
2 my resume, then that's correct.

3 Q. Yeah. And then Black & Veatch from 2013 to
4 2014, correct?

5 A. Correct.

6 Q. And then you worked for Cypress Creek as
7 their vice president of engineering from 2014 to 2016?

8 A. 2014. Yes. Late 2014 to early 2016, yes.

9 Q. And then, in 2016, you started your own
10 consulting firm?

11 A. Correct.

12 Q. And your offices are in Carrboro; is that
13 right?

14 A. That is correct.

15 Q. And that's generally between --

16 CHAIRMAN FINLEY: Closer to the mic.

17 MR. BREITSCHWERDT: I apologize,
18 Commissioner Gray.

19 CHAIRMAN FINLEY: Getting to be like Old
20 MacDonald, you slip back on your chair.

21 MR. BREITSCHWERDT: I can only aspire.

22 Q. Excuse me, Mr. Brucke. So would you agree
23 that Strata and Cypress Creek have generally been the
24 largest utility-scale developers in North Carolina over

1 the last five, six years?

2 A. Yes, I would agree with that.

3 Q. And are you familiar with Witness Freeman on
4 behalf of Duke's testimony that Duke has interconnected
5 150 utility-scale projects for Cypress Creek between
6 2014 to 2018?

7 A. I am not specifically familiar with that
8 testimony, but I would not dispute that.

9 Q. Sounds about right?

10 A. Yeah.

11 Q. Would you ballpark how many of those projects
12 you worked on?

13 A. Of the --

14 Q. The 150 that have been successfully
15 interconnected on behalf of Cypress Creek by Duke.

16 A. That would be difficult for me to do without
17 seeing the list.

18 Q. All right. Fair enough.

19 Can you ballpark how many Strata projects
20 that Duke and Progress have interconnected since you
21 started working at Strata In 2009?

22 A. How many projects during my time at Strata?

23 Q. Just in the last decade, since you began --
24 how many Strata projects have been interconnected in

1 North Carolina?

2 A. I don't have that information in front of me.

3 Q. Hazard a guess?

4 A. I would hesitate to guess.

5 Q. That's all right. And so would you agree
6 that the vast majority of projects in North Carolina
7 that are interconnected are utility-scale distribution
8 projects 5 megawatts connected distribution system?

9 A. In number or capacity? In capacity, yes. In
10 number, I couldn't say.

11 Q. Most projects that have been developed and
12 interconnected are 5 megawatt per generators connected
13 distribution system?

14 A. I don't -- I'm not familiar with the number
15 of smaller commercial or residential projects, so I
16 don't know how those numbers --

17 Q. That's fair enough. Focusing on
18 utility-scale, that's the unique characteristics of
19 North Carolina solar development has been 4 to 5
20 megawatt projects; do you agree with that?

21 A. Yes, yes.

22 Q. All right. And this has been extremely
23 unique to North Carolina; would you agree with that?

24 A. Yes.

1 Q. And I think, subject to check,
2 Witness Freeman's testimony shows that there are
3 approximately 280 4- or 5-megawatt projects in
4 North Carolina. The next closest state had
5 approximately 30 projects that size that had been
6 interconnected to their system; would you agree with
7 that? Would you accept that subject to check? I would
8 be glad to --

9 A. Subject to check, yes. And you are saying
10 neighboring states?

11 Q. I'm saying across the country. California
12 has 30, we have almost 300 projects 4 to 5 megawatts?

13 A. Subject to check, yes, I would.

14 Q. And so would you accept Witness Freeman and
15 Gajda's use of the term "living laboratory" to
16 characterize the interconnection process in
17 North Carolina, and the unique nature of utility-scale
18 solar generation proposed interconnect to the
19 distribution system in our state?

20 A. I think the characterization of a living
21 laboratory is reasonable. I would contend that there
22 is not -- I mean, while the situation in North Carolina
23 is such that the number and the unique size, you know,
24 around 5 megawatts is unique, when looking at the rest

1 of the nation, the impacts to the system would not be
2 unique and would be similar to what would be seen in
3 other parts of the country with significant penetration
4 in the northeast, say Massachusetts for example, or
5 California.

6 Q. And would you agree with me that other parts
7 of the country don't have comparable penetrations on
8 their distribution system between 2 megawatts and 20
9 megawatts, the level of development in North Carolina
10 is unparalleled across the country; would you agree
11 with that?

12 A. I would agree with that.

13 Q. So have you reviewed -- had a chance to
14 review John Gajda's rebuttal testimony in this
15 proceeding?

16 A. No, not in detail.

17 Q. Mr. Gajda spoke to -- I guess he emphasized
18 in his testimony the importance of scaleability and
19 establishing long-term stainable practices in the
20 implementation of good utility practice.

21 Would you agree that scaleability is a
22 reasonable consideration for Duke to take into account
23 in establishing technical standards such as the Method
24 of Service Guidelines in light of the hundreds of

1 utility-scale solar generators already interconnected
2 to the Duke system?

3 A. I would agree that it is reasonable to
4 consider sustainability or scaleability in developing
5 policies.

6 Q. And do you think an approach to applying good
7 utility practice to take into account utilities'
8 long-term responsibility for planning and operating the
9 distribution system and maintaining safe and reliable
10 electric service is a reasonable position for the
11 utility to take?

12 A. Restate that.

13 Q. Sure. Would you agree with me that it's
14 reasonable for Duke to take into account, when it's
15 establishing technical standards, such as Method to
16 Service Guidelines, its long-term responsibility for
17 planning and operating distribution system and
18 maintaining safe and reliable electric service to its
19 customers?

20 A. I would assume it's their responsibility that
21 that be one of the things that Duke takes into account.

22 Q. And are you familiar with Witness
23 Williamson's testimony on behalf of the Public Staff in
24 this proceeding?

1 A. No, I'm not.

2 Q. Okay. So you have not reviewed the Public
3 Staff's testimony in this proceeding?

4 A. I have not.

5 Q. Okay. So I think -- listening to your
6 summary and reviewing your testimony, I think there is
7 a difference of opinion between you and the Company,
8 obviously, on what constitutes good utility practices;
9 would you agree with that?

10 A. In some instances, I suppose there would be,
11 although, in discussions with the Company, it hasn't
12 been framed in that regard.

13 Q. Okay. And when we were here, I think it was
14 on Monday afternoon, counsel for NCSEA had Mr. Gajda
15 read from parts of his testimony regarding good utility
16 practice in establishing consensus between the solar
17 industry and the Duke utilities in North Carolina?

18 MR. BREITSCHWERDT: And may I approach,
19 Mr. Chairman?

20 CHAIRMAN FINLEY: Yes, yes.

21 BY MR. BREITSCHWERDT:

22 Q. And I appreciate you don't have Mr. Gajda's
23 testimony with you here today, so I am going to provide
24 you a page, and then I would like to kind of talk

1 through and ask you some questions about it.

2 A. (Witness peruses document.)

3 Q. So -- and I guess you don't have the
4 preceding page, but if you would accept that the
5 beginning of this question and answer raised questions
6 about why the Company and the solar industry were
7 challenged to achieve consensus on interconnection
8 standards and policies. And so Mr. Gajda's
9 explanation, I would like to focus on specifically page
10 55, the sentence starting on line 4; do you see that
11 there?

12 A. I do.

13 Q. Would you read that to the Commission,
14 please?

15 A. Yes.

16 Q. If you would like to approach?

17 CHAIRMAN FINLEY: Counsel wants to
18 approach.

19 UNIDENTIFIED MALE: May I approach to
20 give the witness a copy of the testimony?

21 CHAIRMAN FINLEY: Sure. Both witness
22 and lawyer talk into the microphone as best you
23 can, please.

24 THE WITNESS: (Witness peruses

1 document.)

2 I'm just reading the preceding
3 paragraph. Sorry.

4 BY MR. BREITSCHWERDT:

5 Q. Sure.

6 A. (Witness peruses document.)

7 CHAIRMAN FINLEY: I tell you what.
8 While he's reading that, let's take our morning
9 recess and come back at 10 after 11:00.

10 (At this time, a recess was taken from
11 10:56 a.m. to 11:11 a.m.)

12 CHAIRMAN FINLEY: Mr. Breitschwerdt?

13 MR. BREITSCHWERDT: Thank you,
14 Mr. Chairman.

15 BY MR. BREITSCHWERDT:

16 Q. Mr. Brucke, we were about to discuss the
17 question and answer, which your counselor very
18 helpfully provided the full piece of testimony,
19 starting on page 54 of Mr. Gajda's testimony over onto
20 page 55. When your counsel asked Mr. Gajda about it,
21 he was talking about the latter end of this discussion
22 on veto rights and whether the Commission has the right
23 or oversight to review the Company's determination of
24 good utility practice. I would like to talk about the

1 first part of that paragraph, starting on line 4, page
2 55.

3 Do you see that?

4 A. Yes, I do.

5 Q. Okay. And would you read to the Commission
6 line 4 through line 10, those first two sentences?

7 A. "The Duke utilities' experience is that
8 consensus is often very difficult, if not impossible,
9 to achieve. This is because the companies and solar
10 developers receive good utility practice differently
11 with regard to the appropriate allocation of
12 engineering and technical risk as well as the proper
13 assignment of cost to mitigate those risks between the
14 interconnection customers, generating facility owner,
15 and the utilities, and existing and future retail
16 customers."

17 Q. Thank you. And would you agree with me that
18 the disagreements between yourself and your views of
19 good utility practice and the Company's technical
20 standards, such as the Method of Service Guidelines,
21 and the Company's views is largely reflective of the
22 appropriate allocation of engineering and technical
23 risk?

24 A. I would say that's -- that would weigh into

1 the decision, yes.

2 Q. And so the companies have taken a more
3 conservative view out of concern based on their role of
4 having to ensure safe and reliable operation of their
5 system, correct?

6 A. Yes. The more conservative the position, the
7 easier it is to ensure reliability, I would say.

8 Q. Okay. And specific to your testimony and
9 your summary's explanation of the DSDR program and the
10 Company's LVR policy, would you agree that the proper
11 assignment of cost, meaning the effectiveness of that
12 DSDR program, could be -- is being protected by the LVR
13 policy?

14 A. The --

15 Q. I think I could rephrase the question a
16 little better.

17 So, the LVR policy the Company has in place
18 is designed to establish, as Mr. Gajda said yesterday,
19 that generators will interconnect closer to the
20 substation ahead of the first LVR; is that correct?

21 A. Yes, correct.

22 Q. And so, through that policy, it allows the
23 effective operation of the DSDR program in DEP; are you
24 familiar with that?

1 A. I am familiar with the program.

2 Q. And so that is an investment that utilities
3 and ratepayers have made, and so in terms of impacting
4 the DSDR program, that would allocate cost and risk or
5 investments that the utility has already made to impair
6 that program versus having the interconnection customer
7 make investments to upgrade the system so they are not
8 adversely impacting that program.

9 Would you agree with that?

10 A. My understanding is that interconnection
11 behind a line voltage regulator would degrade the
12 capacity of the DSDR system. However, I do not believe
13 that Duke quantifies that degradation on an
14 interconnection-by-interconnection basis. So I do not
15 have an understanding of how much that degradation is.

16 Q. Okay. Thank you. So I think, in your
17 testimony and in your summary today, you spoke about
18 the Company's CSR policy and the implications of
19 denying interconnections outright.

20 Are you familiar with that?

21 A. With my testimony?

22 Q. Yes.

23 A. Yes.

24 Q. And I think you said that on page 6, line 16.

1 And would you agree with me that, through
2 discovery, you have subsequently informed the Company
3 that your view is that the Company has never actually
4 denied interconnection outright for any interconnection
5 customers?

6 A. I would say that, if a project were to
7 request interconnection at a specific point of
8 interconnection, then the CSR policy did deny that
9 request, but did -- but could very well offer an
10 alternative interconnection that is practically
11 infeasible.

12 Q. And by practically infeasible you mean it's
13 financially --

14 A. Financially, financially.

15 Q. -- accountable -- feasible for the project to
16 cancel out?

17 A. Correct, correct.

18 Q. So the Company has always offered mitigation
19 options to interconnection customers, in your
20 experience?

21 A. In my experience, yes.

22 Q. And you can't point to any specific project
23 where they have not allowed a generator to interconnect
24 or provided a technically or feasible option from an

1 engineering perspective to interconnect to the
2 distribution or transmission system or directly to a
3 substation. May not be the option the interconnection
4 customer initially desired or at the cost they
5 initially desired, but an option has always been
6 provided?

7 A. In my experience.

8 Q. Okay. All right. I would like to turn to
9 your testimony to material modification and the
10 addition of battery storage, if we could, please. So
11 at page 15 of your direct testimony -- are you there?

12 A. I'm on page 15, yes.

13 Q. Thank you. Starting on line 3, you have an
14 answer to a question that says, "What is your
15 understanding of how Duke interprets whether a
16 modification is material?"

17 Did you see that?

18 A. I do.

19 Q. And you spoke to this somewhat in your
20 summary earlier, but you state, starting on line 6,
21 that, "Duke determines a modification material if Duke
22 would have to revisit the system impact study analysis
23 to determine if the modification has a material impact
24 on the cost, timing, or design of the interconnection

1 facilities or upgrades."

2 Did I read that correctly?

3 A. Yes.

4 Q. And so would you agree with me that, if Duke
5 is -- that if a change is proposed to a generating
6 facility interconnection request that requires the
7 facility to revisit the study or redo specific
8 evaluations, the thermal study we talked about
9 yesterday or stability study within system impact
10 study, that that should be a material modification?

11 A. I mean, one could interpret the definition of
12 material modification that way if one says that simply
13 revisiting the study impacts other interconnection
14 customers, but a revisit of the study could determine
15 that there is no material impact to cause timing or
16 design of interconnection of the facility or upgrades.
17 So I would not necessarily agree that simply revisiting
18 the study should constitute a material modification.

19 Q. But isn't it true that it will impact the
20 timing of the study and the timing of the upgrades
21 because you are actually redoing the work of that
22 study, you are going back and spending -- I don't
23 recall what Witness Gajda said, but the 10 hours or
24 30 hours required to revisit or redo specific aspects

1 of the study to recognize the impacts of adding or
2 changing generating facility, whether it's adding
3 battery storage or whatever the change is?

4 A. So that is what I was saying. One
5 interpretation could be that revisiting the study could
6 affect the timing as is, you know, material impact on
7 cost, timing, design of the interconnection facilities.
8 It's possible that that revisit could not affect the
9 timing, but it's certainly possible that it could
10 affect the timing.

11 Q. So putting aside whether it affects the
12 timing, do you think it's reasonable that a utility
13 engineer would want to revisit and review the study to
14 determine if the addition of battery storage or any
15 other change of generating facility -- material change
16 of generating facility that would fundamentally change
17 its output would have an impact to the system, in terms
18 of the timing or design of the upgrades required to
19 reliably interconnect it?

20 A. In some cases, I believe that would be clear
21 that you should revisit the study, but I do believe
22 that there are instances or configurations of additions
23 of energy storage that, considering how the
24 interconnection request is generally studied, should

1 not cause need to revisit the study.

2 Q. So it's your testimony that, even if Duke has
3 begun a system impact study, modeled the project, let's
4 say they are in facilities study and an interconnection
5 customer says, "We want to add battery storage," which
6 is a significant or material change to the design of
7 the facility that would require utility engineer to go
8 back and revisit the study, it's your testimony that
9 that, in some circumstances, might not be a material
10 modification; is that correct?

11 A. I don't believe that I specifically address
12 that situation where the study is being revisited. I
13 believe that the only specific instance that I
14 testified on was the instance where energy storage is
15 being added is DC-coupled, no AC capacity -- there is
16 no AC capacity increase, and the interconnection
17 customer can state that the energy storage would not be
18 utilized outside the time that is typically studied.

19 Q. So would you accept -- were you here for
20 Witness Gajda's testimony yesterday?

21 A. Yesterday, I was.

22 Q. And I think he had a discussion with
23 Commissioner Brown-Bland about his perspective about
24 the addition of battery storage to utility-scale solar

1 facilities and his perspective, as a utilities
2 engineer, that it would be responsible and prudent to
3 proceed with restudying that generating facility to
4 evaluate the impacts of adding battery storage to that
5 generating facility.

6 Did you hear that testimony?

7 A. I did hear that testimony, yes.

8 Q. And so if we could accept the premise that
9 the utility believes that it would have to restudy a
10 generating facility to add storage, then would you
11 agree with me that that would constitute a material
12 modification if a restudy has to be undertaken because
13 the utility feels it's necessary to do so?

14 A. My testimony was specifically on instances
15 where the utility would not have to revisit the study.
16 I didn't previously testify on the situation where the
17 study is revisited and whether that should be
18 considered material. I believe that's a separate
19 question. Is that the question you are asking me
20 about?

21 Q. Yes.

22 A. I mean, frankly, I believe that that's more
23 of a policy question, whether or not -- I mean, I
24 certainly could see that arguments could be made that

1 revisiting the study, especially if it's done very
2 often, can affect the timing of the interconnection
3 facilities of that specific request. It certainly
4 could affect the timing of other requests. So I could
5 see an argument being made that, generally, that should
6 be considered material.

7 Q. But it's -- I think to summarize your
8 testimony, there are circumstances where you view that
9 utility might not feel it needs to revisit the study?

10 A. Correct.

11 Q. Okay. So let's focus again, and I think, on
12 line 1 and 2 of your testimony, page 15, you make this
13 point, and you say that the material modification
14 standard does not specifically identify the addition of
15 energy storage to a planned or existing solar PV
16 projects material modification; is that right?

17 A. Correct.

18 Q. So we've talked about planned projects that
19 are progressing to the interconnection process that are
20 in study, but we haven't talked about the existing
21 projects.

22 So, returning back to the discussion we had
23 at the very beginning, of the 150 projects that Cypress
24 Creek, let's say, has developed at some number that

1 Statas Solar owns in North Carolina today that are
2 installed and operating, so would you agree with me
3 that the way the interconnection agreement is written,
4 that if it's not a material modification, then the
5 interconnection customer can make changes to its
6 generating facility that's operating without taking
7 that change back to the utility to evaluate whether it
8 will have an impact to the grid?

9 A. You are asking if I agree that, if a change
10 is not deemed material, that the interconnection
11 customer wouldn't have to request that change; is
12 that --

13 Q. That's right. So if it's -- I mean --

14 CHAIRMAN FINLEY: I have polled the back
15 of the room to see if they could hear you guys. If
16 you would please turn your mic a little bit to you,
17 and if you could move your laptop aside and pull
18 the mic up to you, that would be helpful.

19 MR. BREITSCHWERDT: Yes, sir.

20 THE WITNESS: It's my understanding that
21 any change would need to be requested, and then
22 there would be a determination of whether that
23 change is material.

24 BY MR. BREITSCHWERDT:

1 Q. So it's your testimony that any change to an
2 existing operating generating facility, the
3 interconnection customer can't make that change without
4 soliciting the utility's opinion of whether there is a
5 material modification or not?

6 A. Correct.

7 Q. And would an interconnection customer, if you
8 know, have the right to move forward with the change if
9 it's -- let's say, hypothetically, the Commission,
10 through this proceeding, says, "We determine that
11 adding battery storage to a generating facility, if
12 it's not changing the design or the time of the output,
13 is not a material modification."

14 In that circumstance, if the Commission made
15 that determination, would an interconnection customer
16 who is already operating be able to add battery storage
17 without Duke then reviewing that battery storage
18 addition to determine whether there is an impact to the
19 system and operations?

20 A. I believe that an interconnection customer
21 would need to request that change, and then a
22 determination would be made of whether that
23 modification is a material modification. Something
24 being deemed not material modification doesn't mean

1 that you don't have to request the change.

2 Q. But would the interconnection customer have
3 the contractual right to move forward with the change
4 without obtaining Duke's approval, if you know?

5 A. I would assume that Duke would make a
6 determination of whether something is material
7 modification following the standards and any guidance
8 or regulation by the Commission.

