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DATE: Wednesday, January 30, 2019

TIME: 2:15 p.m. - 4:59 p.m.

DOCKET NO.: E-100, Sub 101

E-2, Sub 1159

E-7, Sub 1156

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 6

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IDENTIFIED/ADMITTED

P R O C E E D I N G S

CHAIRMAN FINLEY: Let's go back on the record. Ms. Kemerait, did you want Mr. Wallace to summarize his testimony?

MS. KEMERAIT: Yes, please.

CHAIRMAN FINLEY: All right.

Whereupon,

CHRISTOPHER NORQUAL, LUKE O'DEA, AND MICHAEL R. WALLACE,

having first been duly sworn, were examined and testified as follows:

CONTINUED DIRECT EXAMINATION BY MS. KEMERAIT:

THE WITNESS: Thank you. The purpose of my testimony is to discuss the reasons why the addition of energy storage to the solar facilities should not be deemed to constitute a material modification and to provide information about an expedited review process that should only allow to determine whether the addition of energy storage would be -- would materially change the system impact study results. If energy storage is proposed to deliver power outside the time -- day -- daylight hours, studied in the system impact study, it is important that Duke consider, in a

timely manner, whether the output produced outside the daylight hours would materially change the study results. Otherwise, Duke has currently proposed in the new Section 1.5.2.5 about material modification, energy storage devices would be prohibited from delivering output during peak periods, when power is most needed.

I was an active participant in the Working Group 2, the stakeholder process, and participated in discussions about whether the addition of energy storage to proposed and existing solar projects should be deemed to constitute a material modification. The stakeholders agreed that adding AC-coupled energy storage to a facility would alter the short circuit study result of the system impact study. The stakeholders also agreed that DC-coupled energy storage could be added to the facility without invalidating the system impact study results, so long as the maximum physical export capability was not increased. In other words, the solar storage facility with energy storage cannot produce more power than the maximum power output that was considered during the initial system impact study. However, the stakeholders

disagree with Duke's position that any change in daily production profile of a generating facility would constitute a material modification, because they believe that energy storage can be added without invalidating the study results.

I think it's important to provide information about why it does not constitute a material modification when energy storage is added to deliver output during the same periods considered during the system impact study. If energy storage is discharged during the same periods that were studied in the system impact study, there should be no need for restudy. It was my understanding from Duke's testimony and materials that the results from the thermal/voltage study, rapid voltage change, RVC, flicker analysis, and stability analysis, short-circuit study, and protection circuit would not be altered if DC-coupled energy storage is delivered during the daylight hours that were studied. And I will just note that you will see stability in there, but during my early testimony, I corrected that, and stability could be altered.

It is my understanding that, when Duke

evaluates the thermal and voltage impacts for solar facilities, Duke considers peak load with the profile facility at full output and daytime minimum load. Therefore, there is no material modifications when energy storage is discharged during the same periods that were studied since the impact study -- since the study considers impacts of the facility at full output.

Energy storage may also be added to a solar facility outside the daylight hours without constituting material modification, since the study results will not necessarily be inaccurate. This would allow energy storage to produce power during peak periods, when energy is needed most. For projects that wish to add energy storage outside the hours studied, for example, peak periods of 8 a.m. in the wintertime and 6 p.m. summertime, there should be an expedited study process for those requested to determine whether there will, in fact, be an impact and would prior restudy. The expedited process would consider whether the previous study results, specifically the thermal/voltage study results, would materially change the project -- change, and the project would

not lose their queue position during the evaluation. If the review determines that the system impact study results would not materially change, the interconnect customer should be allowed to add energy storage device without triggering the full restudy required by the material modifications.

This concludes the summary of my testimony. Thank you.

BY MS. KEMERAIT:

Q. Mr. Wallace, I just have two questions before cross examination.

Do you and EcoPlexus interact with and have knowledge of Duke study models?

A. We do. EcoPlexus is in a unique situation. We have, in particular for North Carolina, a transmission planner that worked for Florida Power and Light for 10 years that's on staff, and we also are, with FERC -- and make sure I get this right -- their critical energy electrical infrastructure information. We are in receipt of all utility study models across the country.

MR. JIRAK: Chairman, I am going to object to additional testimony. Again, we are

introducing new evidence that wasn't prefiled for purposes of review by the parties.

CHAIRMAN FINLEY: It hadn't hurt you any.

MS. KEMERAIT: It's simply about qualifications for the testimony.

CHAIRMAN FINLEY: One more question.

MS. KEMERAIT: Okay. One more question.

BY MS. KEMERAIT:

Q. Mr. Wallace, has EcoPlexus submitted any interconnection requests for solar facilities with storage in North Carolina?

A. We have, and we worked three of the CPRE projects submitted.

CHAIRMAN FINLEY: All right.

MS. KEMERAIT: The NCCEBA panel is now available for cross examine.

CHAIRMAN FINLEY: Let me ask Duke this question. We have this little dispute about this. What has been marked for identification as NCCEBA Direct Exhibit Number 1. This topic is -- I haven't looked at it. I have been busy over break, but I understand that this project about adding solar and that type of thing is one that is of

great interest to everybody in this case, in particular some of the Commissioners.

Have you looked at this over the break?

MR. JIRAK: We did not have a chance to look at it in any great detail.

CHAIRMAN FINLEY: Okay. All right. Public Staff, cross examination?

MR. DODGE: Thank you, Chairman Finley.

CROSS EXAMINATION BY MR. DODGE:

Q. Good afternoon, gentlemen. A couple of questions first for the Cypress Creek witnesses.

It's my understanding that Cypress Creek does operate a few solar and storage facilities in North Carolina; is that correct?

A. (Like O'Dea) That's correct.

Q. Those are located, however, in co-op service territory, not in the regulated utility service territory?

A. (Christopher Norqual) Yes, that's correct.

Q. Were those projects designed and built at the same time, or were those initially solar facilities that were later modified to include storage?

A. I personally am unaware of the details of that.

Q. Does Cypress Creek have any projects submitted in the Duke Energy Carolinas interconnection queue with solar and storage at this time?

A. (Luke O'Dea) Yes, that's correct.

Q. Okay. And one just last general comment. I just wanted to thank Mr. O'Dea with his help last year with Working Group 2 and helping to spend some time and put some time and efforts into the discussions we had last year. Thank you.

A. Pleasure.

MR. JIRAK: Thank you, Mr. Chairman.

CROSS EXAMINATION BY MR. JIRAK:

Q. I have a number of questions for the panel, but I want to start with some just, sort of, level set -- high level questions to make sure we are on the same page here. And I will direct the questions generally to the panel, and feel free to respond as necessary.

Would you agree that this proceeding is only addressing questions related to interconnection process, and as we talk about material modification and addition of storage, that here in this proceeding we are only thinking about the interconnection process as it relates to the addition of storage to existing solar

resources, correct?

A. (Luke O'Dea) Yeah, that's correct. We -- the comments filed reflect, you know, the right way to think about interconnecting these projects and have no bearing on energy off-take contracts or anything of that.

Q. Okay. So you anticipated my next question, which is, we are not -- we are not addressing in this proceeding how these requests will be handled under the applicable -- under the legal terms of the applicable PPAs that apply to these projects?

A. That's correct.

Q. And these are all state jurisdictional projects, so they all have PPAs with Duke, correct?

A. The Cypress Creek projects are, for the most part, state jurisdictional. I don't know that that is a blanket statement that covers everybody on the panel here.

A. (Michael Wallace) Yeah. And I was just going to say, my testimony is specific to the process of interconnection and why it's important. So not necessarily a state, but it could be a project already in process being studied or a project that has already been out and been interconnected, so state as well.

Q. Okay. And again, as we think about the PPA arrangements that apply to these projects that would be adding storage, again, there is a range of different PPA options, but would you agree that a lot of them are either Sub 136 standard offer contracts, Sub 140 standard offer contracts, or negotiated PPAs; that captures the vast majority of the projects that are at issue here?

A. (Christopher Norqual) Would you mind just restating that?

Q. Yeah. Again, as we think about the PPAs that are applicable to these projects, the vast -- to be in the state jurisdictional interconnection process to begin with, you have to be selling all of your output to Duke. So all of the projects to which the North Carolina connection procedures be applicable have PPAs with Duke, correct?

A. Correct.

Q. And, as per the policy is developed, there is a number of projects have Sub 136 standard offer PPAs, correct?

A. There are some, correct.

Q. And there is some that have Sub 140 PPAs?

A. Correct.

Q. And some that are negotiated PPAs?

A. Correct.

Q. So what we are not addressing in this proceeding are the important policy and legal questions regarding whether the PPAs, themselves, allow for the addition of storage to the contracted facilities, correct? We are not addressing that question here?

A. Not here, correct.

Q. And there is probably also important policy questions that we need to ask ourselves regarding whether stale and dated cost rates that were established seven years ago in some cases are the appropriate price signal to use to incent development of storage resources in the state today?

A. Well, again, I don't think that's what we are discussing here.

Q. Okay. And when a developer, as you all are, as you think about investing your capital in the storage asset, your first consideration is whether you could earn an adequate return on that investment, correct?

A. Correct.

Q. And so in order to do that assessment, you are focused on, can I sell enough kilowatt hours to

earn a return on this investment?

A. That's one of the considerations.

Q. And you would assess that based on the terms of the applicable PPA.

So you would -- to do the analysis, you would assume a particular kilowatt hour rate, correct?

A. (Michael Wallace) And just to go back to your last question, I think for EcoPlexus, we certainly look at the PPA as part of it, but we also look at the market as a whole. So what I mean by that is we look at where additional opportunities in the market may come into play later on, in terms of interconnection, when we're -- so Green Source Rider -- for us, in North Carolina, Green Source Rider versus state level projects versus FERC PPA. It's not just a PPA, it's an overall diversification of solar moving forward for renewable. So it's a bit different than -- our investor relations are blended, so we are looking at a multiple latitude because, for solar to continue to grow, you are in multiple markets. So it's not just as simple as, there is a PPA rate, and can this work.

Q. I have to confess, I didn't follow all that, but would you agree there is 3 to 400 currently interconnected solar projects that are selling their

output to Duke Energy currently, subject to check?

A. (Christopher Norqual) Yes, subject to check.

Q. And all of those facilities have existing PPAs with Duke?

A. Correct.

Q. So to the extent the companies that you represent here own those, you will be assessing -- the decision to whether to add storage to those projects, you will be assessing that based on the applicable kilowatt hour and the PPA that's applicable to the particular project?

A. That's not the only factor being assessed. For Cypress Creek, we use tax equity, we use multiple forms of financing, and that leads to different valuations of the value of the project, and only one of those inputs is production.

Q. Okay. But the primary revenue stream that you are going -- the only revenue stream from that project is the PPA?

A. (No response.)

Q. There may be --

A. Yes.

Q. I agree that there is tax financing issues that may drive your decision, but the only revenue --

A. The only revenue stream, correct, yeah.

Q. Now, I want to explore the material modification in a little more detail, but I want to start with a very high-level question, and I think it's a simple one.

Should an existing solar facility with a PPA with Duke Energy right now -- let's assume it's a Sub 136 standard offer PPA with an executed IA. Should it be permitted to add a DC-coupled storage facility without notifying the Company?

A. (Michael Wallace) So, for EcoPlexus, should it be permitted to add storage on the DC-coupled side, as in is it my testimony? The answer would be yes. And that's not getting into rate structure. So I honestly haven't looked at the rate structure and looked at the IRs, based on the different PPA results. So I apologize, I didn't prepare for that, but what I can tell you, on the DC side, we would expect to be able to work with Duke, and we agree that Duke needs to be involved in the process. Whenever you are adding something to a new generation facility, as is Duke's policy, you would bring that forward with the modification change, you know, requesting that, and they would review it.

So, in terms of to your question of would we think a Sub 136 project, taking out the Sub 136 and not thinking about a PPA structure, but let's look at that as a vicinity, right, that would be a vintage 2014, 2016 project. Those vintage projects, yes, we would say that we should be able to add storage in circumstances with Duke if we were able to review it.

Q. I want to make sure I have the answer to the specific questions I asked you.

Under the terms of the interconnection agreement that Duke has with that particular project, does the developer have a legal obligation to notify Duke when it adds storage to that resource? If you could give me a yes or no answer, and then you could elaborate as much as you need. Is there a legal obligation to notify Duke when it's going to add storage?

A. (Luke O'Dea) Yes. As with any allowable change under the interconnection standards, be that an update to the inverters, be that a change of the solar panels on the array, change from fixed-tilt to tracking, those are all changes that would go through the modification review process. The utility would be notified and approval from the utility would be granted

before any changes were undertaken.

Q. To be clear, your testimony is that Duke would have to approve your request to add storage?

A. Our practice has been that any changes to the design from the initial interconnection request through the study process is submitted to Duke for a modification review, and those reviews are undertaken under the standard and, you know, Duke grants those modifications very regularly, things like inverters, solar panels, all that.

Q. So if Duke has the right to approve it, does Duke have the right to say no?

A. We believe Duke would need to follow the letter of the standard on that.

Q. So in order to assess whether to approve it or not, can Duke study it using its standard study methods?

A. The modification piece of the standard lays out what change -- essentially lays out, in our view, what changes require study and what changes do not require study. And we don't believe Duke restudies when you change the inverter to a like-kind inverter, even though that is the actual AC component that's touching the grid, and that's the reason why we have

proposed and we advocate for the Working Group 2 language that includes these energy storage devices on the DC side of the system as allowable modifications.

Q. So, again, I am not trying to belabor this point, but I think you've agreed that there needs to be a request for when this occurs. It can't occur without notifying Duke. You've also, I think, agreed with me that Duke needs to approve it, meaning it's not just notification, there actually has to be an affirmative approval by Duke; did you agree with that?

A. Yes. Equipment modification requests are submitted to Duke and Duke approves them.

Q. So in order to determine whether to approve it or not, can Duke study it in the way that it deems appropriate and prudent from a good utility practice?

A. If a change is listed as not indicia of a material modification, it doesn't seem to be necessary that Duke would study it. Of course, Duke's engineers can take a look at any project they like and, you know, make sure they are applying good utility practice, but, in our experience, changes that are not indicative of a material modification don't typically, you know, go through a restudy process.

Q. So Duke has the right to prove it, so they

can think about whether this is something that should be approved or not, in light of good utility practice, but -- let me ask you this:

If Duke, in looking at it, determined it was going to change the amount of upgrades needed that had been previously assigned to that project, could it then assign those additional upgrades to that project?

A. (Michael Wallace) I think that's a different question, and I think, in our testimony, we had said, if we had gotten to a point where you had to -- that thermal and voltage may change, then that's different. And what we're saying is, there are circumstances where that thermal and voltage may not change, and in those circumstances, there should be more of an expedited screen, a check, something where Duke would not have to go through --

Q. So how would you know the thermal/voltage studies don't -- the results don't change if you don't do the study?

A. (Luke O'Dea) I will go back to the discussions in the Working Group 2. You know, it became clear through those discussions that there are certain fixed load cases, like a peak load and a minimum load, that are used to conduct the

thermal/voltage studies. So provided that the maximum output is not changing, and Duke's already looked at the maximum output for the max -- for the peak load and the minimum load, and that the modified system is going to operate within those range of conditions, then there is no additional study conditions that will be applied, and the existing system impact study would be applicable.

Q. But Mr. Wallace just agreed with me, I think, that, if the study results change, then it would be appropriate to alter the upgrades assigned to it, if that's what the study results show, right?

A. (Michael Wallace) Yeah. If you are going to get into a study, and you are going to go back through, and you find some upgrade through that study -- and I think my testimony states this -- then that's different. But what my testimony also stated was that you have to have a Stage-Gate to get to that process. And the Stage-Gate to get to that process isn't restudy. And so the fast track process -- a process that we could easily put together to check that, would be the appropriate steps.

Q. Okay. And you understand that Mr. Gajda's testimony in this proceeding is that he -- in his

expert judgment, having 20-plus years in the electric engineering industry, is that it's necessary to study that in order to show the reliability of the system. And you're -- as I understand your position here is, Duke, just close your eyes, don't do that study, because we don't really want to know the results.

A. No, no, that's not my position at all. And, certainly, Mr. Gajda's experience in utility engineering far outweighs mine, and he does a great job for Duke, and appreciate all he does. I think what I'm stating is, when you look at these projects -- and we will use Mr. Gajda's example of 9:00 to 5:00 and the study profile -- and currently -- we talked about this a bit earlier -- there is not a production profile in these studies that are completed; they are load case studies. Those load case studies are set out specifically over various times. So summer peak, as Luke had mentioned, and then usually there is a minimum load case that is set up.

And I will use an example that, if you've got, you know, EcoPlexus and CCR that's got a number of projects on the grid, and those projects we know will generate at 6 a.m. and we know that will generate past 5 p.m., I would say -- I would say that it's probably

with an engineer -- engineering assumption and practice, that Duke will look at that and understand how many projects are on its system and go back and look to see whether or not they need to make any additional study procedures, even for summer peak. So anything -- you've got 10 projects on, they are certainly going generate before 9 a.m.; they are certainly going to generate after 5 p.m., and they are making that engineering assumption. I think what I'm saying is that same methodology could be put in place here and could be set up to make those determination.

Q. Okay. We are gonna go to those cases in the assumptions that underlie why Duke studies solar-only resources the way it does. We will get back to that, but I want to take one more step back and think about what is material modification, in the first instance, and why is it in the procedures.

Okay. Would you-all agree that the system impact study is designed to assess the impact of a generating facility on the Company's transmission and distribution system? That's the overall purpose of the system impact study?

A. Correct.

Q. And fundamentally, Duke is tasked with

assessing whether a particular generating facility can safely interconnect to the grid and whether -- or whether upgrades are required and ensure the generator is not the cause of liability or power flaw conditions, correct?

A. (Luke O'Dea) Okay.

Q. And where the system impact study identifies upgrades needed to safely interconnect to the generating facility, then those are assigned to the particular interconnection requests being studied, correct?

A. Yes.

Q. Okay. And so when the Company undertakes its system impact study process for a particular project, it does it based on the interconnection request -- the project, as detailed in the interconnection request, correct?

A. That's correct.

Q. Okay. But it's not uncommon for developers to make changes during the study process, correct? I mean, changes can occur either before the study process from time to time; do you agree with that?

A. Changes do occur before the study process, but, you know, more commonly during or after the study

process. You know, when you have multiple years, the equipment that's available on the market, inverters, those kind of things are changed out on, you know, the majority if not almost all projects.

Q. And, again, changes can also occur, as you just pointed out, even after the project's been interconnected? So an operating project could seek to make a change to the project?

A. Yeah, that's correct. Yeah. There have actually been some cases where storm damage has impacted projects and required a rebuild. Rebuild, again, happens at a later date, different equipment is available, so that's an example of an operating facility that required changes.

Q. Okay. And since, as we agreed, the purpose of the system impact study is to assess whether a project can interconnect safely without impact on reliability or power quality, would you agree that the material modification standards specifically are intended to identify those changes, whenever they occur, identify those changes that warrant additional study for the purposes of ensuring -- continuing to ensure safety, and reliability, and power quality?

A. In general, yes. I mean, I think we see a

material modification as something that has a material impact on the upgrade cost for this project, or that would have a material impact to other projects in the interconnection queue.

Q. Okay. So one purpose of the material modification is safety and reliability, power quality, kind of the bread and butter of the system impact study. Now, as we continue to think about the purpose of the material modification, I want to consider a hypothetical, and this is somewhat extreme, but I want to walk us through this hypothetical to see if we agree on another purpose of material modification.

So, in this hypothetical, let's assume there are two projects in interconnection queue waiting to be studied. Both are seeking to interconnect to the same distribution service. We will call them project 1 is earliest in the queue, first priority; and project 2 is later queue. And let's say these are both 5 megawatt AC solar-only projects.

So, again, as we discussed, project 1, the system impact study will study that project to assess its impact on the transmission and distribution system, correct?

A. Sounds correct.

Q. And project 1 will be assigned any upgrades caused by it as studied as a 5 megawatt AC project, correct?

A. That would be correct.

Q. Okay. Let's assume that project 1 then proceeds to interconnection agreement, completes construction, and is placed in the commercial operation.

It's your understanding, then, the study for the second project, project number 2, will assume the operation of project 1 as a 5 megawatt AC project, correct?

A. Yes.

Q. And so the study results for project 2 will be influenced by the assumption that Duke makes about the operation of project 1 as a solar-only 5 megawatt project?

A. Yes.

Q. Okay. Now, in this hypothetical, let's assume that project 1, after having already been interconnected, they have their interconnection agreement, they are operating as a 5 megawatt AC project. Let's assume that project 1 unilaterally increases its megawatt AC size to 10 megawatts. Let's

just assume there is no material modification requirement. They can just do that.

COURT REPORTER: I'm sorry, could you slow down the pace a little? Thank you.

MR. JIRAK: Sorry. This is so fun, I can't.

BY MR. JIRAK:

Q. All right. So again, the hypothetical, project 1 is interconnected, they are operating, they are permitted to add AC capacity to their system before project 2 has been studied, okay? Are you following me on the hypothetical?

So now project 2, when it's assessed in the system impact study, it will be assessed assuming a 10 megawatt AC facility is operating on the project -- on the circuit, correct?

A. So the utility has approved this increase in capacity?

Q. Just a hypothetical --

A. So the first project increased its capacity, and then the second project applied?

Q. Yeah. In this hypothetical scenario, there is no material modification standard, so project 2 is permitted to unilaterally increase its AC capacity,

right? Okay?

So would you assume then that the utility would study project 2 assuming 10 megawatts AC on that distribution circuit?

A. I would assume the utility would study whatever it had in its files or its model. I am having a little bit of trouble following where this hypothetical is going.

Q. Yeah. We're almost there.

So would you agree it's possible that project 2 would get different system impact study results when it's studied in the one scenario if there is only 5 megawatts on that circuit versus now there is 10 megawatt. Potential it's going to get different results now that it's studied with the assumption there is 10 megawatts versus 5 megawatts on that circuit, correct?

A. The results of an impact study for different output levels, 5 megawatts versus 10 megawatts, would be different, so yes, I think there is a difference there.

Q. And so would you agree that the North Carolina procedures generally contemplate the serial application of upgrades?

A. Yes.

Q. Meaning, in general, projects are assigned upgrades based on the relative position?

A. Correct.

Q. And would you agree that the material modification concept, in part, ensures the serial allocation of upgrades by ensuring that a project that is already interconnected is not permitted to make a change to the operating generating facility outside of the interconnection queue process that would impact another project that's waiting in the queue?

A. Yeah, that's correct.

Q. And that's the reason why, for instance, you know, the addition of AC capacity specifically identifies a material modification?

A. That's correct. We certainly don't oppose changing that part of the standard.

Q. So earlier, we discussed that material modification is about identifying those changes that need to be studied for power, quality, and reliability.

Would you also agree that there is an equitable component to the material modification standard that ensures that projects receive the benefit of their serial study position?

A. I suppose so. I'm not sure that I totally follow the question there.

Q. Do you agree with that statement, that the material modification standard also ensures that projects that are waiting in the queue are not adversely impacted by projects that are outside the queue?

A. (Christopher Norqual) I would say -- I think we would say yes, so long as the project, with an interconnection agreement with -- that has an allowable capacity is still allowed to export to that maximum capacity in its interconnection agreement.

Q. Okay. But that equitable component is why material modification standards requires -- if it's a material modification -- which I know we disagree with storage, but if it is, that's why the interconnection standard requires that material modification standard to go to the back of the line, correct? It's that equity issue that we were just discussing. Do you agree with that? That's the logic for putting the material modification request at the back of the line?

A. Right. When being defined -- I would agree that that's the reason for clearly defining indicia of material modification or items that are not indicia of

material modification to help clarify this for interconnection customers who are applying to -- for interconnection service.

Q. Okay. Now, is the panel generally familiar with the voltage/thermal study that's applied in the system impact study process?

A. (Michael Wallace) Correct.

Q. Would you agree that the voltage/thermal study is the primary study that impacts -- is generally the primary study that impacts the mitigation options offered to customers?

A. I would say most cases, correct.

Q. Okay. So as the thermal/voltage study results exceeds acceptable limits, that's generally going to require some form of upgrade, some form of mitigation?

A. (Luke O'Dea) That's correct.

Q. Now, do you understand -- let me hand out an exhibit.

MR. JIRAK: May we approach?

CHAIRMAN FINLEY: Yes, sir.

(Pause.)

MR. JIRAK: All right. So, Mr. Chairman, we would ask this exhibit be marked

as Duke Cross Exhibit Number 1, I believe. Yeah.

CHAIRMAN FINLEY: NCCEBA Panel Cross Exhibit Number 1.

MR. JIRAK: That's much better than I said. Thank you.

(NCCEBA Panel Cross Examination Exhibit Number 1 was marked for identification.)

BY MR. JIRAK:

Q. Now, for some context, this document is a data request that the Company provided to a data request from NCCEBA.

Is the panel familiar with this response?

A. (Michael Wallace) Yes.

Q. Does the panel understand that Duke's current system impact study methodologies are predicated -- Duke's system impact study methodology for solar-only resources are predicated on certain assumptions regarding the potential operation of that facility?

A. Yes. You are referring to the load cases, correct?

Q. Yeah. All right. I'm going to direct your attention to the second page of the data request, in the third paragraph, and I'm gonna read two sections and ask you some questions about it. So third

paragraph on the second page. Are you all there?

"As discussed above, while the production profile of a solar-only facility is relatively certain, thereby allowing the Companies to utilize the thermal/voltage study methodologies described above, the production profile of a solar plus storage facility is not certain, given that, depending on the size of the battery, the facility could be generating at full max capacity at any time of the day."

I'm going to skip to the fourth paragraph:

"On a related note, the assumption described above, that the facility will not operate at significant capacity after 5 p.m., is no longer valid in the case of a solar plus storage facility, which concern is reinforced by the fact that many of the existing solar facilities that may add storage are under PPAs that have on-peak pricing that extends past 5 p.m., thereby creating an economic incentive to produce additional output later than 5 p.m."

