PLACE: Via WebEx Videoconference

DATE: Tuesday, June 17, 2020

TIME: 1:35 p.m. - 5:31 p.m.

DOCKET NO: E-2, Sub 1220

BEFORE: Commissioner Kimberly W. Duffley, Presiding
Chair Charlotte A. Mitchell
Commissioner ToNola D. Brown-Bland
Commissioner Lyons Gray
Commissioner Daniel G. Clodfelter
Commissioner Jeffrey A. Hughes
Commissioner Floyd B. McKissick, Jr.

IN THE MATTER OF:

Williams Solar, LLC,

Complainant

versus

Duke Energy Progress, LLC,

Respondent

VOLUME 2

A P P E A R A N C E S:

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T A B L E O F C O N T E N T S

E X H I B I T S

P R O C E E D I N G S

COMMISSIONER DUFFLEY: We will come back on the record after the lunch and Mr. Burke is currently being questioned by me. I only have a few more questions, Mr. Burke.

THE WITNESS: Yes, ma'am. Can you hear me?

COMMISSIONER DUFFLEY: Yes.

JONATHAN BURKE;

having been previously affirmed,

returned to the stand and

testified as follows:

CONT'D EXAMINATION BY COMMISSIONER DUFFLEY:

Q Can answer this -- if you could turn to Page 8 of your direct testimony -- and Commissioner McKissick asked you if you had received the Facility Study estimate would you have moved -- at the SIS stage would you have moved forward or turned your resources elsewhere. And I heard your response was that you would have in fact turned your resources elsewhere. So if you can answer without revealing confidential information, you can say it will reveal confidential information and I will move on, but at what point, at what dollar amount would you

have made that call between the SIS estimate and the Facility Study's estimate?

A The ultimate point in which we would have chosen to withdraw is $1.5 million for interconnection costs.

Q Okay. Thank you. And on a related note, if the Commission were to decide that the Facility Study estimate stands, are you -- if you can answer, would you plan on moving forward with the project at this point?

A No. No, ma'am, we would withdraw.

Q Thank you. And then can you explain to me, was there any type of class estimate in the System Impact Study that you received?

A I'm sorry, I couldn't hear you. When you said -- did you say class estimate?

Q Class estimate like Class 5 or Class 4. Was there any indication in the SIS estimate of a level of class?

A No, there was not.

Q Thank you. And then my last question has to do with what you understood the System Impact Study estimate to include. I mean, did you understand that it did not include metering costs, overhead

costs, and taxes?
A We understood that there was going to be some metering costs and some taxes that would be allocated. We understood the System Impact Study did look at some overheads but I wasn't aware of the scale or the proportion of those going forward. So that's why I mentioned at the System Impact Study we assumed about a 10 percent increase to that number going forward.
Q Okay. And if I could drill down a little bit on the overheads. So you do -- is your testimony that you believed that some of the overheads were in the SIS estimate or were not in the SIS estimate?
A I've learned that after reading the testimony of the Duke witnesses that there were overheads included in the System Impact Study. At the time that we were looking at it I think we presumed but we did not know for sure.
Q That there were overheads in the SIS estimate?
A Yes.
Q Thank you.
Okay. Thank you. I do have some staff questions for you. So on Page 13 of your

direct testimony, you explain the rule of thumb GreenGo has developed for determining the economic viability of projects like Williams Solar. You note that the Williams Solar project was marginal. Did Williams Solar conduct this analysis again in deciding whether to incur the expenses of requesting the variance in Johnston County's setback ordinance?

A So, if I understand the question right and that is whether or not what they found I was using when we move forward with the zoning application; is that the question?

Q Right. The question is did you conduct an analysis looking at the -- it sounds like the numbers before you moved forward with the Johnston County setback ordinance?

A Yes. Ultimately it fits with our rule of thumb. For this portfolio, everything that's below a million dollars is practically a go. Anything that's between $1 million and $1.5 million is in a gray if it's marginal. And then anything above $1.5 million is the cut off.

Q Thank you. And then do you agree with DEP's assertion that the NCIP requires the

interconnection customer to pay the full cost of interconnection and system upgrades at the time of final accounting regardless of what estimates are provided?

A Assuming you introduce the word reasonable, yes, I think that's correct.

Q And on Page 29 of the DEP's -- let me go to the next question. On Page 34 of your testimony, one request for relief is a PPA subject to preservation of the economic benefits of the entire 15-year term afforded by House Bill 589. Could you explain in a little more detail what really is your thinking with respect to that request for relief?

A Ultimately we're looking to try to capture some of the time that has been delayed by Duke tactically in this process. We would like and are asking for an off-take agreement equivalent kind of inputs on the assumptions that are in Sub 140, which is the rate schedule in which this project is there, to basically be bolt on after the termination of the original standard offer Sub 140 rate.

So ultimately taking -- keeping

Duke accountable associated with the multiple moratoriums that they've introduced and the additional time delay that they've caused related to getting to an answer which we think is where we should have been which is closer to the System Impact Study number than it is the actual Facility Study number.