9 Q. So I think that's what we are talking through
10 here today is that, if the Commission were to decide
11 that, based on your testimony and the testimony of
12 other engineers on behalf of the solar industry, that
13 the addition of battery storage is not a material
14 modification if you don't change the time period of the
15 output, the implication would be that you could add
16 battery storage to existing facilities, the 150 Cypress
17 Creek facilities that are operating today, without it
18 being considered a material modification; is that
19 correct?

20 A. Under those -- under those specific
21 circumstances.

22 Q. That's right.

23 A. Yeah.

24 Q. And so the implication then being that those

1 projects could move forward without the -- those
2 additions of battery storage could move forward without
3 those interconnection customers going back and
4 submitting a new interconnection request to have the
5 battery storage be restudied; would you agree with
6 that?

7 A. As I stated, an interconnection request would
8 need to be submitted. Duke would then determine
9 whether the request is a material modification. That
10 if Duke determines it's not a material modification,
11 then they wouldn't necessarily need to study it.

12 Q. Okay. Do you have a copy of the
13 interconnection agreement -- the North Carolina
14 approved interconnection agreement with you?

15 A. Not in front of me.

16 MR. BREITSCHWERDT: All right.

17 Mr. Chairman, may I approach?

18 And this is not a -- so this is Section
19 3.4.5 of the standard interconnection agreement, so
20 it's not something that's being changed or
21 modified, so I'm not going to mark it as an exhibit
22 at this time.

23 BY MR. BREITSCHWERDT:

24 Q. Did you review Section 3.4.5 of the

1 interconnection agreement -- or let me start with this
2 question:

3 Would you accept, subject to check, that this
4 is a page out of the standard interconnection agreement
5 approved by the Utilities Commission for generating
6 facilities in North Carolina?

7 A. Yes. I'm familiar with it.

8 Q. So Section 3.5, 4.5 speaks to modifications
9 generating facilities; do you see that?

10 A. I do.

11 Q. So I'll read it. It says, "Interconnection
12 customer must receive written authorization from a
13 utility before making a material modification or any
14 other change in the facility that may have a material
15 impact on the safety or liability of the utility's
16 system. Such authorization shall not be unreasonably
17 withheld?"

18 Do you see that?

19 A. I do.

20 Q. And so your premise is that, in all
21 circumstances, the interconnection customer must go
22 back to the utility and submit an interconnection
23 request to modify the generating facility?

24 A. Yes. That would be a change to the

1 generating facility that may have a material impact on
2 the safety and reliability of the utility system.

3 Q. And so would the -- at that point in time,
4 the new interconnection request is submitted, it's your
5 testimony that the utility would then study whether or
6 not the modification is material; is that correct?

7 A. Would determine whether the modification is
8 material.

9 Q. Without doing a full study?

10 A. Typically, a determination of whether a
11 modification is material is more like a screen, it's
12 not a study or an analysis. It's does this change meet
13 this criteria?

14 Q. But in all circumstances, the generator is
15 going to submit a new interconnection request to the
16 utility to make that determination?

17 A. Correct.

18 Q. And are you aware that that is required
19 anywhere in the interconnection agreement?

20 A. That what is required?

21 Q. To submit that new interconnection request.

22 A. In 3.4.5, the clause we are discussing?

23 Q. So it's your position then that the
24 authorization is required where there is a material

1 impact to the safety and reliability of the utility
2 system, they have the right to review that through a
3 new interconnection request?

4 A. If a change is made that may have a material
5 impact, then a -- the request must be made --

6 Q. Right.

7 A. -- and the utility must review that request
8 to determine if it's a material modification.

9 Q. And if they determine it's material, then
10 they would study it again?

11 A. Correct.

12 Q. And the interconnection customer, when they
13 make that request, would submit a deposit, follow the
14 normal procedures for submitting an interconnection
15 request?

16 A. That is what I would assume.

17 Q. Okay. Thank you.

18 MR. BREITSCHWERDT: That's all the
19 questions I have. Thank you.

20 CHAIRMAN FINLEY: Redirect?

21 MR. SMITH: No redirect.

22 CHAIRMAN FINLEY: Questions by the
23 Commission?

24 EXAMINATION BY COMMISSIONER MITCHELL:

1 Q. Good morning, Mr. Brucke. Just a few
2 questions for you.

3 Do I understand correctly that you-all refer
4 to the technical working group as the TSRG?

5 A. I would typically say TSRG.

6 Q. Okay. Well, the technical -- the technical
7 group that you-all are participating in. So you have
8 had four of them. I understand, through cross
9 examination, that the way that the agenda has been
10 developed for each of those meetings, and that all of
11 the issues that have made it to the agenda have been
12 afforded meaningful discussion.

13 Did I understand your testimony correctly?

14 A. Yes.

15 Q. Okay. But you still -- I read your testimony
16 to suggest that it still falls short of NCSEA's
17 expectations; is that correct?

18 A. Correct.

19 Q. Can you explain to us what changes should be
20 made, specifically to the working group, to make it,
21 sort of, more in alignment with your expect -- with
22 NCSEA's expectation?

23 A. The original recommendation was kind of a
24 combination of a recommendation for there to be a

1 requirement for comprehensive documentation on
2 interconnection requirements, procedures, policies that
3 is publicly available, and that a group could be
4 constituted that would be -- have oversight by the
5 Commission, whereby that documentation could be
6 developed and revised, and such that any revision to
7 interconnection policies was -- you know, there was a
8 forum for discussion and approval of such revisions. I
9 mean, there are similar groups, like in Massachusetts
10 and New York now.

11 Where this group falls short of that
12 recommendation is that this group is -- while we do
13 discuss the interconnection policies, there is no
14 authority above Duke that is making any judgments on
15 its policies or determinations as -- you know, as it's
16 decided through those discussions. So, for example, if
17 the industry makes a recommendation for a policy
18 change, it's -- in that context, it's Duke's
19 prerogative completely to either accept or deny that
20 request.

21 Q. Okay. Understood. So -- but help me
22 understand. Are the topics of discussion more related
23 to technical issues that would be screened by Duke or
24 involved in study by Duke, or are they issues that go

1 to the black letter of the procedures and the
2 interconnection agreement?

3 A. Not --

4 Q. Or both?

5 A. Not necessarily. You know, in the procedures
6 and the interconnection agreement there -- I would say
7 there, technical is addressed more broadly in high
8 level. These would be very, you know, sort of in the
9 weeds, technical issues that you wouldn't see
10 necessarily in the interconnection agreement. You
11 know, policies for, you know, restrictions to
12 interconnections or commissioning, testing procedures,
13 and the like.

14 Q. Okay. Okay. That's helpful. Thank you.

15 And so, again, just to make sure I understand
16 your testimony, you would want the Commission to have
17 some sort of oversight over the technical changes, or
18 technical standards for lack of a better word, that are
19 being utilized by the utilities?

20 A. Correct. And also to have better
21 transparency into those policies, such that there is,
22 you know, clear, and comprehensive, and publicly
23 available documentation of all of those policies.

24 Q. Okay. I want to change gears on you. I have

1 two more questions -- sort of two more lines of
2 questions.

3 We have talked a lot about, sort of,
4 information earlier in the interconnection process, the
5 sharing of information earlier in the process to sort
6 of help customers make better-informed business
7 decisions and prevent situations where, you know, an
8 interconnection customer is waiting years to be
9 studied, or sort of is in a situation where it's likely
10 not going to be economically feasible for that project
11 to move forward.

12 Is it your opinion that information -- that
13 anything -- that additional information can be provided
14 earlier in the process that would go to that issue?

15 A. Yes. One example is locations of line
16 voltage regulators.

17 Q. Okay. Any other examples?

18 A. Not that I can think of while I'm sitting
19 here, no.

20 Q. Okay. Last couple of questions on energy
21 storage. I need you to help me understand, sort of,
22 the practical implications of the recommendation that
23 appears to be made by several of the parties in this
24 proceeding, which is that -- and tell me if I am

1 misstating this -- that it should not constitute a
2 material modification to an interconnection request or
3 an existing interconnection if energy storage is added
4 such that it doesn't -- the addition of that storage
5 doesn't change the production profile of the generating
6 facility.

7 A. I would add the nuance that -- so I would say
8 it would not be my position that generally adding an
9 energy storage should not be considered material
10 modification. My opinion is that there are narrow
11 circumstances where it should not be considered
12 material, in that it's not changing any aspect of the
13 generating facility that the utility studies. So if
14 the AC size -- you know, the inverter capacity is not
15 increased and that the operation of the facility is not
16 outside the hours of the day that the utility
17 originally studied, that's different from saying the
18 production profile.

19 My understanding is that, currently, Duke is
20 not considering a production profile in the -- in
21 assessing the interconnection impacts, but that they
22 consider that the facility is operating at its full AC
23 rating during the -- generally, the daylight hours, or
24 9:00 to 5:00. So if, you know, their system impact

1 analysis assumes that it's operating at full capacity
2 during those hours, so if it were to be able to operate
3 at full capacity given the addition of energy storage,
4 that shouldn't make a different -- it shouldn't impact
5 their analysis.

6 Q. Okay. I understand.

7 A. I hope that was helpful.

8 Q. So help me understand, then, sort of from a
9 practical standpoint -- and you may have just answered
10 the question, so you may have to repeat your answer,
11 but the addition of storage -- energy storage to an
12 existing solar generating facility, if that energy
13 storage is set up or, you know, constrained to operate
14 only during the daylight hours, what does that mean?
15 What is the result, in terms of energy production?

16 A. What would be the change in the profile?

17 Q. Yes.

18 A. It would depend upon how the owner of that
19 facility is utilizing the storage. I mean, energy
20 storage is generally a pretty flexible asset. So,
21 generally, if it's DC coupled, as we were discussing,
22 it's being charged by the PV array and not by the grid.
23 But when that energy is discharged would depend upon
24 how it's controlled. So, I mean, certainly, it would

1 have the capability to be discharged at any time of the
2 day, but if -- but my opinion is, if it's limited to
3 the hours in which the utility originally assumed that
4 the facility would be operating at full capacity, then
5 there should be no impact to utility's assessment of
6 impacts.

7 Q. Okay.

8 A. And that's a very narrow application.

9 Q. Understood. Narrow application of?

10 A. Of energy storage.

11 Q. Okay. And that goes to my next question.

12 Isn't that -- I mean, is that maximizing the
13 value of energy storage, if you confine it to operate
14 during daylight hours?

15 A. No. I mean, there certainly would be other
16 applications that would have energy storage being
17 discharged outside of those hours, but, I mean, there
18 is a wide range of applications. And my opinion is not
19 necessarily speaking to what application would be
20 utilized here.

21 Q. Okay. And are there any other sort of
22 benefits provided by that energy storage coupled with
23 an existing solar facility, other than maximize -- if
24 it's confined -- if the storage facility is confined to

1 operate only during the daylight hours, other than just
2 maximizing the production of that facility, any other
3 sort of ancillary benefits?

4 A. Certainly. I mean, so one application of
5 energy storage in that instance could be a smoothing of
6 the output such that it's less variable. One could be
7 shifting the energy two times a day, when the utility
8 needs it more and the energy is more valuable.

9 Q. Assuming those hours occur during the
10 daylight?

11 A. Yes. Which peaking hours typically do,
12 either in the morning or in the afternoon, or late in
13 the afternoon.

14 Q. Okay. I have nothing further.

15 CHAIRMAN FINLEY: Anyone else?

16 Questions on the Commission's questions. Ms. Kells
17 has some questions.

18 CROSS EXAMINATION BY MS. KELLS:

19 Q. Sorry. I can't recall the order for
20 questions on Commission's questions.

21 I'm just curious, did you -- you saw the
22 stipulation that was filed last Friday between the
23 utilities, and Public Staff, and court counsel?

24 A. Yes.

1 Q. You saw it was filed?

2 A. Yes, I did.

3 Q. And then Monday, there was an additional
4 NCSEA -- I guess on Monday morning, NCSEA filed a
5 motion to deny -- or motion to reject it, and then
6 there was a filing and a response filed by Duke.

7 Are you aware of those filings?

8 A. I am aware of the NCSEA filing, but not of
9 the Duke response.

10 Q. Okay. Okay. Have you seen the black-line
11 changes that were in there and that stipulated red line
12 regarding material modifications? Have you had a
13 chance to look at those in the five days since Friday?

14 A. Yes. Very briefly, but I did see them.

15 Q. My only question is, did you have a position
16 on that section of the stipulated red lines? There has
17 been a lot of questions about storage. This is
18 following up on Commissioner Mitchell's questions.

19 Do you have a position on that portion of the
20 stip -- I wasn't able to determine.

21 A. I have not reviewed and formulated a formal
22 position on that, no.

23 Q. Okay.

24 MS. KELLS: That's all.

1 CHAIRMAN FINLEY: Mr. Dodge?

2 CROSS EXAMINATION BY MR. DODGE:

3 Q. Mr. Burcke, just a couple of follow-up
4 questions on Commissioner Mitchell's questions.

5 Commissioner Mitchell asked you about the
6 TSRG group and that it's provided some meaningful
7 discussion, and you discussed the importance of that
8 information being documented and available.

9 Does the TSRG group -- does the utility
10 maintain a website that documents and discussions and
11 the items that are taken up at the TSRG group?

12 A. Yes.

13 Q. All right. And I know you indicated you
14 hadn't reviewed Mr. Williamson -- Public Staff
15 Williamson's testimony, but in Mr. Williamson's
16 testimony, he recommended that, to the extent the
17 utility makes additional changes to screens going
18 forward, that those be posted on the utility's website,
19 they also be filed for informational purposes with the
20 Commission, and that they would also then be tabled for
21 discussion at the next TSRG group.

22 Would those be helpful steps in bringing --
23 continuing the meaningful discussion of good utility
24 practice at the TSRG group?

1 A. I don't see that as inconsistent with the way
2 the group is being operated currently.

3 Q. Also, Commissioner Mitchell asked you about
4 the information that you thought would be helpful to be
5 made available at an earlier point in the -- for
6 prospective interconnection customers. And you
7 specifically mentioned line voltage regulators, their
8 location.

9 In the utility red line that was part of
10 the -- or excuse me, the red line that was part of the
11 stipulation entered into between the utilities, Public
12 Staff, and the Pork Council, it's very -- some
13 components of it are similar to the earlier versions
14 that I think you probably had a chance to review, but
15 are you familiar with the changes in the
16 pre-application request portion of that red line?

17 A. I'm not.

18 Q. Subject to check, would you agree that the
19 red line indicates that Section 1.3.2.8, which
20 describes the information provided in a pre-application
21 report, would include the number, location, and rating
22 of protective devices; and number, location, and type,
23 standard or bidirectional, of voltage regulating
24 devices between the proposed point of interconnection

1 and the substation/area and identify whether the
2 substation has a load tap changer? Would you agree
3 that that's -- subject to check, that that's --

4 A. Subject to check, yes.

5 Q. All right. And so, in the revised
6 pre-application reports, that information would be made
7 available to interconnection customers, correct?

8 A. Upon request, yes.

9 Q. Upon request, yes, thank you.

10 And then with regard to the questions on the
11 battery storage, Commissioner Mitchell also discussed
12 with you, under the scenario where a battery was found
13 to not be viewed as a material modification if it was
14 operating within kind of the narrow application that
15 you described, who would control the discharge of the
16 battery?

17 A. The owner of the facility.

18 Q. The owner of the facility.

19 And if the -- if an applicant wanted to seek
20 to use the broader benefits of -- the energy storage
21 might provide, beyond just that narrow application,
22 they could submit a new interconnection request, and
23 the project could be reviewed, allowing a broader
24 profile?

1 A. Correct.

2 Q. Thank you.

3 CHAIRMAN FINLEY: Silence. Okay. Thank
4 you, sir.

5 THE WITNESS: Thank you.

6 CHAIRMAN FINLEY: We will receive his
7 exhibits into evidence at this point.

8 (NCSEA Exhibit PB-1 and PB-2 were
9 admitted into evidence.)

10 CHAIRMAN FINLEY: You may be excused.

11 MS. KEMERAIT: I call the witness panel
12 for NCCEBA, please.

13 Whereupon,

14 CHRISTOPHER NORQUAL, LUKE O'DEA, AND

15 MICHAEL R. WALLACE,

16 having first been duly sworn, were examined

17 and testified as follows:

18 MS. KEMERAIT: Thank you, Mr. Chair. I
19 have asked the panel for NCCEBA to be seated, and
20 as you can see, we have three panel members. As a
21 preliminary matter, what I would propose to do is
22 have, one by one, each of the panel members read
23 their summary, and then I have some follow-up
24 direct questions, and then I proposed to release

1 the panel for cross examination, if that's
2 acceptable.

3 CHAIRMAN FINLEY: Before they summarize
4 their testimony, let's get it into evidence,
5 please.

6 MS. KEMERAIT: Okay. And as a second
7 preliminary matter, the parties stipulated that the
8 direct testimony of NCCEBA witness, Robert Duke,
9 filed on November 19th of 2018, could be admitted
10 into the record, and so, at this time, I would move
11 that the direct testimony of Robert Duke filed on
12 November 19th be admitted into the record.

13 CHAIRMAN FINLEY: Mr. Duke's direct
14 prefiled testimony of nine pages filed on
15 November 19, 2018, is copied into the record as if
16 given orally from the stand.

17 (Whereupon, the prefiled direct
18 testimony of Robert J. Duke was copied
19 into the record as if given orally from
20 the stand.)

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STATE OF NORTH CAROLINA
UTILITIES COMMISSION
RALEIGH

DOCKET NO. E-100, SUB 101

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

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

DIRECT TESTIMONY

OF

ROBERT J. DUKE

ON BEHALF OF

NORTH CAROLINA CLEAN ENERGY BUSINESS ALLIANCE

November 18, 2018

1 Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

2 A. My name is Robert J. Duke. My business address is 1140 19th Street, NW, Suite
3 500, Washington DC 20036.

4

5 Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

6 A. I am the General Counsel for The Surety & Fidelity Association of America
7 (SFAA).

8

9 Q. PLEASE DISCUSS YOUR EDUCATIONAL AND PROFESSIONAL
10 BACKGROUND.

11 A. I graduated summa cum laude from Loyola College of Maryland in 1988 with a
12 Bachelors in Business Administration, and obtained a Masters in Business
13 Administration from Loyola College in 1992. I also graduated with a J.D. summa
14 cum laude and first in class from Columbus School of Law, Catholic University in
15 2005.

16

17 As mentioned above, I am the General Counsel for SFAA. I joined SFAA in
18 1999 as Director of Underwriting, went into private practice from 2006 until
19 2008, and returned to SFAA in 2008 as Director of Underwriting/Counsel.

20

21 I have authored and co-authored several articles regarding surety and fidelity
22 bonds, including:

- 1 • *A Brief History of the Financial Institution Bond*, in *Financial Institution Bonds*
2 (Duncan L. Clore ed., 2d ed. 1998);
3 • *Interpretation and Construction of the Commercial Crime Policy*, in *The*
4 *Commercial Crime Policy* (Randall I. Marmor & John J. Tomaine eds., 2d. ed.)
5 (2005) (co-author)
6 • *A Concise History of Fidelity Insurance*, in *Handling Fidelity Bond Claims*
7 (Michael Keeley & Sean Duffy eds., 2005) (co-author);
8 • *A Brief History of the Financial Institution Bond*, in *Financial Institution Bonds*
9 (Duncan L. Clore ed., 3d ed.) (2008) and
10 • *A Concise History of the Financial Institution Bond, Standard Form no. 24 in*
11 *Annotated Financial Institution Bond* (Michael Keeley ed., 3d ed.) (2013).
12 • *Interpretation and Construction of the Commercial Crime Policy – Their*
13 *Interpretation and Construction*, in *Commercial Crime Insurance Coverage*
14 (Randall I. Marmor & Susan Koehler Sullivan eds.) (2014) (co-author)
15 • *History and Development of Mercantile Crime Policies*, in *Annotated*
16 *Commercial Crime Insurance Policy* (Toni Scott Reed & Carlton Burch eds., 3d
17 ed. 2015).
18

19 **Q. PLEASE DESCRIBE THE SURETY & FIDELITY ASSOCIATION OF**
20 **AMERICA.**

21 **A.** SFAA is a non-profit corporation whose member companies collectively write the
22 majority of surety and fidelity bonds in the United States. SFAA is a licensed
23 rating or advisory organization in all states, and is designated by state insurance
24 departments as a statistical agent for the reporting of fidelity and surety
25 experience. The vast majority of bonds that secure regulatory and performance
26 obligations are provided by SFAA members. Our membership is comprised of
27 over 400 companies and accounts for over 97 percent of the surety and fidelity
28 premium written in the United States. SFAA serves as the thought leader and
29 trusted advisor for the surety and fidelity industry, state and federal agencies, and
30 legislators. As a licensed rating agency/advisory organization and trade

1 association, SFAA supports its members, subscribers, federal, state, and local
2 government leaders, and the public by providing statistical and actuarial data,
3 expertise, advocacy, education, and promotion on the value of surety and fidelity
4 bonds.