So do you understand that the Company's

position is that the assumptions that it makes -- the reason it studies solar-only projects in the way it does is because of the assumptions it makes about the potential output of that project, and one of those assumptions is that the project would have a particular production profile; do you understand that's one of the assumptions?

A. I understand that the Company studies solar based off a load case, and in that load case they may make assumptions, but it's based off the load case, the generation -- the load case for the utility that the generator will supply to.

Q. Okay. And one of the other assumptions it makes is that the solar-only project will not be able to produce a maximum output outside the window of 9:00 to 5:00; do you understand that's one of the assumptions they make?

A. Yeah. We understand, based on Mr. Gajda's responses, yes.

Q. And are you aware that, as indicated in this data request, Duke has also indicated to NCCEBA that the addition of storage could invalidate the results of the stability study?

A. Yes, correct.

Q. In fact, Mr. Wallace, you noted that correction in your testimony?

A. I did.

Q. You did. So, in your testimony, you had said it does not impact the stability, and you have corrected that to say it does impact the stability?

A. Yeah. Let me elaborate on that a bit. When we initially looked at it, EcoPlexus, and we looked at the stability -- and I think Mr. Gajda correctly noted it in his testimony when he said it's looked at at solar noon, and a lot of circumstances you have rotating machinery that is online, industrial facilities, and you don't know if the hours of operation are the same at 6 a.m. as they may be noon, and rotating machinery, you know, places certain stability factors on the grid. Could be reactive support, things like that.

So I think, to that standpoint, we would say that not knowing those assumptions what are taken, it could change things. And then also, if you get a significant impact in the thermal/voltage, you would want to go back and check that instability study as well. So you would want to plug your results from that thermal/voltage in the stability.

Q. So you gathered information from Mr. Gajda that helped you understand the study better, and that corrected what you thought about the study process?

A. Yeah. And as I stated earlier, we have the opportunity -- we have a transmission planning engineer who worked for Florida Power and Light for 10 years, so we spent a lot of time over the last week discussing this and going through the different scenarios of how this may or may not happen correct.

Q. By the time you filed your testimony, you weren't aware of that -- of that very important aspect of the study process?

A. That's correct. We had not gone into that detail.

Q. Is it possible there are other aspects of the study process that you don't fully appreciate at this time?

A. I would say that is incorrect.

Q. Okay. Okay. So when I walked you through what was admittedly a painfully long hypothetical, I think we agreed that there was an equitable component to the material modification standard, in that we don't want projects that are in the queue to be disadvantaged by actions of projects that are not in the queue. So

let me ask you this question:

I understand it's -- I'm still a little hazy as to whether the Company is or is not permitted to do a study when the developer comes and seeks to add storage, but let's assume that they are permitted to do a study.

If that study changes the identified or assigned timing or scope of the upgrades, and if that change would impact another project that is currently in the queue, should that interconnection request have to go to the back of the line, in other words, be submitted as a new interconnection request?

A. (Luke O'Dea) Yes. If an interconnection impacted a project later in the queue, it would -- I would assume the Company would deem it as a material modification, and that project would then need to go in through a new interconnection request.

Q. Okay. And you understand it's the Company's view that it can't make that assessment until it does the study; do you understand that's the Company's position?

A. I just find that inconsistent with the discussions that were had in the stakeholder working groups with Duke engineers, with Dominion engineers,

with the stakeholder community. That language was not just formulated by industry and thrown in. That was the result of numerous meetings, and it -- we still believe that, under a certain set of circumstances, as we have laid out with DC-couple storage, with hours that line up with the system impact study, that there is not additional study that's required, that the output and the assumptions that go into the study are consistent.

Q. Okay. Mr. Wallace, I want to turn your attention to page 9 of your testimony. Let me know when you are there. I don't think you have -- again, no line numbers on your testimony, so.

A. (Michael Wallace) Go ahead.

Q. Okay. One of the points you make in your testimony is that, in your opinion, the addition -- if a study -- if additional study is needed, it's not a very lengthy study?

A. Correct.

Q. Meaning it's not going to take up a lot of time. In your opinion --

A. Correct.

Q. -- it's not going to take up a lot of time.

A. And to elaborate on that, if I may.

Q. Sure.

A. Again, having that same resource from Florida Power and Light who now works for EcoPlexus, we went through this exact scenario, and for us to go and our internal team to go through and run through this study analysis, it would take anywhere from six to maybe eight hours to run through that. Now, appreciating that Duke is a large corporation and there are multiple probably checks and balances that certainly should be there, that process may be a bit longer for those folks to sign off, and I think Mr. Gajda called out somewhere in the range of two to three weeks, and I would say, for a utility, that makes sense.

Q. Okay. So just note that we don't necessarily agree on the study time, but putting that aside, to your knowledge, has Duke ever assessed that the length of time needed to study a project is germane to the assessment of whether a change constitutes a material modification?

A. So say that one more time, whether the length of time?

Q. To your knowledge, has Duke ever asserted that the length of time needed to perform a particular study, whether it's 1 hour, or 10 hours, or 20 hours,

is a relevant factor in assessing whether or not a particular change constitutes a material modification?

A. I have not had those conversations with Duke or asked if time mattered, only to the fact that, in the standard, it's called out where a material modification that takes an additional amount of time would matter. So that goes to my testimony of why I think that time is not quite -- is shortened.

Q. I will see if I could pull it, but subject to check, is it your understanding that the material modification standard focuses on the timing of the upgrade, not the timing of the study?

A. Subject to check. I thought we had the conversation earlier, and maybe I'm misspeaking based off what you talked to Mr. Brucke about, but I thought you brought up that timing piece.

Q. Okay. So, again, stepping back, we talked in the beginning about one of the key parts of the system impact study is assessing power quality reliability issues, and that's what material modification is intended to identify, those changes that need to be studied for safety reasons and reliability, and the other reason for the material modification is to ensure appropriate and fair allocation of upgrade costs.

Those considerations are not impacted, are they, by if the study takes an hour, or 2 hours, or 10 hours; you still want to know, is it going to be reliable on the system, and are other customers going to be unfairly impacted by this change?

A. I'm not quite sure I understand. So you're saying that timing shouldn't affect whether or not the result is reliable; is that --

Q. That the amount of time to study -- that is required to do whatever additional study is needed is not the fundamental reason why something is or is not a material modification.

A. I would say that the purpose, now that I kind of understand where you are going, why timing is important is because, in talking about a fast track process where we could look at this -- and there certainly will be circumstances -- we believe anyway -- where you would look at storage on the DC-coupled side, and it will not have a modification on the thermal/voltage or the stability. So again, what we are saying is there should be a fast track process where you could quickly assess that and determine, do you go on to that next level study? And there certainly will be cases where it's needed. And I

think, you know, Mr. Brucke said it, I think Luke would agree, we are not stating that you should not do that. So I just want to be clear about, part of the reason for that is we want to make sure that folks understand, again, from having the benefit of having a transmission planner that used to work for a utility on what that process takes to be able to do that. Does that make sense?

Q. And just to be clear, that engineer is not here; this is your representation as to what he's told you, correct?

A. That's correct. I'm a professional engineer licensed in North Carolina and Florida. He is in Florida. So the work that he does is -- would be under my direction for the cites that we review in the southeast United States.

Q. Mr. O'Dea, I have a few questions on your testimony. I'm sorry, is it Mr. O'Dea or Mr. O'Dea? I'm sorry.

A. (Luke O'Dea) It's O'Dea. Thanks for asking.

Q. I apologize. I had that wrong. Would you turn to page 6 of your testimony? Again, there is no line numbers, but we will look at the first Q and A there. You testify in this Q and A that what Duke has

proposed in this proceeding is inconsistent with item 7 of the system impact agreement, and you go on to cite section 7 from the system impact study; do you see that?

A. I do.

Q. Okay. Can you explain exactly what in this section 7 is inconsistent with what Duke has proposed?

A. Well, I admit I'm not totally clear on why Duke has requested specific production profiles going forward. I don't think there has been a good justification or a specific study where the specific profiles for different generators, be that solar-only, be that solar plus storage, would be required. So this is really speaking to the general requirement to ask for a production profile from a generator, and I think this section of the system impact study kind of speaks to why that is not something that's typically required. The purpose of a generator or the way it's used can change over time. An interconnection is something that endures. So the interconnection should study the generator, as the system impact study states, shall model the impact of the generating facility, regardless of purpose, in order to avoid further expense and interruption of operation for reexamination of

feasibility and impacts if the interconnection customer later changes the purpose for which the generator facility is being installed. PBA contracts expire, there are new contracts, there are new marks. So, again, think restricting the flexibility of interconnection is not the intent of this part of the standard.

Q. Okay. So I think you just testified that the actual operation of a generating facility is likely to -- or certainly can change over the course of its useful life, correct?

A. I think that's possible.

Q. So given that when Duke sits down to study a generating facility, in accordance with your testimony, it does not know how it is actually going to be operated, would it be reasonable for a utility that's reliable -- that is responsible for ensuring the reliability of a system to assess the worst case scenario for how that generator might be operated in the future?

A. It's prudent for the utility to take a conservative approach and look at the maximum impact that a generating facility could have, yes.

Q. Okay. Would you agree -- this is a general

question to the panel.

Would you agree that it might be reasonable to implement a different -- that when it comes to system impact studies, it would be reasonable for a utility to implement different study methodologies depending on the type of generation?

A. I believe that different load cases may be used in the thermal/voltage stability studies based on a intermittent renewable resource. Like solar, when you can trim down the study assumptions to daylight-only hours, whereas for a conventional generator, or an energy storage facility that has an energy fuel source that's not time dependant, that all of the load scenarios should be considered.

Q. Okay.

A. (Michael Wallace) And if I may just add to that, I think, to follow up at the end of his point, all the load cases should be considered. That's an important piece. Meaning these are load cases that the utilities have already created, and in our work in the southeast, each utility is the same. They have a number of load cases.

So, for example, winter peak, which you've heard us talk a bit about, summer peak and minimum load

peak, which you have heard Mr. Gajda and his team talk about. There are also sometimes seasonal peaks that can happen in the spring and fall. Those are all studies. So when you get to a specific generator, you'd pull that off that load case from the shell and say, all right, I know, for this generator, these are my load cases and my profiles that I'm going to study for this generator. It's an important piece.

Q. And those load cases may very well -- I'm not conceding that's how Duke does it, but, in theory, Duke would potentially study different load cases depending on the nature of the generating facility?

A. So if they had a load case, for example, for -- or, excuse me, if they had a generator, let's just say gas, and they knew it was going to operate 24/7, I'm assuming -- and I don't know this, but I'm assuming there is a group of cases that represent that firm power for 24/7. So I'm assuming they would -- again, I use the term pull off the shell. That load case would go off the model. When these load cases are created, the generators are studied against these load cases, not the other way around. So these load cases are preconceived.

Q. And would you agree that a solar plus storage

facility has the potential to operate in time periods that are different than a solar-only facility? Again, just does it have the potential to do that?

A. (Luke O'Dea) An energy storage facility has a stored energy source, so it's able to discharge that at any time.

Q. And would you agree that solar plus storage resources have the potential to ramp on and off instantly, or relatively instantly?

A. Storage is capable of responding very quickly, and it can ramp very quickly. Ramp controls can also very easily be incorporated as part of the project.

Q. And given your testimony earlier that we don't know today how that facility would be operated in 10 or 15 years from now, would it not be reasonable for Duke to make some assumptions about how that resource could potentially be operated in the future?

A. So I think there is two pieces of this. One is, you mentioned ramp, and that would be the speed at which the resource comes on and off. I think it's worth mentioning that Duke does look at a solar-only resource as coming on and off at full output down to zero, and zero down to full -- up to full output. So

that case of operation actually has been considered. And then the second piece would be, you know, are there other load cases that may not have been considered in the original system impact study. And I do think that's correct. If you approve a storage resource, which does not have any restraints on its operation and can operate 24/7, then there is additional load cases that would be considered.

Q. And I'm certainly no technical expert in this, but I have been told by our engineers that the on/off scenarios that the utility assesses when it looks at a solar-only facility assumes a very limited number of on/off, because that's a relatively rare occurrence when it comes to solar-only facilities, but would you agree that that is -- a solar plus storage facility has the potential to deal on and off much more frequently than a solar-only facility?

A. (Michael Wallace) I am going to let Luke address this in a second, but just from my perspective of that, my opinion is, in terms of the potential for it to come on and off, I'm not sure I know the answer to that. So you have what is called a plant controller which you program these things to operate as you see fit, and most of the time those controls are put in

place per the utility, what the utility wants to see. So what I mean by that is, if the utility has a certain ramp rate or a number of times it wants it to come on and off, or a time that it's okay and not okay, it would let the generator know. So I actually see storage as less of a risk. With solar, you have got cloud coverage, you have different things that can happen that you have no control over. The advantage that we have with the battery storage is you very much have control. So, Luke, I don't know if you --

Q. But Mr. O'Dea's testimony is that, as we sit here today, we don't know how it's going to operate 15 years from now, so the conservative approach for the utility is to assess some of the worst case scenarios that could result from that generating facility; would you agree with that?

A. (Luke O'Dea) I mean, Mr. Gajda used the analogy of the little kid with the light switch, and it seems a little bit far-fetched to suggest that a generator facility would be doing with the same thing with it's entire output and flipping the output from full capacity to no capacity very rapidly and frequently. It's conceivable that that's possible, and, admittedly, that's not something that I think was

discussed during the working group discussions on this topic, and it's not something that was put into the Working Group 2 language, any restriction around ramp rate or frequency of turning on and off, but I think that's something that could very easily be added to that section, if that's a concern that the project would be excessively cycled.

Q. Okay. Just have a few more questions on storage, then we will move on to other subjects. I want to -- there has been a lot of discussion of daylight hours, and Duke makes some assumptions about operation facility during daylight hours.

Mr. O'Dea, want to turn your attention to your testimony on page 5 towards the bottom of the page. Again, no line numbers here. You state there you believe that 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 be extended to include all peak load hours.

Can you clarify there what you are specifically -- when you say "peak load hours," which hours are you referring to?

A. We know the system has both summer and winter peak load patterns. I think this speaks to the expedited review process that we have suggested for energy storage projects that would want to operate outside of those daylight hours. And our proposal here is that, by looking at the historical load patterns, that any loads that fall between that peak load and the minimum daylight load that were considered in the system impact study would be encompassed in the allowable kind of operating envelope for the storage unit, and that hours that were below that, that were below the daylight minimum load, were in peak -- where an absolutely minimum load would be excluded from operation without further studies. So I think this kind of falls into our suggestions for an expedited study to allow that storage unit some additional operational flexibility.

Q. But if -- and I'm not quite clear how this would be indicated, but if the developer wants to operate outside 9:00 to 5:00, your view is that would definitively require restudy?

A. I think the exhibit is a little bit in question here, but we had put forward some language for an expedited study that could take place under the

supplemental review would not involve additional load cases or additional study, simply a review of what hours, what grid conditions fall under the original impact study. So a screening of the loading conditions at which the original studies are applicable. So we put forth the proposal on how that could be done and believe that fits better as an expedited study, rather than as a full system impact study and something that would require you to go through the interconnection process from the back of the queue.

Q. Again, we haven't had a chance to fully review your proposal, but -- so maybe if you could still just answer the question. So, again, as we discussed, Duke studies the project during the daylight hours 9:00 to 5:00.

If a project wants to operate outside of that window, can Duke do a system impact study to assess the impact of that project operating outside of the 9:00 to 5:00 window?

A. (No response.)

Q. Or even a single load case outside of the 9:00 to 5:00 window?

A. I believe that, with a limited number of additional load cases, the system could be allowed to

operate unconstrained 24/7. I believe that expedited review could allow -- could verify that the existing system impact study, the existing load cases, cover additional hours that go beyond 5 p.m. We know 6 p.m., 7 p.m., 8 p.m. in the summer, there is still a lot of peak load on the system and that the existing study is valid at those hours. So using historical load data, I'm thinking there is a fairly easy screen under a supplemental review that could be completed to allow some of those peak periods to be within in the allowable operating envelope.

Q. Okay. We will leave that one alone for now. I just want to revisit this one more time. Again, if an existing solar facility wants -- that's currently in operation with a PPA with Duke Energy wants to add storage to the project, I think it's your testimony that they need to notify Duke, and I think it's your testimony they need to approve it, but your concern here is you don't want them to do the full restudy of the system impact study for that project; that's the ask here.

A. The Working Group 2 language for the interconnection standard would indicate that there is certainly limited cases where additional study should

not be required and that change should be able to be approved without a material modification, yes.

Q. And that's --

CHAIRMAN FINLEY: Is that what this exhibit is supposed to show, that we fussed about earlier?

THE WITNESS: No. That is beyond the -- so the Working Group 2 language in the markup of the standard gives you the daylight hours, and this very limited case when there is no additional study or screening required. The exhibit here would allow a screen to look at, okay, what hours, besides 9:00 to 5:00, is that original study applicable? Could you go to 6, 7, 8 p.m. in the summer? Then the third tier would be, you want to operate 24/7 unconstrained, I think the position is that that does require probably a new interconnection request and filing and a new queue position for study.

BY MR. JIRAK:

Q. All right. So there are, again, several hundred operating solar facilities in the system right now. Some of them are -- most of them are 5 megawatt projects. There are some larger. So let's say there

is a 50 megawatt project in the system right now. If that project approaches Duke and says I want to add -- it's an extreme example, I understand -- a 50 megawatt battery to this project, and I'm going to operate it only during 9:00 to 5:00, and it's going to be DC-coupled, your testimony is that Duke should not be permitted to restudy that to assess the impact of a 50 megawatt battery on the system?

A. (Michael Wallace) And this is directed to Luke, but I will just say I think that part of what -- from our standpoint is it would not need to be, and that, I think, is the point, but I will let Luke finish on that.

A. (Luke O'Dea) Yeah. I think our position would be that the original impact study would have essentially covered operation up to those periods.

Q. And you understand, with hundreds of generating facilities on the system right now, that, again, sometimes Duke thinks in extreme situations, but we are obligated to think about whether the policies we implement here are scaleable. So as we think about hundreds of megawatts of systems on a solar project in the system, we are now at 2,000 plus megawatts. Under your proposal, and extreme example, every single one of

those projects could add solar storage that it intends to operate only 9:00 to 5:00, DC-coupled, and we could add 2,000 megawatts of storage resources added to the grid with no study on the part of the Company?

A. I think we are kind of venturing into the -- there has been a lot of mention of PPA and the operation of these systems, whereas the interconnection is simply the physical interconnection, the load cases that are reviewed, kind of indicating how would they be operated, would they be operated under the existing PPAs. And I think that's a little bit outside of the interconnection docket, and I just don't want the interconnection of these systems to be withheld on the grounds that there are PPA implications.

A. (Michael Wallace) And also, these cases have been studied at full output already, is what we are saying. So during the 9:00 to 5:00 hour you study summer peak at full output.

Q. Right. And I agree with Mr. O'Dea that we are here to talk about interconnection practices, and interconnection practices center around reliability, power quality on the grid, and we are not asking questions about the PPA here, but as Duke thinks about the reliability and the power quality of its system,

your proposal -- under your proposal, up to 2,000 megawatts of storage could be added to the system. So long as it's only being operated between 9:00 to 5:00, it's DC-coupled, and Duke would not have a right to do any sort of study to assess whether that's actually a good thing for the grid from a reliability, power quality perspective?

A. As Luke's thinking, I think -- again, I will say, I think you have already studied it. So you have already studied it under that peak load with those generators connected.

CHAIRMAN FINLEY: One little piece of advice. We are going to finish this case today.

MR. JIRAK: Yes, sir. I understand, Mr. Chairman.

THE WITNESS: And just one quick other note, as we were just briefly chatting, fixed-tilt versus trackers, in many cases in North Carolina it started out as fixed-tilt, and now trackers have become very financeable. And, in fact, I think almost every solar company including -- and I don't want to speak for Duke, but I would assume that they are also looking at trackers, and there may be cases where they put fixed-tilt in the ground, and

they will go back. That may change that production profile between that 9:00 to 5:00. So I think it's important to note that, again -- and that's okay, because it's already been studied. That load case has already been studied.

BY MR. JIRAK:

Q. Okay. With the admonition of the Chairman, I am going to move along very quickly. Just a few brief other topics, and be as brief as possible. Just a couple quick questions regarding interconnection facilities and the payment arrangements that have been put in place for those.

Mr. Norqual, I know you had some testimony on these issues. You state, on page 6 of your rebuttal testimony, interconnection customers should not have to provide cash or cash-collateralized letter of credit when Duke does not yet need the funds to begin construction of the interconnection facility; do you see that?

A. (Christopher Norqual) On page 6?

Q. Yes, sir.

A. And where on the page?

Q. I'm sorry.

A. I apologize.

Q. No line numbers on here. Let me know if you find it.

A. In which paragraph?

Q. Give me a second. To be clear, it's rebuttal testimony, I believe.

A. Right. I got it.

Q. Okay. Do you understand that, when an IA agreement is signed, there are a lot of activities that occur prior to construction of interconnection facilities on the part of Duke?

A. Yes. I think I testified to that as well.

Q. Okay. So Duke begins to incur cost for the engineering of the interconnection facilities well before construction?

A. That's correct.

Q. And Duke incurs substantial procurement costs well before construction commences?

A. I'm sorry, one more time, please.

Q. Duke begins to incur procurement costs, costs of procuring long lead time items well before the actual construction process starts.

A. Correct.

Q. Okay. And so your proposal that payment become due at the time construction starts could

potentially leave Duke in a position where it's expended money for which it has not been -- has not received payment, correct?

A. Correct. I think it's the intent to always ensure that the utility is whole.

Q. Okay.

A. Is made whole.

Q. Okay. And do you understand that one of the rationales for the prepayment of interconnection facilities is to ensure that interconnection customer's fully and financially committed to the project when Duke commits construction resources and engineering resources to begin that process?

A. Yes. I understand that that could be an intent, but I think, as I testified, when it comes to interconnection facilities, themselves, I'm not sure -- I would argue that the commitment absolutely must be there by the -- on behalf of the customer for system upgrades, because other projects in queue depend on those, but if interconnection facilities are unique to an interconnection customer's connection and do not affect others, then I believe the main goal of a payment in advance of work should be to make sure that the utility is whole for their construction and

engineering.

Q. Understood. But would you also agree that a project choosing to withdraw after it signed an IA could have an impact on later queued projects that were depending on that project going forward?

A. Well, again, I think I testified previously today that I did not believe that there could be significant impacts to -- by not constructing -- by not constructing interconnection facilities for a project.

Q. But if later-queued projects were assessed or not assessed conversely upgrades because that project was assumed to go forward, it could alter the system impacts that results for later projects if that project decides to cancel and walk away?

A. Well, it could, but there is nothing to stop a customer from canceling. So if the intent is to have a financial carrot to keep the project -- to bring the project to fruition and have it producing on the grid, and that is, you know, modeled into the power flow and affects other projects and system impact studies, I mean, it's just -- I guess it's a financial carrot, but projects that are unable to get zoning, it's very binary. They would have to withdraw anyway.

MR. JIRAK: Mr. Chairman, in the

interest of time, I will stop there.

CHAIRMAN FINLEY: Redirect?

REDIRECT EXAMINATION BY MS. KEMERAIT:

Q. Mr. Norqual, just very briefly, when you were on the last series of questions talking about upgrades, can you differentiate with your question -- with your answer about interconnection facilities versus upgrades and the impact to customers, because I'm concerned that there might be some confusion about impact to later queued interconnection customers due to upgrades, and what we are talking about today is interconnection facilities?

A. (Christopher Norqual) Sure. I will try my best, and then can I give the panel a chance to talk if I miss something, but system upgrades are -- system upgrades are determined to be required because of a project that is a coming up impact study. Those upgrades would mean upgrading the transmission system, so reconductoring or installing new electrical facilities that would improve the grid, itself. And since all interconnection customers connect to the same grid, the assumption that a prior queued project is going to do those upgrades is necessary.

When we are talking about interconnection

facilities, those are -- again, as I described earlier today, the facilities where an interconnection customer is tapping off of the existing infrastructure, and those are -- those facilities are usually located on -- on or very near the interconnection customer's own property, and so it would be very much like a homeowner trying to get new service into a service territory.

Q. And, finally, Mr. Norqual, what we are suggesting is that -- we are not suggesting that the interconnection customers should not have to provide financial security in the form of a security -- a surety bond or prepayment before Duke begins spending money on interconnection facilities; is that correct?

A. Yup, that's correct.

MS. KEMERAIT: Thank you. That's all the questions I have.

CHAIRMAN FINLEY: Questions by the Commission? Commissioner Mitchell.

EXAMINATION BY COMMISSIONER MITCHELL:

Q. Mr. Norqual, question for you. On page 7 of your rebuttal testimony, that second Q and A, you discuss the requirement that the prepayment for interconnection facilities is not refundable, and you cite a provision of the interconnection agreement; do

you see that?

A. (Christopher Norqual) Yes.

Q. I'm looking at -- just for ease of reference, I pulled John Gajda's Rebuttal Exhibit 1. So that's the red lined interconnection procedures which includes the agreement, and I'm looking at 6.1.1, and the language doesn't appear to be consistent with what is in your testimony, and it appears to me that there is this Duke-sponsored change that would allow -- that would require that payment for upgrades not be refundable, but I would read that to mean that payments for interconnection facilities would be refundable.

Am I missing -- explain to me if I'm missing something here.

A. I think that's exactly what we are hoping to clarify. The existing language suggests that the utility could keep that -- any funds paid for the interconnection facilities that weren't realized, and we are seeking to clarify and have a language that states that it would be refunded -- any unspent funds would be refunded if the project went zero.

Q. Okay. Thank you. Mr. O'Dea or Mr. Wallace, either one of you-all or both of you-all could answer this next question.

If an existing generating facility sought to add energy storage to that facility -- and there has been a lot of back and forth about whether it's a material modification and whether advanced approval would be required from the utility. Let's just say you did submit some sort of determination of material modification request to Duke -- one of the Duke utilities for that proposal.

What is your expectation with respect to the time it would take Duke to process that and exactly how Duke would process it?