Q Thank you.

COMMISSIONER DUFFLEY: Any further questions from the Commissioners? Questions on Commission questions?

MR. TRATHEN: Chair Duffley, who would you like to go first?

COMMISSIONER DUFFLEY: We'll let Duke go first.

MR. JIRAK: Thank you, Commissioner Duffley. This is Jack Jirak on behalf of Duke Energy Progress and I just have a handful of questions to follow up on some of the topics we've discussed.

EXAMINATION BY MR. JIRAK:

Q Mr. Burke, how are you this afternoon?

A I'm fine, sir. How are you?

Q Good. Let's start by looking at the 2015 Interconnection Procedures that Commissioner

McKissick had asked you about, and we were looking specifically at the definitions section and the definitions for preliminary estimated interconnection facilities charge and preliminary estimated upgrade charge. Do you have that document in front of you?

A I can get it --

COMMISSIONER DUFFLEY: Mr. Jirak, if you could let all of the Commissioners know exactly which document you're looking at please.

MR. JIRAK: Sure. So it was introduced by Commissioner McKissick. I believe it was --

MR. BREITSCHWERDT: Exhibit 30.

MR. JIRAK: -- Exhibit -- potential Exhibit 30 that Williams had submitted and it is the set of Interconnection Procedures that had an effective date in 2015. That would be the North Carolina Interconnection Procedures with an effective date of 5/15/2015. And I'll give a moment to make sure everyone is there.

BY MR. JIRAK:

Q Mr. Burke, if you'd let me know if you've got that document, that would be great.

A I believe I do.

Q Okay. And I'm going to focus on the definition section which is on Page 5 of the document. I'm looking specifically --

COMMISSIONER DUFFLEY: Mr. Jirak, sorry to interrupt again. Do all of the Commissioners -- have you located the document? Thank you. Please proceed.

BY MR. JIRAK:

Q All right. And so this is Page 5 of Appendix 1 and I'm looking at the definition section, in particular, definitions for the defined terms "preliminary estimated interconnection facilities charge" and "preliminary estimated upgrade charge". Do you see that, Mr. Burke?

A I'm turning to it now. Because my -- the document I have does not have page numbers on it, would you mind if I read what I'm reading to make sure that we're talking about the same subject?

Q Sure.

A So the *Preliminary Estimated Interconnection Facilities Charge - the estimated charge for Interconnection Facilities that is developed using unit costs and is presented in the System Impact Study report in Interim Interconnection Agreement. This charge is not based on field*

visits and detailed engineering cost calculations. Is that the definition?

Q Yes, we're in the right place. All right. So you had discussed this last sentence, and to be clear, so this is the cost estimate that the Company delivers at the time of System Impact Study, correct?

A Yes.

Q And you discussed -- in responses to questions from Commissioner McKissick you discussed this last sentence and this last sentence is identical in the definition of preliminary estimated interconnection facilities charges and in preliminary estimated upgrade charges, correct?

A The last sentence I have is *this charge is not based on field visits and detailed engineering cost calculations in that definition*. Am I --

Q Right. And that's applicable to both the interconnection facilities charge and the upgrade charge?

A That's correct.

Q Okay. And you seem to suggest, as I understood your testimony, that when Duke goes to deliver -- so after the System Impact Study report Duke

delivers a second estimate at the time of facilities costs -- a Facility Study report, correct?

A Would you restate the question, please?

Q After an interconnection customer receives their System Impact Study cost estimate they receive a second estimate at the time a Facility Study report, correct?

A Yes.

Q Okay. And obviously the second estimate could be different than the first estimate, correct?

A Yes.

Q Okay.

A There could be some difference.

Q And the basis for those -- you seem to suggest, as I understood your testimony, that the only reason the utility can change the estimate between System Impact Study, the Facility Study cost estimate is because of something specifically identified in a field visit or detailed engineering? Is that -- was that your testimony?

A I am claiming what the definition suggests is a limitation aspect, it was not absolute.

Q So let's just give a real simple example, let's say a pole costs -- a new -- a pole to be installed as part of an interconnection costs, currently costs Duke $100 and that's the cost that they can purchase that pole at the time of the System Impact Study cost report. Okay. So they have included a $100 estimate for a pole in the System Impact Study cost report. If subsequent to the System Impact Study cost -- the System Impact Study cost estimate prior to the point in time for which the Facility Study cost estimate is delivered the cost for poles goes up and it's now $120 for a pole. Can Duke change its cost estimate in the Facility Study cost estimate based on that fact?

A Yes.

Q Okay. So -- and that's not something that would have been determined by a field visit, correct?

A No, I think you have to look at the delta where there is six months between.

Q So if between the time at which the System Impact Study report is delivered and the Facility Study report is delivered Duke identifies the fact that a particular has gone up, it can take that

increased cost into consideration when it delivers that second cost estimate?

A Yes, so long as it's reasonable.

Q And if it determines that additional -- oh, sorry, go ahead.