5
6 **Q. DOES SFAA PERFORM REGULATORY SERVICES?**

7 A. Yes. As a rating or advisory organization licensed by state insurance
8 departments, SFAA develops and files countrywide surety and fidelity manual
9 rules, loss costs, and standard fidelity forms.

10

11 **Q. HAVE YOU PREVIOUSLY SUBMITTED TESTIMONY BEFORE THE**
12 **NORTH CAROLINA UTILITIES COMMISSION?**

13 A. No. I have not previously provided expert testimony to the North Carolina
14 Utilities Commission ("Commission").

15

16 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS**
17 **PROCEEDING?**

18 A. It is my understanding that the North Carolina Clean Energy Business Alliance
19 ("NCECBA") and the North Carolina Sustainable Energy Association
20 ("NCSEA") are asking the Commission to require utilities to allow the use of
21 surety bonds as performance security for the cost of constructing Interconnection
22 Facilities under Section 6.3 of the North Carolina Interconnection Procedures.

1 The purpose of my testimony is to assist the Commission in its consideration of
2 whether to allow the surety bond as an option for financial security for
3 Interconnection Facilities.
4

5 **Q. WHAT IS YOUR UNDERSTANDING OF DUKE'S POSITION**
6 **REGARDING WHETHER TO ALLOW THE SURETY BOND AS AN**
7 **OPTION FOR INTERCONNECTION FACILITIES?**

8 It is my understanding that Duke Energy Carolinas, LLC and Duke Energy
9 Progress, LLC (collectively, "Duke") filed Reply Comments in this docket on
10 September 19, 2018, and stated that it would allow the use of surety bonds for
11 Interconnection Facilities in limited circumstances. Specifically, Duke stated:

12 "[T]he Companies have determined that limited acceptance of surety
13 bonds for Interconnection Facilities upon terms and conditions reasonably
14 acceptable to the Companies' Credit/Risk department would be reasonable
15 in certain limited circumstances. Specifically, the Companies determined
16 that such acceptance would only be reasonable where an Interconnection
17 Customer's Interconnection Agreement requires major Network Upgrade
18 construction over 3-5 years such that the Companies' Interconnection
19 Facilities project would not begin final design, procurement and
20 scheduling of Interconnection Facilities construction for an extended
21 period of time after the Interconnection Agreement has been executed.

1 It is also my understanding that NCCEBA and NCSEA have requested that a
2 surety bond be an allowable form of financial security for Interconnection
3 Facilities in all circumstances.
4

5 **Q. PLEASE DESCRIBE SURETYSHIP.**

6 A. Suretyship is a very specialized line of insurance that is created whenever one
7 party guarantees performance of an obligation by another party. There are three
8 parties to the agreement: (1) the principal is the party that undertakes the
9 obligation; (2) the surety guarantees that the obligation will be performed; and (3)
10 the obligee is the party who receives the benefit of the bond.
11

12 **Q. PLEASE EXPLAIN A SURETY BOND.**

13 A. A surety bond is a written instrument by which an obligation owed by one party
14 (the bond principal) to another party (the obligee) is secured by a third party (the
15 surety).
16

17 The better known service of the surety is to perform its stated bond obligation and
18 provide financial protection in the event the bond principal defaults in its
19 performance. In such an event, the surety steps in to handle the claims on the
20 bond and perform pursuant to the conditions of the bond and the applicable
21 statutory or regulatory language. It is important to point out that the surety bond
22 is a contract, and the form of bond generally is prescribed by the obligee. The

1 terms and conditions of the bond may be written to provide for the non-
2 cancellability of the bond and may set the conditions under which a surety pays.
3 The surety will underwrite accordingly based on the terms and conditions of the
4 bond.

5
6 The second service provided by the bond is the surety's prequalification of the
7 bond principal before the surety will write the bond. A surety seeks to avoid a
8 loss by making an assessment of the bond principal's experience, capabilities, and
9 financial resources, and provides a bond only to those entities that, in the surety's
10 estimation, are capable of performing the obligation that is bonded.

11
12 **Q. ARE THERE AREAS WHERE THE SERVICES AFFORDED BY A**
13 **SURETY BOND ARE GREATER THAN THE SERVICES AFFORDED BY**
14 **A LETTER OF CREDIT?**

15 **A.** Yes. The underwriting focus with respect to a letter of credit is primarily the
16 bond principal's financial position or the collateral backing the letter of credit.
17 The qualitative and operational review that takes place when underwriting a
18 surety bond is usually lacking when underwriting a letter of credit.

19
20 **Q. CAN THE SURETY BOND BE WRITTEN TO ADDRESS DUKE'S**
21 **CONCERN ABOUT FINANCIAL RISK IN THE EVENT OF DEFAULT?**

1 A. Yes. The surety bond is a contract, and the scope of the obligation, the triggers of
2 the surety's remedies, and the cancellability of the bond, among other bond
3 conditions, are determined by the parties and incorporated into the bond form. As
4 noted, the obligee typically prescribes the bond form. Therefore, if Duke requests
5 that the surety bond be non-cancellable, a non-cancellability provision can be
6 written into the bond. Also, in the event of default, the surety steps in to perform
7 pursuant to the conditions of the bond. I note that such features increase the risk
8 to the surety. A surety typically addresses increased risk by tightening its
9 underwriting parameters.

10
11 It is my understanding that Duke allows the use of a letter of credit for financial
12 security for Interconnection Facilities, but historically has not permitted the use of
13 a surety bond. Duke's expressed concern about a surety bond is that it could
14 contain conditions that would allow the surety to assert defenses to payment of a
15 claim if the Interconnection Customer were to default. However, the conditions
16 of payments are established in the bond form, which Duke can prescribe.

17 Limiting a surety's defenses will require a surety to underwrite accordingly.
18 Nevertheless, the bond should remain an option to well capitalized and highly
19 liquid principals.

20
21 For those reasons, Duke will not be exposed to financial risk if a surety bond is
22 permitted as an option for financial security.

1

2 **Q. WHAT IS YOUR RECOMMENDATION TO THE COMMISSION IN**
3 **REGARD TO THIS ISSUE?**

4 A It is my recommendation that the Commission should allow a surety bond as a
5 permissible form of financial security for Interconnection Facilities under Section
6 6.3 of the North Carolina Interconnection Procedures. Giving Duke the discretion
7 not to allow the use of a commercially reasonable surety bond unnecessarily
8 deprives the parties of the valuable services provided by a surety bond.

9

10 **Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

11 A. Yes, at this time.

1 BY MS. KEMERAIT:

2 Q. And I will begin with testimony from
3 Christopher Norqual.

4 Could you state your name for the record
5 please?

6 A. (Christopher Norqual) Yes. My name is
7 Christopher Norqual.

8 Q. And what is your business address?

9 A. My business address is 3402 Pekoe Boulevard,
10 Santa Monica, California 90405.

11 Q. By whom are you employed?

12 A. I'm employed by Cypress Creek Renewables.

13 Q. And what is your position with Cypress Creek
14 Renewables?

15 A. I am the vice president of utility relations
16 and strategy.

17 Q. And in your position with Cypress Creek, are
18 you involved in the development of projects -- of
19 Cypress Creek's projects in North Carolina; and if so,
20 can you just generally explain the ways that you are
21 involved in -- with the North Carolina projects?

22 A. Sure. Yes, I am involved with the
23 development of CCR's projects in North Carolina. I
24 lead the interconnection process for all CCR projects

1 around the country, including North Carolina, and I'm
2 also involved in the commercial management of CCR's
3 development activities in North Carolina.

4 Q. Thank you. Is Cypress Creek a member of the
5 North Carolina Clean Energy Business Alliance?

6 A. Yes, it is.

7 Q. And did you cause to be prefiled -- to be
8 filed a prefiled direct testimony of approximately 18
9 pages, and one exhibit on November 19th of 2018, and
10 also rebuttal testimony of approximately eight pages on
11 January 8th of 2018?

12 A. Yes.

13 Q. And for your direct and rebuttal testimony,
14 do you have any changes or corrections that you would
15 like to be made to that prefiled testimony at this
16 time?

17 A. Yes, I do.

18 Q. Okay. And can you describe the changes that
19 you would like to be made?

20 A. Yes. There would be two changes. On page 9
21 of my direct testimony, it should be revised to state
22 yes, it is my understanding that surety bonds are an
23 accepted form of performance security that provide
24 utilities with more than adequate assurance that the

1 financial obligations of the interconnection customers
2 will be met.

3 Also, the following sentence on page 3 of my
4 rebuttal testimony should be deleted. For utilities
5 outside of North Carolina, I am aware that
6 South Carolina Electric and Gas, Virginia Electric and
7 Power Company, Consumers Energy, Southern California
8 Edison, San Diego Gas and Electric, and Pacific Gas and
9 Electric accept surety bonds for interconnection
10 facilities.

11 Q. Thank you. And with the exception of those
12 two changes that you just described, if I were to ask
13 you the same questions as written if your prefiled
14 testimony here on the stand, would your answers be the
15 same?

16 A. Yes.

17 MR. JIRAK: Excuse me. Sorry, just for
18 clarity, could you go over that deletion one more
19 time? I think we --

20 THE WITNESS: No problem. From page 3
21 of my rebuttal testimony, deleting for utilities
22 outside of North Carolina I am aware that
23 South Carolina Electric and Gas, Virginia Electric
24 and Power Company, Consumers Energy, Southern

1 California Edison, San Diego Gas and Electric, and
2 Pacific Gas and Electric accept security bonds for
3 interconnection facilities.

4 MR. JIRAK: Thank you. Sorry about
5 that.

6 MS. KEMERAIT: Mr. Chairman, at this
7 time, I would move that Mr. Norqual's prefiled
8 direct and rebuttal testimony be entered into the
9 record as if given orally from the stand.

10 CHAIRMAN FINLEY: Mr. Norqual's direct
11 prefiled testimony of November 19, 2018, consisting
12 of 18 [sic] pages and his one attachment, are
13 copied into the record as though given orally from
14 the stand, and his rebuttal testimony of eight
15 pages of January 8, 2019, are copied into the
16 record as if given orally from the stand.

17 (Per Chairman Finley's request, the
18 attachment to Christopher Norqual's
19 direct testimony will be identified and
20 admitted as Norqual Exhibit Number 1.)

21 (Whereupon, the prefiled direct and
22 rebuttal testimony of

23 Christopher Norqual was copied into the
24 record as if given orally from the

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stand.)

STATE OF NORTH CAROLINA
UTILITIES COMMISSION
RALEIGH
DOCKET NO. E-100, SUB 101
BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

In the Matter of:

Petition for Approval of Revisions to Generator
Interconnection Standards

DIRECT TESTIMONY
OF
CHRISTOPHER NORQUAL
ON BEHALF OF
NORTH CAROLINA CLEAN ENERGY BUSINESS ALLIANCE

November 18, 2018

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Christopher Norqual. My business address is 3402 Pico Boulevard, Santa Monica, California 90405.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am the Vice President of Utility Relations and Strategy for Cypress Creek Renewables, LLC ("CCR").

Q. PLEASE PROVIDE INFORMATION ABOUT CYPRESS CREEK RENEWABLES, LLC.

A. CCR develops, builds, and operates solar facilities across the United States. With 3.2 gigawatts of solar deployed in more than a dozen states, CCR is one of the country's leading solar companies. In my role, I work with utility contacts on the interconnection study process and interconnection and offtake contracting for CCR projects. Internally, I coordinate project development activities with multiple groups including Development, Financing, Policy, Strategy & Origination, Corporate Finance, Engineering/Procurement/Construction, Asset Management, and Operations & Maintenance.

In 2017, CCR installed nearly 500 megawatts ("MW") across more than 40 projects in North Carolina, representing 41% of the state's annual solar installations and helping propel North Carolina to the country's number 2 position for the most installed solar of any state last year. This is enough clean energy to power over 60,000 North Carolina

homes and businesses, and together these projects generated over \$500 million in local economic development and helped create thousands of jobs.

In addition to solar, CCR is an emerging leader in energy storage, and earlier this year unveiled the region's first utility-scale solar-battery projects in partnership with Lockheed Martin, developed for the Brunswick Electric Membership Corp. in southeastern North Carolina.

In 2018, CCR opened its national Control Center at its flagship Research Triangle Park office, where it operates nearly 300 solar projects (2,000 MW) across the country. CCR's Control Center ("C4") is one of only a handful of solar-dedicated control centers of its kind in the United States, designed to meet North American Electric Reliability Corporation's ("NERC") most stringent cyber security and reliability requirements for Critical Infrastructure Protection ("CIP").

Combined with the company's growing team of more than 150 employees in North Carolina, and two workforce development partnerships with both Cape Fear Community College in Wilmington, North Carolina and Greenville Technical College in Greenville, South Carolina, CCR is deeply invested and committed to the State of North Carolina and the region.

Q. PLEASE DISCUSS YOUR EDUCATIONAL AND PROFESSIONAL BACKGROUND.

A. I graduated from Amherst College in 2004 with a Bachelor of Arts degree in history. I also graduated with honors from the University of Southern California Marshall School of Business in 2014 with a Master of Business Administration degree. Prior to business school, I worked for 6 years in product development and marketing for Easton Sports, Inc. as a Director of Product. I began working for CCR in July 2014 as the Project Development Manager, responsible for development activities in interconnection, zoning and permitting, regulatory, environmental, and real estate due diligence. After becoming Vice President in January 2016, I began focusing expressly on utility development activities for CCR's pipeline of projects across the United States from inception through commercial operation.

Q. HAVE YOU PREVIOUSLY SUBMITTED TESTIMONY BEFORE THE NORTH CAROLINA UTILITIES COMMISSION?

A. No. I have not previously provided expert testimony to the North Carolina Utilities Commission.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony is to address the impacts to CCR caused by the significant delays and changes in the Duke Energy Progress, LLC and Duke Energy Carolinas, LLC (collectively, "Duke") interconnection study processes. Additionally, I will address the importance to CCR of surety bonds as financial security for interconnection facilities constructed by Duke. Finally, I will discuss how Duke's recently proposed changes to

the Material Modification language will limit the addition of storage to solar facilities, and what potential benefits are being lost.

Q. WHAT IS THE CURRENT STATUS OF CCR PROJECT INTERCONNECTION APPLICATIONS TO DUKE?

A. Of actively-queued CCR projects that have applied for distribution interconnection with Duke but have not yet received a System Impact Study report ("SIS"), the current average time in queue is approximately 1,100 days, or more than three (3) years. The oldest CCR distribution project still in queue without an SIS has been in queue for more over 1,556 days, or more than four years and three months.

Q. ARE THE DUKE INTERCONNECTION DELAYS SIGNIFICANT?

A. Yes, the delays have been significant and continue to be significant.

Q. WHAT EFFECTS DO THESE SIGNIFICANT DUKE INTERCONNECTION DELAYS HAVE ON YOUR BUSINESS?

A. First, CCR projects have submitted approximately \$8 million in total interconnection application deposits which are currently held by Duke, earning zero return in interest. There is a substantial financial carrying cost of capital to CCR. While some of these dollars have likely been utilized by Duke, Duke has been holding some deposits for years without even beginning to spend it on studies.

Second, Qualifying Facilities ("QF") that have established legally enforceable obligations for the E-100, Sub 140 rate schedule have started the 15-year terms as of September 10,

2018. Therefore, potential contracted revenue of these projects is decreasing every day that passes, with a significant impact on the profitability of these projects.

Third, the longer projects sit in queue, the greater the chance that they will be affected by the step down to the federal solar Investment Tax Credit (“ITC”). The ITC currently allows a 30% dollar for dollar basis reduction in income taxes for investing in solar equipment. Tax equity investments, utilizing the ITC, usually make up a significant portion of the financing package for solar projects. The ITC basis reduces to 26% for utility-scale projects that begin construction in 2020, to 22% for construction beginning in 2021, and to 10% for construction beginning in 2022 and beyond. The ITC is an extremely important factor in financeability of solar facilities. Completing studies and moving to Interconnection Agreements in advance of the step down in 2020 is financially material to CCR and other developers.

Fourth, CCR is unable to plan its business without having visibility to when projects will complete study. When projects are beyond the allowable study timeline, and since there is currently no publicly available information about the estimated completion date of studies, we cannot coordinate other development activities that depend on interconnection feedback. Projects are often required to get local permitting approvals in the form of Conditional Use Permits or Special Use Permits, which can have expiration dates. Without interconnection timing information, we’re unable to coordinate in-service dates with the local Authority Having Jurisdiction (“AHJ”) and this can lead to us losing permits and/or frustrating local community groups, resulting in cancelled projects. Other

important land due diligence activities like environmental study, survey, and Geotech also must be commenced depending on receipt of the SIS, and it is difficult to coordinate with vendors without visibility from Duke. We have inquired by phone and email with Duke personnel, and even Duke's personnel claim that they are unable to get answers internally about project status or estimated date of SIS completion. Additionally, we have seen later queue positions get SIS reports and get interconnected before other earlier queued projects that are still sitting in queue without completed SIS reports. I have been unable to obtain an explanation from Duke personnel about why later queue positions have been studied before earlier queue positions.

Fifth, we are unable to develop financing and construction plans without clarity about interconnection timing. Many financing partners depend on knowing which year a project will likely be placed in service. Without visibility to SIS completion, we are often unable to source final project finance until the SIS is complete. Similarly, we cannot plan construction and procurement of equipment.

Finally, there is a large carrying cost for land when the interconnection study process takes years longer than the NC Interconnection Procedures ("NCIP") allows. We sign multi-year lease or purchase options with landowners, but these agreements mostly do not contemplate studies taking more than three years. When studies take this long, we are forced to negotiate additional extensions, resulting in cancellations, significant rate increases, and/or higher total land due diligence costs than originally modeled, threatening the financial viability of projects. Delays in interconnecting projects also can

have unfortunate effects on local landowners (who are very often Duke ratepayers) of not commencing rent or closing on sales when they were planning to.

Q. WHAT IS YOUR UNDERSTANDING OF DUKE'S POSITION REGARDING WHETHER TO ALLOW THE SURETY BOND AS AN OPTION FOR INTERCONNECTION FACILITIES?

It is my understanding that Duke filed Reply Comments in this docket on September 19, 2018, and stated that it would allow the use of surety bonds for Interconnection Facilities in limited circumstances. Specifically, Duke stated:

“[T]he Companies have determined that limited acceptance of surety bonds for Interconnection Facilities upon terms and conditions reasonably acceptable to the Companies' Credit/Risk department would be reasonable in certain limited circumstances. Specifically, the Companies determined that such acceptance would only be reasonable where an Interconnection Customer's Interconnection Agreement requires major Network Upgrade construction over 3-5 years such that the Companies' Interconnection Facilities project would not begin final design, procurement and scheduling of Interconnection Facilities construction for an extended period of time after the Interconnection Agreement has been executed.

NCCEBA and NCSEA believe that a surety bond should be an allowable form of financial security for Interconnection Facilities in all circumstances.