A. (Luke O'Dea) Well, there are -- I think I mentioned that there are modification requests that we file all the time. It's almost every project gets some type of modification request. I don't have the standard in front of me. I believe there is a time period in the standard that might be 10 business days upon which the utility needs to respond to that and let you know whether it's a material modification or not. So without other changes, I think it would follow the same general rules that other modification requests would follow.

COMMISSIONER MITCHELL: Okay. All right. Thank you. Nothing further.

EXAMINATION BY CHAIRMAN FINLEY:

Q. On this issue of material modification, when storage is added to a solar facility, we have had a lot of information about that from various sides.

You folks learn anything more about Duke's position since you have been here that would help you-all to sit down and try to work towards some sort of a compromise in this issue, or are we still at --

A. (Luke O'Dea) We would be happy to have further discussions, you know, to reconvene the stakeholder Working Group 2 or to, kind of, directly sit down with Duke's engineers. I would, kind of, again say that I think the working group proposed pretty reasonable language and that an absolute prohibition of adding energy storage to solar facilities without going to the back of the queue is the only position we have seen from Duke. So if there is other positions, we would love to hear them.

Q. Right now Duke doesn't have on its system a solar facility with storage attached to it, right?

A. I think, with the exception of its Mount Holly facility, and there are some within co-op territories in the greater grid.

Q. I just wonder if, once this becomes a real

issue, you actually got a request to add storage to solar and maybe have some experience with this, then will that give us more experience so that we know more how to deal with this, or are we -- aren't we, sort of, hypothetically talking about it right now and will only know more about it once you actually start interconnecting those type of facilities?

A. Well, we have had multiple projects with solar plus storage that have proceeded through the system impact study, and there haven't been any gotchas or, you know, stipulations in the study reports for those projects that look any different than a solar project.

A. (Michael Wallace) Yeah. I was just going to add in we particularly have a project in South Carolina where we are at the IA stage right now with storage, and we initially didn't have it, and we filled out a modification form, and it was included later on, after the IA. So we went through that process with that utility and worked through it. So I think -- to Luke's point, I think we feel like we are there already.

Q. Okay. Well, I've been hearing about storage for a long time, and there are two trains of thought

that I hear on the extremes. One is we are right on the cusp, and we are going to have a whole lot of storage, and it's going to solve all the problems. We are just right there on the edge. And the other one is we have been hearing that for a number of years. And as of yet, it hasn't materialized to the extent we are on a revolution with respect to storage.

What is your view about that issue?

A. (Christopher Norqual) So absolutely understand that position, and we have been hearing about storage for quite a while. Certainly, Cypress Creek Renewables has a dedicated battery team of six folks and growing, so we are very dedicated. I just wanted to point out that we have requested from at least one operational project connected to Duke to be able to add storage, and we requested that because we were ready to proceed, and because of it now, we weren't able to.

A. (Michael Wallace) Just from EcoPlexus, and in term of storage, I represent the southeast, so probably somewhere around 4,000 giga -- or 4,000 megawatts that -- 4 gigawatts that are under my, kind of, control, and probably half of those have storage and were added a year ago. So -- and I think there are

probably somewhere between six and nine relevant storage companies. We've talked to all of them. I know Cypress Creek has. We have running dialogue. I know Duke does as well, because oftentimes they'll say we have meetings with utilities. So I think, in terms of storage and the outlook on it, I think folks got to the point where they've got it figured out, it's financeable. They have been able to get the operations correct. And one part that you heard in some of the testimony today, it's about a concern throughout Duke, was how do we control that? How do we make sure that doesn't get onto the grid? It's very easily done. And they have plant controllers that control the plants now, as well as there is a battery management system that controls that. So those concerns are really alleviated. They have already been proven, you know, to work.

CHAIRMAN FINLEY: That's all I have.

Thank you. Commission has other questions.

EXAMINATION BY COMMISSIONER MITCHELL:

Q. I'm sorry, I have just one more. Mr. O'Dea, you've discussed, during your testimony, the Working Group 2 proposal and -- that was put forward, and I don't -- the only thing I see in the testimony that

refers to Working Group 2 language occurs in your testimony on pages 6 and 7.

Is there anything else in the record that would help us understand what Working Group 2 --

A. (Luke O'Dea) I believe the advanced energy filings from the stakeholder and working group process were aware of those comments and that language were aggregated. So I think this was in the advanced energy markup of the standard. I'm not personally familiar with how that fits into this proceeding, but that's where the Working Group 2 language fits in.

Q. Okay.

CHAIRMAN FINLEY: Questions on the Commission's questions?

MR. DODGE: Commissioner Mitchell, I will just note, for clarification on that, the advanced energy red line revisions were attached to the Public Staff letter that was filed on February 15, 2017, in this docket. So it includes some of those red lines from the various groups.

CHAIRMAN FINLEY: Anyone else? All right, gentlemen. Thank you very much. We will receive into evidence the one Duke cross examination exhibit without objection.

(NCCEBA Panel Cross Examination Exhibit Number Plaintiff's was received into evidence.)

CHAIRMAN FINLEY: You may be excused. Public Staff?

MR. DODGE: Thank you, Chairman Finley. The Public Staff calls Jay Lucas and Tommy Williamson to testify as a panel.

Whereupon,

JAY LUCAS AND TOMMY WILLIAMSON,

having first been duly sworn, were examined and testified as follows:

DIRECT EXAMINATION BY MR. DODGE AND MS. CUMMINGS:

BY MR. DODGE:

Q. Thank you. I will start with Mr. Lucas. Mr. Lucas, could you please state your name and address for the record?

A. My name is Jay Lucas. My address is 430 North Salisbury Street in Raleigh.

Q. By whom are you employed and in what capacity?

A. I'm a utilities engineer with the Public Staff's electric division.

Q. Did you cause to be prefiled on

November 9, 2018, in this docket, direct testimony consisting of 50 pages and an appendix as well as three exhibits?

A. Yes.

Q. Do you have any changes or corrections to your direct testimony at this time?

A. No.

Q. If I asked you the same questions today, would your answers be the same?

A. Yes.

Q. Did you also cause to be filed in this docket on January 8, 2019, rebuttal testimony consisting of 13 pages and an appendix as well as one exhibit?

A. Yes.

Q. Do you have any changes or corrections to your rebuttal testimony at this time?

A. No.

Q. If I asked you the same questions today, would your answers be the same?

A. Yes.

Q. Thank you.

MR. DODGE: Chairman Finley, at this time I move that Mr. Lucas' prefiled direct and rebuttal testimony be entered into the record as if

given orally from the stand and his exhibits be premarked as filed.

CHAIRMAN FINLEY: Mr. Lucas' prefiled direct testimony consisting of 50 pages of November 18, 2018, and his one direct appendix be copied into the record as though given orally from the stand, and his three direct exhibits are marked for identification as premarked in the filing. His 13 rebuttal pages of testimony of January 8, 2019, and his one appendix -- rebuttal appendix are copied into the record as if given orally from the stand, and his one rebuttal exhibit is marked for identification as premarked in the file.

MR. DODGE: Thank you.

(Lucas Exhibit Number 1 and Lucas Rebuttal Exhibit Number 1 were marked for identification as premarked in the file.)

(Whereupon, the prefiled direct and rebuttal testimony of Jay Lucas was copied into the record as if given orally from the stand.)

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

DOCKET NO. E-100, SUB 101

In the Matter of Petition for Approval of Generator Interconnection Standard	))))))	TESTIMONY OF JAY LUCAS PUBLIC STAFF – NORTH CAROLINA UTILITIES COMMISSION

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

Testimony of Jay Lucas
On Behalf of the Public Staff
North Carolina Utilities Commission

November 19, 2018

Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS, AND PRESENT POSITION.

A. My name is Jay Lucas. My business address is 430 North Salisbury Street, Dobbs Building, Raleigh, North Carolina. I am an engineer with the Electric Division of the Public Staff – North Carolina Utilities Commission.

Q. BRIEFLY STATE YOUR QUALIFICATIONS AND DUTIES.

A. My qualifications and duties are included in Appendix A.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony is to present to the Commission the Public Staff's position on proposed revisions to the North Carolina Interconnection Procedures (NCIP) to be used by Duke Energy Carolinas, LLC (DEC), Duke Energy Progress, LLC (DEP), and Virginia Electric and Power Company d/b/a Dominion Energy North Carolina (DENC), collectively "the Utilities". My testimony will

specifically present the Public Staff's position on the following topics for the Commission's consideration in approval of the revisions to the NCIP:

- Role of the Public Staff
- Desired outcome of this proceeding
- Barriers to success
- Recent legislation affecting interconnection
- Recent history of Docket No. E-100, Sub 101
- Communication and transparency
- Hosting capacity maps
- Queue order and new grouping studies
- Timeline requirements
- Dispute process
- Staffing levels
- Interconnection Fees
- Financial commitment instruments
- Animal waste facilities

Q. WHAT OTHER ENTITIES HAVE PARTICIPATED IN THIS PROCEEDING IN A SIGNIFICANT ROLE?

A. In addition to the Utilities, three other entities have intervened on behalf of the distributed generator (DG) developers and taken a significant role in this proceeding: the Interstate Renewable Energy Council (IREC), the North Carolina Sustainable Energy Association (NCSEA), and the North Carolina Clean Energy Business Alliance (NCCEBA).

Q. WHAT IS THE ROLE OF THE PUBLIC STAFF IN THIS DOCKET?

A. The Public Staff has played a significant role in this docket since its inception, including comments on the proposed model interconnection standard and interconnection agreement for North Carolina which was revised and approved by the Commission on July 6, 2005.

As required by N.C. Gen. Stat § 62-133.8(i)(4), enacted in S.L. 2007-397 (Senate Bill 3) in 2007, the Commission revisited interconnection in 2008.[1] The Public Staff was again involved in developing the interconnection procedures in the Commission's *Order Approving Revised Interconnection Standard* issued on June 9, 2008 (2008

[1] N.C. Gen. Stat. § 62-133.8(i)(4) directed the Commission to adopt rules to "[e]stablish standards for interconnection of renewable energy facilities and other nonutility-owned generation with a generation capacity of 10 megawatts or less to an electric public utility's distribution system; provided, however, that the Commission shall adopt, if appropriate, federal interconnection standards."

NCIP Order). In addition, the Public Staff was actively involved in the proceedings that resulted in the existing NCIP promulgated on May 15, 2015 (2015 NCIP). Since that date, the Public Staff has been heavily involved in stakeholder meetings among the various parties and has thoroughly reviewed the initial comments and reply comments filed by the various parties pursuant to the Commission's *Order Requesting Comments* issued on December 20, 2017. Unlike most other parties to this proceeding, the Public Staff does not have a direct financial stake in the outcome of the interconnection process, and, therefore, believes its testimony will help the Commission develop a fair and more efficient interconnection process.

However, the Public Staff cannot act as a completely independent evaluator of all issues in this case. As stated in N.C. Gen. Stat. § 62-15(b), the purpose of the Public Staff is "to represent the using and consuming public" versus the general public. Therefore, all recommendations of the Public Staff in this proceeding reflect its efforts to protect the using and consuming public from absorbing unreasonable risks, costs, and service degradation. To the extent they are quantifiable, the Public Staff must also determine the benefits to the using and consuming public.

Q. WHY DO YOU DRAW A DISTINCTION BETWEEN THE USING AND CONSUMING PUBLIC AND THE GENERAL PUBLIC?

A. At first glance, these terms may appear to be euphemisms, but there is a clear distinction in this context. The government of the State of North Carolina provides to the "general public" access to safety, justice, transportation, education, a clean environment, and many other aspects of a modern society. The "using and consuming public" as it pertains to regulated utility matters is a much narrower category than "general public." It is protected by Chapter 62 of the General Statutes only with regard to utility service. It is the Public Staff's mission and statutory obligation to advocate before the Commission for the using and consuming public to have reliable utility service at reasonable prices within the framework of state and federal law.

The developers of DG are not the using and consuming public because they are primarily not a consumer of utility service, at least not in the same way as other consumers represented by the Public Staff. The primary purpose of DG is to provide electricity to the utility for resale, not purchase electricity from the utility for end use consumption. As such, the interests of the DG developers are not always in alignment with those of the using and consuming public.

Q. WHAT DO YOU BELIEVE IS THE DESIRED OUTCOME OF THIS PROCEEDING?

A. From the standpoint of the Public Staff, the desired outcome of this proceeding is to have a process in place that allows DG to interconnect to the grid in a safe, efficient, and timely manner that is fair to all parties and benefits, or at least does no harm to, the using and consuming public.

No party in this case denies that the Utilities' interconnection queues are congested. Relieving this congestion in an efficient and timely manner, while protecting the safety and reliability of the grid, has been and continues to be challenging. However, an improved interconnection process as a result of this proceeding will be a step in the right direction.

Q. DO YOU BELIEVE THAT ANY BARRIERS TO SUCCESS EXIST?

A. Yes. As required by 18 C.F.R. § 292.303(c), "any electric utility shall make such interconnection with any qualifying facility as may be necessary to accomplish purchases or sales under this subpart". As IREC has stated, the Public Utility Regulatory Policies Act ("PURPA") requires that utilities provide a fair and non-discriminatory interconnection process.

One overarching issue that no party has mentioned thus far in this proceeding is that the DG interconnection process provides no direct financial incentive for the Utilities.

As described in their initial and reply comments in this proceeding, the Utilities have significantly increased their staffing and been required to develop administrative, technical, and information technology processes to enable third party renewable energy facilities to interconnect. The Utilities have also had to hire significant new staff to construct and manage interconnection facilities and upgrades. While they pass these costs on to the developers and customers, they do not profit from any of it. The interconnection process for them results simply in "churn." The Utilities must act in good faith to interconnect but are incentivized not to. As a result, PURPA allows renewable energy projects to compete directly with the primary portion of the Utilities' business that does make money – building rate base.

RECENT HISTORY OF DOCKET NO. E-100, SUB 101

Q. PLEASE DESCRIBE THE HISTORY OF THE 2015 NCIP.

A. On May 15, 2015, the Commission issued an *Order Approving Revised Interconnection Standard* (May 2015 Order). In that order, the Commission resolved several items in dispute and applied the revised NCIP to all interconnection requests then pending or

submitted after the date of the order. The Commission also ordered the Public Staff to convene a working group of interested parties within two years to determine whether revisions to the NCIP were warranted or whether it should remain unchanged, and to deliver a report on such recommendations within four months from the first meeting of the working group. In addition, on May 18, 2015, the Commission issued an *Order Approving Interconnection Agreement*, which provided a standard agreement to be used for all Interconnection Customers following the study process.

Q. PLEASE DESCRIBE THE ACTIONS THAT OCCURRED BETWEEN APPROVAL OF THE 2015 NCIP AND THE BEGINNING OF THE STAKEHOLDER PROCESS IN 2017.

A. On May 18, 2016, the Commission issued an *Order Requesting* Comments in response to the North Carolina Pork Council's and North Carolina Poultry Federation's joint Petition for Relief filed on May 17, 2016 (Petition), which requested exemptions from interdependency provisions of the NCIP for swine and poultry waste to energy facilities until the requirements of N.C. Gen. Stat. § 62-133.8(e) and (f) have been met. Initial and reply comments were filed by numerous parties generally supporting the Petition. On August 16, 2016, the Commission issued an *Order on Petition for Relief*, in which it granted the Petition and ordered the Public Staff and other stakeholders to begin stakeholder meetings to address

future interconnection requests filed by the owners of animal waste resource projects.

On August 29, 2016, DEC and DEP (collectively, "Duke Energy") filed a Settlement Agreement with several solar developers resolving several formal disputes raised in response to Duke Energy's implementation of an additional impact study called "circuit stiffness review" or "CSR" criteria. The Settlement Agreement also committed the parties to Solar 2.0 Policy Discussions and Technical Discussions (Solar 2.0) to jointly explore alternative technical options for addressing any system reliability and power quality issues.

In its November 1, 2016 *Order Regarding Duke Settlement Agreement with Generation Interconnection Customers* (Settlement Order), the Commission established that in the future, similar language or details as the CSR shall not be presented as revisions to the NCIP, but rather as additional terms and conditions, and that all changes to the NCIP shall be presented to the Commission for review and approval. The Settlement Order allowed Duke Energy to add additional technical screens to its interconnection process without re-opening the NCIP revision process, but also prohibited any major revisions to the NCIP without Commission approval.

Q. HAS THERE BEEN RECENT LEGISLATION THAT HAS AFFECTED INTERCONNECTION?

A. Yes. On July 27, 2017, Governor Roy Cooper signed into law Session Law 2017-192, commonly known as HB 589. This law clarified and expanded the renewable energy options available in North Carolina to include solar rebates, solar leasing, community solar, contract renewable energy for large customers, and the Competitive Procurement of Renewable Energy (CPRE) program.[2] The renewable energy facilities that are procured and built as a result of HB 589 must interconnect pursuant to the NCIP.

Q. PLEASE DESCRIBE THE STAKEHOLDER PROCESS IN 2017.

A. On May 9, 2017, the Public Staff convened an initial planning meeting for the stakeholder process as required by the May 2015 Order. This initial planning meeting was followed by larger stakeholder meetings on the following dates: June 1, 2017; July 14, 2017; August 8, 2017; and September 6, 2017. In addition to these larger group meetings, a number of smaller working group discussions were held to review various topics related to the interconnection process. Advanced Energy was retained to assist with facilitation of the stakeholder process and with documentation of the recommendations for revisions.

[2] As discussed later in my testimony, HB 589 also required expedited review of interconnection requests submitted by the owners of animal waste facilities.

On December 15, 2017, the Public Staff filed the Working Group Recommendations, which included a redlined NCIP. The Public Staff recognized that despite the stakeholder process being inclusive and informative to parties, the evolving nature of interconnection standards made it difficult to reach a resolution on many of the issues that were discussed. In addition to the recommendations, the Public Staff suggested that a more regular, structured process for consideration of interconnection topics, such as a technical working group, would be potentially beneficial. The Public Staff specifically noted that the increases in fees proposed by the Utilities were not reflective of a shared position, and the parties were unable reach agreement regarding fees despite them being identified early on in the process as a topic for discussion.

Q. PLEASE DESCRIBE WHAT HAS TRANSPIRED IN THIS PROCEEDING SINCE THE PUBLIC STAFF FILED THE WORKING GROUP RECOMMENDATIONS.

A. On December 20, 2017, the Commission issued an *Order Requesting Comments* on the Working Group Recommendations. On January 29, 2018, IREC, NCSEA, the Utilities, and the North Carolina Pork Council filed initial comments.

On February 7, 2018, Duke Energy sent an invitation to developers, the Public Staff, and other stakeholders informing them of their intent

to hold an inaugural Technical Standards Review Group (TSRG) meeting on April 11, 2018, pursuant to the Solar 2.0 commitment made in the Settlement Agreement. Duke Energy held additional meetings on July 19, October 23, and October 24, 2018 for mutual learning and understanding between Duke Energy's staff, industry developers, and other stakeholders. During these meetings, Duke Energy advised attendees that the TSRG meetings were intended as a discussion and learning forum, and not a decision making venue. Duke Energy restated that it is solely accountable and responsible for maintaining adequate customer reliability and power quality. Therefore, Duke Energy has final decision authority over technical standards applied to interconnection of distributed energy resources (DER). TSRG is discussed more fully in the testimony of Public Staff witness Williamson.

On March 12, 2018, IREC, NCSEA, NCCEBA, and the Utilities filed reply comments to the January 29, 2018 filed comments. The Utilities' comments included a redlined NCIP, which reflected their proposed changes, and discussed differences with the Working Group Recommendations. In addition, Duke Energy filed additional reply comments, in which it requested approval of modifications to several sections of the NCIP concerning an optional grouping study process associated with the new CPRE Program. A grouping study (or cluster study) is an interconnection study in which two or more

projects in close proximity are reviewed collectively rather than individually. A grouping study has the potential for these projects to be studied more quickly and to be interconnected with lower total costs than if they had been studied separately.

In their additional reply comments, Duke Energy requested modifications to Section 4.3.9 of the NCIP to require Interconnection Customers that execute a Facilities Study Agreement to commit to funding the interconnection and upgrade costs estimated in the System Impact Study. This modification would advance the interconnection customer's commitment to move forward with network upgrades prior to the commencement of the more detailed Facilities Study, thus significantly accelerating the current payment schedule. On July 30, 2018, Duke Energy petitioned the Commission for expedited approval of the CPRE modifications due to the imminent deadline of the first solicitation, or Tranche 1, of the CPRE Program.

On August 10, 2018, the Commission issued an *Order Scheduling Hearing, Requesting Comments, and Extending Tranche 1 CPRE Solicitation Response Deadline*. This order scheduled oral arguments for the CPRE modifications, set an evidentiary hearing to review the broader NCIP Recommendations, requested comments and testimony from all parties, and delayed the Tranche 1 deadline until after the oral arguments.

On August 24, 2018, the Public Staff, NCCEBA, DENC, IREC, and Duke Energy filed initial comments. On September 19, 2018, First Solar, NCSEA, Duke Energy, IREC, NCCEBA, and the Public Staff filed reply comments. The North Carolina Pork Council filed its reply comments on September 20, 2018. Parties were generally supportive of the CPRE grouping study process and related changes proposed by Duke Energy. Some concerns were raised, however. IREC raised specific concerns about how the process might affect customers who chose not to participate, and other parties raised concerns regarding the accelerated financial security requirements. The Public Staff raised concerns about so-called "phantom upgrades" that might result if non-participating projects are included in the study baseline but later withdraw from the interconnection queue. The cost of these upgrades could be suddenly passed on to the next project in the queue, affecting its bid price.

On September 24, 2018, the parties presented their oral arguments before the Commission, and in the days that followed the parties responded to additional questions asked by the Commission.

On October 5, 2018, the Commission issued an *Order Approving Interim Modifications to NC Procedures for Tranche 1 of CPRE RFP*. The Commission adopted the proposed changes, as modified by the Public Staff in its reply comments. These changes allowed Duke

Energy to create a single Competitive Resource Solicitation queue position which would be a grouping study for all projects bidding into the CPRE. The Commission also put the parties on notice of its interest in possibly revising the CPRE rules and Duke Energy's CPRE plan prior to Tranche 2 to change the way CPRE related costs are recovered and how network upgrade costs are allocated to market participants. The Commission requested comments on or before November 5, 2018, regarding changes of this nature.

COMMUNICATION AND TRANSPARENCY

Q. PLEASE DESCRIBE YOUR KNOWLEDGE OF THE COMMUNICATION PROCESS BETWEEN THE UTILITIES AND THE DG DEVELOPERS.

A. On the front end of the Interconnection Request Process, Duke Energy's interconnection staff has been generally available to answer questions by telephone and e-mail. Customers have been able to take advantage of the Pre-Request process described in Section 1.2 of the NCIP and the Pre-Application Report Process in Section 1.3 added in 2015 to the NCIP. These processes are designed to provide preliminary information to prospective interconnection customers about a proposed project at a specific site based on current, readily available data.

Duke Energy has maintained a software platform, PowerClerk that allows developers of small DG systems (20 kW or less) to submit interconnection requests and track them electronically. Duke Energy is phasing out PowerClerk and is in the process of implementing Salesforce. In response to a Public Staff data request, Duke Energy provided the following:

> Duke Energy is developing its system of record, Salesforce, to eventually house all interconnection-related data in all regulated jurisdictions. An important feature of the Salesforce system is an online portal that will enable interconnection customers to log in to their specific projects, enter all interconnection-related application data, allow for electronic signatures and printer-friendly formatting, provide edits and re-submissions of incomplete applications, make electronic payments of fees and deposits, and log in to monitor status of customer-specific projects.

In the past year, Duke Energy started the TSRG meetings discussed above to facilitate in-person discussions with the DG developers regarding the detailed policies necessary for safe interconnection of their facilities. Also, some of Duke Energy's interconnection staff is available by telephone and by e-mail to answer questions regarding projects currently in the Interconnection Queue.

Over the past two years, DEC and DEP have also begun posting bi-monthly distribution and transmission queue status reports on their websites that provide additional information on all projects in the

interconnection queue. These reports include over 30 operational status definitions ranging from an Interconnection Request that is pending through to commercial operation and/or closure.[3]

DENC's interconnection staff is generally available by telephone and e-mail.

Q. HOW WELL HAS THIS COMMUNICATION PROCESS WORKED?

A. Some of these additional measures reflect significant improvements to the availability of information to DG developers. To the best of my knowledge, the results have remained mixed, however. The Public Staff has received some complaints from DG developers alleging either that Duke Energy did not respond to telephone calls or e-mails regarding specific actionable steps related to their Interconnection Request or has been very slow to do so. In many cases the Public Staff agreed with the DG developers' assertions and contacted Duke Energy's regulatory staff to assist with problem resolution. The Public Staff continues to investigate communication protocol between the Utilities and the DG developers and believes new processes under development should improve communication.

[3] See, e.g. DEP's Interconnection webpage at https://www.duke-energy.com/home/products/renewable-energy/generate-your-own/interconnection-queue.

Q. WHAT COMMUNICATION IMPROVEMENTS DO YOU RECOMMEND THAT THE UTILITIES MAKE?

A. I recommend that the Utilities evaluate the cost of developing and operating an on-line portal, utilizing existing platforms like Salesforce that allows DG developers to track the near real-time status of their projects, as well as provide a record of the date on which a project achieves each step in the interconnection process. By near real term, I mean the status of a particular project within two business days of any changes. The Public Staff recommends that the Utilities provide a detailed cost estimate for an on-line portal to the Commission and the Public Staff for review and consideration.

The Public Staff commends Duke Energy on its efforts to make additional information available to Interconnection Customers through the bi-monthly distribution and transmission queue status reports on their websites and encourages the Utilities to continue to provide that information on all projects in the interconnection queue. In addition, the Public Staff recommends that the Utilities modify the interconnection information filed with the Commission. Currently, the Utilities must file a list of interconnected facilities by March 31 of every year per the Commission's Order in this docket issued on January 5, 2015. Due to the rapid increase in the amount of DG built and the anticipated DG to be constructed as a result of HB 589, the Public Staff recommends that this report now be filed on a quarterly

basis instead of annually. In addition, these reports should be modified to include interconnections that are under the jurisdiction of the Federal Energy Regulatory Commission (FERC), since these projects result in potential interdependency issues with State-jurisdictional interconnections. These reports should also be modified to utilize the operational status definitions used in the utilities online distribution and transmission queue reports.