A I was just going to say yes as long as that's reasonable. I think if that's a reasonable cost.

Q And if it determines that additional labor hours are needed to perform that work because of information that's gathered in between the point in time at which it delivered the System Impact Study and when it delivered the Facility Study cost estimate, can it take that fact into account in determining a revised estimate?

A Yes, I believe that would be prudent.

Q And if it determines that vehicle costs have gone up between the assumptions that were made at the time of the System Impact Study report and the time of the Facility Study cost report, can it take that change in cost into account?

A Yes, as long as they are reasonable.

Q You were asked a number of questions on this and I just want to make sure we're all on the same page on this one. I believe it started with

Commissioner Clodfelter asking you about an email and it's Ken Jennings/Holmes Exhibit 4, and this is an email, a GreenGo email. Do you have that in front of you, Mr. Burke?

A I can find it. Would you mind if I bring my counsel over to help me be efficient?

Q Of course not. Please proceed.

(Counsel approaches witness)

A Can you state which document you're referring to so I can make sure I have the correct one?

Q It's K. Jennings/Holmes Exhibit 4 and it's an email with the subject line "Interconnection Request of Williams Solar, LLC".

A I can confirm I have it here.

Q Okay. So again, you were asked this question but the answers came out to our ear slightly different. But just to confirm at the time it received the System Impact Study report Williams Solar, GreenGo, understood that metering costs, and overhead costs, and taxes were not included in that estimate, correct?

A In -- what we understood is, if I were to point to the line that Carl wrote to Fred and I, and the line starts with "after this the expected

metering costs, overhead costs are not included in the report, furthermore, eight thirty-four is a pretax estimate. We were aware that there are some overheads that are going through that. Typically, those overheads were related to processing the documents. But when it comes down to this, we factor that in in making our analysis at the $1 million threshold, at the System Impact Study phase, which was effectively addressing where we are so that's one -- when I make my testimony saying we're hitting the marginal limit we were right there based upon the assumption that there were potentially other things that were missing.

Q And I believe that Commissioner Clodfelter pointed you to this at the outset of his line of questioning on this, but have you reviewed the portion of Mr. Ken Jennings' testimony where he identified the fact that discrete line items, that some of which we just discussed, account for approximately 50 percent of the total increase between the System Impact Study and Facility Study report estimate? Are you familiar with that portion of Ken Jennings' testimony?

A Can you point me to where that is so I can have that for record -- for reference?
Q Sure. It's Page 34, line 16 -- starting on line 16.
A Thirty-four. To confirm I have the right location, line 16 starts with a question which is "Please discuss some of the main drivers of the increase?"
Q That's correct.
A Am I in the right -- okay. And can you restate your question, please?
Q Yes. Do you have any basis to disagree with what manner in which Mr. Jennings has characterized what accounts for a substantial portion of the difference in the System Impact Study cost estimate and the Facility Study cost estimate?
A So, quite frankly, I have learned more information through the discovery process of this. So if the question is prior to the discovery process I just kind of colored with what I've seen in other documentation, specifically from our subject matter expert as it relates to what was included or not included.
Q Okay. But as it relates to the five items

identified on line, beginning on line 22, you don't have any reason to disagree that that -- those five discrete items account for 50 percent of the total increase that occurred between the System Impact Study and the Facility Study cost estimates?

A I think ultimately I would defer to those who would have actually done the analysis. I have not done the discrete analysis.

Q So you don't -- you don't have any basis to disagree with that math?

A Nor agree, quite frankly.

Q You haven't even considered that position that Ken Jennings set out in his testimony?

MR. TRATHEN: Madam Chair, I believe that -- Madam Chair, if I could interpose here I believe his question has been asked twice and answered twice.

COMMISSIONER DUFFLEY: Mr. Jirak, please move it along.

MR. JIRAK: Okay.

BY MR. JIRAK:

Q Let's move on to a couple of more topics, Mr. Burke. There was a discussion earlier about -- in response to the questions I believe

from Chair Mitchell regarding average interconnection costs and as it relates to GreenGo's portfolio of projects. Do you recall topic of conversation?

A I do.

Q So when we think about average interconnection costs, would you agree that it matters a great deal what the scope of the interconnection is in thinking about, when you're comparing one interconnection cost to another interconnection cost it's important to understand what's embedded to the scope that gives rise to that interconnection cost estimate, correct?

A Yes.

Q So, for instance, if a project is -- has an interconnection option that only requires -- and would you agree that the two biggest picture categories when you think about interconnection costs are the interconnection facilities and any upgrades that are required? Would you agree those are the two biggest cost categories?

A I think I broke it up slightly different than what you're mentioning. I put it into the interconnection facilities. I put it into the

distribution upgrades that go between interconnection facilities and the substation then I characterized substation upgrades and transmission upgrades. So slightly different than what you characterized.

Q Okay. So, three buckets - we can break out upgrades as transmission or distribution but they're upgrades. Okay. So if I'm looking at one interconnection and it has no upgrades, just interconnection facilities, and then comparing it to another upgrade, another interconnection that has interconnection facilities plus upgrades we would assume, all things being equal, that the one with upgrades is going to cost more.