Q. ARE YOU AWARE OF UTILITIES THAT ACCEPT SURETY BONDS FOR INTERCONNECTION FACILITIES PAYMENTS?

A. Yes, it is my understanding that surety bonds are a widely accepted form of performance security that provide utilities with more than adequate assurance that the financial obligations of Interconnection Customers will be met. For North Carolina Interconnection Customers, Dominion Energy ("Dominion") has confirmed that it accepts surety bonds for North Carolina Interconnection Facilities. I have attached a copy of the approved bond form I received from Dominion. In 2018, CCR posted a bond on behalf of one of its projects for Attachment (Interconnection) Facilities.

Q. WHY IS ALLOWANCE OF A SURETY BOND FOR INTERCONNECTION FACILITIES IMPORTANT TO CCR?

A. As an initial matter, performance security for Interconnection Facilities in the forms that are only currently accepted by Duke (cash or a cash-collateralized letter of credit ("LOC")) is burdensome to Interconnection Customers and serve no legitimate public purpose. Until the utility has a need to begin incurring costs for the design or construction of the Interconnection Facilities, there is no need for the payment of the costs to be secured. Neither Duke, other parties, nor the ratepayers are at risk because they would suffer no harm if interconnection failed to go forward with the completion of the Interconnection Customer's unique Interconnection Facilities.

Also, there is a cost of capital to CCR for cash deposits and LOCs. At recently quoted costs and timelines by Duke Energy Progress, LLC ("DEP"), a typical 115kV transmission interconnected project would have a cash carrying cost to CCR of nearly \$1 million. This could be almost completely alleviated by allowing a surety bond.

Duke Energy Carolinas, LLC ("DEC") returns the up-front payment for Interconnection Facilities to the Customer after the date of Commercial Operation. Therefore, a surety bond would be a fair and equitable method of securing the interconnection requirement if the intention is to ultimately return the security to the Interconnection Customer.

Q. WOULD OTHER INTERCONNECTION CUSTOMERS BE PREJUDICED IF A PROJECT WAS CANCELLED AFTER POSTING A SURETY BOND?

A. I do not believe so. My understanding is that the normal scope of Interconnection Facilities does not extend into the electrical grid beyond where the line is tapped and therefore should not have a material effect on other projects.

Q. SHOULD INTERCONNECTION CUSTOMERS BE REQUIRED TO IRREVOCABLY PAY FOR INTERCONNECTION FACILITIES IF THEY ARE NOT CONSTRUCTED?

A. No. An Interconnection Customer should not be required to irrevocably pay for Interconnection Facilities if the generation facility is not constructed. If a project is not constructed, any unspent funds should be returned to the Interconnection Customer. Duke should not be permitted to retain the funds (and frequently substantial funds) of

Interconnection Customers for Interconnection Facilities if the Interconnection Facilities are not constructed and Duke has not had to incur any costs.

Q. IF DUKE ALLOWED A SURETY BOND AND NEEDED TO MAKE A CASH PAYMENT FOR MATERIALS OR LABOR DURING THE CONSTRUCTION PROCESS, COULD IT INVOICE THE CUSTOMER?

A. Yes. Interconnection Customers could pay cash as Duke requires it, during construction and/or upon completion of the project.

Q. WOULD A SURETY BOND PROVIDE SUFFICIENT FINANCIAL PROTECTION TO DUKE?

A. Yes, a surety bond would protect Duke from financial risk in the event that the Interconnection Customer fails to provide payment. In the event that the Interconnection Customer failed to pay Duke for costs of the Interconnection Facility, the surety would step in to handle the claim on the bond and provide payment.

Q. IN WHAT CAPACITY DID YOU PARTICIPATE IN THE 2017 NORTH CAROLINA INTERCONNECTION STANDARD STAKEHOLDER PROCESS?

A. I represented CCR along with Luke O'Dea, Director of Utility Engineering for CCR. Additionally, Mr. O'Dea and I co-facilitated Working Group #2 for "New Technologies" with the Interstate Renewable Energy Council ("IREC"). This working group covered issues related to battery storage and associated Material Modification policy.

Q. DID DUKE PARTICIPATE IN THE 2017 NORTH CAROLINA INTERCONNECTION STANDARD STAKEHOLDER PROCESS?

A. Yes. John Gajda was active in discussions in Working Group #2 and Mike Grant was copied on correspondence.

Q. DURING THE INTERCONNECTION STAKEHOLDER PROCESS, WHAT WERE DUKE'S CONCERNS ABOUT ADDING ENERGY STORAGE TO AN EXISTING OR PLANNED SOLAR FACILITY?

A. During the Working Group #2 discussions, my recollection is that Duke had two primary concerns about adding energy storage to solar facilities and the Material Modification implications: short circuit current and the load cases used for thermal and voltage studies. The concern around additional short circuit current pertains to an AC coupled storage unit with separate inverters for the battery system. Those additional inverters contribute short circuit current which would not have been considered in the interconnection studies, resulting in the need to restudy the project and triggering a Material Modification. The second concern around load cases arises because the interconnection studies for a solar facility typically evaluate the impact to the system under peak load and minimum daylight load conditions. A solar facility that includes energy storage has the ability to discharge energy outside of the minimum daylight load hours, resulting in the need to restudy the project and triggering a Material Modification.

Q. WHAT LANGUAGE WAS DEVELOPED IN WORKING GROUP #2 TO ADDRESS DUKE'S CONCERNS AROUND THE MATERIAL MODIFICATION IMPLICATIONS OF ADDING ENERGY STORAGE TO A SOLAR FACILITY?

A. The final Working Group #2 language proposed the addition of item 1.5.2.5, a change that is not indicia of a Material Modification, which reads: "A change in the DC system configuration to include additional equipment that does not impact the Maximum Generating Capacity or the proposed AC configuration of the Generating Facility including: DC optimizers, DC-DC converters, DC charge controllers, power plant controllers, and energy storage devices such that the output is delivered during the same periods considered during the System Impact Study."

Q. DO YOU BELIEVE THIS PROPOSED LANGUAGE ALLOWS FOR THE ADDITION OF ENERGY STORAGE TO A PLANNED OR OPERATIONAL SOLAR FACILITY?

A. Yes. The proposed language above would allow the addition of a DC-coupled energy storage facility, provided that the output was limited to daylight hours. The output restriction is required because the load cases used for solar interconnection studies are the minimum daylight load and not the absolute minimum load case.

Q. TO YOUR KNOWLEDGE, WERE THERE ANY OTHER TECHNICAL ARGUMENTS RAISED BY DUKE, DOMINION, OR OTHERS DURING THE WORKING GROUP #2 MEETINGS ABOUT THE ADDITION OF DC-COUPLED STORAGE BEING DEEMED A MATERIAL MODIFICATION?

A. No. Duke's two primary concerns discussed above were addressed in the proposed language, and no other concerns were raised for discussion in the working group. Duke's comment in the final markup of the NCIP as compiled by Advanced Energy reads: "Duke supports this version of 1.5.2.5, but only if the modification of the Interconnection Request to include 24 hours import/export production profile information is included."

Q. ARE YOU ABLE TO PRODUCE A 24-HOUR IMPORT/EXPORT PRODUCTION PROFILE FOR A DC-COUPLED STORAGE ADDITION?

A. Yes. Since we can configure a DC-coupled energy storage device to produce such that the output is delivered during the same periods considered during the System Impact Study, we could provide a production estimate demonstrating that the output would be limited to the allowable time periods.

Q. SINCE THE CONCLUSION OF THE 2017 STAKEHOLDER PROCESS, WHAT LANGUAGE HAS DUKE PROPOSED IN LIEU OF THE LANGUAGE FROM WORKING GROUP #2?

A. In 2018 filings, Duke proposed the following alternative language for item 1.5.2.5: "A change in the DC system configuration to include additional equipment that does not impact the Maximum Generating Capacity or the proposed AC configuration of the Generating Facility including: DC optimizers, DC-DC converters, DC charge controllers, power plant controllers, and energy storage devices such that the output is delivered during the same periods and with the same profile considered during the System Impact Study."

Q. HOW DOES THE PHRASE WHICH WAS ADDED TO THE DUKE FILING “AND WITH THE SAME OUTPUT PROFILE” IMPACT THE ADDITION OF ENERGY STORAGE TO A SOLAR FACILITY? ALSO, IS THERE TECHNICAL MERIT FOR ADDING THIS CONDITION?

A. This phrase seems to largely exclude energy storage from being added to a solar facility without triggering a Material Modification, especially during peak hours when consumer demand for energy is highest. Based on knowledge of the Duke study process and the study cases used, it does not appear that there is technical merit for the addition of this criteria. Duke currently allows changes to DC equipment and even allows increases in the capacity of such equipment. The current NCIP includes items 1.5.2.3 and 1.5.2.4 which allow for the increase or decrease in the DC/AC ratio of a solar facility. Changing the DC/AC ratio, installing tracking solar arrays, and changing solar module orientation can significantly change the output profile. Adding DC-coupled storage devices that operate during the same time period in which solar facilities produce would be comparable to adding other DC equipment that Duke already allows.

Q. WOULD RATEPAYERS BENEFIT FROM ADDING ENERGY STORAGE TO SOLAR FACILITIES?

A. Yes. The existing and planned solar facilities on Duke’s grid are studied to ensure reliable operation of the grid. As these facilities are added to the system, the interconnection capacity of distribution and transmission infrastructure is allocated to those resources. Adding future resources to meet peak capacity needs could require

ratepayer funded transmission investments. Using the approved interconnection capacity of operating and queued resources with added energy storage could better utilize existing transmission and distribution infrastructure to meet system capacity needs.

The original Working Group #2 language for Material Modification contemplates that the addition of DC-coupled storage operated during daylight hours should not be considered a Material Modification. However, energy storage could also provide reliable power during non-daylight hours when ratepayers need energy the most, during morning and evening peak loading windows. Therefore, there should be a process available for submitting a request to Duke to quickly restudy solar facilities that wish to add storage, but do not intend to increase the facility's overall output capacity.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

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Clerk's Office
N.C. Utilities Commission

STATE OF NORTH CAROLINA
UTILITIES COMMISSION
RALEIGH

DOCKET NO. E-100, SUB 101

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

In the Matter of:

Petition for Approval of Revisions to Generator
Interconnection Standards

REBUTTAL TESTIMONY

OF

CHRISTOPHER NORQUAL

ON BEHALF OF THE

NORTH CAROLINA CLEAN ENERGY BUSINESS ALLIANCE

JANUARY 8, 2019

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Christopher Norqual. My business address is 3402 Pico Boulevard, Santa Monica, California 90405.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am the Vice President of Utility Relations and Strategy for Cypress Creek Renewables, LLC ("CCR").

Q. DID YOU PREVIOUSLY SUBMIT TESTIMONY IN THIS PROCEEDING?

A. Yes. I submitted direct testimony in this proceeding on behalf of the North Carolina Clean Energy Business Alliance ("NCCEBA") on November 20, 2018. My direct testimony includes a summary of the scope of my employment with CCR and my professional and educational background.

Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY IN THIS PROCEEDING?

A. The purpose of my testimony is (1) to address the reasons that Duke Energy Progress, LLC and Duke Energy Carolinas, LLC (collectively, "Duke") should accept surety bonds as financial security for Interconnection Facilities constructed by Duke, and (2) to address Duke's position that performance security and pre-payment for Interconnection Facilities are non-refundable even when Duke has incurred no costs for the Interconnection Facilities.

Q. IN ADDITION TO DOMINION ENERGY, ARE YOU AWARE OF OTHER UTILITIES THAT ACCEPT SURETY BONDS FOR INTERCONNECTION FACILITIES PAYMENTS?

A. As I mentioned in my initial testimony, it is my understanding that surety bonds are a widely accepted form of performance security, and I mentioned that Dominion Energy accepts surety bonds for North Carolina Interconnection Facilities. For utilities outside of North Carolina, I am aware that South Carolina Electric & Gas (South Carolina), Virginia Electric and Power Company (Virginia), Consumers Energy (Michigan), Southern California Edison (California), San Diego Gas & Electric (California), and Pacific Gas and Electric (California) accept surety bonds for Interconnection Facilities.

Q. ARE SURETY BONDS EXPRESSLY PERMITTED FOR INTERCONNECTION FACILITIES PURSUANT TO FEDERAL ENERGY REGULATORY COMMISSION ORDERS AND AGREEMENTS?

A. Yes. The Federal Energy Regulatory Commission's ("FERC") Standard Large Generator Interconnection Agreement ("LGIA") and FERC orders make it clear that surety bonds are an acceptable form of performance security. Specifically, Section 11.5 (Provision of Security) in the LGIA expressly includes the surety bond as an acceptable form of security:

At least thirty (30) Calendar Days prior to the commencement of the procurement, installation, or construction of a discrete portion of a Transmission Provider's Interconnection Facilities, Network Upgrades, or Distribution Upgrades,

Interconnection Customer shall provide Transmission Provider, at Interconnection Customer's option, a guarantee, a surety bond, letter of credit or other form of security that is reasonably acceptable to Transmission Provider and is consistent with the Uniform Commercial Code of the jurisdiction identified in Article 14.2.1. Such security for payment shall be in an amount sufficient to cover the costs for constructing, procuring and installing the applicable portion of Transmission Provider's Interconnection Facilities, Network Upgrades, or Distribution Upgrades and shall be reduced on a dollar-for-dollar basis for payments made to Transmission Provider for these purposes.

Furthermore, in July 2003, FERC issued Order No. 2003, which established standard procedures and a standard interconnection agreement for the interconnection of large generators to remedy undue discrimination. In FERC Order No. 2003, FERC instructed:

. . . [T]he Interconnection Customer has the right to select a form of security that is acceptable to the Transmission Provider and that the Transmission Provider cannot unreasonably refuse to accept a particular form. As the Commission has noted in recent orders, allowing the Interconnection Customer to provide an 'irrevocable letter of credit . . . or an alternative form of security proposed by the Transmission Customer and acceptable to the Transmission Provider and consistent with commercial practices' is not unreasonable Granting the Transmission Provider absolute discretion on what forms of security to allow

would provide too great an opportunity to erect hurdles to new generation, by allowing it to act in an unduly discriminatory or preferential manner.

FERC Order No. 2003 ¶597—Final Rule (2003).

Q. DO YOU BELIEVE THAT THIS COMMISSION SHOULD CONSIDER FERC ORDERS AND AGREEMENTS IN CONSIDERING WHETHER SURETY BONDS SHOULD BE PERMITTED BY DUKE?

A. Yes. I recognize that the North Carolina Interconnection Procedures are not bound by FERC's orders and interconnection agreements. However, before FERC adopted the LGIA, including Section 11.5 (Performance Security) of the LGIA, FERC issued an Advance Notice of Proposed Rulemaking, initiated a consensus-making process in which members of various segments of the electric power industry, government, and the public had the opportunity to provide input, and received numerous comments from transmission providers, transmission owners, interconnection customers, and state regulators. *See* FERC Order No. 2003 ¶¶13, 14. FERC therefore analyzed and considered numerous comments from interested parties prior to concluding that surety bonds are an acceptable form of security for Interconnection Facilities. As such, it seems that FERC's rulemaking process and conclusion might provide valuable guidance on this issue in this docket.

Q. HAS DUKE STATED THAT IT WILL ACCEPT SURETY BONDS FOR INTERCONNECTION FACILITIES?

- A. Yes, but Duke is only willing to accept surety bonds for Interconnection Facilities in very limited circumstances. In Duke's Reply Comments filed in this docket on September 19, 2018, Duke stated that it will accept surety bonds as an acceptable form of Financial Security in certain limited circumstances: where an Interconnection Customer's Interconnection Agreement requires major Network Upgrade construction over three to five years, such that Duke's Interconnection Facilities project would not begin final design, procurement, and scheduling of Interconnection Facilities construction over an extended period of time after the Interconnection Agreement has been executed. *See* Duke's Reply Comments, p. 33.

Duke's refusal to allow surety bonds unless Network Upgrade construction will take three to five years is problematic for several reasons. I want to again point out that Duke's substantial limitation of the use of surety bonds is contrary to FERC orders and agreements. As mentioned previously, the LGIA allows the Interconnection Customer to select the form of security that is reasonably acceptable to the Transmission Provider and consistent with the Uniform Commercial Code, and it in no way limits the use of surety bonds based upon when Network Upgrades will be constructed.

Also, the Interconnection Customer should not have to provide cash or a cash-collateralized letter of credit when Duke does not yet need the funds to begin construction of the Interconnection Facility.

Additionally, Duke requires that 100% of the total cost for the Interconnection Facility be an up-front payment that is usually required to be made well in advance of

construction of the Interconnection Facility. This requirement is inconsistent with Section 11.5 of the LGIA that provides that the Interconnection Customer must provide Financial Security for Interconnection Facilities at least thirty days prior to the commencement of the procurement, installation, or construction of a discrete portion of the Interconnection Facilities. Under the LGIA, the Interconnection Customer is not required to fund 100% of the cost of the Interconnection Facilities well in advance of when the funds are needed, and is instead permitted to pay for discrete portions of the Interconnection Facilities when payment is needed.

Q. IS DUKE PERMITTED TO RETAIN THE INTERCONNECTION CUSTOMER'S PRE-PAYMENT FOR INTERCONNECTION FACILITIES EVEN IF DUKE DOES NOT USE THE FUNDS?

- A. Yes. Section 6.1.1 of Duke's Interconnection Agreement allows Duke to keep the Interconnection Customer's pre-paid money even when Duke does not spend the money. Section 6.1.1 provides: "The Interconnection Customer shall pay 100% of required Upgrade, Interconnection Facilities, and any other charges required by the Interconnection Agreement Milestones Appendix 4. Upon receipt of 100% of the foregoing pre-payment charges, the payment is not refundable due to cancellation of the Interconnection Request for any reason." Duke's requirement that pre-payment for Interconnection Facilities in non-refundable—under all circumstances—is both unreasonable and could result in a financial windfall to Duke at the expense of the Interconnection Customer. For example, if the Interconnection Customer canceled the Interconnection Request before Duke began spending any money to procure or construct

the Interconnection Facility, Duke would still be able to keep the Customer's pre-payment. Similarly, if the final cost for the Interconnection Facility ultimately ends up being less than the Interconnection Customer's pre-payment, Duke could retain the unspent funds. Duke clearly should not be entitled to keep any amount of the Interconnection Customer's money that is not spend.

Q. SHOULD SECTION 6.1.1 OF DUKE'S INTERCONNECTION AGREEMENT BE REVISED?

A. Yes. Section 6.1.1 should enable the Interconnection Customer to "pay-as-you-go" for Interconnection Facilities, as allowed by the LGIA. Section 6.1.1 should state that any payments made for Interconnection Facilities must be refunded to the Interconnection Customer if the funds are not needed for the Interconnection Facility for any reason. That revised language will prevent a financial windfall to Duke to the detriment of the Interconnection Customer.

Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?

A. Yes.

1 BY MS. KEMERAIT:

2 Q. Mr. Norqual, have you prepared a summary of
3 your testimony?

4 A. Yes, I have.

5 Q. Would you please read your summary at this
6 time?

7 A. Yes. The purpose of my testimony is to
8 explain the impacts to Cypress Creek Renewables, LLC,
9 or CCR, caused by the significant delays in the Duke
10 Energy Progress, LLC and Duke Energy Carolinas, LLC,
11 collectively Duke, interconnection study process.

12 Q. Mr. Norqual, if you could hold on just one
13 minute. We are passing out the testimony.

14 A. No problem. Sorry.

15 (Pause.)

16 Q. Mr. Norqual, since it took me a minute to
17 pass out the testimony for all of the panel members,
18 can you begin again by reading your testimony?

19 A. Yeah, of course. The purpose of my testimony
20 is to explain the impact to Cypress Creek Renewables,
21 LLC, or CCR, caused by the significant delays in the
22 Duke Energy Progress, LLC and Duke Energy Carolinas,
23 LLC, collectively Duke, interconnection study process.
24 The purpose of my testimony also concerns the

1 importance of Duke allowing the use of surety bonds as
2 financial security for interconnection facilities.