HOSTING CAPACITY MAPS

Q. WHAT ARE HOSTING CAPACITY MAPS AND WHY ARE THEY RELEVANT?

A. Hosting capacity maps (HCM) are web-based maps that provide advance details of the electric grid to DG developers. For certain sections of the grid, they identify existing line voltages and existing DG. These maps are relevant because they allow DG developers to target areas of the distribution grid that are more amenable to building and interconnecting their generation facilities and to avoid areas that are already saturated with DG. Areas of the grid that are already saturated with DG resources typically require significant and costly system upgrades to add more resources. By providing better information to prospective DG developers about where the Utilities' distribution grid can best accommodate additional DG interconnections, the queue should become more manageable.

Q. HAVE ANY INTERVENORS REQUESTED THE ESTABLISHMENT OF HOSTING CAPACITY MAPS?

A. Yes. On page 26 of its comments filed on January 29, 2018, IREC stated, "The queue backlog and interconnection process in North Carolina could also be vastly improved by a provision for a hosting capacity or "heat" map of some sort, indicating what locations have ample capacity for interconnection." NCSEA echoed this sentiment in its March 12, 2018 reply comments and further suggested that such maps be made publicly available.[4]

Q. WHAT DO THE UTILITIES RECOMMEND REGARDING HOSTING CAPACITY MAPS?

A. On page 28 of their joint reply comments filed on March 12, 2018, the Utilities stated:

> The Utilities oppose IREC's specific recommendation to add a new NC Procedures Section 1.4 to formally mandate development of hosting capacity mapping. However, the Duke Utilities do not necessarily oppose IREC's recommendation, in concept, and explained to IREC and other stakeholders during the 2017 stakeholder process that the Duke Utilities are committed to developing "grid locational guidance" to support CPRE Program implementation under HB 589.

To wit, Duke Energy has developed a grid locational guidance map of interconnection constrained areas on its transmission system and has also developed a list of its constrained infrastructure in North

[4] March 12, 2018, Reply Comments of NCSEA at p 6.

Carolina and South Carolina where interconnection of DG would be more costly. This information was made available as part of the RFP for Tranche 1 of the CPRE Program.

DENC stated that it is opposed to creating a web-based HCM, but in response to a Public Staff data request, DENC indicated that it is "currently assessing the feasibility of pursuing a system-level hosting capacity analysis including platforms and presentment systems that can be regularly updated to reflect growing DER penetration."

Q. HAVE OTHER STATES IMPLEMENTED HCM AS PART OF THEIR INTERCONNECTION MANAGEMENT PROCESS?

A. Yes. Other utilities in other states[5] have developed HCMs either by themselves or in conjunction with third parties such as the Electric Power Research Institute (EPRI).[6] The aforementioned states that utilize HCMs are members of regional transmission organizations or have independent system operators. The HCMs are reflective of available capacity on the distribution system. While no state statutes explicitly require or direct the use of HCMs, some state legislatures

[5] California, including utilities: Pacific Gas and Electric, San Diego Gas & Electric Company, and Southern California Edison; New York, including utilities: Central Hudson Gas and Electric Corporation, Consolidated Edison Company of New York, New York State Electric & Gas Corporation, and others comprising the 'Joint Utilities'; Minnesota, specifically Xcel Energy, has deployed HCMs. Xcel Energy has also rolled their HCMs out to its territory in Colorado; and Portions of New Jersey, Maryland, Washington D.C., and Delaware served by Pepco Holdings, Inc., utilize a stochastic methodology to create HCMs.

[6] EPRI has developed the 'Distribution Resource Integration and Value Estimation (DRIVE) Tool' which was utilized in New York and Minnesota.

have required distribution resource planning, leading their state commissions to approve HCMs (e.g., California, Minnesota, New York, and Nevada[7]). Other HCMs have been explicitly utility-driven (Pepco)[8].

Q. WHAT DOES THE PUBLIC STAFF RECOMMEND REGARDING HOSTING CAPACITY MAPS?

A. IREC is seeking HCMs with far more detail than the grid locational guidance maps developed by Duke Energy for the CPRE program. Because the recent trend in North Carolina has been the development of larger, transmission-connected projects,[9] the Public Staff believes that a distribution level HCM would provide only limited benefits for future projects entering the queue. The primary queue benefit for future interconnection requests is likely to result from a transmission-level, Tier I[10] HCM that would provide basic information on the transmission system and identify those areas that are at or near their hosting capacity. Such an HCM would essentially be the next step from the transmission-focused grid locational guidance provided by Duke Energy in the recent CPRE Tranche 1.

[7] The Public Utilities Commission of Nevada, in August 2017 issued a proposed regulation which would require utilities to develop a Hosting Capacity Analysis of their distribution system as part of their distributed resources plan. The proposal is pending approval in Docket No. 17-08022.

[8] See IREC's December 2017 study, *Optimizing the Grid: A Regulator's Guide to Hosting Capacity Analyses for Distributed Energy Resources.*

[9] Transcript of Oral Argument Hearing held on Monday, September 24, 2018, Raleigh, Volume 1, Brett Breitschwerdt at p 11.

[10] *See* Reply Comments of the Interstate Renewable Energy Council at p 24.

An HCM could reduce the number of interconnection requests that would later fail one or more of the NCIP screens, which would assist in unclogging the queue. An HCM could also result in a more efficient bidding process in future tranches of the CPRE program, particularly given the Commission's interest in "[exploring] options for Duke to more specifically direct generators to locations on the system that will not involve major network upgrades."[11] Therefore, the Public Staff recommends that Duke Energy provide a detailed cost estimate for the development and maintenance of an HCM to the Commission and the Public Staff for review and consideration. This analysis should evaluate the information already available to the utilities in a geographically-based system and the utilization of existing software platforms. For example, EPRI has developed hosting capacity analysis tools for use by utilities in developing HCMs. This tool has been developed to work with Eaton's CYME distribution modeling software currently in use by Duke Energy (albeit a newer version than Duke Energy currently uses). The CYME software also has integrated tools that can help utilities produce HCMs without the learning curve associated with add-on tools.[12]

[11] *Order Approving Interim Modifications to North Carolina Connection Procedures for Tranche 1 of CPRE RFP* at pp 12-13.

[12] Eaton's CYME Integration Capacity Analysis Brochure; accessed on November 19, 2018; accessed from: http://www.cyme.com/software/cymeica/

Q. HOW SHOULD THE COST OF DEVELOPING AND MAINTAINING HOSTING CAPACITY MAPS BE RECOVERED?

A. At this time, the Public Staff believes that HCMs will primarily benefit DG developers through improved interconnection transparency and efficiency. As such, it is appropriate for the costs associated with the development of HCMs to be recovered from DG developers through the fees and charges collected from those customers.

QUEUE ORDER AND NEW GROUPING STUDIES

Q. HOW ARE QUEUE NUMBERS ASSIGNED TO INTER-CONNECTION REQUESTS IN THE 2015 NCIP?

A. The 2015 NCIP follows a serial study process, and a queue number is assigned to each project according to the "original date- and time-stamp applied to the Interconnection Request Application Form."[13] This queue number is used in part to determine: (1) the cost responsibility of upgrades necessary to accommodate the interconnection; and (2) the order in which each Interconnection Request is studied, subject to NCIP Section 1.8.

Q. HOW DOES SECTION 1.8 OF THE 2015 NCIP DETERMINE THE STUDY ORDER FOR PROJECTS THAT ARE INTERDEPENDENT?

[13] NCIP Section 1.4.2

A. Interdependent Projects are defined in the NCIP as "an Interconnection Customer (or Project) whose Upgrade or Interconnection Facilities requirements are impacted by another Generating Facility, as determined by the Utility." Projects without interdependencies are automatically classified as "Project A" and can proceed directly to the applicable study process. If a project is determined to have an interdependency with only one lower queue numbered project, the higher queue numbered project is classified as "Project B." Should a higher queue numbered project be found to be interdependent with more than one lower queue numbered project, all study on that project stops until it becomes a Project B or Project A.

Q. WHAT DOES THE PUBLIC STAFF RECOMMEND REGARDING THE USE OF NEW GROUPING STUDIES BEYOND TRANCHE 1 OF THE CPRE?

A. As presented above, the parties involved in developing a grouping study process for Tranche 1 of the CPRE were generally supportive of the concept.

The Public Staff does not oppose grouping studies being implemented for all interconnection projects whether or not they are part of the CPRE program.

However, the Public Staff understands that this issue is a complex one and requires input from many stakeholders. I recommend that within three months from the final order in this proceeding, or three months after issuance of the CPRE Tranche 1 report, whichever occurs later, interested parties should convene a stakeholder discussion focused solely on revisiting the Project A/B process and the optional grouping study process to determine how they might be used together to more efficiently manage the large number of projects in the queue. Within six months of the start of the discussions, the Utilities should file a report with the Commission with recommendations and any consensus among the parties. In addition, because the parties have offered limited comments about grouping studies outside of the Commission's review of Tranche 1 of the CPRE, the Public Staff recommends that the Commission direct all parties to comment on this subject in their rebuttal testimony.

TIMELINE REQUIREMENTS

Q. WHAT ARE THE TIMELINE REQUIREMENTS FOR THE UTILITIES AND THE DG IN THE 2015 NCIP?

A. The 2015 NCIP provides timelines for the Utilities and the DG developers to complete many, but not all, steps of the interconnection process.

Q. PLEASE DESCRIBE THE TIMELINE REQUIREMENTS THAT THE VARIOUS PARTIES RECOMMEND.

A. In the Working Group Recommendations filed by the Public Staff on December 15, 2017, NCSEA wanted a 10 business day response on screen failure for systems 20 kW or less in Section 2.2.2. IREC proposed additions to the Supplemental Review process Section 3.4 of the NCIP, which included several timeline additions as well. IREC also proposed changes to the Dispute process in Section 6.2 that included timelines.

On page 41 of its comments filed on January 29, 2018, IREC stated that it did not support the timeline changes proposed by the Utilities during the stakeholder process in 2017. IREC also wanted the Utilities to refund 25% of a deposit to the customer if they do not notify the customer within 10 days of it becoming a Project B.

On pages 29 and 30 of its comments filed on March 12, 2018, NCSEA recommended that the following timelines be added to the NCIP, all of which the Utilities oppose:

- add a 10-day requirement to Section 1.3.3 for utilities to provide a pre-application report;
- add a 10-day requirement to Section 2.2.2 in which the Utilities must provide the reasons for failing the fast-track screens;

- add a 10-day requirement to Section 6.3.3 in which the Utilities must settle up interconnection deposits (the Utilities wanted 90 business days); and
- add a 10-day requirement for the Utilities to provide a written statement regarding the results of a commissioning inspection.

DENC recommended that an Interconnection Customer be provided 30 business days to execute a final interconnection agreement in Section 5.2.2 and allow 30 business days for an Interconnection Customer to make payment for upgrades and interconnection facilities in Section 5.2.4.

Q. WHAT TIMELINE REQUIREMENTS DOES THE PUBLIC STAFF RECOMMEND?

A. Because the Public Staff is not a developer of DG facilities nor a designer of interconnection facilities, it is difficult for me to recommend specific timelines for the NCIP. However, I believe I can provide reasonable estimates of time for common and routine activities like providing existing information, scheduling meetings, and making payments. The Public Staff recommends that the Commission adopt the timeline recommendations made by NCSEA with the exception of the 10-day time limit to refund interconnections per Section 6.3.3 (with the Utilities recommending 90 business

days). The Public Staff believes 60 business days is a reasonable amount of time because the Utilities must receive invoices from their subcontractors and other suppliers and determine which costs they believe are attributable to the DG developer. Another timeline disagreement is the amount of time necessary to schedule a scoping meeting for the study process in Section 4.2.1. The 2015 NCIP allows 10 business days, but the Utilities have requested 30 business days. I believe 10 business days is a reasonable amount of time to schedule a scoping meeting.

The Public Staff agrees with DENC's two proposed timeline changes mentioned above.

Q. WHAT DOES IREC RECOMMEND FOR ENFORCING THE TIMELINE REQUIREMENTS?

A. In its comments filed on January 29, 2018, IREC stated the following on pages 29 and 30:

> Specifically, IREC recommends that North Carolina adopt an enforcement mechanism similar to the one being used in Massachusetts: a "timeline enforcement mechanism" (or, "TEM"), which provides positive and negative earnings adjustment for utilities to encourage compliance with the timelines set forth in the procedures. The process works by utilities providing reporting information to the state agency (through the use of a detailed queue as identified above), which tracks compliance with each timeline in the procedures. Under the TEM, each utility calculates the total aggregate average time, in business days, that it has taken to interconnect projects on each track over the past year, starting from the date an application is

> received until the date an interconnection service agreement is executed. Each utility then compares that calculation with the total aggregate number of business days that its interconnection tariff allows for the projects on each track. When the utility's annual report shows that its performance has deviated from the aggregate allowed timeframes by more than five percent in one direction or the other, the utility will either incur a penalty or earn offsets that it can carry forward into the next reporting year.

Q. WHAT DO THE UTILITIES RECOMMEND FOR ENFORCING THE TIMELINE REQUIREMENTS?

A. In their joint reply comments filed on March 12, 2018, the Utilities stated the following on pages 29 through 31:

> IREC alleges without support that timeline delays for processing interconnection applications in North Carolina are "unprecedented" and argues for imposition of monetary "penalties" and the creation of a "timeline enforcement mechanism" for the purpose of providing "positive and negative earnings adjustment[s] for [the] [U]tilities to encourage compliance with the timelines set forth in the [NC Procedures]."...
>
> In an attempt to support its proposal, IREC points to the Massachusetts Department of Public Utilities' 2012 Order adopting a similar timeline enforcement mechanism, which will "impose monetary penalties on the [Massachusetts distribution] utilities if they fail to meet the timelines specified in the interconnection procedures." IREC omits, however, that the Massachusetts legislature explicitly authorized the Massachusetts Commission to adopt such penalty provisions...
>
> [P]rocedures already exist pursuant to which Interconnection Customers can seek relief if DEC, DEP or DENC allegedly fail to make reasonable efforts in processing their interconnection applications. The General Assembly has provided all utility customers with a complaint process under N.C. Gen. Stat. § 62-73. Using its authority under N.C. Gen. Stat. § 62-30, the Commission has also approved the informal

dispute resolution process in the NC Procedures that allows the Public Staff to assist in resolving any dispute in an effort to avoid formal complaints. The Joint Utilities Redline retains this existing dispute resolution section.

Q. WHAT DOES THE PUBLIC STAFF RECOMMEND FOR ENFORCING THE TIMELINE REQUIREMENTS?

A. The Public Staff does not support the adoption of a timeline enforcement mechanism. While not perfect, the Utilities appear to have made good faith efforts to interconnect DG. Eleven years ago, North Carolina had less than one megawatt of interconnected solar capacity but now has over 3,000 megawatts. This unprecedented growth of solar could only have been brought about by cooperation of the Utilities.

In the 2015 NCIP, the Commission implemented new policies designed to help clear the queue, including the following: larger deposits, site control by the facility owner at the time an Interconnection Request is made, and that the Utilities review of interdependent Project B, with or without Project A proceeding. However, all parties agree that the Utilities have not met the timeline requirements in the 2015 NCIP and the backlog in interconnection queue has persisted.

The Public Staff recommends that the Utilities continue to add additional staffing as needed to relieve the queue backlog and further

improve transparency. The costs of adding these additional resources should be assigned to DG developers through the fees and charges allocated to their projects.

DISPUTE PROCESS

Q. WAS THE DISPUTE PROCESS CONSIDERED AS PART OF THE NCIP REVISIONS IN 2008 AND 2015?

A. Yes. In the 2008 proceeding, the dispute process was discussed extensively, and the Commission in its 2008 NCIP Order held as follows:

> The Commission notes that no party provided instances of any specific complaints from a generator regarding its effort to secure an interconnection with a North Carolina utility. Given the renewable energy requirements of Senate Bill 3, the electric utilities have every incentive to facilitate the development and interconnection of distributed generation, much of which could help them meet the law's requirements to use more renewable generation to serve customer demand. Because any dispute could ultimately evolve into a formal complaint, the Commission will not place itself in the position of directly assisting in dispute resolution as suggested by the Public Staff.
>
> Rather, the Commission concludes that it is more appropriate to adopt dispute resolution language that directs disputing parties to contact the Public Staff for assistance in informally resolving the dispute. If the parties are still unable to resolve the dispute, either party may then file a formal complaint with the Commission.[14]

[14] 2008 NCIP Order at pp 10-11.

Q. PLEASE DESCRIBE BRIEFLY THE DISPUTE PROCESS IN THE 2015 NCIP.

A. Section 6.2 of the 2015 NCIP requires DG developers that have a disputes arising out of the interconnection process to first attempt to resolve the dispute with the Utility. If the dispute is not resolved satisfactorily in 10 business days after a written Notice of Dispute is provided to the other party, either party may submit an informal dispute with the Public Staff. If the informal dispute process fails, any party may then file a formal complaint with the Commission.

Q. IS THIS PROCESS IN ALIGNMENT WITH THE ROLE OF THE PUBLIC STAFF IN INFORMALLY RESOLVING DISPUTES AND COMPLAINTS?

A. Yes. Commission Rule R1-4 provides that "[w]henever practical, informal proceedings are recommended for speedy, amicable adjustments of complaints or controversies which do not necessarily require a formal hearing or a formal order or decision, and to that end, informal complaints may be made to the Commission or Public Staff..." The Rule further provides that "the filing of an informal complaint is without prejudice to the right to thereafter file a formal complaint" pursuant to N.C. Gen. Stat. § 62-73.

Q. DOES THE PUBLIC STAFF BELIEVE THAT THE EXISTING DISPUTE RESOLUTION PROCESS PROVIDED IN THE 2015 NCIP ADEQUATELY ADDRESSES DISPUTES OVER TIMELINE EXCEEDANCES?

A. No. Due to the backlog of Interconnection Requests in the queue, as well as continued submission of additional projects in recent years, adherence to the timelines called for in the NCIP has proven difficult for the Utilities. The informal dispute process has not been effective in resolving these disputes. In addition, filing a formal dispute before the Commission can be expensive and time-consuming, resulting in additional delays that potentially impact other facilities in the queue. Since 2015, the Public Staff has participated in a number of informal disputes between the utilities over interconnection matters, and anticipates that the disputes in this area will continue to arise as additional distributed generation seeks to interconnect to the Utilities' transmission and distribution system.

Q. WHAT IS THE POSITION OF IREC AND NCSEA REGARDING RESOLUTION OF TIMELINE EXCEEDANCES AND OTHER DISPUTES?

A. In the Working Group Recommendations and accompanying redline filed by the Public Staff on December 15, 2017, IREC proposed an extensive revision of the dispute process in Section 6.2. In its comments filed on January 29, 2018, IREC stated on pages 19 and 20:

> Relying on individual complaints is inefficient and ineffective to ensure compliance across the board, for all customers and projects. For example, it is not guaranteed enforcement, because it places the burden on customers to file a complaint against utilities, which they may be hesitant to do since the utilities are ultimately the gatekeepers to their projects getting built and interconnected. In addition, the time it requires to resolve a dispute is not practical for projects essentially concerned about the impact of yet further delays.

On page 31, IREC further states:

> The recent disputes regarding queue management and implementation of new study guidelines highlights the need for a clearly defined dispute resolution process in North Carolina. The dispute resolution section in the current Procedures is quite limited and in need of improvement in order to help facilitate timely resolution. IREC's suggested revision of Section 6.2 proposes a dispute resolution process that adopts features from California and Massachusetts, and that is currently under consideration in Minnesota. The central feature of this process is the inclusion of an interconnection ombudsperson at the Commission who could help facilitate resolution of disputes.

In its comments filed on March 12, 2018, NCSEA stated on page 32:

> The 2015 Interconnection Standard relies on the Public Staff to be an arbitrator for interconnection disputes. However, the Public Staff is an overworked State agency with a distinct client: the using and consuming public. Thus, while it does an admirable job under the circumstances, the Public Staff is not necessarily a neutral facilitator for the resolution of disputes.

Q. WHAT IS THE POSITION OF THE UTILITIES REGARDING THE RESOLUTION OF TIMELINE EXCEEDANCES AND OTHER DISPUTES?

A. In their comments filed on January 29, 2018, the Utilities stated in Attachment 1, page 11 of 14:

> Utilities propose to retain existing Dispute language. Development of an Interconnection Ombudsperson appears inconsistent with treatment of disputes for retail customers. Also reference to additional remedies under law beyond NCUC appears inappropriate for interconnection procedures designed to address the interconnection of DG to the electric grid that is under the jurisdiction of the NCUC.

In their joint reply comments filed on March 12, 2018, the Utilities stated that "the [current] dispute resolution process has been reasonably effective in resolving disputes that have arisen in the interconnection process and continues to sufficiently protect the Interconnection Customers' interests."[15]

Q. WHAT IS THE POSITION OF THE PUBLIC STAFF REGARDING RESOLUTION OF TIMELINE EXCEEDANCES AND OTHER DISPUTES?

A. The Public Staff agrees with NCSEA that it is not a neutral facilitator for the resolution of disputes. As discussed above, the Public Staff's primary goal is to protect the using and consuming public, not the DG developers. When reviewing informal disputes, the Public Staff must

[15] March 12, 2018 Joint Utility Comments at p 31.

err on the side of ensuring the using and consuming public is not adversely affected by the DG developer's interconnection. Consistent with Commission Rule R1-4, the Public Staff agrees that it should continue to be involved in the dispute process to protect the interests of the using and consuming public, and to promote the efficient resolution of informal disputes where possible, but the Public Staff should not be the only option for dispute resolution between the Utilities and the DG developers other than a formal complaint. The Public Staff recommends the dispute process shown in **Lucas Exhibit No. 1,** which allows for the parties, upon mutual agreement, to utilize a third party dispute resolution service. In addition, the Public Staff supports the inclusion of additional timeframes for the dispute resolution process to ensure that the informal dispute process proceeds in a timely fashion.

STAFFING LEVELS

Q. HAVE ANY PARTIES MADE RECOMMENDATIONS REGARDING STAFFING LEVELS?

A. Yes. In its additional reply comments filed on March 12, 2018, Duke Energy stated on page 7:

> As of early 2018, Duke Energy has approximately 40 full-time employees in the Distributed Energy Technologies group that are assigned to interconnection processing, technical standards oversight, and contract management, as well as approximately 30 additional employees and/or contract

> engineers to manage the increased volume and complexity of the Interconnection Request study process in North Carolina and South Carolina. The Companies have also added approximately 400 new construction crew members in the past few years to support the growing level of utility system upgrades required to interconnect new generators to the Companies' distribution and transmission systems in addition to new retail customer connections. In addition, the Companies have invested in new IT platforms, namely Power Clerk and Sales Force, to better manage and support the task of processing Interconnection Requests under the NC Procedures.

Q. WHAT DOES THE PUBLIC STAFF RECOMMEND REGARDING STAFFING LEVELS?

A. While the Public Staff recognizes Duke Energy's increase in staff over the last few years, further additional staff may be necessary to reduce the existing queue backlog and assist in implementing additional interconnections resulting from HB 589. As I indicated above, all costs for additional staff to support the interconnection process should be assigned to DG developers.

INTERCONNECTION FEES

Q. WHAT HAVE THE INTERVENORS STATED REGARDING INTERCONNECTION FEES?

A. On page 34 of its comments filed on January 29, 2018, IREC stated:

> After the working group process was complete, Duke shared a proposal to increase the interconnection fees. IREC supports interconnection fees that compensate utilities for time efficiently spent processing interconnection applications. However, fees should be

> set with the expectation that utilities are acting efficiently and using best practices when processing applications.
>
> In this case, IREC believes that the Commission should seek more information before approving the requested increase in fees. First, because the fee proposal was raised later in the stakeholder process, it did not undergo full review by stakeholders in the working group. When Duke's proposal was shared, IREC asked for Duke to provide more information explaining the need for the relatively significant increases in the fees (roughly tripling fees in most cases).

On pages 24 of its reply comments filed on March 12, 2018, NCSEA stated:

> ...Duke's assertion that its proposed fees, particularly for residential and small commercial solar, "generally align" with fees in other jurisdictions is indefensible. IREC notes that "for projects of under 1 MW, the California utilities report that it costs between approximately $35 and $101 to process an interconnection application. In contrast, Duke seeks fees between $350 and $1,000 for projects in the same range. [Quoting IREC's Initial Comments at p 35] "Duke's proposed interconnection fees for projects of this size are ten times greater than the fees in California and thus, contrary to Duke's assertion, the two do not "generally align."

On page 27 of its reply comments, NCSEA further stated that "the Commission should require the Utilities to justify the costs that are included in their interconnection fees, as well as to provide the impacts of the change in interconnection fees."

On pages 15 to 16 of its reply comments filed on March 12, 2018, IREC stated:

> There is also insufficient evidence in the record to support the substantial fee increases that Duke seeks, which are higher than those in most states, and which were proposed very late in this process with little opportunity for stakeholder discussion. When Duke proposed a fee increase, IREC and other stakeholders requested that Duke provide evidence that the fees sought are justified. This information should include a detailed explanation of how fees are spent, broken down by category (e.g., expenses for pre-applications reports, and for each level of review). It should also include an explanation of the efforts Duke is taking to ensure that it is processing applications efficiently and keeping costs down. Indeed, with such information, IREC could support fee increases that are necessary for efficient processing of interconnection applications. We believe utilities should be compensated appropriately for processing interconnection applications, but they should be expected to do so with reasonable efficiency.