A Yes. The one with upgrades should cost more than one without, correct.

Q And were you involved in the interconnection proceeding that occurred in early 2019 at the North Carolina Utilities Commission in Docket E-100, Sub 101?

A I was a member of the public stakeholder process that went through that and I attended several meetings in Raleigh.

Q So are you familiar with the testimony of Duke

witnesses in that proceeding that identified the fact that as solar penetration levels increase on the system, and available distribution and transmission capacities consumed by those solar interconnections, it becomes more and more likely to be the case that upgrades will be triggered when a project seeks interconnection?

A I have not -- I'm not familiar with that testimony, quite frankly. I didn't study it to a high degree.

Q All right. Would you agree it's reasonable to assume that when there are multiple projects ahead of you in the queue that are already interconnected to a particular distribution circuit that it's possible that the available capacity on that distribution circuit would become fully consumed over time?

A Yes.

Q And do you know how many projects are interconnected ahead of Williams Solar on this particular distribution circuit?

A I believe it's in the System Impact Study report. Do you mind if I turn to that document?

Q No. Go ahead.

A Okay. I found it. It's actually on Page 5 of 20 of Exhibit JB-2.
Q Okay. Let me just step back a second and say we were talking earlier about average interconnection costs, and for purposes of assessing whether interconnection costs are rising over time, would you agree with me that the more upgrades are triggered over time the more interconnection costs will rise, all things being equal?
A Yes, all things being equal.
Did you want me to answer the question as to what was ahead on the queue, because I have the document in front of me?
Q Actually, yes. I guess the question is how many projects were connected on the substation to which you were seeking interconnection. Do you have that number?
A Okay. I have three projects. It doesn't give me a total, but effectively it's going to be somewhere just under 12 megawatts, if I did my math right.
Q And is it reasonable to assume that because there were already interconnected generation what --

the previously interconnected generation substation was one of the causal factors that resulted in a need for upgrades on this circuit?

A I don't remember actually an upgrade at the substation or upstream. So if I -- if you will bear with me I'll look to see if there was any upgrades in here and nominated. I'm referencing Page 17 of 20 of Exhibit JB-2.

Q Okay.

A There are no transmission upgrades. There are no substation upgrades. And effectively there's just a reconductoring of the existing line from where we are approximately. It's broken down into different lengths. But on the previous page, 16 of 20, you can see that there is under 3A, B and C you have different lengths of changes of reconductoring.

Q And that reconductoring constitute upgrades, correct, distribution level upgrades?

A That's right. But, you know, ultimately, that is what we look for when it comes down to projects ahead of us in the queue, as it kind of -- what the first risk is is it comes through in the thermal overload and the voltage limit creations

of which this project passed all those parameters.

Q Okay. All right. Moving along just a bit I want to ask you, so you understand that in this case Duke's testimony is that one of the reasons for the need to update the cost estimation methodology was observations that it has made regarding actual project costs experienced on constructed projects, correct?

A Yes, that's correct.

Q And to date -- and so because of those costs -- Duke's testimony is that because of those costs exceedances it was necessary to update the methodology in order to provide more accurate cost estimates for interconnection costs, correct?

A I don't agree that's the only thing that could be. I actually believe that Duke has a responsibility to actually control costs and to influence the cost direction.

Q Understood. But Duke's testimony is that there have been actual changes in costs that are necessary to be -- that need to be reflected in the way in which cost estimation is done for

these projects.
A They have but Duke also holds all the cards here. And ultimately when you're looking at the information to substantiate the reasonableness, we still have yet to see actually proof of the reasonableness of these type of costs. But I think to the degree, this is beyond what Williams Solar is, Williams Solar has yet to get to a point where we actually have actual costs.
Q Okay. And to date how many final accounting reports has GreenGo received for GreenGo owned projects.
A Five, from what I'm aware.
Q And have those projects experienced actual costs that exceed the estimated costs?
A Yes. And we have submitted five notices of dispute relating to those.
Q Okay. Now, let me end then briefly on where there a discussion about -- you raised a couple of issues related to technical barriers that Duke has -- what you characterize as technical barriers that Duke has raised in the interconnection process. Do you recall that

discussion?
A I do.
Q And let me try to cut to the chase on this and just say has this Commission ever concluded that any of Duke's technical policies are inconsistent with Good Utility Practice?
A I think that's a Commission question. Are you -- I don't want to be speak on behalf of the Commission.
Q Are you aware of the Commission having ever concluded that one of Duke's technical policies is inconsistent with Good Utility Practice?
A No. I'm also not aware of any adjudication of any of those policies that were introduced.
Q So one of the technical policies you identified, in fact one of the major ones, is the Method of Service Guidelines, Mr. Burke. Are you familiar with that technical policy?
A I am. Ultimately the Method of Service Guidelines was in the policy I referenced. I referenced LVR DPT.
Q You referenced the Method of Service Guidelines in your testimony and would you not agree that the LVR policy is set forth in the Method of