3 Duke's delays in the interconnection process
4 have been significant. For example, for
5 actively-queued CCR projects that have applied for
6 distribution interconnections with Duke but have not
7 received a system impact study, or SIS, report, the
8 current average time in queue is approximately
9 1,100 days, or more than three years. However, I do
10 want to point out that, since the filing of my direct
11 testimony, Duke has made progress in studying CCR
12 interconnection requests in a more timely manner, which
13 is appreciated by CCR and indicates that Duke can
14 better comply with the timelines in the North Carolina
15 interconnection procedures, or NCIP.

16 Duke's delays in the interconnection study
17 process have had a significant financial impact on CCR.
18 First, CCR projects have submitted approximately
19 \$8 million in total interconnection application
20 deposits, which represent a substantial carrying cost
21 of capital to CCR, especially the longer the study
22 process draws out. While some of these funds have been
23 utilized by Duke, Duke has been holding other deposits
24 for years without spending them on studies. Second,

1 QFs, or qualifying facilities, that have established
2 legally enforceable obligations, or LEOs, for the
3 E-100, Sub 140, rate schedules recommended the 15-year
4 terms as of September 10, 2018. Many of the facilities
5 entitled to E-100, Sub 140, rates have not been
6 constructed due to the delays. Third, the longer a
7 project remains in the queue, the greater the
8 likelihood the project will be affected by the stepdown
9 to the federal solar investment tax credit. Fourth, it
10 is important to CCR that there be a better
11 predictability as to when Duke will complete the study
12 process for projects. For instance, predictability is
13 important when obtaining local government approvals
14 that typically have expiration dates. Fifth, clarity
15 about interconnection timing is critical when
16 developing financing and construction plans. Finally,
17 there is a substantial carrying cost to solar
18 developers for land when the interconnection study
19 process takes longer than the NCIP timelines allow.

20 I also explain in my testimony the importance
21 of allowing surety bonds as an option for financial
22 security for interconnection facilities. I pointed out
23 that Dominion allows surety bonds for interconnection
24 facilities, and that the Federal Energy Regulatory

1 Commission, FERC, standard large generation
2 interconnection agreement, LGIA, and FERC orders make
3 it clear that surety bonds are an acceptable form of
4 performance security. Under the LGIA, the
5 interconnection customer is not required to fund 100
6 percent of the interconnection familiarities in advance
7 of when the funds are needed, and is instead allowed to
8 pay for discrete portions of the interconnection
9 facilities when payment is needed.

10 Unlike Dominion, Duke currently requires
11 either a cash payment or cash-collateralized letter of
12 credit for the upfront cost of interconnection
13 facilities. Duke's requirement that the
14 interconnection customer provide payment or post a
15 letter for credit for the total cost of the
16 interconnection facilities is frequently required well
17 in advance of the time when funds are actually needed
18 for construction of the interconnection facilities.
19 The requirement is inconsistent with Section 11.5 of
20 the LGIA that provides that the interconnection
21 customer must provide financial security for
22 interconnection facilities at least 30 days prior to
23 the commencement of the procurement, installation, or
24 construction of a discrete portion of interconnection

1 facilities. The interconnection customer should not
2 provide cash or a letter of credit to Duke when Duke
3 does not yet need the funds to begin construction of
4 the interconnection facilities. Instead, the
5 interconnection customer should be permitted to provide
6 payment or post financial security, that would include
7 a surety bonds, for the cost of the interconnection
8 facilities. If financial security is posted, the
9 interconnection customer should be allowed to make
10 interim payments to the utility for the cost upon
11 receiving invoices from the utility. That way, the
12 utility would receive the cash payment as funds are
13 needed for the interconnection facilities, but not
14 significantly in advance of the time when funds are
15 needed.

16 Duke has recently reconsidered the
17 interconnection customers' request that surety bonds be
18 allowed for interconnection facilities. Duke witness
19 Jeff Riggins states in his rebuttal testimony that Duke
20 will allow surety bonds for interconnection facilities
21 when there is a material lag between the execution of
22 the interconnection agreement and the date when Duke
23 begins to incur costs or would require payment for the
24 interconnection facilities. Duke's recent position to

1 allow surety bonds when there is a material lag is
2 certainly appreciated; but, as I stated, Duke should
3 require cash payment for discrete portions of the
4 interconnection facilities when the payment is needed.

5 This concludes the summary of my testimony.

6 Thank you.

7 Q. Mr. Norqual, I would like to follow up with
8 additional questions about Duke's policy regarding
9 payment for interconnect facilities and also some brief
10 questions about testimony that has been provided in
11 this proceeding from Duke's witnesses.

12 So I would like to begin by asking if you
13 could clarify about what Duke's current requirements
14 are for prepayment for interconnection facilities.

15 A. So Duke Energy currently requires full
16 payment of the interconnection facilities within 60
17 calendar days of delivery of the interconnection
18 agreement to the customer.

19 Q. And is that requirement provided in any of
20 the written documentation with the interconnection
21 procedures?

22 A. It is. It is in Section 6.1.1 of the IA that
23 refers to, I believe, appendix 4 of the IA, and that's
24 where the milestone is listed.

1 Q. And so the milestone, typically, as you said,
2 requires payment within 60 days of the execution of the
3 IA?

4 A. I would correct that to 60 days from delivery
5 from -- of the IA to Duke from the interconnection
6 customer.

7 Q. Thank you. And are you aware of whether
8 there are any differences in Duke's requirements for
9 prepayment for interconnection facilities in the DEC
10 and DEP territories?

11 A. Yes, I believe there are some differences.

12 Q. And I think that the dif -- could you just
13 generally explain what those differences are to the
14 Commission?

15 A. Yes. We're aware that Duke Energy Progress
16 allows the customer to elect a contributory plan in
17 which the customer could post a lump sum payment up
18 front in exchange for lower ongoing monthly costs.
19 With Duke Energy Carolina's transmission projects, the
20 upfront is paid as a financial security deposit. It's
21 in the form of cash or a letter of credit. At the --
22 once the project has reached commercial operation, DEC
23 refunds that payment to the interconnection customer
24 and recoups the cost in the form of monthly payments

1 through the term of the IA.

2 Q. In regard to financial security, does Duke
3 currently allow an interconnection customer's
4 obligation to provide prepayment for 100 percent of the
5 cost of the interconnection facilities to be secured
6 with a surety bond?

7 A. No. Currently, Duke does not allow a surety
8 bond as a financial option for state jurisdictional
9 projects.

10 Q. And what -- do you have an understanding --
11 or what is your understanding of requests that both
12 Cypress Creek and NCCEBA has been making to Duke on
13 this issue?

14 A. Well, in the past, Cypress Creek has
15 requested the use of a surety bond for state
16 jurisdictional IAs from Duke. It has been reviewed
17 with the credit risk department, from what I'm told,
18 and we have been denied. And then I am aware that
19 NCCEBA has engaged Duke for approximately 10 months --
20 the last 10 months in discussing this as an option
21 going forward.

22 Q. And is it your understanding that, as
23 recently as last week, that NCCEBA has been discussing
24 a possibility of a settlement in this regard with Duke?

1 A. Yes, that is my understanding.

2 Q. And is it also your understanding that NCCEBA
3 approached Duke in this regard with this specific
4 proposal?

5 A. Yes, I believe so.

6 Q. And then I want to move on to what the
7 current process is for prepayment for the cost of
8 interconnection facilities; and, in your experience,
9 have you found that there can be a delay after payment
10 for the interconnection facilities has been made and
11 then the time that Duke begins construction of those
12 facilities?

13 A. Yes, there can be a delay. Would you like me
14 to explain?

15 Q. Yes, please.

16 A. So there is an engineering phase that begins
17 upon signing the interconnection agreement and making
18 the payment. For transmission projects, I understand
19 that that takes about six to nine months. After that
20 process -- well, in total, DEP and DEC do quote at
21 least 24 months to construct a project from signing of
22 the interconnection agreement and funding and also
23 providing detailed information about substation
24 location. So that's kind of the standard process for a

1 project that does not have upgrades.

2 Now, if there are system upgrades, previous
3 testimony we have heard that that could be as long as
4 three to five years to construct system upgrades.
5 Typically, my understanding is that Duke would not
6 construct the interconnection facilities until closer
7 to the in-service date, after -- closer to when the
8 system upgrades' would be complete. So, essentially,
9 that means that interconnection facility construction
10 could be pushed out correspondingly by the amount of
11 system upgrades required. So if there is a three- to
12 five-year timeline to build the upgrades, the
13 interconnection facilities could be pushed out for a
14 number of years.

15 Q. And are those delays in construction
16 completion of the interconnection facilities
17 problematic for interconnection customers?

18 A. Well, obviously, we prefer an inservice date
19 as soon as possible in most cases. However,
20 financially, if we were posting cash or a letter of
21 credit that has a significant carrying cost to us or
22 cost of capital, we would very much prefer a more
23 cost-effective option to the developer of a surety
24 bond.

1 Surety bonds could potentially be offered to
2 customers -- interconnection customers in the range of
3 1 percent fee annually, whereas the cost of capital to
4 cash or a letter of credit could be in the 5 to
5 10 percent range. So it is a significant cost savings
6 for the interconnection customer to retain that cash.

7 Additionally, if we are able to retain cash
8 that is not being spent, we are able to invest and make
9 our own return on that, rather than have it sit in a
10 utility bank account and not receive an interest rate
11 or return on that for state jurisdictional projects.

12 Q. Thank you. And I want to move on to a
13 question about whether there would be any risk to Duke
14 for allowing surety bonds.

15 To your understanding, does Duke ever begin
16 spending any money on interconnection facilities until
17 it receives the payment from the customer?

18 A. I don't believe so. I believe Duke requires
19 payment before beginning spending on behalf of the
20 interconnection customer.

21 Q. And on Monday of the hearing, there was some
22 discussion with Duke witness John Gajda about the
23 possibility that interconnection customers could
24 withdraw their interconnection request before the

1 interconnection facility is constructed.

2 And can you just generally describe the
3 circumstances in which that might happen, where an
4 interconnection request might be withdrawn?

5 A. Sure. To clarify, are you talking about
6 after the signing of an interconnection agreement?

7 Q. Correct.

8 A. And funding?

9 Q. Correct.

10 A. I would say that it is typically rare to
11 withdraw a project after signing interconnection
12 agreement and funding the payment. That is because the
13 project would typically be in very late-stage
14 development. A number of factors, like zoning and
15 local permitting, would have ideally been solved. The
16 land due diligence and environmental impacts would have
17 been assessed. So it would take a shock late in the
18 development process and kind of one of those areas
19 around land, around financing, or some other unexpected
20 change to make a customer withdraw at that late stage.

21 Q. And in the unlikely event that the
22 interconnection request would be withdrawn at that
23 time; would there be any risk to Duke, because
24 prepayment would be required; is that your

1 understanding?

2 A. That's my understanding.

3 Q. And then what about any risk to -- or any
4 adverse effect upon interconnection customer -- other
5 interconnection customers if the interconnection
6 facility is not ultimately constructed?

7 A. Well, my general understanding -- and this is
8 from some conversations with Duke personnel about that
9 question -- is that the interconnection facilities are
10 typically designed directly for the interconnection
11 customers. So tapping an existing line for the purpose
12 of connecting the interconnection facility and building
13 out poles, and lines, and a breaker station, and other
14 electrical facilities to allow that single
15 interconnection customer to connect. So, in general, I
16 believe the understanding is that it would have no
17 effect on other interconnection customers. That said,
18 I can't speak from an electrical perspective without --
19 Duke would be best to say that, but from what I'm told,
20 I don't believe there would be any effect.

21 Q. In your summary, you mentioned that Duke
22 witness Jeffrey Riggins has stated that Duke will allow
23 surety bonds, but only when there is a material lag of
24 about three to five years.

1 Do you think that that is an appropriate
2 position or response of that material lag of three to
3 five years?

4 A. Well, as I stated, there is a cost to the
5 customer for having cash go out the door. So I believe
6 that there would be other situations that would be
7 shorter than three to five years that would -- that
8 could also warrant the use of a surety bond.

9 Q. And in addition to the surety bond, as I
10 mentioned before, it's your understanding that there
11 has been some conversations about another possibility
12 of an equitable process about when payment should be
13 provided for interconnection at facilities?

14 A. Yes. And so just to talk a little bit about
15 historical -- historically how we have made payments
16 for interconnection agreements, I know at least Duke
17 Energy Progress, and I believe Duke Energy Carolinas,
18 used to allow milestone payment schedule. So,
19 typically, it was 10 milestone payments in succession
20 monthly to spread out the cost and more accurately
21 reflect the bill timeline. I understand that that --
22 that and a pay-go scenario is not desired by Duke, and
23 I know there is some administrative burden.

24 So I believe NCCEBA has offered up a

1 compromise, which we call it a 10/90 plan, where a
2 10 percent payment could be paid, as currently due,
3 along the timeline of 60 days from IA delivery, and
4 that would allow the utility to perform engineering
5 activities, and proceed with the project, and then
6 notify the interconnection customer when payment over
7 10 percent has been exceeded, and the customer could
8 post the additional 90 percent payment.

9 Q. Mr. Norqual, maybe just two additional
10 questions.

11 Does -- do you have any other concerns about
12 how payment for interconnection facilities is currently
13 being handled by Duke, and if so, can you explain to
14 the Commission what is occurring at this time?

15 A. Well, I would highlight that one reason for
16 our recommendation is that we have recently begun to
17 receive final accounting reports for distribution
18 projects from Duke Energy, DEC and DEP. This is the
19 first time we've actually received them, and they began
20 coming in in September of 2018. Some of them from as
21 far back as a year and a half -- for projects that have
22 been connected more than a year and a half before that
23 receipt of the final accounting. So we do have some
24 concerns that that would not adhere to Section 6.1.2 of

1 the interconnection agreement that we believe requires
2 the utility to deliver that within 120 business days.
3 But that aside, there are also some that have been
4 received within the acceptable time period.

5 But that aside, our general concern is just
6 to try to have transparency of the actual costs that
7 are being spent, because we are investing a large
8 amount of dollars up front, and it is a good faith
9 estimate by the utility that we do believe they are
10 doing their best estimate they can at the time. But if
11 costs do exceed -- if actual costs exceed the estimated
12 along the way, we would really like to know if they --
13 at the time that the spending is going to go over the
14 estimated costs that we already paid. The reason
15 being, it's very difficult for us to finance projects
16 if, for instance, we pay \$500,000 of interconnection
17 and finance the project, and then get a true-up a year
18 and a half later that requires us to pay an additional
19 \$750,000. So we are just looking for more
20 transparency. And I will say that we have started
21 discussions with Duke Energy, and I'm confident that we
22 could figure it out by this issue that really needs to
23 be solved.

24 MR. JIRAK: Mr. Chairman, if I could

1 make an observation. Simple practice of the
2 Commission, as I understand it, is testimony is
3 filed, prefiled, fashioned to allow the parties an
4 adequate opportunity to review the substance of the
5 positions of the parties to prepare for the
6 hearing.

7 I understand the sort of initial
8 discussion here related to discussions between
9 NCCEBA and Duke, from a substantive perspective,
10 okay, talking about interconnection facilities,
11 understanding that those discussions happened, and
12 we don't have any problem with the Commission
13 hearing about that, but we are now straying into
14 new areas, basically new positions that were not
15 outlined in the prefiled direct testimony, and we
16 probably introduced six or seven pages of new
17 direct testimony that we haven't had a chance to
18 review ahead of time. Again, we are glad to have
19 discussion about these topics, but, from a
20 procedural perspective, it's somewhat unique and
21 potentially objectionable to have these new
22 positions kind of put out on the table here without
23 us having had any time to prepare.

24 Certainly wouldn't object to this

1 further testimony about the stipulations, since I
2 recognize the parties did not have a chance to
3 testify about that issue, but, at this point, we
4 now strayed into non-stipulation, non-negotiation
5 topics that we weren't notified of and had no
6 ability to prepare for. Just an observation. I
7 think we could probably streamline this a little
8 bit.

9 CHAIRMAN FINLEY: How many more
10 questions do you have, Ms. Kemerait?

11 MS. KEMERAIT: One more question, and I
12 will just note that that is -- that question was
13 related to transparency, which is an important
14 issue, and it also relates specifically to
15 interconnection facilities.

16 MR. JIRAK: If I could just make an
17 observation, there is a clear accounting process --
18 true-up accounting process and procedures, and if
19 NCCEBA had a position on how that should be
20 modified, it could have easily have addressed that
21 in testimony, could have proposed red lines on how
22 that language could have changed to better achieve
23 your goals. It's a new subject, very discrete new
24 subject here. Again, we want to discuss these

1 topics, but it's -- from a procedural perspective,
2 there are some challenges when things like this are
3 introduced without any notice.

4 CHAIRMAN FINLEY: What you are saying
5 has a lot of merit. Unfortunately, you waited
6 until she was finished before you made your
7 objection. This is a bit of an unusual proceeding.
8 I don't know who has the burden of proof here, to
9 tell you the truth. And when the parties file
10 their direct and rebuttal testimony all at the same
11 time, that sort of -- I never used to do that for
12 this reason.

13 One more question, and then we will move
14 on to what has been prefiled. And to the extent,
15 Mr. Jirak, if something comes out here that you
16 want to bring your witness back and talk about,
17 that's fine, but I do understand that this is an
18 issue that has some fluidity to it. It's about the
19 security and that type of thing, and to the extent
20 this helps you all reach an agreement and we don't
21 have to resolve it for you, we are happy for that
22 to happen. So one more question.

23 BY MS. KEMERAIT:

24 Q. My final question is, Mr. Norqual, testimony

1 from the Duke panel, there was a lot of discussion
2 about the reasons for what was described as being the
3 clog in the queue, and I think at that time the focus
4 was on interdependencies.

5 In your experience, are there other reasons
6 for the clog in the queue, in addition to
7 interdependencies?

8 A. Yes, I would --

9 MR. JIRAK: Can we object to that
10 question, because that's introducing new evidence
11 here that we haven't had a chance to prepare for?

12 CHAIRMAN FINLEY: Are you objecting?

13 MR. JIRAK: Yes. We would like to
14 object to that question.

15 MS. KEMERAIT: I think it's relevant to
16 the testimony he provided about the delays in the
17 interconnection process and then relates to
18 questions from the Commission to Duke's witness
19 panel.

20 MR. JIRAK: I will have discussion with
21 the witness based on the testimony of, you know,
22 delays in the interconnection process, and if he
23 wants to share his additional perspective during
24 that line of cross, he's free to do that.

1 CHAIRMAN FINLEY: All right.

2 Mr. Jirak's going to ask him questions about that.

3 If you want to still bring in your point, you could
4 bring it back on redirect.

5 MS. KEMERAIT: Thank you, Mr. Chair.

6 BY MS. KEMERAIT:

7 Q. That's all the questions I have for you,
8 Mr. Norqual.

9 A. Thank you.

10 CHAIRMAN FINLEY: Two more witnesses.

11 MS. KEMERAIT: Two more witnesses.

12 Mr. Chair, I will move on to Luke O'Dea.

13 BY MS. KEMERAIT:

14 Q. Mr. O'Dea, can you begin by stating your name
15 for the record, please?

16 A. (Luke O'Dea) My name is Luke O'Dea.

17 Q. I'm sorry, I mispronounced your name. Excuse
18 me.

19 A. That's okay.

20 Q. What is your business address?

21 A. 3402 Pekoe Boulevard, Santa Monica,
22 California.

23 Q. And by whom are you employed?

24 A. Cypress Creek Renewables.

1 Q. What is your position with Cypress Creek
2 Renewables?

3 A. Director of utility engineering.

4 Q. And are you involved with Cypress Creek's
5 development of projects in North Carolina?

6 A. I am. I'm primary technical resource for the
7 interconnection issues across the country.

8 Q. And did you cause to be prefilled rebuttal
9 testimony of approximately 18 pages on
10 January 8th of 2019?

11 A. I did.

12 Q. And do you have any changes or corrections
13 that you would like to be made to your prefilled
14 testimony?

15 A. I do not.

16 Q. And if I were to ask you the same questions
17 as written in your prefilled rebuttal testimony here on
18 the stand, would your answers be the same?