Q. WHAT HAVE THE UTILITIES STATED REGARDING INTERCONNECTION FEES?

A. On page 37 of their reply comments filed on March 12, 2018, the Utilities stated:

> The Duke Utilities specifically identified that they are incurring North Carolina-assignable interconnection-related costs that are currently not directly charged to Interconnection Customers for recovery through fees or studies and, to date, have not been recovered as project-assigned "overhead" costs. Subsequent to this meeting, the Duke Utilities also provided more detailed cost information in response to NCSEA's request for information related to the Duke Utilities' Salesforce platform.

On pages 38 and 39 of their March 12 reply comments, the Utilities presented the fee table shown in **Lucas Exhibit No. 2.**

Also on pages 39 and 40, the Utilities stated:

> In addition to the increased fees/deposits set forth above, the Utilities have also clarified Section 1.4.1.2 to identify that the costs being recovered through the Section 4 study process include the Utilities' indirect costs or "overheads" associated with administering the Section 4.3 System Impact Study and Section 4.4 Facilities Study process. Existing Section 4.4.4 as well as the Facilities Study Agreement and Interconnection Agreement already identify that the Duke Utilities are assigning overhead costs related to administering the interconnection process to Interconnection Customers, and this additional language clarifies that overheads associated with each step of the Section 4 study process will be assigned to an Interconnection Customer as it elects to continue through the study process...the Duke Utilities' 2017 category one costs...experienced under-recovery of approximately $600,000 under the current fee structure and a projected $137,000 under-recovery under the proposed fees.

Q. HAS THE COMMISSION CONSIDERED INTERCONNECTION FEES IN OTHER DOCKETS?

A. Yes. Every year, the Utilities seek cost recovery from the Commission for expenses for complying with North Carolina's Renewable Energy and Energy Efficiency Portfolio Standard (REPS). In the 2016 DEC and DEP REPS Rider Proceedings, the Public Staff raised questions and concerns over the utilities attempts to recover interconnection costs in the annual REPS riders. In the Commission's *Order Approving REPS and REPS EMF Riders and 2015 REPS Compliance*, issued on August 16, 2016, in Docket No. E-7, Sub 1106 (2016 DEC REPS Rider Order), the Commission stated:

> The Commission has several concerns regarding the charging of any interconnection costs to the REPS rider because the Commission has separately approved interconnection fees that allow DEC to recover interconnection costs directly from those developers and customers who seek to interconnect electric generating facilities to DEC's distribution facilities.

Further, in its January 17, 2017, *Order Approving REPS and REPS EMF Rider and REPS Compliance Report* in Docket No. E-2, Sub 1109, the Commission restated its position that interconnection costs should be recovered from connecting renewable generators. The Commission directed DEP to refine its interconnection cost allocation procedures to ensure that interconnection costs are not recovered through the REPS rider charges and more interconnection costs are recovered from the interconnection customer through Commission approved interconnection charges. The Commission also directed DEP to file a report on these efforts on or before March 1, 2017. DEP filed its report on March 1, 2017.

Q. WHAT DOES THE PUBLIC STAFF RECOMMEND REGARDING INTERCONNECTION FEES?

A. With regard to the interconnection fees proposed by Duke Energy, The Public Staff has performed a limited review of the interconnection fees requested by the Utilities as shown in **Lucas Exhibit No. 2.** However, the Public Staff has not audited interconnection fees and takes no position on them. The Public

Staff's position is that the costs to process interconnection requests should be borne by the interconnection customers and not shifted to retail customers.

FUTURE COST-OF-SERVICE FOR DG

Q. HAS THE PUBLIC STAFF'S REVIEW OF INTERCONNECTION FEES RAISED OTHER ISSUES CONCERNING THE COST OF THE GRID?

A. Yes. The contentiousness of the debate surrounding interconnection of DGs has remained high for the last several years. As more and more DG capacity is interconnected, that capacity is straining the grid's ability to accommodate additional, future capacity without requiring significant investments in additional facilities. Those additional facilities could be characterized as either additional interconnection facilities, network upgrades, or customary transmission and distribution system investment and capacity. With those additional facilities comes additional grid operation and maintenance expenses. The decision as to who will pay these costs will continue going forward.

Q. PLEASE EXPLAIN.

A. Today, the interconnection fees paid by DGs are designed and calculated to recover two costs: (1) the costs of the actual studies and facilities needed to interconnect the DG to the grid, and (2) the

necessary upgrades needed to accommodate the generating capacity of the specific DG on the grid without creating adverse impacts on other DGs and consumer loads. It is the Public Staff's understanding that the fees associated with network upgrades do not include costs associated with future grid investments or ongoing operation and maintenance of the grid. The Utilities do not currently have a way to separate and allocate those costs, and as a result, the costs are generally borne broadly over time by the Utilities' consumers.

Early on, as long as capacity existed on the grid to accommodate interconnection of DGs, the issue of future grid costs was not a major concern. Upgrades, beyond those needed in the vicinity of the DG to accommodate the interconnection of the DG, were considered minimal. However, as network hosting capacity has been limited in recent years due to sheer volume of DGs and consumer load, the issue of future grid capacity expansion and the need to update the grid to accommodate ever higher density of both DGs and consumer loads has given rise to a question of fairness regarding the drivers behind the need for future grid costs and who pays for them.

Q. HOW ARE GRID COSTS CURRENTLY ADDRESSED BY THE UTILITIES?

A. Each Utility calculates its transmission and distribution system rate base on a net basis. In other words, the total plant investment, minus all contributions from DGs and other consumers and accumulated depreciation, results in the Utilities' net rate base for their transmission and distribution systems. This net rate base, along with the operational and maintenance expenses, ongoing depreciation, and taxes related to all transmission and distribution assets, is included in the Utilities' cost of service studies and allocated among the classes of consumers based on load data. Transmission system costs are allocated on the basis of coincident peak demand and distribution system costs are allocated on the basis of non-coincident peak demand. It is important to understand that this allocation scenario does not incorporate the impact of DGs. Most DGs are consumers of electricity, but their consumption is de minimis compared to their output, which has a greater effect on the grid.

Q. WHY ARE GRID COSTS A CONCERN OR ISSUE?

A. Under today's cost recovery paradigm, only consumer load is responsible for the recovery of grid related investments and expenses. This highlights two concerns. First, once a DG is interconnected, it benefits from having access to the grid to inject the energy produced. However, virtually none of the cost responsibility

associated with grid operation and maintenance is assigned to the DG beyond what the DG needs for its electricity consumption served by the Utility.

Second, when future DGs interconnect on the same or nearby circuits, they may be solely responsible for incremental upgrades.

The Public Staff believes these concerns raise serious questions about the fairness and equity regarding cost responsibility for users of the grid, whether they are DGs injecting energy or consumers extracting energy. All parties are influencing the operation, maintenance, and future expansion needs and cost of the grid. All parties should bear a representative responsibility to recover those costs. A diagram that further explains the Public Staff's concerns is shown in **Lucas Exhibit No. 3**.

Q. WHAT DOES THE PUBLIC STAFF RECOMMEND BE DONE TO ADDRESS THESE CONCERNS?

A. Additional scrutiny of grid investments to interconnect these DGs, serve new loads, update the grid, provide safe and reliable service, and operate the grid is necessary to ensure that all grid users appropriately share in those costs and benefits. That scrutiny will likely challenge the traditional cost of service, allocation, and recovery models that have been used to date. The Public Staff believes that the parties will need to discuss the future of the grid,

the benefits and costs exerted on the grid by the various users of the grid, and how the grid and the services it provides will be paid for going forward in areas of high DG interconnection. The appropriate forum for much of this discussion, however, is in the Utilities' general rate cases, rather than in the interconnection docket. The Public Staff recommends that the Commission direct the Utilities to evaluate these long-term operations and maintenance costs resulting from distributed generation and incorporate these costs into future cost of service studies.

ANIMAL WASTE FACILITIES

Q. ARE THERE ISSUES TO BE CONSIDERED IN THIS DOCKET REGARDING ANIMAL WASTE FACILITIES?

A. Yes. HB 589 added the following language to N.C. Gen. Stat. § 62-133.8(i)(4):

> The standards adopted pursuant to this subdivision shall include an expedited review process for swine and poultry waste to energy projects of two megawatts (MW) or less and other measures necessary and appropriate to achieve the objectives of subsections (e) and (f) of this section.

Subsections (e) and (f) are the swine waste and poultry waste set-asides in REPS, which requires the electric power suppliers in the state to obtain a certain amount of energy every year from those resources. The electric power suppliers have had difficulty meeting these set-asides, and expedited interconnection may allow certain

animal waste to energy facilities commence construction and operation in a shorter timeframe.

In response to the addition to N.C. Gen. Stat. § 62-133.8(i)(4), the Utilities proposed adding the following Section 1.8.3.3 to the NCIP as shown in their reply comments filed on March 12, 2018:

> When an Interconnection Customer is proposing to interconnect a Small Animal Waste Facility and that facility is interdependent with more than one project, each of which has a lower Queue Number, the utility shall designate the Small Animal Waste Facility for expedited Section 4 study ahead of other interdependent Interconnection Customers that have not commenced the Section 4 study process pursuant to Section 1.8.3.1, as either (i) Project B, if the project with the next lowest Queue number to Project A has not completed the Section 4.2 Scoping Meeting or executed a System Impact Study Agreement; or (ii) Project C, if a Project B has already been designated by the Utility, completed the Section 4.2 Scoping Meeting, and or executed a System Impact Study Agreement. Upon being designated by the Utility as a Project C, the Small Animal Waste Facility shall be the next facility to become a Project B, regardless of whether another interdependent Interconnection Request with a lower Queue Number exists. Notwithstanding Section 1.7.1, a Small Animal Waste Facility be responsible for Interconnection Facilities and any Upgrades arising from its new designated Project B or Project C position in the Queue as provided for in this Section.

Q. WHAT COMMENTS HAVE INTERVENORS FILED REGARDING THE INTERCONNECTION OF ANIMAL WASTE FACILITIES?

A. The North Carolina Pork Council filed comments on January 29, 2018, and concurs with proposed Section 1.8.3.3 of the NCIP in the Joint Utilities redline.

Q. WHAT DOES THE PUBLIC STAFF RECOMMEND REGARDING THE INTERCONNECTION OF ANIMAL WASTE FACILITIES?

A. The Public Staff agrees with the Joint Utilities redline proposed Section 1.8.3.3 of the NCIP.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes, it does.

Appendix A

Jay B. Lucas

I graduated from the Virginia Military Institute in 1985, earning a Bachelor of Science Degree in Civil Engineering. Afterwards, I served for four years as an officer in the U. S. Air Force performing many civil and environmental engineering tasks. I left the Air Force in 1989 and attended the Virginia Polytechnic Institute and State University (Virginia Tech), earning a Master of Science degree in Environmental Engineering. After completing my graduate degree, I worked for an engineering consulting firm and worked for the North Carolina Department of Environmental Quality in its water quality programs. Since joining the Public Staff in January 2000, I have worked on utility cost recovery, renewable energy program management, customer complaints, and other aspects of utility regulation. I am a licensed Professional Engineer in North Carolina.

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

DOCKET NO. E-100, SUB 101

In the Matter of Petition for Approval of Revisions to Generator Interconnection Standards	)	REBUTTAL TESTIMONY OF JAY LUCAS PUBLIC STAFF – NORTH CAROLINA UTILITIES COMMISSION

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

DOCKET NO. E-100, SUB 101

Rebuttal Testimony of Jay Lucas

On Behalf of the Public Staff

North Carolina Utilities Commission

January 8, 2019

Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS, AND PRESENT POSITION.

A. My name is Jay Lucas. My business address is 430 North Salisbury Street, Dobbs Building, Raleigh, North Carolina. I am an engineer with the Electric Division of the Public Staff – North Carolina Utilities Commission.

Q. BRIEFLY STATE YOUR QUALIFICATIONS AND DUTIES.

A. My qualifications and duties are included in Appendix A.

Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?

A. The purpose of my rebuttal testimony is to present to the Commission the Public Staff's position on issues presented in this docket by other parties in their direct testimonies filed on November 19 and 20, 2018, regarding proposed revisions to the North Carolina Interconnection Procedures

(NCIP). The approved revised NCIP will be used by Duke Energy Carolinas, LLC (DEC), Duke Energy Progress, LLC (DEP), and Virginia Electric and Power Company d/b/a Dominion Energy North Carolina (DENC), collectively "the Utilities" and the distributed generation (DG) developers to govern their actions regarding the interconnection of DG facilities to the electric grid. My rebuttal testimony will specifically present the Public Staff's position on the following topics for the Commission's consideration in approval of the revisions to the NCIP: (i) interconnection costs; (ii) the appointment of an Ombudsperson to mediate resolution of disputes; (iii) additional timelines for the dispute process; (iv) incentives or timeline enforcement mechanisms for efficient queue management; and (v) clarifying the definition of Material Modifications.

Q. OTHER THAN THE PUBLIC STAFF, WHAT PARTIES IN THIS CASE FILED DIRECT TESTIMONY?

A. In addition to the Public Staff, the following parties filed direct testimony in this case: DENC, the North Carolina Pork Council, the Interstate Renewable Energy Council (IREC), the North Carolina Sustainable Energy Association (NCSEA), the North Carolina Clean Energy Business Alliance (NCCEBA), and DEC and DEP (together, Duke Energy) jointly.

Q. DOES THE PUBLIC STAFF TAKE A POSITION ON THE PROPOSED REVISIONS INCLUDED IN THE REDLINED VERSION OF THE NCIP INCLUDED AS EXHIBIT NO. 1 TO DUKE ENERGY WITNESS GAJDA'S TESTIMONY?

A. With the exception of the material modification and the dispute resolution provisions discussed below and in my direct testimony, as well as the direct testimony of Public Staff witness Williamson, the Public Staff does not object to the other revisions recommended by Duke Energy. In general, these modifications were discussed during the 2017 NCIP stakeholder review process, and also include other clarifying and conforming changes identified since that time.

INTERCONNECTION COSTS

Q. HAS THE COMMISSION RULED ON INTERCONNECTION COSTS IN THE PAST?

A. Yes. As stated in my direct testimony (page 43, lines 9 through 12), the Commission ruled in its January 17, 2017, *Order Approving REPS and REPS EMF Rider and REPS Compliance Report* in Docket No. E-2, Sub 1109 that interconnection costs should be recovered from connecting interconnection customers, including renewable generators (the DG developers).

Q. IS DUKE ENERGY PASSING ALL INTERCONNECTION COSTS TO INTERCONNECTION CUSTOMERS?

A. No. On pages 19 and 20 of his direct testimony, Duke Energy witness Jeffrey Riggins describes the following three categories to track interconnection-related activities: (1) Fees-Recovered Work, (2) Study-Recovered Work, and (3) Construction Cost-Recovered Work. However, on page 20, lines 16 through 20, he describes interconnection costs that Duke Energy does not recover in these three categories to include: "regulatory support, legal expenses, small customer meter charges, dispute follow-up costs, Distributed Energy Technologies Account Management follow-up costs after energization, and normal generator follow up activity in Distribution or Transmission groups". In response to a Public Staff data request, Duke Energy explained that these costs, "are recovered as normal ongoing Operations and Maintenance."

Q. WHAT DOES THE PUBLIC STAFF RECOMMEND REGARDING INTERCONNECTION COSTS THAT ARE NOT RECOVERED IN THE THREE CATEGORIES DESCRIBED ABOVE BY WITNESS RIGGINS?

A. The Public Staff recommends that Duke Energy continue to refine its methods to track interconnection-related activities, and seek to recover interconnection costs that are currently being recovered as normal ongoing Operations and Maintenance from interconnection customers. To the extent

these costs are indeterminate or general in nature and cannot be allocated or assigned to specific customers, it may be appropriate for those costs to be recovered through base rates.

INTERCONNECTION OMBUDSPERSON

Q. WHAT PARTIES IN THIS CASE HAVE REQUESTED THE APPOINTMENT OF AN OMBUDSPERSON TO ASSIST THE INTERCONNECTION CUSTOMERS?

A. In its filed comments and in the direct testimony of witness Sara Baldwin Auck, IREC has requested the appointment of an ombudsperson to facilitate the resolution of disputes between the Utilities and the interconnection customers. NCSEA has supported IREC with this request. On page 46, lines 6 through 10, of her direct testimony, witness Auck states:

> IREC's suggested revision of Section 6.2, found in Exhibit SBA-Direct-2, proposes a dispute resolution process that adopts features from California and Massachusetts, and is similar to what was recently adopted in Minnesota. The central feature of this process is the inclusion of an interconnection ombudsperson at the Commission who could help facilitate resolution of disputes.

Q. WHAT HAVE THE UTILITIES STATED REGARDING APPOINTMENT OF AN OMBUDSPERSON?

A. On page 20 of his direct testimony, lines 20 and 21, DENC witness Mike Nester states, "the introduction of an ombudsperson appears inconsistent with treatment of disputes for retail customers". The witnesses for Duke

Energy did not mention the appointment of an ombudsperson in their direct testimony; however, DENC and Duke Energy opposed the appointment of an ombudsperson in their initial comments filed on January 29, 2018.

Q. WHAT IS THE PUBLIC STAFF'S POSITION REGARDING APPOINTMENT OF AN OMBUDSPERSON?

A. The Public Staff does not oppose the appointment of an ombudsperson to facilitate the resolution of disputes between the Utilities and interconnection customers. On page 38, lines 10 and 11, of my direct testimony, I recommended an alternative dispute process that would allow parties to an interconnection dispute to utilize a third party dispute resolution service. I believe an ombudsperson would act in a similar manner to a third party dispute resolution service.

However, I believe the role of the ombudsperson should not be assigned to the Public Staff. As I stated in my direct testimony, it is the Public Staff's mission and statutory obligation to advocate before the Commission for the using and consuming public, and a dispute resolution settlement between the Utilities and interconnection customers may not necessarily be in the best interest of the using and consuming public. The Public Staff recommends that the Commission require any dispute resolution reached under Section 6.2.4 of the NCIP between the Utilities and interconnection customers be filed for informational purposes with the Commission, with a

copy served on the Public Staff. The Public Staff notes that the Utilities bear the burden to demonstrate any costs incurred as a result of an interconnection dispute resolution for which they seek recovery from customers are just and reasonable.

If an ombudsperson is appointed, the Public Staff believes that the costs for the ombudsperson should be split between the utility and the Interconnection customer

ADDITIONAL TIMELINES FOR THE DISPUTE PROCESS

Q. WHAT PARTIES HAVE RECOMMENDED ADDITIONAL TIMELINES FOR THE DISPUTE PROCESS?

A. In his direct testimony, Duke Energy witness John Gajda provides a red-line version of his proposed NCIP as Gajda Exhibit No. 1. Pages 34 and 35 of this exhibit contain a revised Section 6.2 regarding disputes in which Duke Energy has added the following timelines:

- Ten Business Days to informally resolve a dispute before requesting assistance from the Public Staff, filing a formal complaint, or abandoning the dispute process.
- Twenty Business Days to establish meeting date with the Public Staff after requesting assistance from the Public Staff.

- Twenty Business Days to file a formal complaint or abandon the dispute process after meeting with the Public Staff.

On pages 33 through 37 of his direct testimony, Duke Energy witness Riggins provided further explanation for Duke Energy's proposed dispute resolution timelines. In summary, witness Riggins states that Section 6.2 of the existing NCIP allows for an open-ended process that enables an interconnection customer to stay in dispute negotiations in perpetuity while other higher-queued interconnection customers must wait for a resolution. In one case, an interconnection dispute delayed the queue for over a year.

Q. WHAT IS THE PUBLIC STAFF'S POSITION REGARDING DELAYS IN THE DISPUTE RESOLUTION PROCESS?

A. The Public Staff agrees with Duke Energy witness Riggins that the informal dispute resolution process has resulted in delays and, in some cases, further congestion in the interconnection queue. The Public Staff believes that the dispute resolution timelines shown in Lucas Exhibit No. 1 of my direct testimony will help reduce delays in the dispute resolution process.

MATERIAL MODIFICATIONS

Q. PLEASE SUMMARIZE THE UTILITIES' POSITIONS ON MATERIAL MODIFICATIONS, SPECIFICALLY AS THEY RELATE TO ENERGY STORAGE.

A. The Utilities proposed language defines any change to the daily production profile as indicia of a Material Modification. On pages 38 and 39 of his direct testimony, witness Gajda states that the "production profile of a Generating Facility has become a more crucial component going forward as independent generators seek more flexibility on how to operate their facilities."

Q. PLEASE SUMMARIZE THE INTERVENORS' POSITIONS ON MATERIAL MODIFICATIONS, SPECIFICALLY AS THEY RELATE TO ENERGY STORAGE.

A. NCCEBA witness Christopher Norqual addresses this issue in his direct testimony on pages 14 and 15 and explains how Interconnection Working Group #2 proposed language that provides an exemption from a Material Modification for changes to the direct current (DC) system configuration. His proposed added exemptions include "energy storage devices such that the output is delivered during the same periods considered during the System Impact Study" (SIS). Witness Norqual asserts that this proposal would allow the addition of energy storage at any time because the "same period" restriction would mitigate the impact of energy storage devices on interconnection studies. In this case, "same period" means the same daily time period that the Utilities studied for solar output from the facility. Witness Norqual then states that Duke Energy's addition of the phrase "and with the same output profile" to the above language largely excludes energy

storage from ever being added to a solar facility without triggering a Material Modification and requiring a full re-study.

NCSEA witness Paul Brucke concurs with witness Norqual's testimony and, in his direct testimony on page 16, states that the addition of DC-coupled energy storage should not be a Material Modification so long as "it does not increase the AC [alternating current] capacity of the project and the project is configured such that it does not generate outside of the time of day that Duke typically considers in the system impact study."

Q. HOW ARE PRODUCTION PROFILES USED IN THE CURRENT STUDY PROCESS?

A. Under the current NCIP, the Utilities do not request a production profile from interconnection customers during their review. To a limited extent, Duke Energy utilizes a "standard" self-generated production profile during the SIS that is developed from an equipment list the interconnection customers submit in their Interconnection Request and should indicate whether energy storage is included.

However, Duke Energy has stated that with the addition of energy storage, production profiles can vary greatly from the "standard" production profile, and thus significant changes to the production profile should be considered Material Modifications. In their proposed redlines to the NCIP, the Utilities

propose to amend the Interconnection Request Form to include production profile information for all interconnection requests going forward.

Q. WHAT DOES THE PUBLIC STAFF RECOMMEND REGARDING MATERIAL MODIFICATIONS RESULTING FROM THE ADDITION OF ENERGY STORAGE?

A. Some level of discretion and subjectivity exist regarding changes to a facility's production profile. In fact, at present, some design modifications that alter the production profile already are not considered sufficiently different from the SIS-generated "standard" production profile to automatically constitute a material change under proposed Section 1.5 of the Utilities' NCIP redline. Examples of these modifications are: single-axis-tracking from fixed tilt, east-facing panels from south-facing, or an increased inverter loading ratio (DC/AC ratio).

In summary, a facility's production profile is not used in any significant manner prior to the SIS, and even within the current SIS process, the production profile plays a minimal role. Therefore, the Public Staff believes that changes to the DC configuration of the system, including energy storage, should not automatically constitute a Material Modification if requested prior to the execution of the SIS Agreement. As such, the Public Staff submits **Lucas Rebuttal Exhibit No. 1**, a revised Section 1.5, which

includes additional language clarifying this point and makes other clarifying changes to the Utilities' redline version.

Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?

A. Yes, it does.

APPENDIX A

Jay B. Lucas

I graduated from the Virginia Military Institute in 1985, earning a Bachelor of Science Degree in Civil Engineering. Afterwards, I served for four years as an officer in the U. S. Air Force performing many civil and environmental engineering tasks. I left the Air Force in 1989 and attended the Virginia Polytechnic Institute and State University (Virginia Tech), earning a Master of Science degree in Environmental Engineering. After completing my graduate degree, I worked for an engineering consulting firm and worked for the North Carolina Department of Environmental Quality in its water quality programs. Since joining the Public Staff in January 2000, I have worked on utility cost recovery, renewable energy program management, customer complaints, and other aspects of utility regulation. I am a licensed Professional Engineer in North Carolina.

BY MR. DODGE:

Q. Mr. Lucas, did you prepare a summary of your testimony?

A. (Jay Lucas) Yes.

Q. Would you please provide it at this time?

A. Yes. The purpose of my direct testimony is to make recommendations to the Commission on the Public Staff's position on proposed revisions to the North Carolina interconnection procedures, or NCIP. In my testimony, I describe the Public Staff as charged with representing the using and consuming public with regard to utility service, which may not always be in alignment with the interest of distributed generators, or DG, developers. The Public Staff supports changes to the NCIP that allow DG developers to interconnect in a safe, efficient, and a timely manner, so long as the costs are borne by the DG developers and the service quality to the using and consuming public is not harmed by the interconnection.

The Commission last revised the NCIP in 2015 and requested that the Public Staff convene a working group with the utilities, including Duke Energy Carolinas, Duke Energy Progress, and Dominion Energy North Carolina, and the DG developers and report back

to the Commission on proposed revisions. In my testimony, I summarize the activities that have taken place since 2015, including the 2017 stakeholder process and the positions taken by parties since that time.

Regarding the communication between DG developers and utilities, the Public Staff has received complaints from some DG developers that Duke Energy has not been responsive to phone calls and e-mails regarding the status of their projects. In many cases, the Public Staff agreed with the DG developers' assertions and contacted Duke Energy's regulatory staff to assist with problem resolution. Duke Energy stated that it is expanding its sales force software to include an online portal so that DG developers can more easily get the status of individual interconnection projects.

The intervenors in this case have recommend that the utilities develop hosting capacity maps, which are web-based maps that provide advanced details of the electric grid. The utilities oppose this request, but the Public Staff recommends that the utilities evaluate this option further and provide a cost estimate for hosting capacity maps and, if implemented, that the

costs be assigned to the DG developers.

Due to the serial nature of the interconnection queues in North Carolina, interdependencies that exist between projects have resulted in delays and congestion. In the competitive procurement for renewable energy, or CPRE process, the Commission has allowed grouping studies that allow Duke Energy to review interconnection requests for facilities as a group, rather than individually. The Public Staff believes a grouping study approach may also be appropriate for projects outside of the CPRE process and recommends that the interested parties hold stakeholder discussions on the matter.