Service Guidelines?
A If you recall correctly, the Settlement Agreement carved that out. We did not agree -- we agreed to disagree on the LVR.
Q Is the Method of Service Guidelines something that you would characterize as a technical barrier to interconnection or do you --
A Ultimately the -- and I think this is nuanced, quite frankly, from my perspective I think there are alternatives -- I'm sorry. Am I speaking over you, Jack? I can't interpret, there's a lag -- there's a lag here and I apologize if I'm speaking over you.
Q Please proceed.
A So the Method of Service Guidelines were approved by the Commission from what I understand. However, I feel that there are ultimate and opportunities to finalize ways in which to accommodate the concerns that Duke has that could have prevented new technical barriers/entries such as using the smart inverter functionality and some of the other things that are there, but that's request my personal belief.
Q So just to confirm, you're not aware of any

instance in which the Commission has found any of Duke's technical policies to be inconsistent with Good Utility Practice, and this Commission has specifically after a litigated proceeding concluded that the Method of Service Guidelines are affirmatively, in fact, consistent with Good Utility Practice?

MR. TRATHEN: I'd have to object to that question. I think there are several compound parts in that and testimony of the lawyer. Perhaps it could be rephrased.

MR. JIRAK: Okay.

COMMISSIONER DUFFLEY: Mr. Jirak, please break the question up.

MR. JIRAK: Sure.

Q Has the Commission affirmatively concluded the Method of Service Guidelines are consistent with Good Utility Practice?

A I believe that is the case, yes.

MR. JIRAK: No further questions.

COMMISSIONER DUFFLEY: Mr. Trathen. Oh, hold on. Kim Mitchell.

(WHEREUPON, the Court Reporter requested that the witness repeat

his answer.)

A I believe it is the case. I don't know all of the dockets that are there, I can just effectively state that I reviewed the updated Interconnection Standard and it appears that the Method of Service was grandfathered in that process and so that's what I'm referencing. If there are other areas of technical kind of adherence or judicial kind of decision making, I'm not aware of.

MR. JIRAK: Can I follow up on that, Commissioner Duffley? He said it was grandfathered.

COMMISSIONER DUFFLEY: Yes, sir --

MR. JIRAK: I'm sorry, Commissioner Duffley. May I proceed? I'm sorry.

COMMISSIONER DUFFLEY: Yes, you may.

BY MR. JIRAK:

Q When you say it was grandfathered, do you mean it was approved?

A I mean it was -- to be quite frank it was unilaterally implemented -- I'm sorry. Again, there's a lag in the video and you're -- I don't want to speak over you.

Q Proceed.

A Quite frankly, my pause here is - just to give you context is the Method of Service Guidelines could have been introduced in the public stakeholder process of the Interconnection Standard, but Duke never once raised that in any sort of public forum prior to unilaterally introducing that in September and enforcing it in October of 2017.

So my pause is I don't think it actually included stakeholder feedback. I don't think there was any debate. I don't think that there was public discourse. Effectively there was no kind of feedback from the industry on specifically that of which through the Settlement Agreement we agreed to take parts of the Method of Service and comply with that and there were others that were reserved. And then, of course, the Interconnection Standard was reviewed and adopted and this is the document we live with today.

Q Okay.

MR. JIRAK: I'm sorry to do this, Commissioner Duffley, but I just have one more minute.

Q (Mr. Jirak) Can we just turn to the North

Carolina -- this will be our -- the North Carolina Interconnection Procedures Order from June of 2019. It was one of the potential cross exhibits that was submitted by Duke.

MR. BREITSCHWERDT: And by Williams -- Exhibit 31 of Williams.

COMMISSIONER DUFFLEY: Mr. Jirak, please make the Commissioners know where they need to go.

MR. JIRAK: I apologize. We're getting the numbers right now.

MR. BREITSCHWERDT: It's Exhibit 31 of Williams --

MR. JIRAK: So if you're looking at Williams potential exhibits it's Exhibit 31 in the Williams list of potential exhibits.

COMMISSIONER DUFFLEY: And while everyone is getting to that document, out of an abundance of caution, the Commission has taken judicial notice of Commission Order -- the Commission's Order in Docket E-100, Sub 101 entitled "Order Approving Revised Interconnection Standard and Requiring Reports and Testimony" dated June 14th, 2019, which also includes the June 14th, 2019 Interconnection Procedures, Forms and Agreements, and that is introduced into the

record.

MR. JIRAK: Thank you, Commissioner Duffley. I'll will give another moment to make sure everyone has the Order in front of them. And I'm going to be looking at Page 9, paragraph 15.

BY MR. JIRAK:

Q Mr. Burke, let me know when you have that document in front of you.

A I believe I do. Does it begin with paragraph 15, "the Duke Utilities' Method of Service Guidelines are reasonable and reflect Good Utility Practice"?

Q That's correct.