19 A. They would.

20 MS. KEMERAIT: Mr. Chairman, at this
21 time, I would move that Mr. O'Dea's rebuttal
22 testimony filed on January 8, 2019, be entered into
23 the record as if given orally from the stand.

24 CHAIRMAN FINLEY: Mr. O'Dea's direct

1 prefiled testimony of 18 [sic] pages -- rebuttal --
2 filed on January 8, 2019, is copied in the record
3 as if given orally from the stand.

4 Does he have an exhibit to that?

5 MS. KEMERAIT: There is no exhibit.

6 CHAIRMAN FINLEY: All right.

7 (Whereupon, the prefiled rebuttal
8 testimony of Luke O'Dea was copied into
9 the record as if given orally from the
10 stand.)

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STATE OF NORTH CAROLINA
UTILITIES COMMISSION
RALEIGH

DOCKET NO. E-100, SUB 101
BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

FILED
JAN 09 REC'D
Clerk's Office
N.C. Utilities Commission

In the Matter of:

Petition for Approval of Revisions to Generator
Interconnection Standards

REBUTTAL TESTIMONY

OF

LUKE D. O'DEA

ON BEHALF OF THE

NORTH CAROLINA CLEAN ENERGY BUSINESS ALLIANCE

JANUARY 8, 2019

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Luke D. O'Dea. My business address is 3402 Pico Boulevard, Santa Monica, California 90405.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am the Director of Utilities Engineering for Cypress Creek Renewables, LLC ("CCR").

Q. PLEASE DESCRIBE YOUR EDUCATIONAL AND PROFESSIONAL BACKGROUND.

A. I graduated from California Polytechnic State University with a Bachelor of Science degree in Mechanical Engineering. As the Director of Utilities Engineering for CCR, I am responsible for engineering and professional management for all utility project engineering work. I am also responsible for the interconnection design of more than 3 gigawatts of projects, including single line, impedances, transformer sizing, substation design, and reactive power studies. I have progressed multiple solar plus storage projects through interconnection studies, and I lead the technical coordination and review of power flow and injection studies. My curriculum vitae is attached hereto as Exhibit 1.

Q. WHO ARE YOU SUBMITTING REBUTTAL TESTIMONY FOR IN THIS PROCEEDING?

A. I am submitting rebuttal testimony in this proceeding on behalf of the North Carolina Clean Energy Business Alliance ("NCCEBA").

Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY IN THIS PROCEEDING?

A. The purpose of my testimony is (1) to address the direct testimony submitted by Duke Energy Progress, LLC and Duke Energy Carolinas, LLC (collectively, "Duke") that the addition of storage to solar facilities should constitute a Material Modification, and (2) to provide information about the Working Group 2 proposed addition of item 1.5.2.5 to the NC Interconnection Standard of a change that is not indicia of a Material Modification.

Q. DID YOU PARTICIPATE IN THE STAKEHOLDER PROCESS THAT CONSIDERED WHETHER REVISIONS SHOULD BE MADE TO THE NC INTERCONNECTION STANDARD?

A. Yes. I was co-chair of Working Group 2 during the stakeholder process, and I was heavily involved in the discussions regarding the Material Modification implications of adding energy storage to existing and planned distributed energy resource projects. Much of the discussion from Working Group 2 was summarized in the direct testimony of Chris Norqual filed on behalf of NCCEBA in this proceeding.

Q. DO YOU AGREE WITH DUKE WITNESS JOHN GAJDA'S TESTIMONY ABOUT THE WORKING GROUP 2 DISCUSSIONS DURING THE STAKEHOLDER PROCESS?

A. Duke Witness John Gajda provided information about the Working Group 2 discussions in his direct testimony. However, Mr. Gajda made several points about energy storage and Material Modification in his testimony that differ from my recollection of the Working Group 2 technical discussions.

Q. PLEASE SUMMARIZE THE WORKING GROUP 2 DISCUSSION ABOUT ENERGY STORAGE AND MATERIAL MODIFICATION.

A. The Working Group 2 discussion about adding energy storage to a solar facility raised legitimate concerns about the applicability of a system impact study for a solar facility to a modified facility with co-located solar generation and energy storage. Three of the primary areas of study that could be impacted by the addition of energy storage are short circuit, line thermal rating, and circuit voltage. The applicability of each portion of the study may differ between distribution and transmission interconnections, but the Material Modification implications generally hold for both categories of projects. It is important to point out that Duke did not raise additional study concerns during the Working Group 2 discussions.

Q. PLEASE DESCRIBE THE WORKING GROUP 2 DISCUSSION AND PROPOSED LANGUAGE FOR REVISIONS TO THE NC INTERCONNECTION STANDARD FOR DC-COUPLED STORAGE.

A. As discussed in Duke Witness Gajda's testimony, Duke supports adopting the term Maximum Physical Export Capability Requested, which may be lower than the sum of the nameplate ratings of the generating equipment at a facility. Mr. Gajda acknowledges in his testimony that the thermal and voltage studies for a facility would be valid for a project that had limited the output to the Maximum Physical Export Capability requested, but that the short circuit studies would need to be based on the full nameplate rating of the generating equipment. The Material Modification implication is that adding AC-

coupled energy storage to an existing facility would invalidate the short circuit portion of the system impact study and would result in a material modification. For this reason, the Working Group 2 proposed language for Material Modification in the NC Interconnection Standard focused on DC-coupled storage.

Mr. Gajda testified that “failing to account for generation export at 6 AM or at 8 PM, which might occur where battery storage has been added to a solar facility, would produce incorrect study results since interconnection studies for solar facilities typically do not account for operation at those times.” *See Duke Witness Gajda Direct Testimony*, p. 39. However, the Working Group 2 discussions addressed Duke’s concern. Pursuant to the Working Group 2 discussions, as described in Mr. Norqual’s direct testimony, we understand that two load cases are used to evaluate voltage and thermal impacts: peak load and daytime minimum load. I have seen the minimum load case referred to as “valley loading” in Duke’s Mitigation Options correspondence. The study would not have considered the absolute minimum load case (as opposed to daylight minimum load), and the Working Group 2 proposed language addresses this concern by stating that the energy storage system may only discharge during the same periods considered in the system impact study. This would encompass all hours between peak load and daytime minimum load (*i.e.*, all daylight hours). I believe it is reasonable to assume that non-daylight hours designated as peak load periods (*i.e.*, early morning winter peak) would be within the bounds of the existing system impact studies and that the window for energy storage operation would be extended to include all peak load hours.

Q. DO YOU BELIEVE IT IS NECESSARY TO PROVIDE A PRODUCTION PROFILE FOR SOLAR OR BATTERY STORAGE RESOURCES?

A. Duke's direct testimony and proposed modifications to the Interconnection Request Form in the NC Interconnection Standard indicate that a production profile is necessary even for new interconnection requests for an energy storage facility. I believe this is inconsistent with item 7 of the System Impact Agreement that states: "The System Impact Study shall model the impact of the Generating Facility regardless of purpose in order to avoid the further expense and interruption of operation for reexamination of feasibility and impacts if the Interconnection Customer later changes the purpose for which the Generating Facility is being installed." A key value of energy storage resources are the flexibility and multiple use cases that a storage system can provide. Limiting the operation to a production profile submitted at an early stage in the development of a facility is not supported with technical justification, and is in conflict with the standard. Furthermore, the currently allowed modifications to the DC system of a solar array does not modify the output profile, and those changes are not indicia of a Material Modification.

Q. DO YOU AGREE WITH THE WORKING GROUP 2 PROPOSED LANGUAGE?

A. Working Group 2 proposed the addition of item 1.5.2.5 to the NC Interconnection Standard. New item 1.5.2.5 references a change that is not indicia of a Material Modification and states: "A change in the DC system configuration to include additional equipment that does not impact the Maximum Generating Capacity or the proposed AC

configuration of the Generating Facility, including: DC optimizers, DC-DC converters, DC charge controllers, power plant controllers, and energy storage devices such that the output is delivered during the same periods considered during the System Impact Study.”

I am in agreement with that proposed language, with the understanding that the output of the facility should not be restricted to a specific profile and that the Maximum Physical Export Capability can be delivered at any time of day at which the studied load cases are applicable.

Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?

A. Yes.

Luke D. O'Dea



*Development, structuring, design and deployment of renewable energy projects.
Strong communicator, analytic problem solver, results driven team player.
Licensed Professional Electrical Engineer in 8 states.*

FERC CEII Number 18-052

RELEVANT EXPERIENCE:

Cypress Creek Renewables, Santa Monica, CA

December 2016 - Present

Director of Utilities Engineering: Responsible for engineering and technical project management for all utility project interconnection work. Interconnection design of 3GW+ of projects including single line, impedances, transformer sizing, substation design, reactive power studies. Progressed multiple solar + storage projects through all interconnecton studies. Led technical coordination and review of power flow and injection studies.

BayWa r.e. Solar Projects, Irvine, CA

April 2015 – December 2016

Director of Engineering: Responsible for development and EPC engineering for utility solar projects throughout the Americas. Electrical Engineer of Record on multiple projects. Contracted with and managed engineering vendors throughout the US and Mexico for geotechnical, civil, structural, and electrical engineering services.

Neighborhood Power Corporation Maui HI

June 2012 – April 2015

Vice President, Operations Developed, designed, and built a portfolio of small utility and commercial projects throughout Hawaii. Responsible for engineering, procurement, contracting, and construction management.

3 Phase Energy Santa Monica, CA

January 2013 – Present

Founder and Principle Founded 3 Phase Energy to provide engineering and project technical consulting services.

United Solar Ovonic (Uni-Solar) Los Angeles CA September 2009 to Present

September 2009 – April 2012

Manager, Design and Applications Engineering: Responsible for project planning for North America. Management and training of a nationwide team of designers, technical sales process development, project design and specification to meet PPA and utility standards, lead engineer in the development of utility scale energy wholesale solar projects. Also responsible for technical training of partners on design and specification of Uni-Solar PV systems.

Solar Integrated Technologies, Inc., Los Angeles CA October 2008 to September 2009

Solar Integrated Technologies was acquired by Energy Conversion Devices (Uni-Solar) August 2009

June 2009 – September 2009

Senior Design Engineer: Engineering team lead in all aspects of project development, specification, design and execution.

October 2008-June 2009

Reported to VP of Product Development and Systems Engineering in two roles:

Solar Project Engineer: System design and project management for solar photovoltaic installations. Technical sales support, site evaluation, project estimating, engineered design, permitting and installation support of photovoltaic projects. Technology implementation consisting of: solar roofing (BIPV), raked and ballasted crystalline systems, as well as tracking systems. Customer base including large commercial property owners, architecture firms, utilities, and government/military.

Product Development Engineer: Product manager for metal application PV products. Involvement in product requirements development, product and applications design, pricing and installation modeling, and product deployment planning.

Engineers Without Borders, Los Angeles, CA January 2009 to present

Team Member, Solar Team, Mali Project. Solar design consulting as well as build-to drawing creation for battery backup solar and lighting projects at three schools in Mali.

FM Global, Walnut Creek CA September 2007 to October 2008

Consultant Engineer. Consulting work in the areas of fire protection and loss prevention. Engineered solutions to fire, explosion, earthquake, collapse, mechanical and electrical breakdown, and other hazards. Worked in a consulting role with clients to develop and implement sound loss prevention recommendations. Managed projects ranging from equipment safeguards to construction of entire facilities through to completion. Highly independent field-based job requiring effective scheduling time management.

R.E.C. Solar, San Luis Obispo CA January 2006 to June 2007.

Design Engineer. Solar Photovoltaic system design including both mechanical design and electrical design work. Field work on prospect locations and projects. Significant projects include work on proprietary racking system and design of large-scale photovoltaic arrays.

SELECTED PROJECT HIGHLIGHTS:

Interconnection Projects, Various, 2017-2019

- Specification and interconnection design for distribution and transmission projects 1-250MW including single line diagram, reactive power calculations, collector system impedance, transformer sizing, and interconnection level substation design
- SGIP, LGIP or equivalent interconnection filings in: PJM, NYISO, ERCOT, PacifiCorp, Southern Company, SCE&G
- State jurisdictional interconnection filings in FL, IL, IN, TA, MA, MI, MT, NC, NY, OR, SC, TX, WY

North Carolina Portfolio, Halifax County, NC 2016

- 4 projects totaling 70 MW
- 3 sites with ATI single axis trackers, one fixed tilt
- Project engineer

Granger and Valley Center, San Diego 2016

- 3.0 and 3.9 MW DC SDG&E REMAT projects
- Electrical EOR, project engineer

Maui FIT Portfolio, Maui 2013-14

- 4 small utility FIT systems totaling 1.6 MW DC
- Project designer, project manager

Toys 'R' Us Distribution Center, New Jersey 2011

- 5.3 MW single rooftop PV system

- Roles: preliminary design, design of custom metal panel solution to meet structural requirements, cost estimating, value engineering.

New Jersey Resources / Adler Development, Southern New Jersey 2010-11

- A total of 3.2 MW of rooftop PV systems at four sites
- Roles: site selection, preliminary designs, cost estimating, value engineering, contract specifications, P.E. design review, project management.

East Los Angeles Community College, Los Angeles CA 2009

- 370 kW over six buildings in coordination with Chevron Energy
- Roles: preliminary designs, fully specified designs, P.E. review, contractor coordination, installation support

Portland General Electric / ProLogis, Portland OR 2008

- A total of 1.1 MW of rooftop photovoltaic systems over three sites.
- Roles: design engineering, system commissioning, as-built drawing sets

EDUCATION:**California Polytechnic State University, San Luis Obispo CA**

Bachelor of Science in Mechanical Engineering, graduating class of 2007. Course work includes mechanics, dynamics, mechanical design, thermodynamics, advanced fluids, thermal design, and engineering economics. Significant mechanical, thermal, electro-mechanical, and embedded software design projects. Cumulative GPA 2.91.

San Marin High School, Novato, CA

Graduated 2002. AP classes including Calculus, Chemistry, Physics, Spanish.

Software:**ETAP**

Project planning, design, and detailed studies including load flow, overhead and underground cable selection, duct bank design, and arc flash.

AutoCAD

Extensive experience with AutoCAD in drafting construction drawings for permit submittal and contractor bidding. Designed CAD templates for solar project design and permitting.

Office

Excel. Built tools for: electrical design of PV systems, PV technology selection, PV project estimating. Basic script programming, advanced data lookup function proficiency.

Visio. Process mapping of technical sales process from qualification through project completion.

Outlook. Effective organization, scheduling and time management, and contact sorting.

Word. Use of design mode to create standardized fill-in forms.

PVSyst

Highly accurate and data intensive solar photovoltaic performance modeling software.

Programmed custom modules to accurately model temperature dependence of amorphous silicon PV laminates.

Physical modeling and Other Engineering

Experience with 3-D modeling software such as Solid Works and Sketch-Up. Building energy analysis with Energy Plus. Sprinkler system modeling and performance analysis in SprinkCalc. Thermal/fluid systems analysis using Engineering Equation Solver (EES).

1 MS. KEMERAIT:

2 Q. And have you prepared a summary of your
3 testimony?

4 A. I have.

5 Q. Could you please read it at this time?

6 A. The purpose of my testimony is to provide
7 information about the Working Group Number 2 proposed
8 addition of Section 1.5.2.5 to the North Carolina
9 Interconnection Procedures, NCIP, to explain why the
10 addition of energy storage to solar facilities should
11 not constitute a material modification in certain
12 circumstances, and to recommend an expedited review or
13 fast track process for determining whether the addition
14 of energy storage will materially change the system
15 impact study results. It is my opinion that the
16 material modification implications for adding energy
17 storage to renewable facilities is one of the most
18 important issues before the Commission in this
19 proceeding. I believe that, if Duke's proposed
20 language for the new Section 1.5.2.5 of the NCIP is
21 adopted, energy storage in almost all instances would
22 not be able to be added to a facility without
23 triggering a material modification. The practical
24 implications that arise if the addition of energy

1 storage is deemed to be a material modification is that
2 the solar facility would have to submit a new
3 interconnection request and go to the back of the queue
4 for an entirely new study process. The significant
5 time delays due to a new study process may very well
6 make the addition of energy storage to existing
7 projects infeasible.

8 I was cochair of Working Group Number 2
9 during the stakeholder process, and I was intimately
10 involved in the discussions about whether the addition
11 of energy storage to planned and existing solar
12 projects should be deemed to constitute a material
13 modification. My recollection is that, during the
14 Working Group Number 2 discussions, Duke had two
15 primary concerns about adding energy storage to solar
16 facilities in regard to the system impact study
17 results; one, the short circuit current; and two, the
18 load cases used for thermal and voltage studies.
19 Duke's concern about short circuit pertains to an
20 AC-coupled storage unit with separate inverters used
21 for the battery system. Duke's second concern around
22 load cases arises because the system impact study for a
23 solar facility typically evaluates the impact of a
24 system under peak load and minimum daylight load

1 conditions. Duke did not raise any additional study
2 concerns during the Working Group Number 2 discussions.

3 I first want to say that I'm in agreement
4 with Duke that adding AC-coupled storage to a facility
5 would invalidate the short circuit results of the
6 system impact study and would therefore constitute a
7 material modification. For that reason, to address
8 Duke's concerns during the working group process and to
9 avoid the potential for the addition of energy storage
10 to constitute a material modification, Working Group 2
11 focuses used on the addition of DC-coupled energy
12 storage.

13 Working Group Number 2 and I believed that
14 the new Section 1.5.2.5 of the NCIP should state that a
15 change that is not indicia of a material modification
16 is, quote, a change in the DC system configuration to
17 include additional equipment that does not impact the
18 maximum generating capacity or the proposed AC
19 configuration of the generating facility, including: DC
20 optimizers, DC-DC converters, DC charge controllers,
21 power plant controllers, and energy storage devices
22 such that the output is delivered during the same
23 periods considered in the system impact study. This
24 means that the output from the energy storage that is

1 delivered during the same periods considered in the
2 system impact study would not change the results of the
3 system impact study. When energy storage is discharged
4 only during the same periods that were studied in the
5 system impact study, there should be no need for a
6 restudy and no material modification. It is my
7 understanding that even when the production profile is
8 changed, Duke would not need to fully restudy a
9 facility if the energy storage system operates during
10 the same daylight period.

11 However, Duke has proposed an additional
12 requirement for the addition of energy storage not to
13 constitute a material modification. Duke suggests that
14 the energy storage output must also be delivered with
15 the same profile studied during the system impact
16 study. Energy storage, by its nature, would typically
17 change the production profile, even when limited to
18 daylight hours. What this means is that the addition
19 of energy storage will almost always be deemed a
20 material modification under Duke's proposed new
21 material modification language. I believe that the
22 output at the facility should not be restricted to a
23 specific profile, and that the maximum output can be
24 delivered during daylight hours without being

1 considered a material modification..

2 It's important to point out that energy
3 storage could also provide reliable power during
4 non-daylight hours when the utility system experiences
5 its highest loading -- this would be morning and
6 evening peak load periods -- and that the assumptions
7 underlying a solar-only system impact study may need to
8 be validated for the system conditions during these
9 periods. When solar facilities wish to add energy
10 storage outside the daylight hours, but without
11 increasing the overall output of the facility, there
12 should be an expedited or fast track supplemental
13 review process. This expedited process would allow
14 interconnection customers to submit a request for the
15 addition of energy storage, and for Duke to
16 expeditiously restudy solar facilities with the
17 addition of energy storage. During the expedited
18 process, Duke could review system loading conditions
19 and determine what additional hours the system could
20 operate without invalidating the original system impact
21 study. If Duke were to determine that the study
22 results would materially change, Duke would then
23 proceed with the new study process.