The Interstate Renewable Energy Council, or IREC, and the North Carolina Sustainable Energy Association, or NCSEA, recommended an enforcement mechanism to push the utilities to adhere to the timelines in the existing NCIP. The Public Staff agrees that the utilities should make reasonable efforts to comply with the timelines in the NCIP, but disagrees with the timeline enforcement mechanism recommended by IREC and NCSEA. The Public Staff recommends that utilities continue adding staff as needed and approve the transparency of the

interconnection process so long as those costs are appropriately assigned to the DG developers.

With regard to the dispute resolution process in the NCIP, the Public Staff recommends that parties have an opportunity to use third-party dispute resolution service when appropriate. The Public Staff also recommends additional timelines in the dispute resolution process to prevent informal disputes from unreasonably delaying other interconnection projects that are impacted by the interconnection project that is the subject of the dispute. The Public Staff has not conducted an audit of the utilities' interconnection fees and takes no position on the reasonableness of the proposed interconnection fees, but recommends that interconnection costs should not be shifted to retail customers. Furthermore, the Public Staff recommends that future grid costs, such as updates and operations and maintenance not currently captured in the interconnection facilities' charges, be evaluated in the utilities' general rate cases to ensure these costs are properly paid for by all users of the grid.

With regard to animal waste facilities, the Public Staff recommends that the Commission adopt the

proposed Section 1.8.3.3 to the NCIP that resulted from the 2017 stakeholder process as directed in part by provisions in House Bill 589 that directed the Commission include an expedited preview process for animal waste projects less than two megawatts in capacity. This provision was clarified in the agreement and stipulation of partial settlement entered into between the utilities, the North Carolina Pork Council, and the Public Staff on January 25, 2019.

The purpose of my rebuttal testimony is to make recommendations to the Commission on the Public Staff position on issues presented in this docket by other parties in their direct testimonies regarding proposed revisions to the NCIP. With the exception of the material modification and the dispute resolution provisions discussed below and in my direct testimony as well as the direct testimony of Public Staff Witness Williamson, the Public Staff does not object to the other revisions recommended by Duke Energy.

On pages 19 and 20 of his direct testimony, Duke Energy's witness, Jeffrey Riggins, describes the categories in which Duke Energy recovers interconnections costs of DG developers. However, the following interconnection-related costs are recovered

as normal ongoing operations and maintenance for retail customers, not DG developers: regulatory support, legal expenses, small customer meter charges, dispute follow-up costs, account follow-up costs after energization, and normal generator follow-up activity. The Public Staff recommends that Duke Energy continue to refine its methods to track interconnection-related activities and seek to recover, to the extent possible, the interconnection costs that are currently being recovered as normal ongoing operations and maintenance from the DG developers instead.

The intervenors in this case have requested the appointment of an interconnection ombudsperson to facilitate the resolution of disputes between the utilities and the DG developers. The utilities oppose this request. The Public Staff does not oppose appointment of an ombudsperson or other third-party dispute resolution service, but recommends that, if appointed, the role should not be limited to the Public Staff, because a dispute resolution settlement between the utilities and the DG developers may not necessarily be in the best interest of the using and consuming public.

Duke Energy has recommended additional

timelines for dispute resolution in its proposed Section 6.2 of the NCIP. The Public Staff supports these additional timelines.

With regard to material modifications, the Public Staff recommends that changes to the direct current or DC portion of the facility, including energy storage, should not automatically constitute a material modification if the changes are requested prior to the execution of the system impact study agreement.

In the agreement and stipulation of partial settlement entered into between the utilities, the North Carolina Pork Council, and the Public Staff on January 25, 2019, the utilities agreed with the dispute resolution changes presented in my direct testimony and the material modification changes presented in my rebuttal testimony.

This completes the summary of my direct and rebuttal testimonies.

BY MS. CUMMINGS

Q. Thank you, Mr. Lucas. We will turn to Mr. Williamson now.

Mr. Williamson, would you please state your name, title, and address for the record?

A. (Tommy Williamson) Tommy Williamson, Jr.,

utilities engineer for the Public Staff electric division.

Q. And your business address?

A. 430 North Salisbury Street, Raleigh.

Q. Mr. Williamson, did you cause to be prefiled in this proceeding 31 pages of direct testimony plus an Appendix A with your education and experience and one attachment on November 19, 2018?

A. Yes, I did.

Q. And do you have any changes to your testimony?

A. Yes. I would like to note one change to the responses provided in my prefiled testimony. Starting on page 28 of my direct testimony, I recommend a full independent review of the North Carolina interconnection procedures, and as stated in the agreement and stipulation of partial settlement filed in this docket on Friday, January 25th, the Public Staff has agreed to withdraw its recommendation of an independent review of the entire North Carolina interconnection process and a stakeholder discussion focused on the project AB process. In exchange, DEP and DEC have agreed to undertake efforts to fully implement a grouping study process, including

initiating a stakeholder process in the first quarter of 2019 and making filings of the proposed changes to FERC and this Commission no later than July of 2019. Duke also further agrees to consult with EPRI regarding any potential modifications to the fast track and supplemental review process by April 1st of this year and will provide a summary report to the TSRG regarding any potential modifications in its meeting in the third quarter of 2019.

Q. And other than that change, if asked the same questions today on the witness stand, would your responses be the same as the answers you have prefiled?

A. Yes.

MS. CUMMINGS: Mr. Chairman, we ask that Mr. Williamson's prefiled testimony be copied into the record as if given orally from the stand and that his prefiled attachment be marked for identification as shown in the prefiled attachment.

CHAIRMAN FINLEY: Mr. Williamson's direct prefiled testimony of November 19, 2018, consisting of 31 pages, is copied into the record as if given orally from the stand, as is his appendix, and his attachment is marked for identification as premarked in the file.

(Williamson Attachment A was marked for identification as premarked in the file.)

(Whereupon, the prefiled direct testimony of Tommy C. Williamson, Jr. was copied into the record as if given orally from the stand.)

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

DOCKET NO. E-100, SUB 101

In the Matter of North Carolina Interconnection Procedures	)	TESTIMONY OF TOMMY C. WILLIAMSON, JR. PUBLIC STAFF – NORTH CAROLINA UTILITIES COMMISSION

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

DOCKET NO. E-100, SUB 101

TESTIMONY OF TOMMY C. WILLIAMSON, JR.
ON BEHALF OF THE PUBLIC STAFF
NORTH CAROLINA UTILITIES COMMISSION

NOVEMBER 19, 2018

Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS, AND PRESENT POSITION.

A. My name is Tommy C. Williamson, Jr. My business address is 430 North Salisbury Street, Dobbs Building, Raleigh, North Carolina. I am an Engineer with the Electric Division of the Public Staff – North Carolina Utilities Commission.

Q. BRIEFLY STATE YOUR QUALIFICATIONS AND DUTIES.

A. My qualifications and duties are included in Appendix A.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony is to discuss my review of, and applicable recommendations to, the proposed technical revisions to the North Carolina Interconnection Procedures (NCIP) concerning the following areas:

1) Good Utility Practice;

2) Technical screens;

3) Method of Service Guidelines;

4) IEEE Standard 1547;

5) Expeditious movement of backup generators through the interconnection queue; and

6) Technical Standards Review Group.

Following my discussion of the current technical revisions requested in this proceeding, I also propose more transparency and an independent review of the entire NCIP to aid in the development of future revisions.

GOOD UTILITY PRACTICE

Q. WHAT IS "GOOD UTILITY PRACTICE" AS DEFINED IN THE NCIP?

A. Good Utility Practice (GUP) is defined in the NCIP as, "Any of the practices, methods and acts engaged in or approved by a significant portion of the electric industry during the relevant time period, or any of the practices, methods and acts which, in the exercise of reasonable judgment in light of the facts known at the time the decision was made, could have been expected to accomplish the desired result at a reasonable cost consistent with good business practices, reliability, safety and expedition. GUP is not intended to be limited to the optimum practice, method, or act to the exclusion of all others, but rather to be acceptable practices, methods, or acts

generally accepted in the region." [1]

Q. DO YOU AGREE WITH THIS DEFINITION OF GOOD UTILITY PRACTICE?

A. Yes, I find this to be a reasonable definition and it is consistent with the definition included in the *pro forma* Small Generator Interconnection Procedures adopted by the Federal Energy Regulatory Commission (FERC).[2]

Q. COULD GOOD UTILITY PRACTICE CHANGE OVER TIME?

A. Yes, the definition, by use of the phrase "relevant time period," clearly contemplates the application of GUP changing over time as utilities examine the dynamic conditions that occur on their systems. In addition, changes in technology or revisions to industry standards can also lead to GUP modifications. For these reasons, the term GUP is somewhat amorphous, and should not be interpreted in an overly static or prescriptive manner, particularly in the context of NCIP, to ensure utility flexibility is not hampered.

The Public Staff respects that it is the Utilities' responsibility to maintain and operate the electric grid in a safe and reliable manner. North Carolina is in a unique position nationally due to the amount of

[1] NCIP Glossary of Terms.

[2] *Small Generator Interconnection Agreements and Procedures,* Order No. 792, 145 FERC ¶ 61,159 (2013), *clarified,* Order No. 792-A, 146 FERC ¶ 61,214 (2014) (Order No. 792).

utility-scale, grid-tied, intermittent, and non-dispatchable Qualified Facility (QF) generation on its distribution system, and increasingly on its transmission system. This "uniqueness" has the potential to create operational challenges that must be managed in both the short- and long-term. While formal modifications to the NCIP may address long-term issues, short-term "fixes" may be necessary prior to formal NCIP revisions; therefore, a degree of flexibility should be at the discretion of the Utilities.

Q. WHO SHOULD BE RESPONSIBLE FOR DETERMINING WHAT CONSTITUTES GUP?

A. While the Utilities are responsible for the operation of their electric grids, they must do so within a regulatory framework established by this Commission and other regulatory agencies such as, but not limited to, the FERC and the North American Electric Reliability Corporation (NERC). The Utilities are responsible for determining the practices, methods and acts necessary to meet the rules and standards established by the relevant regulatory bodies. While GUP must be consistent with the practices, methods and acts engaged in or approved by a significant portion of the electric industry during the relevant time period, to the extent the Utilities identify new or emerging challenges or issues that may impact safety and reliability concerns, their application of GUP must retain some level of flexibility.

TECHNICAL SCREENS

Q. WHAT ARE TECHNICAL SCREENS AND WHY ARE THEY USED IN THE INTERCONNECTION PROCESS?

A. Technical screens are a pre-defined set of variables set out in Section 3.2.1 used to compare against specific criteria. They are used to evaluate proposed Generating Facilities (proposed facilities) seeking to use the Fast Track process as described in NCIP Section 3. This process applies multiple, pre-defined screens to the proposed facilities with the intent of providing an early indication as to whether a particular proposed facility is likely to impose negative or unintended consequences on the electrical grid. These screens include the fast track eligibility size limit, which is a particular point of contention in this proceeding and one that I will go into more detail about later in my testimony.

Technical screens, in theory, should help to identify technically flawed proposed facilities prior to beginning a more detailed analysis, such as the system impact study prescribed in NCIP Section 4, thus promoting greater efficiency in the interconnection process.

Q. WHEN ARE TECHNICAL SCREENS USED IN THE INTERCONNECTION PROCESS?

A. After an Interconnection Customer submits their Interconnection Request (IR),[3] the Utility assigns a queue number and determines if any interdependencies exist with other IRs. If the proposed facility then meets the eligibility requirements in Section 3.1, the technical screens in Section 3.2 are applied.

Q. HOW ARE TECHNICAL SCREEN RESULTS USED?

A. As described in Section 3.2.2, screen results may lead to a range of possible outcomes for the proposed facility from passing the screen and receiving interconnection approval with no additional costs to failing a screen and moving to a Customer Options Meeting between the Applicant and the Utility as described in Section 3.3.

Q. WOULD A TECHNICAL SCREEN FAILURE AUTOMATICALLY PRECLUDE INTERRCONNECTION OF A PROPOSED FACILITY?

A. No. There is prescriptive language in Section 3.2.2 that allows any proposed interconnection that fails a screen an opportunity to interconnect the Generating Facility, if the Utility determines the safety, reliability, and power quality standards of the grid are not negatively impacted without further study, and an agreement is reached on the cost of interconnection.[4] Further, if a proposed

[3] An "Interconnection Request" is the Interconnection Customer's requests, in accordance with [the NCIP], to interconnect a new Generating Facility, or to change the capacity of, or make a Material Modification to, an existing Generating Facility that is interconnected with the Utility's system. NCIP Glossary of Terms.

[4] NCIP Section 3.2.2.4 through 6.

interconnection fails a screen and the Utility does not or cannot determine from the initial review that the Generating Facility can be interconnected consistent with safety, reliability, and power quality standards unless the Interconnection Customer is willing to consider minor modifications or further study, the Utility shall provide an opportunity for the Interconnection Customer to attend a customer options meeting. A Customer Options Meeting, as set out in NCIP Section 3.3, provides the Interconnection Customer and the Utility the opportunity to review possible facility modifications or screen analysis results to determine what steps can be taken to safely and reliably connect the Generating Facility. While the Public Staff is supportive of the parties taking necessary steps to mitigate screen failures, the Utilities should guard against processes that exacerbate an already backlogged serial queue.

The timelines listed in the NCIP should be followed by all parties to minimize latent delays that are within the existing and proposed processes. Not following the timelines listed in the NCIP, diminishes the opportunity to "unclog" the serial queue, as discussed throughout Public Staff witness Lucas' testimony.

Q. WHAT IS YOUR OPINION OF THE USE OF TECHNICAL SCREENS IN THE INTERCONNECTION PROCESS?

A. In my professional opinion, technical screens are appropriate tools. Screens, when used correctly, are the by-product of both GUP and applicable engineering principles. North Carolina's interconnection process is evolving. As lessons are learned from the significant increase of distributed energy resources (DER) in the state, changes are made to relevant technical standards, and stakeholder comments are being continuously applied and expanded upon.

Q. WHAT IS THE CURRENT NCIP FAST TRACK ELIGIBILITY SIZE LIMIT FOR CONNECTING AT LESS THAN 5 KV REGARDLESS OF LOCATION?

A. Let me first discuss the relevance of the 5 kV voltage level. Typically, 5 kV circuits operate at a nominal 4160 V. 4160 V is a common voltage level for commercial and industrial facilities and is a legacy design/operating voltage for sections of the Duke electrical grid, most notably in both older downtown, heavily built-up urban areas, as well as some rural distribution feeders with limited room or availability to expand and upgrade the existing assets.

NCIP Section 3.1 identifies the maximum generator size for this particular line voltage to be 100 kW.

Q. IS THERE A RECOMMENDAION TO MODIFY THE 100 KW FAST TRACK ELIGIBILITY LIMIT IN THIS PROCEEEDING?

A. Yes. The Interstate Renewable Energy Council (IREC) recommends increasing the size limit to 500 kW.

Q. WHAT IS THE RESPONSE OF THE PUBLIC STAFF TO THIS RECOMMENDATION?

A. The Public Staff recommends maintaining the 100 kW Fast Track eligibility limit at this time. This limit is only for Fast Track eligibility determination, and does not hinder a proposed Generating Facility's ability to move through the interconnection process. We believe it is prudent to require additional study of a 500 kW facility.

Q. WHAT IS A "LINE SECTION" AS IT IS DESCRIBED IN NCIP SECTION 3.2.1.2?

A. A "line section" as described in section 3.2.1.2 is "that portion of a utility's system connected to a customer bounded by automatic sectionalizing devices or the end of the distribution line." In other words, it is that portion of the distribution grid from the customer meter(s) to a device that protects the grid from electrical faults or disturbances, whether it is an immediate isolation device or a subsequent isolation device further away.

Q. HOW DO THE UTILITIES CURRENTLY DEFINE "LINE SECTION"?

A. The Utilities stated in their March 12, 2018 Joint Reply Comments in this docket that they define line section within the context of the NCIP

as "...a zone described by any distribution system section that can be isolated via an automatic protective device, whether that be a feeder circuit breaker, recloser, sectionalizer, line fuse(s), or distribution transformer fuse(s)."[5]

Q. WHAT HAVE BEEN THE RESULTS OF THE UTILITIES' IMPLEMENTION OF LINE SECTION?

A. IREC notes that the Utilities' current application of line section has caused a high percentage of proposed Generating Facilities to fail screen in Section 3.2.1.2.[6] Duke Energy Progress (DEP) and Duke Energy Carolinas (DEC) note, however, that a high percentage of proposed Generating Facilities that fail this screen ultimately pass the Fast Track process through Supplemental Review.[7]

DEC and DEP have applied line section in a conservative manner, "sufficient to ensure a high likelihood that there will be no unintentional islanding,[8]"[9] thus placing a premium on their ability to

[5] Joint Reply Comments of DEC, DEP, and Dominion Energy North Carolina, filed in Docket No. E-100 Sub 101 on March 12, 2018, Page 16.

[6] IREC Initial Comments filed in Docket No. E-100, Sub 101 on January 29, 2018, Page 7. 63 out of 65 IRs in DEP and 86 out of 99 IRs in DEC failed the screen in 3.2.1.2.

[7] Utilities' Joint Reply Comments at 15.

[8] "Islanding" occurs when a portion of the electrical grid is disconnected from its source up stream. If the remaining generation on the disconnected section closely matches the load, then that section may remain energized. This condition is potentially dangerous to utility personnel working on that line believing it to be de-energized. It is also potentially damaging to equipment on reconnection to the up line source.

[9] Utilities' Joint Reply Comments at 17.

safely and reliably interconnect growing levels of small[10] DER while avoiding degradation of line voltage regulation.

Q. HAVE ANY OTHER PARTIES PROPOSED AN ALTERNATIVE DEFINITION OF "LINE SECTION"?

A. Yes. IREC proposed a definition that would require an increased length of distribution circuit be used in the Fast Track screen in Section 3.2.1.2.[11]

Q. WHAT IS THE RESPONSE OF THE UTILITIES TO IREC'S PROPOSED DEFINITION?

A. The Utilities state that "changing the definition of the screening zones to allow more projects to avoid triggering the Section 3.2.1.2 screen...would therefore risk the loss of visibility to technical issues closer to the customer's premises." [12]

Q. DO YOU AGREE WITH THE UTILITIES' RESPONSE?

A. Yes. A screen should not be arbitrarily adjusted on the sole premise of allowing more projects to pass the screen and be interconnected. The need to perform detailed studies should be balanced, but as higher levels of DER are connected to the system, the cumulative

[10] Less than 100 kW.

[11] NCIP: Redline of Working Group Recommendations, Attachment 1, Page 3, filed on December 15, 2017.

[12] Utilities' Joint Reply Comments at 17.

effect of multiple facilities being interconnected will result.

Q. WHAT IS YOUR OPINION OF HOW THE UTILITIES HAVE IMPLEMENTED THE TERM LINE SECTION?

A. In my opinion the Utilities are reasonable in using a conservative approach that will result in a higher degree of grid safety and reliability. While there may be an elevated number of proposed Generating Facilities that experience a screen failure due to this approach, those impacted facilities will continue to have access to the interconnection process. The Public Staff does, however, believe that the Utilities should promote transparency when determining how they interpret terms within the NCIP, alert the Technical Standards Review Group (TSRG) to any changes made to the application of those terms, including "line section," and be open to feedback from the TSRG stakeholders. I will further discuss transparency and the TSRG later in my testimony.

METHOD OF SERVICE GUIDELINES

Q. WHAT ARE THE METHOD OF SERVICE GUIDELINES AS USED BY DUKE ENERGY?

A. The Method of Service Guidelines (MOS) are a collection of design and study elements applied by Duke that embody GUP and are to be applied to DERs greater than or equal to 2MW but, not larger than 20 MW. Duke first introduced the MOS in September 2017, with an

effective date of October 1, 2017.[13]

Q. WHY DID DUKE DEVELOP THE MOS?

A. Traditionally, there had not been a need for the MOS to be formalized into a single document. However, there has been a significant increase of interconnected DERs in North Carolina.[14] The MOS are, in part, a response to this significant increase, and they provide information to applicants seeking to file, or who have already filed, an IR. In short, the MOS are used as a tool to promote the concept of "right size" and "right place," while utilizing in-house experience.

Q. WHEN ARE THE MOS APPLIED WITHIN THE NCIP?

A. For proposed Generating Facilities of 20 MWs or smaller, the MOS are applied throughout Sections 3 and 4. However, as I noted above, the MOS should be used by Interconnection Customers prior to even submitting an IR.

Q. WHAT ARE SOME POSSIBLE OUTCOMES AVAILABLE TO THE INTERCONNECTION CUSTOMER THROUGH APPLICATION OF THE MOS?

A. The MOS are general information guidelines to those Interconnection Customers seeking interconnection to the Duke grid.

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[13] https://www.duke-energy.com/_/media/pdfs/for-your-business/generate-your-own-renewable/method-of-service-guidelines-20171013.pdf?la=en

[14] Public Staff witness Lucas Direct Testimony, Page 20.

Duke has certain discretion based on particular existing facilities, future planning projections, and application of GUP to determine a reasonable outcome. Examples of possible outcomes listed within the MOS are:

- Section 2.1.1 – provides general guidance on the proper method of interconnection to: transmission, direct to a retail substation, or a general distribution circuit.
- Section 3.2 – provides locational guidance based on the location of the Point of Interconnection relative to line voltage regulators.
- Section 3.4 – may require the proposed interconnection to move to an Advanced Study in NCIP Section 4, if it fails the Circuit Stiffness Review.[15]

Q. WHAT IS YOUR OPINION OF THE MOS AND ITS APPLICATION BY DUKE?

A. In my professional opinion the MOS are reasonable guidelines for the Duke utilities to apply in meeting their obligation to provide safe, reliable electric service to the using and consuming public.

Q. DO YOU HAVE ANY RECOMMENDATIONS?

[15] A review designed to determine the ability of an Area electric power system (EPS) to resist voltage deviations caused by DERs or loading, DEC & DEP: October 2017 DER Method Of Service guidelines for DER no larger than 20 MW, Page 16 of 20.

A. First, I agree with the Utilities inception of the MOS. As I discuss later in my testimony in the section on "Transparency," I recommend that any future guidelines similar to the MOS developed by the Utilities, and any modifications or revisions to the current MOS, be filed with the Commission for informational purposes only, and submitted for review to the Technical Standards Review Group.

IEEE STANDARD 1547

Q. WHAT IS IEEE STANDARD 1547?

A. IEEE Standard 1547 is a technical standard published by the Institute of Electrical and Electronics Engineers (IEEE) for the uniform interconnecting and interoperability of distributed energy resources (DER) with electrical power systems (EPS) interfaces.

Q. HAS IEEE 1547 BEEN REVISED RECENTLY?

A. Yes. The current revision of IEEE 1547 was released in January 2018.

Q. HOW HAVE THE PARTIES AGREED TO CONSIDER USE OF IEEE 1547?

A. Duke and IREC have agreed to continue a discussion of IEEE 1547 in the TSRG quarterly meetings.[16]

[16] Utilities' Joint Reply Comments at 44.

Q. HOW DOES IEEE 1547 APPLY TO THE UTILITIES?

A. While the IEEE 1547 standard,[17] is not a mandatory requirement for the EPS operator [Utility]; it does provide guidance for the interconnection of DERs to the grid. Nevertheless, it is important to remember that there are many items outside the scope of IEEE 1547 to which the Utilities must respond.

Also, IEEE 1547 is not a procedural standard, although it does provide "requirements relevant to the performance, operation, testing, safety, and maintenance of the interconnection."[18] "Installation of DER on radial primary and secondary distribution systems is the main emphasis of this standard...."[19] Therefore, it is not a standard that the Utilities are bound to follow but is a standard that provides guidance on incorporating DER onto the grid.

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[17] See IEEE-1547-2018 for an entire list of what items remain outside the scope of this standard. Listed below is a brief excerpt from the standard;

- Not intended for energy resources connected to transmission or networked sub-transmission systems.
- Does not define maximum DER capacity on a given feeder.
- Does not address the EPS [Utility] responsibility to plan, design, operate, and maintain their system with DER.
- No guidance of how the Utility [operator of the system] may specify parameter settings to coordinate with the existing protection and control devices.
- Values listed for voltage and frequency trip settings are not intended to limit/hamper other Utility equipment.

[18] http://grouper.ieee.org/groups/scc21/1547/1547_index.html

[19] *Id.*, General Remarks and limitations.

EXPEDITIOUS MOVEMENT OF BACKUP GENERATORS THROUGH THE INTERCONNECTION QUEUE

Q. PLEASE DESCRIBE THE UTILITIES' PROPOSED ADDITION TO THE NCIP REGARDING STANDBY GENERATION FACILITIES (SGF).

A. In their joint reply comments, the Utilities discuss the proposed inclusion of additional language in NCIP Section 1.8.3.4 to allow for the study of standby or backup power generating facilities ahead of interconnection requests for facilities that will export power to the grid.[20] The Utilities also propose to add the following definition of a "Standby Generation Facility" to the NCIP:

> An electric generating facility primarily designed for standby or backup power in the event of a loss of power supply from the Utility. Such facilities may operate in parallel with the Utility for a brief period of time when transferring load back to the Utility after an outage, or when testing the operation of the Facility and transferring load from and back to the Utility. [21]

The Utilities state that in order to qualify for this proposed treatment under Section 1.8.3.4, the proposed generator must show that it is not designed for power exporting capabilities, and will not impact the infrastructure capacity of the distribution grid up-line from the Point of Interconnection. The Utilities further state that because standby

[20] Utilities' Joint Reply Comments at 41.