MR. JIRAK: And, Commissioner Duffley, do I need to give a moment more to make sure all of the Commissioners have the document in front of them?

COMMISSIONER DUFFLEY: It looks like no one is objecting.

MR. JIRAK: Okay.

Q And so we talked about this and I want to move on, but would you agree that this is an affirmative finding of the Commission with respect to the reasonableness and the Good Utility Practice of the Method of Service

Guidelines?
A I think, if I understand it correctly, you're asking if this document applies to all future interconnection applications, sir, no.
Q No. The question is did the Commission approve and find that the Method of Service Guidelines are consistent with Good Utility Practice?
A Yes, as referenced in paragraph 15.
MR. JIRAK: Thank you. No further questions.
COMMISSIONER DUFFLEY: Thank you. Mr. Trathen.
MR. TRATHEN: Thank you. Just a few questions.
REDIRECT EXAMINATION BY MR. TRATHEN:
Q Mr. Burke, do you still have this last exhibit in front of you, the June 14th, 2019 Order?
A I do.
Q Do you see a couple of paragraphs right under paragraph 17, a reference to TSRG?
A Paragraph 17, correct. Yes, it starts with "the TSRG shall be information-sharing".
Q Yes. And what do you read this paragraph to be referencing with respect to TSRG?

A Okay. I'm reading from, again, Docket Number E-100, Sub 101, Order Approving Revised Interconnection Standards and Requiring Reports and Testimony. I am on Page 9 and it looks like paragraph 17. "The TSRG shall be an information-sharing and discussion forum convened and organized by the Duke Utilities, with continued participation by the Public Staff and generation developers. At TSRG meetings, the Duke Utilities shall make reasonable efforts to continually inform the Public Staff, Interconnection Customers and solar developer advocates of new or changing engineering and technical standards within the interconnection process".

Q So, Mr. Burke, with respect to the actual issue in this case which is the challenges with the estimates by Duke, was there any discussion that you are aware of brought to this TSRG by Duke?

A No, I'm not aware of any discussions.

Q Okay. So, shifting gears, there were questions from several Commissioners about GreenGo's experience aside from Williams Solar with respect to changing estimates. Let me see if I can ask

this a little bit differently.

Prior to July 2019, which is the date of the Williams Solar revised estimate, do you recall ever receiving a Facility Study estimate that was nearly a hundred percent more than the initial estimate?

A Yes, that's correct.

Q Do you -- so the question, Mr. Burke, is are there any other examples other than Williams Solar prior to that date, do you recall any increases of that magnitude?

A No. And the magnitude is not based on percentage, it's also a function of the size. So smaller projects where you may have slightly higher costs we'll see a higher percentage but the overall cash outlay from us is low. This was -- this magnitude was equivalent in magnitude and in the scale of costs. So this was the largest in both.

Q Okay. Commissioner McKissick asked you several questions about the System Impact Study report and its purpose. Could you turn to Exhibit 1 to your testimony, please?

A What did you say? The exhibit number again

please?
Q Exhibit 1. Exhibit 1 to your testimony.
A Okay. I am at Exhibit JB-1, Page 1 of 2.
Q Perfect. So the last -- could you read the last sentence of the first paragraph starting "the purpose of this email"?
A So the email I'm looking at starts with "the result of the System Impact Study report". Is that the email that you're referencing?
Q Yes, sir.
A Okay.
Q I'm asking you could you read just the last sentence of the first paragraph starting with "the purpose of this email"?
A The purpose -- I'm trying to -- I am having a hard time finding that with the documents that I have. Can I ask for counsel to come over and help me?
COMMISSIONER DUFFLEY: Allowed.
(Counsel approaches witness)
A Okay. Thank you. To answer your question. "The purpose of this email is for a decision to be made whether or not to continue moving forward with the project for the final costs or to

withdraw".

Q So with respect to the purpose of the System Impact Study report how do you interpret that sentence?

A Ultimately, it is something that -- it is a quality enough for us to make an informed business decision as to whether or not to stay and continue development and spend money or to leave. So the information is meant to be a decision-making tool.

MR. TRATHEN: That's all I have.

COMMISSIONER DUFFLEY: Thank you, Mr. Trathen.

To clean up the record, I will take judicial notice of the Commission's Order in Docket E-100, Sub 101, entitled "Order Approving Revised Interconnection Standard" dated May 15th, 2015, which included the May 15th, 2015 Interconnection Procedures Forms and Agreements, and that will be introduced into the record.

Mr. Trathen, are there any other cats or dogs out there?

MR. TRATHEN: We would simply ask that our exhibits that were attached to the prefiled testimony

be admitted into evidence.

COMMISSIONER DUFFLEY: So moved.

(WHEREUPON, Exhibit JB-1 through JB-14 were previously received in evidence in Volume 1 at Page 17.)

COMMISSIONER DUFFLEY: Please call your next -- thank you, Mr. Burke. I appreciate you testifying today.

THE WITNESS: Thank you very much.

(The witness is excused)

COMMISSIONER DUFFLEY: Mr. Trathen, you may call your next witness.