24 Q. And a few minutes ago, during NCSEA witness

1 Paul Burcke's testimony, Commissioner Mitchell asked
2 him about some of the ways that energy storage might
3 benefit the utility's system.

4 Could you elaborate on some of those ways?

5 MR. JIRAK: I think we'd object to this
6 question as well. This is, again, introducing new
7 direct testimony. We were not given the
8 opportunity to cross examine our witnesses -- or to
9 introduce new direct testimony from our witnesses
10 on statements of other witnesses. I don't think
11 it's appropriate at this time.

12 MS. KEMERAIT: This is all in relation
13 to the rebuttal testimony that was provided by the
14 witness and filed on January 8th.

15 MR. JIRAK: Procedurally, this is not
16 the point in time in which these witnesses are
17 given an opportunity to respond to other witnesses'
18 testimony.

19 CHAIRMAN FINLEY: Well, it is my
20 practice to allow people to rebut what they have
21 heard from the witness stand, and in this case,
22 again, it's unusual, because everybody filed their
23 testimony at the same time, and everybody filed
24 their rebuttal testimony at the same time. There

1 was no sequence, as there usually is. So I will
2 allow a limited exception to the general rule, but
3 let's be brief about it.

4 MS. KEMERAIT: I will move quickly.

5 BY MS. KEMERAIT:

6 Q. Can you describe the benefits?

7 A. Yes. Energy storage output can help to firm
8 renewable resources and reduce the intermittency from
9 cloud cover and that kind of thing. It also allows a
10 renewable resource to shift its energy output to the
11 peak load periods, when demand on the utility's system
12 is the greatest.

13 Q. And can you describe what Duke's specific
14 position about energy storage and material modification
15 is and whether you agree with Duke's position, and if
16 you do not agree, can you explain why not?

17 A. Yeah. The language which was added in the
18 joint utility filing stipulates that an energy storage
19 addition will not be a material modification if it
20 keeps the same profile as a solar facility, and I don't
21 believe that, the way these studies are conducted, that
22 that -- that that really is an accurate statement.
23 Should not always be a -- should not always be a
24 material modification, and the specific case where it

1 should not be a material modification is when the
2 maximum output of the facility is not increased.
3 Outputs during the same overall periods -- let's just
4 call it the daylight periods that were considered in
5 the SIS -- and even when the storage system would be
6 intended to discharge outside of those periods, a full
7 restudy may not be required.

8 Q. And Duke witness Gajda talked about certain
9 studies that might have to be looked at again if energy
10 storage is added, and specifically what are those
11 studies that might have to be reconsidered?

12 A. Without going back to Witness Gajda's
13 testimony, I believe that, you know, from our working
14 group discussions, that the studies that are conducted
15 during the system impact study would be valid for a
16 solar plus storage facility, as long as there are
17 certain restrictions to the periods above that.

18 Q. And does -- Duke's position is that any
19 addition of energy storage would trigger a material
20 modification.

21 Does Duke ever perform restudies in the
22 system impact study without a material modification
23 being triggered?

24 A. Yes. I mean, there is some degree of restudy

1 that happens when mitigation options are provided
2 that's studying multiple options. So that's one
3 example of, you know, these kind of brief restudies or
4 relook at a project or look at additional variance of a
5 project that currently happen in the study process.

6 Q. And in your --

7 CHAIRMAN FINLEY: How much more do you
8 have there, Ms. Kemerait?

9 MS. KEMERAIT: I have about two more
10 minutes. I would say two or three more minutes.

11 CHAIRMAN FINLEY: I would remind
12 everybody that a lot of this is opinionation and
13 policy as opposed to putting facts on the record.
14 I will give you all an opportunity to file briefs
15 and proposed orders in this case. So let's be as
16 brief as we can, please.

17 BY MS. KEMERAIT:

18 Q. In your rebuttal testimony, you suggested a
19 fast track process that could be considered -- an
20 expedited review of fast track process in the event
21 that energy storage was added during hours outside of
22 the study period; is that correct?

23 A. That's correct.

24 MS. KEMERAIT: May I approach,

1 Mr. Chair?

2 BY MS. KEMERAIT:

3 Q. I have handed to you what I ask to be
4 marked --

5 MR. JIRAK: Can we pause in the line of
6 questions?

7 CHAIRMAN FINLEY: Wait until everybody
8 sees it.

9 MR. JIRAK: It's a newly-filed direct
10 exhibit.

11 (Pause.)

12 MR. JIRAK: Sorry. I guess we are
13 looking for some description of what this exhibit
14 is and what it's intended to be used for.

15 MS. KEMERAIT: I would ask that this
16 exhibit be marked as NCCEBA Direct Exhibit 1. And
17 can you describe --

18 CHAIRMAN FINLEY: One minute. Direct
19 Exhibit 1?

20 MS. KEMERAIT: Direct Exhibit 1.

21 CHAIRMAN FINLEY: Okay. Shall be so
22 marked.

23 (NCCEBA Direct Exhibit Number 1 was
24 marked for identification.)

1 BY MS. KEMERAIT:

2 Q. In your rebuttal testimony, you talked about
3 a recommended expedited review or fast track process.

4 Can you describe what this document is and
5 whether you prepared it?

6 A. Yes. I prepared the language. This is a --
7 this is modified language for the interconnection
8 standard that is placed in the supplemental review
9 section. So this is a proposed section that would
10 allow the energy storage facility, provided that it's a
11 DC-coupled energy storage facility, to proceed with a
12 fast track or an expedited review under the
13 supplemental review process to allow the facility to
14 operate at hours that are outside of the daylight hours
15 that are considered in the system impact study, but at
16 which the results of the system impact study would
17 still be valid.

18 CHAIRMAN FINLEY: Hold on a minute.

19 When was this exhibit prepared, ma'am?

20 MS. KEMERAIT: It was prepared -- it was
21 discussed with counsel for Duke we would be
22 providing a proposal, and it was prepared over the
23 weekend after that discussion.

24 CHAIRMAN FINLEY: Well, it should have

1 been distributed. If you are going to bring it up
2 here this time of day, in this proceeding, it
3 should have been presented before this.

4 MR. JIRAK: I mean, this proceeding has
5 been pending for a year plus, and to have to
6 evaluate the reasonableness of new modifications
7 with no red lines.

8 CHAIRMAN FINLEY: Objection to this
9 exhibit is sustained.

10 BY MS. KEMERAIT:

11 Q. And then, finally, have -- has Duke presented
12 any request for energy storage to be included with the
13 projects in North Carolina?

14 A. Has Duke?

15 Q. Excuse me, has Cypress Creek presented
16 request for energy storage to Duke in North Carolina?

17 A. Cypress Creek has submitted projects with
18 energy storage that have proceeded and completed the
19 system impact study process, yes.

20 Q. Okay. And then my final question is, are you
21 aware of any other states that have adopted an
22 expedited review of fast track process for
23 consideration of energy storage?

24 A. Yes. Just wanted to mention that New York

1 adopted interim rules for adding energy storage to
2 solar projects in December. It's for a very similar
3 situation, where a DC-coupled storage that outputs
4 during the same periods of the system impact study and
5 provides an expedited process for those approvals,
6 including a process to look at additional hours during
7 the peak load periods.

8 MS. KEMERAIT: Thank you. That's all
9 the questions I have for this witness.

10 CHAIRMAN FINLEY: All right. Let's get
11 the other witness' testimony on the record, please.

12 BY MS. KEMERAIT:

13 Q. Mr. Wallace, can you state your name for the
14 record, please?

15 A. (Michael Wallace) Sure. Michael Wallace.

16 Q. What is your business address?

17 A. 807 East Main Street, Durham, North Carolina.

18 Q. And by whom are you employed?

19 A. EcoPlexus, Inc.

20 Q. And what is your position with EcoPlexus?

21 A. Vice president of development in the
22 southeast.

23 Q. And does EcoPlexus also develop projects in
24 North Carolina?

1 A. They do.

2 Q. And is EcoPlexus a member of the
3 North Carolina Clean Energy Business Alliance?

4 A. They are.

5 Q. Did you cause to be filed -- prefiled
6 rebuttal testimony of approximately nine pages on
7 January 8, 2019?

8 A. I did.

9 Q. And do you have any changes or corrections
10 that you would like to be made to your prefiled
11 testimony?

12 A. I do. One correction -- and I apologize, I
13 don't have the line item on this, but this is in
14 connection to the question, "Do you agree with Duke
15 Witness Gajda that material modifications will be
16 triggered if daily production profile of a generating
17 facility changes, and in particular to the stability
18 analysis?" In response to Mr. Gajda's response to our
19 questions, I would agree that there are circumstances
20 where that could change.

21 MR. JIRAK: Sorry, can we get a page
22 number and then a more precise description of the
23 change being made?

24 THE WITNESS: Yeah. My apologies. It's

1 in the stability analysis, and my copy is page 5 of
2 9.

3 MR. JIRAK: There is no line numbers on
4 your testimony. So stability analysis?

5 THE WITNESS: Yes, sir. And in the
6 portion that says, again, "The addition of energy
7 storage to facility would not affect the previous
8 results -- study results for stability analysis."
9 I would say that I would agree with Mr. Gajda that
10 that could happen in circumstances.

11 MR. BREITSCHWERDT: You want to strike
12 that sentence?

13 THE WITNESS: Yes, I would like to
14 strike it, please.

15 MR. BREITSCHWERDT: Well, to be clear,
16 you are striking the word "not," so the addition of
17 energy storage facility would affect previous study
18 results?

19 THE WITNESS: It could.

20 MR. BREITSCHWERDT: Could affect. Okay.
21 Got you.

22 MS. KEMERAIT: Mr. Chairman, at this
23 time, I would move that Mr. Wallace's prefiled
24 rebuttal testimony be entered into the record as if

1 given orally from the stand.

2 CHAIRMAN FINLEY: Mr. Wallace's rebuttal
3 testimony of nine [sic] pages, as amended, is
4 copied into the record as if given orally from the
5 stand.

6 (Whereupon, the prefiled rebuttal
7 testimony of Michael R. Wallace was
8 copied into the record as if given
9 orally from the stand.)

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STATE OF NORTH CAROLINA
UTILITIES COMMISSION
RALEIGH

DOCKET NO. E-100, SUB 101

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

FILED
JAN 09 REC'D

Clerk's Office
N.C. Utilities Commission

In the Matter of:

Petition for Approval of Revisions to Generator
Interconnection Standards

REBUTTAL TESTIMONY

OF

MICHAEL R. WALLACE, PE, CEM, GBE

ON BEHALF OF THE

NORTH CAROLINA CLEAN ENERGY BUSINESS ALLIANCE

JANUARY 8, 2019

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Michael R. Wallace. My business address is 807 East Main Street, Suite 6-050, Durham North Carolina 27701.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am the Vice President of Development in Southeast United States for Ecoplexus, Inc. ("Ecoplexus").

Q. PLEASE DESCRIBE YOUR EDUCATIONAL AND PROFESSIONAL BACKGROUND.

A. I received a Bachelor of Science degree in Mechanical Engineering from the University of Maine. I am a professional engineer licensed in North Carolina, South Carolina, Maine, New Hampshire, Vermont, Massachusetts, New York, Virginia, Georgia, Florida, California, and Washington. I am a Certified Energy Manager in the United States, and I am currently half-way to completing a Masters of Business Administration degree from the University of North Carolina at Chapel Hill.

I have more than fourteen years' experience in progressively responsible engineering and business leadership.

As the Vice President of Development in Southeast United States for Ecoplexus, I am responsible for leading business planning, business development, and design expertise in all aspects of utility scale solar with a focus on projects designed for distribution and transmission interconnections ranging from 2 megawatts ("MW") to 300 MW AC in the Eastern United States. I manage a team of eight to twelve individuals who initiate

projects from concept through development and onto construction. I am also responsible for strategy and business planning in the Southeast United States. I am currently managing a pipeline of approximately 3,000 MW AC. I am responsible for origination of projects with utilities, including Duke Energy, Florida Power & Light, South Carolina Electric & Gas, Dominion, Southern Company, Tampa Electric, and Santee Cooper. Additionally, I am responsible for complete development of utility scale projects to construction, including negotiation and purchase power agreements and interconnection agreements.

My curriculum vitae is attached hereto as Exhibit 1.

Q. WHO ARE YOU SUBMITTING REBUTTAL TESTIMONY FOR IN THIS PROCEEDING?

A. I am submitting rebuttal testimony in this proceeding on behalf of the North Carolina Clean Energy Business Alliance ("NCCEBA").

Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY IN THIS PROCEEDING?

A. The purpose of my testimony is to address the direct testimony submitted by Duke Energy Progress, LLC and Duke Energy Carolinas, LLC (collectively, "Duke") that the addition of storage to solar facilities should constitute a Material Modification.

Q. DID YOU PARTICIPATE IN THE STAKEHOLDER PROCESS THAT CONSIDERED WHETHER REVISIONS SHOULD BE MADE TO THE NC INTERCONNECTION STANDARD?

A. Yes. I was present for many of the stakeholder meetings in 2017, and I supported revisions to the NC Interconnection Standard designed to improve the interconnection study process. As an active participant of the stakeholder process, I was involved in the discussions about the Material Modification implications of adding energy storage to existing and planned distributed energy resource projects.

Q. HAVE YOU HAD AN OPPORTUNITY TO REVIEW DUKE WITNESS JOHN GAJDA'S TESTIMONY ABOUT ENERGY STORAGE AND MATERIAL MODIFICATION?

A. Yes. I have read Duke Witness John Gajda's direct testimony, and I have carefully considered his testimony about energy storage and Material Modification.

Q. PLEASE RESPOND TO WITNESS GAJDA'S TESTIMONY ABOUT ENERGY STORAGE AND MATERIAL MODIFICATION.

A. I would first like address Duke Witness Gajda's testimony that the stakeholders did not reach consensus on the "utilization of the System Impact Study agreement execution date as a decision point for certain modification considerations, and the importance of only allowing changes to the DC portion of a facility if all elements of the production profile are considered." See Duke Witness Gajda Direct Testimony, p. 38. The stakeholders did not agree to Duke's position that changes to the DC portion of a facility would be allowed only if all elements of the production profile are considered because the production profile is not a typical element of the System Impact Study and should therefore not have to be considered. Section 9.0 of the System Impact Study specifies the

study requirements of System Impact Study: short circuit analysis, stability analysis, power flow analysis, voltage drop and flicker studies, protection and set point coordination studies, and grounding reviews as necessary.

Q. DO YOU AGREE WITH DUKE WITNESS GAJDA THAT A MATERIAL MODIFICATION WILL BE TRIGGERED IF THE DAILY PRODUCTION PROFILE OF A GENERATING FACILITY CHANGES?

A. I do not believe that any change to the daily production profile due to the addition of energy storage should constitute a Material Modification. Changes to the daily production of the generating facility will not necessitate further study of the facility to prevent inaccurate study results for the short-circuit study, stability analysis, voltage drop and flicker analysis, and production and set point coordination studies.

Short-Circuit Study

It is my understanding that during the short-circuit study, Duke considers a "worst case" scenario, which could include summer or winter peak conditions. It is my understanding that the addition of energy storage to a solar facility would not affect the results of this study.

Stability Analysis

It is my understanding during the stability analysis, Duke studies the "worst case" scenario regardless of summer or winter peak conditions. Again, the addition of energy storage to a facility would not affect the previous study results.

Voltage Drop & Flicker Analysis

It is my understanding during the voltage drop and flicker analysis, Duke considers the “worst case” scenario, which is typically light load conditions. The addition of battery storage would not affect the previous study results.

Protection and Set Point Coordination Studies

It is my understanding during the protection and set point coordination studies, Duke studies the “worst case” scenario regardless of summer or winter peak. Thus, the addition of energy storage to a facility would not affect the previous study results.

Q. SHOULD DUKE BE ABLE TO TRIGGER A MATERIAL MODIFICATION IF THE POWER FLOW ANALYSIS RESULTS NEED TO BE CONSIDERED DUE TO A CHANGE IN THE DAILY PRODUCTION PROFILE?

A. No. As background to this issue, I want to point out that it is my understanding that the Eastern Interconnection Reliability Assessment Group (ERAG) shares responsibilities on behalf of the Southern Electric Reliability Council (SERC) in defining cases to be studied during power flow assessments. Case studies are snap shots in time and not dependent on the production profiles. The power flow model would be based on the load forecast, which assumes statistical probability of one occurrence in two years and that renewable generation should be dispatched at seasonally expected values corresponding to the appropriate model.

As I understand Duke’s System Impact Study methodology, Duke incorporates summer peak load and light load case conditions. I do not believe it unreasonable to assume winter peak load conditions, as Duke may have assumed winter peak load conditions in many cases of the studies already.

Below is the definition of each case study as defined by ERAG:

Summer Peak Load (yyyySUM) is defined as the summer peak demand expected to be served, reflecting load reductions for peak shaving. Topological modeling changes shall be incorporated into the model if they are to go into effect on or before July 15. Summer interchange schedules should reflect transactions expected to be in place on July 15. Planned summer maintenance of generation and transmission should be reflected in the operating year case.

Winter Peak Load (yyyyWIN) is defined as the winter peak demand expected to be served, reflecting load reductions for peak shaving. Topological modeling changes shall be incorporated into the model if they are to go into effect on or before January 15 of the following year (yyyy + 1). Winter interchange schedules should reflect transactions expected to be in place on January 15. Planned winter maintenance of generation and transmission should be reflected in the operating year case.

Light Load (yyyySLL) is defined as a typical early morning load level, modeling at or near minimum load conditions. Topological modeling changes shall be incorporated into the model if they are to go into effect on or before April 15. Pumped storage hydro units should either be modeled off-line or in the pumping mode, with appropriate pumping interchange schedules in place. Dispatchable hydro units should generally be modeled off-line, with run-of-river hydro on-line. Generation dispatch and interchange schedules should be commensurate with the experience of the area during such load

periods, not just including firm transactions. Planned spring maintenance of generation and transmission should be reflected in this case. Summer or appropriate equipment ratings should be used.

It is my understanding that the power flow study results are the results that might change due to a winter peak case. As Duke considers the winter peak case, Duke will typically rework the following inputs:

- System demand under the winter peaking scenario – This will change based on the time of day, and it could therefore be affected by energy storage.
- Added generation under the winter peaking scenario – This is the only case where the use of production profiles are useful to Duke for the study of storage since batteries may not discharge at the full nameplate output of the array, and Duke will need to understand what the applicant intends.
- Firm transactions – Duke purchases and sells energy on a regular basis, and this could be affected by the addition of energy storage.
- Topology of the system – This is typically constant, but is affected by time and could be affected by energy storage.
- Facilities ratings – Facilities ratings are utility defined, and are temperature dependent from season to season. These ratings may change at the utility's discretion.

For the power flow analysis, it is my understanding that Duke could consider energy storage using the winter peak case, which would require about four to eight hours of study time with an additional four to eight hours of review time.

Q. EVEN IF DUKE HAS TO CONSIDER THE POWER FLOW ANALYSIS AGAIN DUE TO A CHANGE IN PRODUCTION PROFILE, SHOULD A MATERIAL MODIFICATION BE TRIGGERED THAT WOULD REQUIRE A NEW SYSTEM IMPACT STUDY?

A. No. Since the addition of energy storage will not impact the vast majority of the study results and because the power flow analysis requires only a minimal time commitment from Duke, the addition of DC-coupled energy storage that alters the daily production profile should not trigger a Material Modification.

Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?

A. Yes.



MICHAEL R. WALLACE, PE, CEM, GBE

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Ecoplexus, Inc, Vice President, Southeast Development

Versatile and outcome-oriented individual with 14+ years' achievement in progressively responsible engineering and business leadership and a proven history of success at the helm of challenging, multimillion-dollar projects. Multidisciplinary engineer and business owner who effectively manages clients, vendors and staff, excels at building teams, and delivers process improvement initiatives that fuel bottom-line growth. Adept in all aspects of construction management, field engineering, design engineering and process engineering. Wholehearted leader with the business and financial planning acumen to conduct reliable forecasting and complete projects on-time and under-budget. Core stakeholder responsible for identifying risk, secure funding, project procurement and managing resources. Professional Engineering (PE), Certified Energy Manager (CEM), Green Building Engineer (GBE).