[21] *Id.*, Redline version of Attachment A, NC Glossary of Terms, Page 8.

generators are "zero export" generation and are not interdependent, they have no adverse effect on other facilities' queue position.[22]

Q. DO YOU SUPPORT THE UTILITIES' PROPOSED ADDITION CONCERNING SGF IN SECTION 1.8.3.4?

A. Yes. The proposed language is reasonable to address the limited circumstance of standby or backup power facilities requesting interconnection. The Public Staff believes that allowing SGFs that are designed to provide backup power during outage events and serve retail customers to move through the queue in an expedited fashion is appropriate. As indicated by the Utilities, unlike QF generators, these facilities are not interdependent and do not have an impact on infrastructure capacity of the distribution grid. The Public Staff supports efforts to allow customers to be prepared for unexpected, emergency, or storm related utility outages such as those experienced recently during and in the aftermath of Hurricanes Florence and Michael. Moving SGFs ahead in the study queue allows those retail customers to expedite their preparedness efforts with minimal disruption to other projects in the queue.

Q. WHAT IS THE POTENTIAL IMPACT TO THE OTHER POTENTIAL GENERATING FACILITIES IN THE STUDY QUEUE?

[22] *Id.* at 42.

A. The Public Staff agrees with the Utilities that SGFs do not materially impact the queue position of other interconnection requests.[23] While the SGFs do require some Utility resources to complete the studies, the time and labor required to complete these studies is much less than for facilities that are exporting power to the grid. In addition, Duke indicated that it anticipates approximately 15 SGFs seeking to interconnect per year, a relatively small volume of interconnection requests as compared to other types. [24]

TECHNICAL STANDARDS REVIEW GROUP

Q. WHAT IS THE TECHNICAL STANDARDS REVIEW GROUP (TSRG)?

A. It is a stakeholder working group that has been meeting since April 2018 for the purpose of discussing Duke Energy interconnection technical standards. The group meets quarterly, and three meetings have been held over the last nine months. The TSRG is an extension of a previous informal technical discussion group that began meeting on August 31, 2016 as result of the settlement agreement entered into between Duke Energy and seven solar developers representing 33 interconnection customers regarding Duke's implementation of

[23] *Id.* at 42.

[24] *Id.* at Attachment 3, Page 8. Slide entitled "Category 2 Activity – Recovered by Deposits."

additional impact study "circuit stiffness review" criteria for utility-scale generator interconnection requests.[25] Duke discusses the TSRG in its March 12, 2018 additional reply comments at p. 18, and additional information on the TSRG initiative such as a detailed list of meeting minutes, attendees, agenda and presentations can be found on the Duke Energy Website.[26]

Q. WHAT TOPICS ARE COVERED IN THE TSRG?

A. TSRG meetings typically cover technical topics related to the interconnection of generating facilities to the DEC and DEP grids. Topics range from specific issues such as system study parameters, to a more general discussion of technology improvements that can mitigate risks, or historical perspectives of how the current North Carolina grid has evolved over time.

Q. WHO PARTICIPATES IN THE TSRG STAKEHOLDER GROUP?

A. The TSRG meeting participants are persons with primarily technical backgrounds such as project developers and engineers, utility engineers and technical staff, and other technical subject matter experts. During the prior circuit stiffness review stakeholder meetings, a significant percentage of attendees were non-technical,

[25] Settlement Agreement dated August 24, 2016, by and among DEC and DEP, and the Settling Interconnection Customers, filed in Docket No. E-100, Sub 101 on August 29, 2018.

[26] https://www.duke-energy.com/business/products/renewables/generate-your-own/tsrg

which seemed to inhibit an open, free-wheeling, technical discussion.

Q. DOES THE PUBLIC STAFF PARTICIPATE IN THE TSRG?

A. Yes, members of the Public Staff participate actively in the quarterly TSRG meetings, either in person or via teleconference.

Q. HAS THIS NEW STAKEHOLDER GROUP BEEN BENEFICIAL TO DATE?

A. In my opinion, the TSRG has been beneficial to participants even though it is still in its infancy. Participating stakeholders have been very open to feedback and are committed to process improvement; and the format provides more of a bi-directional sharing of information with questions and answers originating from all participants. The original informal technical discussions resulting from the circuit stiffness settlement were more of a presentation or lecture format, and not necessarily supportive of open dialogue. I commend the stakeholders for self-identifying the issues and improving the process.

Q. DOES THE PUBLIC STAFF SUPPORT THE TSRG PROCESS?

A. Yes. The TSRG stakeholder meetings should continue in their current format on at least a quarterly basis for the foreseeable future. Duke Energy should continue to bring forward operational challenges and proposed NCIP revisions to the quarterly stakeholder

process and allow parties to discuss methods to address or mitigate the operational challenges in an open and transparent way. The Public Staff recognizes that Duke Energy is solely accountable and responsible for maintaining adequate customer reliability and power quality, and as such the TSRG meetings should be viewed as a discussion forum and not a decision making venue. As it should, Duke Energy retains the right to make the final decision on all technical standards or evolving GUP revisions, subject to Commission review as part of its general regulatory power and the dispute resolution process defined in the NCIP.

TRANSPARENCY

Q. DO THE UTILITIES SOMETIMES INITIATE NEW CRITERIA THAT ARE NOT CLEARLY DEFINED WITHIN THE NCIP?

A. Yes, there are numerous examples of new criteria being introduced during the interconnection process; the circuit stiffness review and line voltage regulator policies are examples. It is my understanding and belief that such new criteria have not always been clearly or uniformly communicated to the Interconnection Customers, thus causing confusion, incomplete or inaccurate applications, and resulting in project re-study and delays.

Q. DOES GUP ALLOW FOR THIS PROCESS?

A. Yes, the general concept of GUP suggests that lessons learned

should be applied as they evolve and not restricted to a static study process. However, the current process of communicating new criteria with interconnection applicants should be improved.

Q. WHAT RECOMMENDATIONS DO YOU HAVE TO HELP IMPROVE THE PROCESS OF COMMUNICATING NEW CRITERA MODIFICATIONS FROM THE UTILITY TO THE INTERCONNECTION CUSTOMERS?

A. I recommend that in the event a new screen, study, or major modification in their application of the NCIP is developed, particularly as it relates to evaluating the technical merits of an application and corresponding interconnection, the Utilities should be required to: 1) file the new screen, study, or major modification in their application of the NCIP with the Commission in this docket for information purposes only; 2) post information on the utility's website regarding the new screen, study, or modification to the NCIP; and 3) present the topic for discussion at the next TSRG stakeholder meeting.

When the Utilities file a revision as discussed directly above, they should also inform the Commission of any potential queue impacts, including, but not limited to: 1) impacts to IR processing time; 2) potential projects withdrawing from the queue to the extent possible; and 3) increased costs to be incurred by the Applicant, if known. If

any information is deemed "sensitive" or "confidential" in nature, it may be filed under seal.

This recommendation should provide a more transparent process, and be an improvement over the current methodology.

Q. WOULD THE UTILITIES BE REQUIRED TO DELAY IMPLEMENTATION OF THE REVISION UNTIL THE TSRG MEETS OR THE COMMISSION ACTS ON THE FILING?

A. No, to the extent the either Utility identifies a new screen or study or modifies its current application of the NCIP due to a situation, which the Utility deems as absolutely necessary to address safety and reliability concerns, the Utility may begin to implement the new criteria uniformly across projects seeking to interconnect without first presenting the change to the TSRG. However, the Public Staff would expect the Utility to follow the protocol I recommended above as soon as reasonable possible after the change is implemented. Further, to the extent that such changes can be reasonably anticipated or do not pose safety or reliability concerns, it is appropriate for the Utilities to follow the process described above before implementing the change.

Q. PLEASE DISCUSS SOME OF THE BENEFITS OF THIS PROCESS?

A. Increasing the transparency in the process will allow interconnection customers to make better informed decisions in a timely fashion, will build trust between participants, and potentially reduce disputes and complaints arising from the implementation of the new criteria. Such decisions should result in and promote queue efficiencies (i.e., modifications to existing requests, projects not entering the queue because due to better information on the infeasibility of the project it its proposed size or location, and, in some cases, projects withdrawing from the queue).

In my opinion, my proposal, while not as formal as the stakeholder processes recommended by IREC and NCSEA, would incorporate many of the concerns voiced throughout the stakeholder process.

Q. COULD THE UTILITIES INCORPORATE YOUR RECOMMENDATION UNDER THE CURRENT CONSTRUCT OF THE NCIP?

A. Yes. I believe there is nothing in the currently effective version of the NCIP that prohibits this process from being implemented by the Utilities. While the Commission could consider memorializing such a requirement in the NCIP, the Commission can direct the Utilities in this docket to implement this approach to improving the transparency of the process with equivalent effect.

NCIP INDEPENDENT REVIEW

Q. ARE INDEPENDENT REVIEWS OF PROCEDURES, PROCESSES, AND SUBPROCESSES COMMON?

A. Yes, it is common for an independent or third party subject matter expert to perform a review of procedures, processes, and sub-processes.[27]

Q. WHAT IS THE PURPOSE FOR AN INDEPENDENT REVIEW?

A. In short, process improvement. An independent review is often used as a quality assurance tool used to identify any system latencies that may exist. Once system latencies are identified, the procedure/process owner (in this case, the Utilities) initiate changes to revise the procedure/process in question.

Q. ASSUME HYPOTHETICALLY THAT AN INDEPENDENT REVIEW OF THE NCIP PROCESS IDENTIFIED A SYSTEM LATENCY OR EVEN A DEFICIENCY. SHOULD THAT BE IMMEDIATELY CONSIDERED AS A NEGATIVE?

A. Absolutely not. The purpose of the review process is to provide a higher quality product. In the case of the NCIP, a higher quality product could be, but not limited to, any of the following: 1) to align Utility practices with other effective national practices; 2) to achieve process improvements; 3) to promote efficiencies and streamline the

[27] Utilities' Joint Reply Comments at 19 notes the *Interconnection of Distributed Generation in New York: A Utility Readiness Assessment,* prepared by EPRI.

overall process to minimize waste; and 4) to encourage positive findings and incorporate them into other aspects of Utility processes.

Q. DO YOU RECOMMEND AN INDEPENDENT REVIEW OF THE ENTIRE NCIP PROCESS BE COMPLETED?

A. Yes. It is my professional opinion that an independent review of the entire NCIP process should take place as soon as possible in order to identify any inefficiencies or latencies that exist within the process.

An independent review was mentioned in the Utilities' March 12, 2018 reply comments, "The Duke Utilities commit to evaluate whether it would be appropriate to obtain EPRI or a similar third-party to assist in studying and further developing North Carolina's Fast Track and other technical interconnection screens in the future."[28] In a response to a Public Staff data request, the Duke Utilities appeared to be receptive to, at a minimum, having a discussion on the overall topic of an independent review and setting meaningful milestones for such an undertaking.

Q. WHO SHOULD CARRY OUT AN INDEPENDENT REVIEW IN NORTH CAROLINA, SHOULD ONE BE UNDERTAKEN?

A. I am not prepared to recommend a specific entity to comprehensively review the entire NCIP. However, any independent administrator

[28] Utilities' Joint Reply Comments at 19.

likely would have to coordinate with multiple groups or agencies to deliver a final product. For example, IEEE may be able to provide insight or guidance on incorporations of inverter based technologies or even energy storage. NREL and EPRI may be able to provide benefits to certain sections of the NCIP as well.

I encourage other stakeholders and intervenors in this proceeding to respond in their rebuttal comments with ideas and suggestions for consideration by this Commission on avenues for this process to take place.

Q: HOW WILL THIS INDEPENDENT REVIEW PROCESS DIFFER FROM THE PROCESS THAT ADVANCED ENERGY COMPLETED LAST YEAR IN THIS DOCKET?

A: Advanced Energy (AE) led a process that included several large stakeholder meetings, and many other smaller sub-group meetings, in which AE documented the views of the participants and attempted to facilitate a consensus on changes that should be made to the NCIP. The process that I am recommending would appoint independent third party to evaluate the NCIP and the current state of the interconnection queue. The independent evaluator would request information from stakeholders and use its own judgement to determine what amendments should be made to the NCIP. Once the evaluator has completed its review and formed its conclusions,

the evaluator would present its recommendations to the Commission and the stakeholders.

Q. WHAT SHOULD BE THE TIMELINE FOR SUCCESSFUL COMPLETION OF AN INDEPENDENT REVIEW?

A. An independent review should be completed prior to the commencement of the next NCIP revision process. The time and effort required to process the significant solicited stakeholder input as part of an independent review is an extensive, albeit necessary undertaking. In other words, should the NCIP process be reopened for further revisions in early 2020, the independent review should be completed no later than year-end 2019. Attempting to implement or incorporate process improvements mid-review would be counterproductive. Nonetheless, I recommend the Commission take this recommendation into consideration and establish a timeline in its final Order in this proceeding.

CONCLUSION

Q. WHAT CONCLUSIONS HAVE YOU MADE?

A. North Carolina has experienced significant growth of renewable, most notably solar, DER over the previous eleven years. The cumulative effects of this growth have produced unforeseen impacts on utility industry practices and has placed North Carolina in a unique position nationally relative to the amount of intermittent and non-

dispatchable generation on the utility's distribution and transmission systems. In this unique position, it is prudent to apply industry engineering principles, while allowing for a degree of flexibility, when considering the technical issues for DER interconnection, as the Utilities are responsible for the safety and operation of the grid.

The communication between interconnection stakeholders has been strained since the previous NCIP process was completed. I have outlined different strategies that addresses communication in the spirit of increasing transparency.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes

APPENDIX A

Tommy C. Williamson, Jr.

I am an Engineer with the Public Staff's Electric Division. I graduated from North Carolina State University with a Bachelor in Science in Electrical Engineering. I have approximately 3 years of electrical distribution design and construction experience with Florida Power & Light Company. During that time I designed distribution circuits for overhead and underground services from the substation through to end users. This was inclusive of but not limited to; customer load analysis, feeder line loading analysis, facilities construction and installation. I then served 11 years as an Engineer with General Electric Company. In this role at General Electric Company, I represented the company with electrical design engineers, industrial and commercial end customers, and installation contractors to develop technical specifications for the procurement and use of electrical distribution equipment.

Since my employment with the Public Staff, I have reviewed customer quality of service complaints, transmission and distribution construction projects, vegetation management, small generator interconnection procedures, and filed testimony in general rate cases.

MS. CUMMINGS:

Q. Mr. Williamson, at this time, would you please provide the summary of your testimony?

A. Yes. Good afternoon Commissioners. My testimony in this docket addresses my review of the North Carolina Interconnection Procedures, or NCIP, and related issues concerning good utility practice, technical screens, the method of service guidelines, and the Technical Standards Review Group, or TSRG. My testimony is generally supportive of giving flexibility to the utility to maintain the safety and reliability of the grid and adding measures that will increase the transparency of the utility's implementation of good utility practice.

North Carolina is in a unique position, nationally, due to the amount of utility-scale, grid-tied, intermittent, and non-dispatchable quality facility generation on its distribution and transmission system. Eleven years ago, North Carolina had less than 1 megawatt of interconnected solar generation. Today it has over 3,000 megawatts interconnected and there are over 14,000 megawatts of solar currently in the queue.

The utilities are responsible for the safety

and reliability of the grid as well as providing service to the using and consuming public under the regulatory framework established by this Commission and other regulatory bodies.

Utilities must determine the practices, methods, and acts necessary to meet those rules and standards and must have the flexibility to continue to respond to emerging issues affecting grid operation. As a result of my review, the utilities' interconnection procedures and practices, I support the current NCIP definition of good utility practice.

When used properly, technical screens are the product of both good utility practice and applicable engineering principals. In light of the large volume of interconnection request, technical screens are appropriate tools used to evaluate proposed generating facilities seeking to use the NCIP fast track process.

The method of service guidelines are a collection of design and study elements applied by Duke that embody good utility practice and are applied to facilities between 2 and 20 megawatts. I believe the method of service guidelines are reasonable for the utilities to apply in meeting their obligation to provide safe and reliable electric service to the using

and consuming public.

In an effort to improve overall transparency to the interconnection process, I make three recommendations.

First, I recommend that any new screen, study, or major modification in the utilities' application of the NCIP to be filed with this Commission in this docket for informational purposes only, and posted on the utility's website, and also presented as a discussion topic at the next meeting of the TSRG.

Second, I support the work of the TSRG as a forum for the open and free discussion of technical issues related to interconnection and recommend those discussions continue.

Finally, consistent with the agreement and stipulation of partial settlement filed on January 25, 2019, I recommend Duke consult with EPRI to identify any potential changes to the fast track and supplemental screen process, and report back to TSRG on any changes, and to proceed with its commitment to a stakeholder process to fully implement a grouping study in 2019.

This concludes my summary.

MS. CUMMINGS: Mr. Chairman, this concludes the summaries of the witnesses, and they are available for cross examination.

CHAIRMAN FINLEY: All right.

MS. BEATON: Thank you, Mr. Chairman. As an initial matter, Mr. Chairman, I would like to ask your permission to be excused at 5 p.m. if I have completed -- which I will have completed my cross exam by then -- so I might catch a flight, and Ms. Bowen will continue to represent IREC when I leave, with your permission.

CHAIRMAN FINLEY: If you have completed by 5:00.

MS. BEATON: All right. Gives me some motivation. And, yes, I trimmed this down considerably so we could get out of here today.

CROSS EXAMINATION BY MS. BEATON:

Q. Good afternoon, Mr. Lucas. I am going to start with questions for you. And again, since the microphone is ahead of you and I'm behind you, I encourage you to give your answers facing the microphone so everyone can hear you. I won't find it rude. I want to start with a few questions first about your direct testimony. On pages 5 through 7 of your

testimony -- of your direct testimony, you generally observe that the utilities do not experience any forces that might motivate them to create or comply with an efficient interconnection process.

Is this an accurate representation of your testimony?

A. (Jay Lucas) Yes.

Q. Thank you. And do you believe that, if the utilities either faced repercussions for not complying with their obligations under the procedures or received some sort of incentive for meeting or exceeding expectations, do you think they might be more motivated toward compliance and efficiency?

A. If they were to receive some true incentives, yes, they might be more motivated to interconnect renewable energy facilities.

Q. So you think the carrot would work, but you don't think the stick would also work?

A. It would be hard to apply the stick for a few reasons. One of them, somebody has to decide how much stick to apply. Also, there are many a reasons that the queue is as clogged as it is. There are interdependency problems, sometimes disputes raised by the distributed generators can delay the queue. It

would be hard to sort out exactly what is delaying the queue in each circumstance.

Q. I understand. And I know that you impose -- not impose -- oppose some of the enforcement mechanisms that have been proposed in this docket by IREC and others, and I wonder if you have any other ideas on how to motivate the utilities to comply with the timelines the best possible?

A. I don't have any new ideas, other than what's been in my testimony. I believe that grouping studies may help speed the queue along some.

Q. All right. Thank you. Now I have a few questions about fees.

In your direct testimony, it's a wide range of pages, but generally 39 to 48, you discuss interconnection fees, and do I understand correctly that Public Staff is not taking a position on the amount of fees requested by Duke, but that Public Staff's position is that the Commission requires that interconnection customers are responsible for all costs associated with the interconnection process?

A. That is correct.

Q. Great. And can you tell me if there are any incentives, in your opinion, for the utilities to keep

costs down if they simply pass on all interconnection related costs to interconnection customers?

A. Some of those costs could be reviewed during a general rate case. It could be reviewed by the Public Staff, some costs could being rejected by the Public Staff. So there is some motivation there to keep costs lower.

Q. So you are saying that if the costs the utilities were saying they were incurring and then passing on to interconnection customers, if those were very high or outrageous, Public Staff would, at that point, weigh in to say that these are unreasonable?

A. We could, but, typically, those costs would only be reviewed during a general rate case.

Q. Okay. And do interconnection customers have any other interconnection options if they believe that the fees that the utilities charges are unreasonable or not reflective of what an efficient process could cause?

A. They could go through the dispute process if they think they are being overcharged for fees.

Q. Okay. But they can't just find another utility to interconnect to in the location they are planning to interconnect?

A. That's correct.

Q. All right. And does the Public Staff have any recommendations to ensure that the utilities are fairly and efficiently managing the process to ensure costs are kept to a reasonable level?

A. Yes. Again, the dispute process. During some disputes, the Public Staff gets involved and reviews costs, timeline problems, that sort of thing. I don't think the utilities want the Public Staff consistently looking over their shoulder in all cases.

Q. Thank you. I don't have any more questions for you. I do have a few questions for Mr. Williamson.

Good afternoon. And as I said to Mr. Lucas, don't feel obligated to turn around. On pages 3 and 4 of your prefiled direct testimony, you discuss the idea of good utility practice, and I'm going to ask you some questions about that.

The current definition of good utility practice in the NCIP refers only to utility practices, quote, in the region and not Nationwide; is that correct?

A. (Tommy Williamson) That's correct.

Q. And, in your opinion, do you think North Carolina utilities could benefit from learning

from other utilities Nationwide as opposed to only utilities in the region? Definition aside, just personal opinion.

A. I think it's fair. Any time that you're running an organization, it's good to accept input and to try to find best practices.

Q. And those best practices could be learned from utilities outside of the southeast?

A. Yes.

Q. Thank you. And, in your opinion, under the definition of good utility practice in the NCIP, do utilities have an obligation to consider utility practices that lower costs for interconnection customers or keep costs down, while at the same time maintaining safety and reliability?

A. Would you say that one -- there was two parts to that. Would you say that again?

Q. Sure. Under the definition of good utility practice in the NCIP, do utilities have an obligation to consider and adopt practices that lower costs or keep costs down for interconnection customers while maintaining safety and reliability?

A. I would say it's -- in my opinion, it's clear that utilities have an obligation to meet the

regulatory construct as set by this Commission and other regulatory bodies. So that's their obligation. And then to determine the practices, methods, and acts that allow them to achieve that regulatory construct.

Q. Right. And so you agree that the definition of good utility practice, as it is in the NCIP right now, says -- I'm just going to quote from it -- that utilities are expected to accomplish the desired result at a reasonable cost consistent with good business practices, reliability, safety, and expedition?

A. Yes, that's what it says.

Q. Thank you. And, in your opinion, could a practice that -- I'm just going to throw out a hypothetical. We were doing that earlier. Could a practice that maintains safety and reliability, but costs twice as much as a comparatively safe and reliable alternative, be considered good utility practice? Same results, just costs twice as much.

A. Hypothetically, you are looking at that. I think, if you are achieving the same results, I guess it could be, but I think you have to look at -- even without the hypothetical, look at the particulars of how the environment, when comparing two different utilities, may be in one versus the other.

I think an issue in North Carolina, as has been stated throughout this hearing, is the unique situation that North Carolina is in in regards to the high levels of penetration of DER. So, you know, with that added to the hypothetical, yes, I guess you could agree. It could be same outcome with double -- with extra cost.

Q. You think the same outcome with double cost could be good utility practice or not really? Were you agreeing with me? I'm sorry.

A. If we are trying to achieve a goal, it's not going to be the same between different regions. So I think to say you are getting the same outcome, you've got to understand what the actual situation is. So if you say an outcome in one area -- one utility is the same as the outcome in another utility, that could be, even though the cost was higher, but the particulars of that -- of the utility with the higher cost is what is pushing the extra cost, and that's in the hypothetical.

Q. I see what you are saying.

MS. CUMMINGS: All right. I have no further questions.

CHAIRMAN FINLEY: Okay. Let's take a break until 4:15. Come back at 4:15.

(At this time, a recess was taken from 4:05 p.m. to 4:16 p.m.)

CHAIRMAN FINLEY: NCSEA?

MR. LEDFORD: Thank you, Mr. Chairman.

CROSS EXAMINATION BY MR. LEDFORD:

Q. Mr. Williamson, I am going to start off with one question for you real quick. On page 23 of your -- well, your direct testimony is your only testimony -- you recommend that Duke retain the right to make a final decision on evolving good utility practice subject to Commission review.

Can you tell me how the Commission has reviewed the good utility practice decisions made by the utilities since the Commission's 2015 order in this docket?

A. (Tommy Williamson) And where specifically were you looking at; which line?

Q. Line 7 through 9.

A. (Witness peruses document.)

Okay. Yes. So -- and your question? I'm sorry, say your question again.

Q. I'm sorry. How has the Commission reviewed the good utility practice decisions made by the utilities since the Commission's 2015 order in this

docket?

A. Well -- and what I was getting at in there, that last line, is the dispute resolution process is available. So if there is any complaint regarding anything within the NCIP, the DR developer can go through the dispute resolution process, and ultimately, the Commission can decide.

Q. So it's your position that an interconnection customer would have to go through the dispute resolution process and file a formal complaint in order to have good utility practice reviewed by the Commission?

A. I mean, that's available. I mean, obviously, we are having discussions, the TSRG is going on, but if it gets to a point where it's an impasse and any party believes that it's, you know, egregious, and we really need this resolved, and we want to push it all the way, the dispute resolution process is available.

Q. All right. Thank you, Mr. Williamson.

A. You're welcome.

Q. The rest of my questions are for you, Mr. Lucas, and you will be happy to know I spent my break deleting questions from my outline.

So, in your direct testimony, on page 6,

lines 15 through 16, you state that developers of DG are not the using and consuming public?

A. (Jay Lucas) Yes.

Q. And I understand the position regarding if the developers of sell-all DG facilities not being part of the using and consuming public, but are adopters of DG, such as customers and ratepayers who are net metering customers, are they a part of the using and consuming public?

A. Yes, but that's a lot more complicated. As far as their consumption of capacity and energy, yes, it's easy in that respect. But in their action as a generator of electricity, they are subject to the complexity of the electricity markets. A lot of them don't understand that. But purely just from regard of interconnection, net metering systems are not much of a problem. With regard to interconnection, like I said, net metering doesn't consume a lot of our time.

Q. But I think IREC has presented some testimony that, for those customers, it could a least be improved; would that be fair? That IREC has presented arguments to fast track --

A. If you could show me where that is. I don't know how improvements could be made at the process for

net metered customers.

Q. Would you agree that IREC has presented testimony from Ms. Auck that changes should be made to how the fast track screens are used that would benefit those --

A. Oh, in the fast track, yes, they have suggested changes to fast track, yes.

Q. Thank you. Moving forward just a couple of pages in your testimony to page 10. Starting on line 11, you discuss the Commission's November 1, 2016, order regarding Duke's settlement agreement, and on page -- excuse me, lines 14 to 15, you point out that the order directs that screens are to be included in terms and conditions attached to the NCIP.