MR. TRATHEN: I'll turn the mic over to Mr. Tynan.

COMMISSIONER DUFFLEY: Mr. Tynan, you need to unmute yourself.

MR. TYNAN: I'll probably do that again. I'll try not to.

We'd like to call our second witness Charles Bolyard. Good afternoon, Mr. Bolyard.

MR. BOLYARD: Good afternoon, Mr. Tynan.

MR. TYNAN: Could you please state your name and business address for the record?

MR. BOLYARD: My name is Charles --

COMMISSIONER DUFFLEY: Excuse me. I need to affirm him.

CHARLES E. BOLYARD;

having been duly affirmed,

testified as follows:

DIRECT EXAMINATION BY MR. TYNAN:

Q Mr. Bolyard, could you please state your name and business address for the record?

A My name is Charles E. Bolyard, Jr. And my business address is 3040 Williams Drive, Suite 300, Fairfax, Virginia 22031.

Q And did you cause to be filed in this proceeding direct testimony consisting of 33 pages and 21 exhibits.

A Yes, I did.

Q If I were to ask you the same questions in these prefiled submissions today, would your answers be the same?

A Yes, sir.

Q Do you have any corrections to your testimony?

A No, sir.

MR. TYNAN: Madam Chair, I would ask that Mr. Bolyard's direct testimony be entered in the record and the corresponding Exhibits 1 through 22 be

marked for identification? You're muted I think.

COMMISSIONER DUFFLEY: Thank you. Thank you. Mr. Bolyard's direct prefiled testimony consisting of 33 pages filed on April 28th, 2020 is copied into the record as though given orally from the stand, and his 21 exhibits are marked for identification as premarked in the filings and will be received into the evidence.

MR. TYNAN: Thank you, Madam Chair.

(WHEREUPON, Exhibit CEB-1 through CEB-20 and Confidential Exhibit CEB-21 are marked for identification as prefiled and received into evidence. Confidential filed under seal.)

(WHEREUPON, the prefiled direct testimony of CHARLES E. BOLYARD is copied into the record as if given orally from the stand.)

DIRECT TESTIMONY OF CHARLES E. BOLYARD, JR.

OF McDONOUGH BOLYARD PECK, INC.

FOR WILLIAMS SOLAR, LLC

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

Docket No. E-2, Sub 1220

April 28, 2020

I. INTRODUCTION AND SUMMARY

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. Charles E. Bolyard, Jr. My business address is Williams Plaza 1, 3040 Williams Drive, Suite 300, Fairfax, VA 22031.

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

A. I am employed by McDonough Bolyard Peck, Inc., which is headquartered in Fairfax but has offices in nine states, including North Carolina. I currently serve as Chairman of the Board of Directors, having been continuously employed with this firm for more than 30 years. The firm specializes in construction management and consulting services.

Q. PLEASE SUMMARIZE YOUR BACKGROUND AND PROFESSIONAL EXPERIENCE.

A. I am a 1974 graduate of West Virginia Institute of Technology (now West Virginia University Institute of Technology) with a Bachelor of Science Degree in Civil Engineering. I attended Catholic University of America, taking graduate level course study in Estimating, Bidding and Cost Control. I have continued my

education through participation in seminars and training provided through professional associations and private entities.

Over my career, I have attained and maintain the following professional certifications and affiliations:

- Certified Construction Manager (CCM) – through the Construction Management Association of America (CMAA).
- Planning and Scheduling Professional (PSP) – through AACE International (AACE).
- Certified Forensic Claims Consultant (CFCC) – through AACE International (AACE).
- Member and Fellow of CMAA.
- Member and Fellow of AACE International, a Past-President, and currently serve as Chairman of AACE's Certification Associate Board.
- I have previously served as a Regional Director, Vice President of Certification and as Chairman of the CFCC Committee of the Certification Associate Board.
- I am a Life Member of the American Society of Civil Engineers (ASCE).
- I am a member of the Dispute Review Board Foundation (DRBF).

A CV providing a complete summary of my professional experience is attached as Exhibit CEB-1.

Q. PLEASE SUMMARIZE YOUR EXPERIENCE IN THE FIELD OF CONSTRUCTION COST ESTIMATION.

A. I have more than 46 years of experience in the construction industry in varying capacities and with increasing responsibility over construction managers, contractors, owners, and construction consultants. My cost estimating experience includes direct responsibility for design and construction cost estimates as large as

$3.3 billion. My Critical Path Method (CPM) scheduling experience includes preparation, maintaining, and updating CPM schedules for projects of varying sizes and complexities in both design/bid/build and design/build project delivery approaches. As components of my work in claims analysis and dispute resolution, I have reviewed and investigated schedule performance, schedule impact and delay analyses, labor loss of productivity analyses, cost estimates, actual costs of performance and claimed damages of contractors, architects/engineers, owners and consultants for projects as large as $10 billion.