Areas of Expertise:

OPERATIONS MANAGEMENT, INVESTMENT STRATEGIES, PROJECT MANAGEMENT, DESIGN, NEW CONSTRUCTION, RENOVATIONS, STRATEGIC PLANNING & ANALYSIS, P&L, COMPLIANCE, CONTINUOUS IMPROVEMENTS, BUDGETING, REPAIRS, CAPITAL REPLACEMENT PROJECTS, REPORTING, TRAINING, INSPECTIONS, CONTRACT NEGOTIATION, LEASE NEGOTIATIONS, REQUEST FOR PROPOSAL, BUSINESS PLANNING, PURCHASE POWER AGREEMENTS, INTERCONNECTION AGREEMENTS; DEVELOPMENT STRATEGY

PROFESSIONAL EXPERIENCE

Ecoplexus, Inc. – Durham, NC

May 2017 to Present

A Better Energy Future

mwallace@ecoplexus.com

Vice President, Ecoplexus, Inc.

Ecoplexus believes in a better energy future. We are a leader in the development, design, construction, and financing of solar power projects for the commercial, municipal, non-profit and utility markets in the US and key International markets. The Company's energy services capabilities, and strong analytical and project finance expertise are the foundation from which we have successfully developed, built and financed many solar energy facilities in a short period of time. We focus on distributed generation and utility scale projects in the 2MW-AC to 100MW-AC range and are currently working a pipeline of over 3000 MW-AC of projects in the US and Internationally.

Ecoplexus currently has employees in San Francisco CA, Dallas TX and Raleigh NC in the United States, as well as International offices in Japan, Mexico, Turkey and Thailand. The EcoPlexus project teams have completed, or currently have under construction, over two hundred (350) MWs of projects, and include Licensed General Contractors (B), Licensed Electrical Contractors (C-10), Specialty Solar Contractors (C-46), and NABCEP certified professionals.

The finance team has originated over (\$300m) three hundred million in projects to date under Power Purchase Agreements with excellent returns for investors.

- <http://www.ecoplexus.com/>
- Lead business planning, business development, and design expertise in all aspects of utility scale solar with a focus on projects designed for distribution and transmission interconnections ranging from 2 MW AC to 300 MW AC in the Eastern US. Manage a team of 8-12 individuals who initiate projects from concept through development and onto construction to deliver to long term value to Stakeholders.
- Responsible for strategy and business planning in Southeast United States. Currently managing a pipeline of approximately 3000 MW-AC. Responsible for origination of projects with utilities including Duke Energy, Florida Power & Light, South Carolina Electric & Gas, Dominion, Southern Company, Tampa Electric, Seminole, and Santee Cooper.
- Responsible for complete development of utility scale projects to construction including negotiation and Purchase Power Agreement and Interconnection Agreement.

Sunlight Partners – Portland, ME

2015 to 2017

*Our Mission + Your Land = Environmentally Friendly Clean Energy**Michael.Wallace@sunlightpartners.com***Senior Vice President, Sunlight Partners, LLC**

Led business planning, business development, operations and design expertise in all aspects of utility scale solar with a focus on projects designed for distribution and transmission interconnections ranging from 2 MW AC to 40 MW AC. Manage a team of 6-10 people who initiate projects from concept through development to deliver to long term owners/investors at "Notice to Proceed" (NTP) status ready for construction. Responsible for creating and maintaining a P&L plan for Sunlight Partners. Responsible for managing all consultants and vendors in states of operation. Understanding of solar tax equity structures critical for financing solar projects. Key development areas and tasks include:

- SUNLIGHT PARTNERS – NC, GA, and NY | UTILITY SCALE SOLAR DEVELOPER: Developed of over 425 MW AC of solar in North Carolina consisting of two portfolios. Ongoing development efforts for distribution and transmission scale projects in North Carolina, Georgia and New York. Over 300 leases secured and ongoing, approximately 80 projects developed or in various development stages. Strong communicator and networker which has led to the growth and recognition of Sunlight Partners in the industry across the United States. Created and maintain Sunlight Partners business plan, development strategy, development schedule and execution. Total portfolios value to date of approximately \$50 MM.
- Managed and provided development expertise of each individual site including; identifying sites, interconnection application, power purchase agreement, interconnection agreement, site single line drawings, site layout design, site engineer of record, state regulatory and legislative knowledge, PVsyst power output analysis, phase 1 & phase 2 environmental site assessment, wetland delineation including jurisdictional determination, site surveying, Nation Environmental Policy Act (NEPA) permitting, over 200 planning board & County Commissioner hearings resulting in Special Use permits, Utilities Commission Applications and management, FERC Applications and management, Archaeological Survey, EPC management to establish baseline pricing.
- Currently continuing to work with Sunlight Partners as a Senior Vice President to finalize a 170 MW-DC with Duke Energy Progress in North Carolina. www.sunlightpartners.com

Cate Street Capital – Portland, ME

2014 to 2017

*Intelligent Investing For a Sustainable Future.**mwallace@catecapital.com***Managing Director, Engineering Cate Street**

Provided engineering and project management expertise and guidance across multiple business ventures for Cate Street Capital.

- BURGESS BIOPOWER – BERLIN, NH | ENGINEERING DESIGN & PROJECT MANAGEMENT: Served as a professional engineer to evaluate and offer assistance for a 75 MW bio-mass facility in northern New Hampshire. Duties included:
 - a.) Preparation and review of the site Spill Prevention Plan.
 - b.) Physical review of punch list items during project close to assists Babcock and Wilcox to get to substantial completion.
 - c.) Managed a landfill gas and natural gas feasibility study in which both were considered to help offset the rising cost of biomass fuel. Project involved looking at new sub gun assemblies for the existing bubbling fluidized bed as well as a combine heat and power unit at 5.4 MW AC to help offset the parasitic loads. Based on the projects return on investment, a landfill gas pricing model was derived to understand how much Burgess Power could afford to pay for this technology.
- ORGANIC NUTRITION INDUSTRIES – RATON BOCCA, FL | FACILITY DESIGN: Served as a professional engineer to assists in the design and construction of a facility intended to convert organic waste streams into edible protein for animals. Duties include assisting with a complete design package to provide finance, engineering, construction management, permitting, regulatory affairs and operational support to prepare the site commercial operation.
- THERMOGEN – MILLINOCKET, ME | ENGINEERING DESIGN & MANAGEMENT: Served as a professional engineer to assist and support in the design of a 330 metric ton/yr black pellet plant in Millinocket, Maine. Duties included:
 - a.) Working with outside engineers to develop a plant layout and process flow.
 - b.) Directing and working with vendors to identify equipment necessary to meet the project pro-forma material output.
 - c.) Review, input and guidance of the plant mass balance.

D.E.E.P. Engineering Solutions LLC – Scarborough, ME
Design, Evaluate, Execute, Performance – Engineering Design Company.

2013 to 2017

Michael.wallace@deepengsolutions.com

Owner & President/Principal Engineer

Provide design and operational expertise in all aspects of commercial and industrial engineering with a focus on industrial process and energy conservation. Manage project teams of 5-10 people for an engineered wood product facility, commercial building design and process piping design. Effectively analyze the task presented, construct a scope based on available budget and client expectation and complete the task in the time allotted. The company has expanded in revenue 30%-35% since its inception with 100k + of contracts on the books in 2016.

D.E.E.P. Engineering Solutions is a multi-discipline engineering consulting firm with professional liability insurance to handle projects valued up to \$10 MM. D.E.E.P. utilizes Paragon Management for CPA and financial services as well as Brann & Isaacson for legal advice and contracting. Key clients and projects include:

- SUNLIGHT PARTNERS, LLC – PORTLAND, ME | ENGINEER OF RECORD: Principal Engineer in charge of all solar design work which is submitted to the utility and local jurisdictions for approval. These tasks include preliminary single line drawings, site layouts, FERC applications, Public Utility Applications, and Utility Applications.
- IDEX LABORATORIES, INC. – WESTBROOK, ME | CHILLED WATER UPGRADE OWNERS ENGINEER: Owners Engineer responsible for reviewing a chilled water tie-in between the East and West buildings. Duties include P&ID review, pumping requirements review, site layout & piping design review, control narrative review.
- LOUISIANA PACIFIC – HOULTON, ME | LOG DECK & SLASHING MODERIZATION: Principal Engineer in charge of new log deck and slashing system. Reviewed the existing log deck and slashing system design as intended during the Laminated Strand Lumber, (LSL) upgrade. Current log singulation and pendulum slashing design did not meet LSL board output. Worked with the plant team to confirm the existing mass balance and desired throughput. Developed a vendor specification and worked with three equipment suppliers on various layouts which were reviewed and graded. Based on equipment cost, schedule and functionality a vendor was selected to assist in the final design. The project is scheduled to be implemented in early 2018. Project valued at \$4MM.
- LOUISIANA PACIFIC – HOULTON, ME | REGENATIVE THERMAL OXIDIZER STACK EVALUATION: Principal Engineer in charge. Reviewed the existing 100 foot process stack for structural integrity. Ultra-Sonic thickness measurements were taken in six locations every 5 to 6 feet in height. Measurements were compared to ASME-STS-1-2000 and revision ASME-STS-1a-2003 for code compliance. Anchor bolts were evaluated and a recommendation made to protect the integrity of the bolts.
- STEEL-PRO INCORPORATED – ROCKLAND, ME | ASME VESSEL DESIGN REVIEW: Provided review of filter and accumulator assembly design per ASME standards and client design specifications. Upon completion of review, provided Professional Engineering Stamp for construction and installation. Have completed these reviews in Washington and California.
- RAMSAY WELDING & MACHINE – LINCOLN, ME | CONVEYOR DESIGN & RECORD DRAWINGS: Serving as the Principal Engineer responsible for working with an engineered wood products company on behalf of Ramsay Welding & Machine. Design of a heavy industrial Oriented Strand Board sanding line including rolls conveyor, chain conveyor, jump chain conveyor, paint both conveyor, paint booth, boxing ring conveyor, strapper and discharge rolls. Responsible for all equipment design and shop drawings. Shop drawings supplied to Ramsay Welding & Machine to construct and install the approved design. Sizing of conveyor structural members was a key to the success of the project. Drawings were finalized as record prints and stamped with Professional Engineering Seal. Project valued at \$330k.
- RAMSAY WELDING & MACHINE – LINCOLN, ME | COMMERCIAL BUILDING FLOOR ANALYSIS: Served as the Principal Engineer responsible for evaluating an existing 2nd story floor to determine additional beam sizes needed to support a client requested live and dead load while maintaining proper deflection per code. Final stamped calculations were provided to Ramsay Welding & Machine with Professional Engineering Seal.

WOODARD & CURRAN – Portland, ME

2011 to 2013

840-person, integrated engineering, science, and Operations Company.

Project Manager

Provided expertise in all aspects of project management, construction management, field engineering, design engineering, and process engineering. Managed 3–15-person project teams on diverse engagements, including: process design for engineered wood product facilities; paper and tissue manufacturing design; water room treatment design; food and beverage utility and process design; steam design; and boiler systems design. Effectively managed client expectations, carefully monitor scheduling, and ensure accurate reporting. Implement broad-spectrum process improvements and spearhead compliance initiatives for diverse clientele. Key clients and projects included:

- IDEXX LABORATORIES – WESTBROOK, ME | FACILITY BOILER STUDY, DESIGN & INSTALLATION: Lead Principal Engineer of record, responsible for completing a detailed energy study of a campus boiler system. The campus was composed of two buildings covering 200,000 sqft and 350,000 sqft respectively. The study included steps necessary to combine the East 550 HP boiler system with West 800 HP boilers system. Five boilers total. Responsible for complete design including friction loss, pipe routing, pipe sizing, boiler lifespan analysis and overall system efficiency. Effectively managed the engineering, procurement and installation within the purposed scope, schedule and budget. Responsible for holding daily project meetings with 3-5 contractors, the client and engineering staff throughout the 6 month project. Total project savings were calculated at \$300k and are on target as three of the five boilers were placed on backup once the two buildings were combined.
- CON EDISON – NEW YORK, NY | POWER ENGINEERING BOILER DESIGN: Serving as lead Project Engineer on \$500K, year-long component of \$46MM project for one of the nation's largest investor-owned utility companies. Proactively managed client expectations while directing 6–7-person team and ensuring on-time project scheduling. Reviewed piping and instrumentation diagram (P&ID) for a new, 12-inch Natural Gas line addition for 5 boilers on West 59th Street and 7 boilers on East 74th Street and created functional test procedures for commission team. Conceived, managed, and maintained project schedule comprising 300+ procedures and codes, including NFPA 54, NFPA 56, NFPA 85 and American Gas Association Purging 2001.
- COCA-COLA – ATLANTA, GA | STEAM & POWER COGENERATION DESIGN: Built full facility from scratch, serving as lead Project Engineer on intensive year-long project. Held directly management responsibility for 2–4 engineers throughout all phases of implementation. Designed utility connections for GE-supplied engine. Completed stress analysis of 6" steam line utilizing Caesar II, checking codes B31.1 and B31.3. Determined and identified anchor points, expansion joints, and valve locations. Performed hydraulic calculations relating to engine's high- and low-cooling circuits for pump selection, potable water system for booster pump selection, process waste for pump selection, feed water line for pump skid selection and condensate line for pump skid selection. Developed P&IDs for the compressed air system, potable water system, process waste system, feed water system, condensate return system and steam system. Drafted mechanical specifications for the contractor to purchase and install piping, valves, insulation and components.
- COCA-COLA – NATIONWIDE | 1881 CLOSURE UPGRADES: Lead Project Engineer to convert 32 small PET lines to 1881 closures, which improved sustainability (utilizing a single thread start) and reduced closure inventory levels across North America. Managed 9 plant conversions across the U.S. and assisted on others. Supported plant maintenance teams in assessments of cappers. Developed plant shutdown schedule for implementations of key improvements, with the duration of outages ranging from 2–5 days. Personally supervised all shutdowns and startups.

MICHAEL R. WALLACE, PE, CEM, GBE | michael.wallace87@gmail.com | Page 5

D&S ENGINEERING, INC. – Millinocket, ME 2009 to 2010

Offering broad-spectrum construction services as well as designs and studies.

Project Engineer

Assisted process design in paper mills and surrounding industrial facilities throughout Maine for a small, multidisciplinary firm. Identified inefficiencies and implemented process improvement initiatives.

Signal achievements as project engineer at D&S Engineering, Inc. (2009–2010):

- HOSPITAL – MAINE: Evaluated an existing hospital kitchen and measured heat loads generated throughout normal day. Calculated sensible and latent heat loads; subsequently selected appropriate cooling coil for an existing air makeup unit.
- POWER PLANT – NORTH CAROLINA: Identified Reverse Osmosis (RO) system that could effectively treat the water supply that the plant received from the city (and used to produce steam). Assisted vendors in selecting an RO system and submitted pricing for selection.
- CORRECTIONAL FACILITY – MAINE: Designed 6" return-and-supply hot water line, transferring water to new 1.2-MMBTU/hr pellet boiler stationed in a building approximately 100 ft. from existing mechanical room. Installed pipe outside at 10'-elevation and placed in compliance with new pipe stands. Produced detailed design, encompassing valving, insulation, wall penetrations and thermal expansion

LOUISIANA PACIFIC CORPORATION – Houlton, ME

2004 to 2008

Leading manufacturer of quality engineered wood building materials.

Senior Plant Engineer/Project Manager (2005 to 2008)

Served as in-house engineer and project manager, leading all phases of capital projects ranging in scope from \$20K to \$3.5M. Ran pre-bid and construction meetings to ensure clear communication and strategic alignment between the plant, contractors and all vendors for each project. Acted as construction manager, POC, and field-engineer throughout implementation. Leveraged financial planning skillset to assist in the calculation of ROI for each project. Managed 14 maintenance personnel during internal plant projects, while holding indirect management responsibility for up to ~115 workers across 3 shifts during day-to-day operations. Undertook plant wide process improvements initiatives, designed structural supports for equipment/catwalks, and implemented product storage systems.

- OVERSAW \$7M in capital expenditures in 2007, including \$3.5M replacement of a Regenerative Thermal Oxidizer for the plant's dryer gases.
- MANAGED phases of large-scale project to flush and refill 45K gallons of thermal oil fluid from an LP plant's energy system. Captured 33% increase in capacity by designing conveyor modifications for 8-belt and drag-chain conveyors.
- DESIGNED AND INSTALLED new wet-bin distribution conveyors to transport wood flakes to various bins for storage, forecast to increase capacity by 25%.
- KEY CONTRIBUTOR on 2-year, \$150M design and build of new Laminated Strand Lumber (LSL) line at the New Limerick facility. Performed design reviews during execution of LSL line and at various OEM facilities and conducted extensive field engineering during LSL construction phase. Served as plant representative on all subsequent design changes as the project developed and managed small pieces up to \$250K.
- LED project team in overhauling 6K gallon propane farm, bringing the system into compliance with NFPA 58.
- DIRECTED project teams of 5–50 direct reports—and as many as 80 during shutdowns.

Plant Engineer II /Project manager (2004 to 2005)

Efficiently coordinated diverse capital projects for Louisiana Pacific, with management responsibilities spanning budgeting, scheduling, and engineering. Reviewed the equipment proposals of OEMs for all processes within the plant. Led teams within the facility to modify and improve existing equipment and processes. Directed plant shutdown activities and created a work schedule governing all plant functions.

PROFESSIONAL PROFILE

Organizations	Town of Scarborough Maine Energy Committee, North Carolina Clean Energy Business Alliance, North Carolina Sustainable Energy Association, South Carolina Clean Energy Business Alliance, South Carolina Solar Business Alliance.
Education	Bachelor of Science in Mechanical Engineering – University of Maine – Orono, ME
Associations	American Society of Heating, Refrigeration & Air Conditioning Eng (ASHRAE) American Society of Mechanical Engineers(ASME) Project Management Institute (PMI) Association of Energy Engineers (AEE)
Technical Skills	Microsoft Office (Word, Excel, PowerPoint, Outlook & Project 2013), Adobe Acrobat 9 Professional Design software: Micro Station, Math Cad, Auto Cad 2013, Pipe-Flo (Hydraulic Modeling), Mechanical Desktop, TRANE – TRACE 700, Compress Codeware, Caesar II Stress Analysis, PVsyst Computer Programming: FORTRAN & Q-Basic
Registrations	Licensed Professional Engineer, ME, 12281; Registered Professional Engineer: NH, 13239; VT, 72395; MA, 48926; GA, 35979; CA, 35984; NY, 091268; the Commonwealth of Virginia, 052010; WA 50397; North Carolina, 041311; Florida, 77501 Certified Energy Manager-CEM# 20388 Green Building Engineer-GBE

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CHAIRMAN FINLEY: We are going to break
right now, and we're gonna come back at 2:15.

(Whereupon, the hearing was adjourned at
12:43 p.m. and set to reconvene at
2:15 p.m.)

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CERTIFICATE OF REPORTER

STATE OF NORTH CAROLINA)

COUNTY OF WAKE)

I, Joann Bunze, RPR, the officer before whom the foregoing hearing was taken, do hereby certify that the witnesses whose testimony appears in the foregoing hearing were duly sworn; that the testimony of said witnesses was taken by me to the best of my ability and thereafter reduced to typewriting under my direction; that I am neither counsel for, related to, nor employed by any of the parties to this; and further, that I am not a relative or employee of any attorney or counsel employed by the parties thereto, nor financially or otherwise interested in the outcome of the action.

This the 12th day of February, 2019.

Joann Bunze



JOANN BUNZE, RPR

Notary Public #200707300112

FILED

FEB 13 2019

**Clerk's Office
N.C. Utilities Commission**