Is CSR, which was of the -- which was the subject of that 2016 order, memorialized as an additional term and condition to the NCIP?

A. No, it's not.

Q. All right. And any of the other screens that have been introduced by the utility since 2015 memorialized as additional terms and conditions?

A. Can you give me some examples?

Q. Line voltage regulator screen, things like that.

A. No, that wasn't memorialized in the NCIP.

Q. All right. Thank you. Jumping forward a good bit to page 37. Generally, on this page -- well, specifically starting at line 22, you note that the Public Staff is not necessarily a neutral party, but rather that you have a distinct client, the using and consuming public.

Is it fair to say that one of the Public Staff's primary goals in representing its client in this proceeding is to keep your client's rates low, electricity rates?

A. Yes.

Q. All right. So does it follow that, in representing your client's interests, the Public Staff has an interest in seeing that interconnection customers bear certain costs, rather than the utilities bearing those costs and ultimately them being passed on to ratepayers?

A. That's correct.

Q. Now, you're familiar with the declarations of policy that are set forth in the beginning of Chapter 62, generally?

A. Yes.

Q. Subject to check, would you agree that one of

them involves the promotion of renewable energy being a policy for the state of North Carolina?

A. Can you show me specifically? Yeah, it generally does. I mean, we have a renewable energy portfolio standard, but it goes on -- let me further clarify. I will find it. I have got a copy of General Statute 62-2.

Q. And it's A10.

A. Okay. But also it goes on to General Statute 62-3, paragraph 23, where it defines what a public utility is. And it -- I will just summarize here. A public utility is a person producing, generating, transmitting, delivering, or furnishing electricity by gas, steam, or any other like agency, for the production of light, heat, or power to and for the public for compensation. So that's a more specific task that the Public Staff is involved in.

Q. Correct. And right now I'm not asking about the Public Staff's role. I was just asking if you agree that 62-2(a)(10), specifically sub A and sub C are about encouraging renewable energy and energy efficiency.

A. Yeah. But that same sentence goes on, "Through the implementation of a renewable energy and

energy efficiency portfolio standard reps," and that's not really under consideration at this time. I think the Public Staff is heavily involved in the reps and has done a good job.

Q. But don't facilities that use -- are used for reps compliance have to interconnect to the grid at some point?

A. Yes, but some interconnection facilities are involved at reps and do not, so they are reps to a power supplier.

Q. I would agree. Moving on, in that same -- actually, higher up on that page, your previous question, you state that the Public Staff should not be the only option for dispute resolution, other than the -- an interconnection customer filing a formal complaint, and you go on to recommend creating a dispute resolution process that allows a third-party dispute resolution service to be used; is that correct?

A. Yes.

Q. Why is the Public Staff interested in creating a dispute resolution process that does not use the Public Staff as the mediator?

A. The Public Staff can't be an independent arbiter in these types of cases. The Public Staff is

required to represent the using and consuming public in all cases. Also, in serving the using and consuming public, the Public Staff has limited amount of time in working on general rate cases, at the same time as doing annual cost recovery cases, having to represent or serve the distributed generation community will sometimes have to take second place to more pressing matters.

Q. And the position that you advocated for regarding dispute resolution, that was incorporated into the stipulation and settlement that was last Friday, correct?

A. Yes.

Q. And that stipulation says that the outside dispute resolution service can only be used upon mutual agreement of the utility and the interconnection customer; is that correct?

A. Give me just a moment. Let me find the exact language and stipulation.

(Witness peruses document.)

Do you have a paragraph number? That would help me.

Q. 6.2 point --

A. Yeah. You're right, 6.2.4. It's upon mutual

agreement.

Q. Were you present on Monday when Duke's witness Riggins testified?

A. Yes.

Q. And would you agree that Witness Riggins stated Duke's preference to continue using the Public Staff as a mediator?

A. Yes.

Q. So are you confident that the stipulation between the Public Staff and the utilities will reduce the Public Staff's workload in that regard?

A. Yes. I think the Public Staff would press the utilities and not let them disagree with the use of a third-party mediator for no apparent reason. The Public Staff would press utilities and provide a good reason why they would recommend why a third-party mediator not be used.

Q. Okay. Great. Thank you. Then just a couple of last questions about page 43 of your direct testimony.

And at the very bottom, lines 25 and 26, you note that the Public Staff has not audited Duke's interconnection fees; you performed an overview, but not an audit?

A. That's correct.

Q. All right. But the Public Staff does have the legal authority to audit Duke's books, correct?

A. Yes, but that's typically done during a general rate case.

Q. Would you agree that the Public Staff, even subject to those limitations, has more of a legal authority than an interconnect customer to audit Duke's books?

A. That's a legal question. I can't really answer how much authority the interconnection customers have.

Q. All right. So, subject to check, and taking it for this hypothetical, let's assume that interconnection customers do not have the authority to audit Duke's books. Given that the Public Staff has not audited Duke's interconnection fees -- and I recognize that you are not taking a position on fees moving forward -- why should interconnection customers be confident that the stipulated fees are appropriate?

A. I don't have any reason why they should accept those fees completely. We see no -- they seem reasonable to the Public Staff. I can't opine as to what decisions the interconnection customers should

make about them.

Q. Okay. Thank you.

MR. LEDFORD: That's all I have.

CROSS EXAMINATION BY MS. KEMERAIT:

Q. Mr. Lucas, I just have one question to follow up on a question or comment made by the Chairman at the end of NCCEBA's panelled presentation.

NCCEBA has indicated that -- to me that it would be certainly willing to participate in further discussions with Duke to try to resolve the issue of energy storage and material modification.

A. Yes. I remember that.

Q. Okay. And in the event that Duke is willing to participate in the discussions, would the Public Staff also be willing to be part of those discussions?

A. Yes, we would like to participate.

MS. KEMERAIT: Thank you very much. That's all the questions I have.

CHAIRMAN FINLEY: All right. Attorney General's Office?

MS. TOWNSEND: Yes.

CROSS EXAMINATION BY MS. TOWNSEND:

Q. Good afternoon, Mr. Lucas. I'm Terry Townsend with the Attorney General's Office.

A. (Jay Lucas) Good afternoon.

Q. Just a few questions for you. First of all, talking about your duty to the using and consuming public.

Mr. Ledford talked the to you about Chapter 62 and the promotion of renewable energy?

A. Yes.

Q. Would you agree that there is a value to the using and consuming public of having a diversified energy profile that includes energy from renewable sources?

A. Yes.

Q. Okay. And, in your opinion, are the risk and cost inherent in using fossil fuels, that renewable fuels do not pose, or at least at much lower levels, such as the cost of waste disposal and the cost of remediating environmental contamination?

A. Yeah. All sources of energy have costs and benefits. I agree, yes.

Q. Thank you. In your role as an engineer with the electric division at the Public Staff, have you encountered literature by scientists who support the belief that the use of fossil fuels has contributed greatly to climate change?

A. I can't say. I'm not a climate scientist; I'm an engineer. So I can't stand up here as a professional witness and render an opinion on climate change.

Q. Okay. But you can say that there has been some severe and unusual weather patterns within the last few years, and that the cost of that not only goes to the utilities, but also filters to the using and consuming public; does it not?

A. I really can't opine on weather patterns. There have been great changes of weather throughout many, many years. I really -- since I'm not a climate scientist and have not analyzed climate change through my professional job, I really can't render an opinion.

Q. That's fine. Thank you. Going to page 8 of your direct testimony, around line 12. Actually, line 10. You say, "While they -- the utilities -- pass these costs on to the developers and consumers, they do not profit from any of it. The interconnection process for them results simply in churn."

Can you define what you mean by "churn"?

A. It's the utilities expending money without earning any kind of profit on it, and that includes interconnection costs that the utility incurs. There

are other things that are like that. Purchasing a fuel, the utilities don't earn a return on purchasing fuel. Paying their staff, they don't earn any kind of return on paying their staff.

Q. Okay. And what specific evidence have you reviewed that brings you to the conclusion that Duke Energy simply churns these interconnection costs?

A. And what I mean by churn is just in that sentence -- well, the sentence before, I say they don't earn any profit. So they are expending money and resources and recovering, I hope to the maximum extent possible from the interconnection customers, the costs of that interconnection. By churn I mean there is no profit there. Maybe I haven't understood your question correctly.

Q. No. I guess the next question in follow up is, how do you know there is no profit?

A. We audit their books and records during general rate cases and see what costs they have incurred, and we review their revenues and expenses.

Q. And when was the last time they were audited?

A. For Duke Energy Carolinas and Duke Energy Progress, they both had rate cases in 2017 that were concluded late 2018.

Q. And, at that time, were the interconnection costs considered in the audit?

A. We audit costs. Yeah, labor costs, et cetera.

Q. Okay. Question becomes, if the utilities are currently churning under the current interconnection process, what, if any, impact will Duke's proposed fee increases do to the churning analysis?

A. That will allow Duke Energy to recover the cost that it incurs for interconnecting renewable energy facilities.

Q. So you don't believe there would be a profit; you believe it would continue to churn?

A. That's correct.

Q. Okay. You further state that the utilities must act in good faith to interconnect, but are incentivized not to; do you recall that testimony?

A. What page are you on?

Q. It's -- let me make sure I get you on the right page. I believe it's still on page 8, and it's line 12 through 13.

A. Oh, okay. Okay. I'm there.

Q. Okay. And can you explain that?

A. Yes. The interconnection customers build

facilities that generate electricity. Assuming there had never been PRPA, the utility companies could have been -- could have built their facilities and earn a rate of return or earn a profit on building the facilities themselves.

Q. Okay. Would you agree that, in contrast, the solar developers are incentivized to move their projects through the queue?

A. Yes.

Q. Okay. I have been adding and deleting, so let me make sure I don't add something I don't need to.

Do you think the fact of this hearing and the associated Commission oversight has motivated the utilities to more actively work to promote efficiency in the queue?

A. Yes.

Q. You note in your testimony -- this is on page 32, lines 20 through 25 -- you say that all parties agree that the utilities have not met the timeline requirements in the 2015 NCIP and the backlog in interconnection queue has persisted. The Public Staff recommends that the utilities continue to add staff -- additional staff as needed to relieve the queue backlog and further improve transparency. The cost of adding

these additional resources should be assigned to DG developers through the fees and charges allocated to their projects." That's your testimony?

A. Yes.

Q. Okay. You note that the queue is clogged in 2015 and that it's still clogged today, correct?

A. Yes.

Q. Okay. You're also noted that the utilities are required by law, by both federal and state law, to interconnect renewable energy projects, and the procedures provide timelines to accomplish that purpose, correct?

A. That's correct.

Q. Okay. You then recommend that the utilities continue to add additional staffing as needed to relieve the queue backlog and further improve transparency.

Is it the Public Staff's position that the addition of staff would constitute good utilities practice, or is that recommended fix simply a matter of the utilities putting into place necessary resources to comply with the federal and state law?

A. I don't understand the difference between your two scenarios. Can you say that, please, again?

Q. Sure. Is the addition of staff that you recommend, would that constitute good utilities practice?

A. No. Good utility practice -- and maybe Witness Williamson can help me a little bit here -- good utility practice is more of a technical process as operating a safe and efficient grid. But your second scenario I believe is more accurate. It would be something to assist the queue and speed up the process.

Q. Okay. And one final question for you, and that is, what do you mean when you say that the utilities need to, quote, further improve transparency?

A. Couple of years ago, we, the Public Staff, was getting some complaints about the utilities not being transparent, not answering phone calls or e-mails. Utilities have proposed increasing the capacity of their sales force program, and just last week, they announced they are adding an online portal to increase transparency to the renewable energy developers. They will have that portal ready within two months, and I think that would greatly improve the process.

Q. Now, Dominion's witness indicated that direct communication seems to have been a great help in

advancing their queue.

Is direct communication occurring between Duke and the --

A. Yes. There is some direct communication, yes.

Q. Some, okay.

A. Yes.

Q. All right. Mr. Williamson?

A. (Tommy Williamson) Yes.

Q. A few questions for you, please.

A. Okay.

Q. If you will go to page 23 of your direct testimony.

A. I'm there.

Q. Lines 12 through 20.

A. Okay.

Q. And if you would read that for me, please.

A. Okay. This is page 23, line 12, my direct testimony, and:

"Question: Did the utilities sometimes initiate new criteria that are not clearly defined within the NCIP?

"Answer: Yes. There are numerous examples of new criteria being introduced during the

interconnection process. The circuit stiffness review and line voltage regulator policies are examples. It is my understanding and belief that such new criteria have not always been clearly or uniformly communicated to the interconnection customers, thus causing confusion, incomplete, or inaccurate applications and resulting in project restudy and delays," end quote.

Q. Thank you. Could you please give us an example or two of how the utility's decision to unilaterally implement a new criteria has not been, quote, clearly or uniformly communicated to the interconnection customers, end quote?

A. Yes. I think this was -- actually occurred prior to my becoming -- joining the Public Staff. But, in fact, during the period of time when the circuit stiffness review, as I mentioned there on line 15, was being rolled out, so like when Mr. Lucas was talking about Public Staff started getting some reports of applications not proceeding, or there -- they were just not moving forward the way they thought, and we were getting complaints about that, and so my understanding

is that there was a pause in the processing while the circuit stiffness review was being finalized and rolled out. And so, as a follow-up to that, part of what we are recommending with the transparency recommendations is that, any time there is a circumstance like that, any new study, screen, or modification to the application of NCIP, and I gave the three recommendations, we recommend that change be presented, filed with the Commission in this docket for informational purposes only, to post it on their website, and also to bring it up to the TSRG for discussion there.

Q. Thank you. Can you give us an example of when it has caused confusion?

A. I think it was just that uncertainty. There was -- no one knew why the delay was happening, and so that was really it, just that it didn't appear processing was happening of the application, so there was no clear indication that this is what's happening. And so it was -- that was the main source of the confusion.

Q. And that would also be true of the incomplete or inaccurate applications?

A. Yes.

Q. Okay. And what about the project restudy and delays?

A. I don't have a direct example of the past, and that's looking more toward the future that, if we don't have that clear indication of to -- as to what change has occurred and been implemented, that that would result in confusion and delays.

Q. Okay. And just one other line of inquiry.

In the settlement, the Public Staff, as you indicated in your summary, has agreed to drop your recommendation of an independent review of the NCIP, correct?

A. Yes.

Q. Why did you believe that such review would have been a benefit when you suggested it?

A. Well, the main goal of the review was really process improvement. And so prior to my joining Public Staff, the NCIP has been developed and revised. And as we have seen with the growth of the high levels of the DER penetration in the last 11 years, the review was the hope to find efficiencies that could be gained, and so that was our main recommendation to achieve those process improvements and gain efficiencies.

Q. Okay. And what about -- are there factors

that you originally considered, again in these recommendations, that are likely to change in the context of the group study or the cluster study?

A. Well, I think the main purpose of the group study is to look at helping to unclog the queue. I know that was discussed at - previously in prior discussions, but I think we see that the -- and the companies have come to the conclusion, it appears, that a grouping study is a way to move forward with the processing of new applications.

Q. And you believe the way that that's going to move forward is something that will actually accomplish the goal?

A. Well, we hope so. I mean, I think -- I know Witness Lucas has discussed this as well, but, you know, we are looking -- we are hopeful that that will take us a step down the road that makes the queue better.

A. (Jay Lucas) I can add to that. I talk about group studies in my testimony. One of the reasons that queue is having so many problems, there are so many interdependencies among these renewable energy developers. The cluster studies will allow these facilities to be studied as a group, so the

interdependencies can be all studied at one time. Now, we do believe that will speed up the process.

Q. Assuming everybody works collaboratively, correct?

A. Yes. It would require a lot of people to work collaboratively, but I believe the renewable energy developers have an incentive to.

Q. Thank you very much, both of you.

MS. TOWNSEND: That's all the questions I have.

CHAIRMAN FINLEY: Duke?

MS. KELLS: Since I just have one, I'm going to go.

CROSS EXAMINATION BY MS. KELLS:

Q. For Mr. Williamson, really quickly, on page 22 and 23 of your testimony, you talk about the Public Staff support of the TSRG process, and do you see on page 23 of your testimony, starting on line 7, where you make the statement that Duke Energy retains the right to make the final decision on all technical standards revolving GEP revisions subject to Commission review as part of its general regulatory power and the dispute resolution process defined in the procedures; did I read that correctly?

A. (Tommy Williamson) That's correct.

Q. I know you made that statement in the context of a Q and A about the TSRG, but putting aside that context, do you agree that the same statement would apply to Dominion, such that Dominion also retains the right to make the final decision on technical standards or involving good utility practice subject to Commission review?

A. Yes, I agree.

MS. KELLS: That's all.

MR. BREITSCHWERDT: Just a few questions, Mr. Chairman.

CROSS EXAMINATION BY MR. BREITSCHWERDT:

Q. For you first, Mr. Lucas. You testified about the stipulation earlier that the Public Staff, Duke, Dominion, and the Pork Council entered into; do you recall that testimony?

A. (Jay Lucas) Yes.

Q. And you briefly mentioned the material modification provisions, Section 1.5.1?

A. Yes.

Q. And so Duke and Dominion agreed to those material modification provisions as part of that stipulation?

A. That's correct.

Q. And the Public Staff's recommendation for the Commission to approve is that the addition of battery storage prior to an interconnection customer beginning the system impact study process would not be a material modification?

A. That's correct.

Q. And under this approach, the Public Staff, would you agree, is that the utility would be assured of fully modeling the final design of the facility, including that storage, through that system impact study process?

A. Yes.

Q. Mr. Williamson, a couple of questions on the TSRG, or TSRG, or I don't know if the Public Staff has a different acronym that you all prefer. We could use whatever you prefer.

But you discuss this in your direct testimony, that your experienced participating in the TSRG?

A. (Tommy Williamson) Yes, I have attended, and other Public Staff as well.

Q. And there has been four meetings thus far?

A. That's correct.

Q. And would you agree that the TSRG is exclusively an engineering and technical discussion forum?

A. Yeah. The focus -- the intent is for it to be an open and free exchange of technical issues regarding interconnection in North Carolina.

Q. So put another way, lawyers aren't invited?

A. Those are your words.

Q. I will accept that. So have you generally observed the participation of John Gajda, Anthony Williams, and other representatives of Duke Energy and their interactions with the solar developer representatives in the TSRG?

A. Yes, I have.

Q. And would you share with the Commission your perspective on Duke's participation, whether it's been in good faith, whether it's been a robust communication back and forth, whether you think it's an effective process to continue to evolve good utility practice in North Carolina?

A. Yes. Just from my perspective, being involved in the meetings and talking to other Public Staff that have also been involved in the TSRG meetings, yes, the discussion is robust and there is --

it's open. It's a lot of back and forth Q and A during the sessions. If you look at the meeting minutes and agendas from past meetings, you'll see a diverse range of topics and issues that are discussed. So yes, we support the TSRG continuing those discussions in the future.

MR. BREITSCHWERDT: That's all I have. Thank you.

CHAIRMAN FINLEY: Redirect?

REDIRECT EXAMINATION BY MS. CUMMINGS:

Q. Mr. Williamson, you were asked by IREC counsel about the definition of good utility practice; do you remember that?

A. (Tommy Williamson) Yes.

Q. They asked you about, does good utility practice include assessment of reasonable costs, and they gave you a hypothetical that, if something costs twice as much with the same outcome, is that reasonable.

Let me ask you, if something costs twice as much but with no additional benefits, you wouldn't consider that reasonable, would you?

A. No.

Q. And the AG -- counsel for the AG asked you

about your withdrawal of your recommendation for a full independent review.

You would still, in future proceedings, consider whether a full independent review would be appropriate?

A. Yes. And that was included in the stipulation, that we reserve -- the Public Staff reserves our right to be able to reintroduce that request for a review in the future.

Q. But after a grouping study?

A. Yes. The timing on it is based on the timeline is a stakeholder group beginning the first quarter 2019, that would be finished around June '19, and then the results filed with FERC and this Commission in July of 2019.

Q. And the Public Staff is of the opinion that that process would be more useful after the transition to your grouping study than before?

A. Yes.

Q. Thank you.

CHAIRMAN FINLEY: Questions by the Commission? Commissioner Mitchell.

EXAMINATION BY COMMISSIONER MITCHELL:

Q. I think these may all be for Jay, although

either one of you-all can answer them. Just very quickly, Mr. Lucas -- I'm sorry, I meant to say Mr. Lucas.

How many -- give us an idea of how many informal complaints the Public Staff is involved in in any given year, just off the top of your head.

A. (Jay Lucas) I have looked back in that. In 2018, we were involved in 11 informal complaints; in 2017, we were also involved in 11 complaints. Just the sheer number is misleading. Sometimes they are very simple net metering-type complaints that we solved with just a few telephone calls and e-mails, but if it's a problem with a utility-scale solar, it could take many hours of dealing with the attorneys and engineers that are involved in the complaint.

Q. Okay. Okay. That's helpful. Thank you. I want to ask you about your testimony on grid costs. You expressed some concern about grid costs in your direct testimony, specifically beginning on pages -- page 46 and continuing on into 47, and, in a nutshell, you indicate that additional scrutiny of grid investments that are necessary to interconnect these generating facilities is gonna be necessary to ensure, sort of, appropriate sharing of costs and benefits, and

you indicate also that the scrutiny will challenge traditional cost of service allocation and recovery models?

A. Yes.

Q. Can you expand on that and help us understand exactly --

A. Yes. I can give an example. And I have an exhibit, talk about on page 47, my Lucas Exhibit Number 3 graphically and simply lays out what the grid looks like. I can give you a moment to find that. If you take a look at that, Lucas Exhibit 3, it's on the left-hand side, I show a distribution circuit that has a mix of customers and distributed generation. Example of storm cost recovery. We have had lots of storm damage the past few years. Many millions of dollars expended. That storm cost recovery is only passed on to the load customers. However, distributed generators are using the grid, to a large degree, for their benefit. Those storm cost recovery costs are only very minimally passed on to distributed generators only through whatever electricity consumption they have. So storm cost recovery is one example where the using and consuming public is bearing almost all those costs. However, distributed generation is also benefitting

from that storm recovery.

Q. Okay. So has the Public Staff given any thought to what types of mechanisms might be appropriate to address that issue?

A. I think they can be addressed during the general rate case. My testimony, I think it's time to start that type of discussion. We haven't come to specific recommendations on that.

Q. Okay. And one last question on this issue of material modification. I understand the position of the Public Staff, as identified in the stipulation, to be that any addition of energy storage to an interconnection request that has not yet proceeded to the system impact study would not be considered a material modification; do I have that right?

A. That's correct.

Q. Okay. We have heard from other parties in the proceeding that they have a different opinion or a different position on material modification that's based, in part, on the discussion that was held in Working Group 2. And I know that you-all -- the Public Staff has been involved in Working Group 2.

A. Yes. I personally was not involved in Working Group 2, but I'm generally familiar with the

discussions that have gone on, and also I was here to hear all the other witnesses' testimony.

Q. Okay. Well, can you explain why the Public Staff doesn't align with the position taken by those parties?

A. The Public Staff does not necessarily align with the interconnection customers. One thing this problem has raised is how storage can be dispatched. If it's dispatched very quickly off and on, somebody used the analogy of a light switch clicking off and on, it could have an adverse effect on nearby customers. And what we laid out in stipulation is some very basic facts. We didn't go into any great technical detail. We laid out where, definitely, the addition of storage before the system impact study will not trigger material modification. It's possible that storage could be added later in the process, maybe, maybe not trigger material modification. To shed some light on it, there is a lot more that needs to be learned from the addition of storage to the grid. We just don't have a good record of it in North Carolina. We would like to look at it further.

Q. Okay. You heard the testimony today from NCCEBA's witnesses that there have been interconnection

requests that would combine solar and storage that have been studied at this point by Duke.

Do you know whether -- recognizing that it's not the Public Staff that's conducting the studies, but do you know whether the study for that request would be different from the study made on a request to add an energy storage device to an existing facility?

A. It would be a little bit different. In your first scenario, it would be a storage and solar combined and studied as one. In your second scenario, there is existing solar facility on site, up, and operating. Adding storage to that would be a little bit different. For one thing, in the second scenario, the utility would already know the generation profile of that solar facility, things like whether it was fixed-tilt or have a tracking system on there. I can see there would be some difference in that type of study in your two scenarios. You basically have storage combined with solar all looked at one time, or have an existing facilities up and operating. There could be some differences there. I just can't enumerate them at this point.

COMMISSIONER MITCHELL: Okay. Okay. I have nothing further.

CHAIRMAN FINLEY: Other questions by the Commission? Questions on the Commission's questions?

(No response.)

CHAIRMAN FINLEY: Okay. Very well. We will receive into evidence Mr. Williamson's attachment and Mr. Lucas' direct and rebuttal exhibits into evidence at this point.

(Lucas Exhibit Number 1, Lucas Rebuttal Exhibit Number 1, and Williamson Attachment A, have been received into evidence.)

CHAIRMAN FINLEY: Thank you very much, gentlemen. You may be excused.

Anything else? Okay. What about briefs, proposed orders, post hearing filings? What is your pleasure? Thirty days is a usual time frame. If you want anything different, let me know.

MR. JIRAK: I think Duke would support 30 days from the transcript with proposed order only. We don't think there is probably much need to have both a brief and post order.

CHAIRMAN FINLEY: Well, what would you

like?

MS. BOWEN: We would like the option -- IREC would like the option to file either post hearing brief or a proposed order, please.

CHAIRMAN FINLEY: We are not going to limit what you could file. File recipes, if you want to.

MS. BOWEN: Thirty days sounds great.

CHAIRMAN FINLEY: Thirty days from the receipt of last transcript. All right. Commissioner Dockham has missed a few hours here. Does anybody object to his, for the time that he was not here in the hearing room, reading the transcript and participating in the decision?

(No response.)

CHAIRMAN FINLEY: Very well. Anything else? Thank you all for your participation. Commission has learned a lot. And we will read with great interest what you filed with us and give you an order. Thank you very much.

(Hearing concluded at 4:59 p.m.)

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, RPR

Notary Public #200707300112