I have developed and presented instructional training on topics including project records management, cost estimating, bidding, cost management, CPM scheduling, delay analysis, and impacts and damages analysis, and co-authored an article entitled Earned Value Analysis and CPM Schedule Review in Construction, published in AACE International's periodical Cost Engineer.

Q. PLEASE SUMMARIZE YOUR EXPERIENCE WITH OF UTILITY CONSTRUCTION PROJECTS.

A. I have more than 40 years' experience in evaluating cost estimating methodologies and process for power generating facilities and the interconnection of those facilities to the distribution grid. I also have the experience on these same power generation projects of evaluating the following: (a) the actual costs of performance in comparison to original cost estimates; (b) updated cost estimates and re-estimates; (c) forecasts of costs at completion of projects; and (d) impacts to estimated costs arising from changes in project scope and impacts from delays and disruptions to the progress of construction. The types of power generating facilities

include coal-fired, natural gas and alternate fuel fired, integrated coal gasification, hydroelectric and nuclear facilities within and outside the United States.

Q. HAVE YOU PROVIDED TESTIMONY IN PRIOR STATE REGULATORY COMMISSION PROCEEDINGS?

A. No.

Q. HAVE YOU PROVIDED TESTIMONY IN PRIOR COURT OR ADMINISTRATIVE PROCEEDINGS?

A. Yes. I have provided expert testimony in numerous construction disputes, and I have also served as mediator and third-party neutral in the resolution of claims and disputes arising from design and construction projects. My experience in expert testimony has been in the areas of cost estimating, cost management, actual costs of construction, construction means and methods, trade coordination, CPM scheduling and delay analysis, impacts analysis and damages analysis, construction management, and cost estimating and management standard of care.

I have been qualified and provided expert testimony in venues such as the United States Court of Federal Claims, federal district courts, the Civilian Board of Contract Appeals, the International Institute for Conflict Prevention & Resolution arbitration proceedings, various state and county courts, AAA Arbitrations, and federal agencies' Board of Contract Appeals. A summary of my prior testimony is included as part of Exhibit CEB-1.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. I have been engaged on behalf of Williams Solar, LLC ("Williams Solar") to independently review and evaluate the reasonableness of, and basis for, the cost

estimates provided by Duke Energy Progress ("DEP") for network upgrades and interconnection facilities necessary to interconnect Williams Solar to DEP's electric power distribution system.

Q. HOW IS YOUR TESTIMONY ORGANIZED?

A. First, I discuss the process by which DEP arrived at its initial cost estimate for the Williams Solar interconnection project provided by DEP at the System Impact Study Report stage (which I refer to as the "Initial Estimate").

Second, I discuss the process by which DEP arrived at its revised cost estimate for the Williams Solar interconnection project provided by DEP at the Facilities Study Report stage (which I refer to as the "Revised Estimate"). In this section, I discuss the key differences between DEP's Initial and Revised Estimates.

Third, I present my opinions regarding both DEP's Initial Estimate and Revised Estimate and identify the underlying documents that informed my opinions.

Finally, I discuss DEP's claim that in 2019 it investigated and resolved problems with its processes and procedures for estimating the costs of construction for interconnection projects.

Q. PLEASE PROVIDE A SUMMARY OF YOUR TESTIMONY.

A. In January 2019, DEP provided Williams Solar with its Initial Estimate, which indicated expected Upgrade costs in the amount of $774,000 and Interconnection Facilities costs of $60,000. Six months later, in July 2019, DEP provided its Revised Estimate indicating expected Upgrade costs in the amount of $1,388,374.26 and Interconnection Facilities cost of $196,495.13.

DEP prepared its Initial Estimate using a spreadsheet-type template—referred to as the SIS Estimation Tool Rev0—that purportedly relied on compatible unit cost data based on historical work order cost information from DEP's project management database. In contrast, DEP prepared its Revised Estimate by applying an arbitrary set of "plus up" calculations to the estimated costs calculated by DEP's Maximo software platform.

Based on my experience with appropriate methods of cost estimation in the construction industry and my review of the documents provided by DEP in discovery, my conclusion is that neither estimate was properly designed to yield fair, reasonable and reliable results.

First, the Initial Estimate was based on cost inputs that DEP knew, or should have known, were outdated and yielded results that were inconsistent with construction costs DEP claimed it was experiencing on interconnection projects.

Second, the Revised Estimate forecast significantly increased costs, not based on any new information or changes in the scope of the project but based on an arbitrary set of calculations applied by DEP for the sole purpose of generating a higher cost estimate. In fact, the Revised Estimate simply takes the output of DEP's estimating software and grosses it up by certain multipliers.

Third, as regards DEP's application of 20% contingency in its cost estimate, based on DEP's purported level of engineering design and site investigation performed prior to developing its Revised Estimate, I find 20% to be an excessive amount of contingency and would expect the contingency applied in the Revised Estimate to be significantly less than the 20% used by DEP.

Finally, while DEP claims it has made efforts toward improving its cost estimating processes, by all appearances, these "improvements" are not consistent with industry practice.

Q. ARE YOU OFFERING AN OPINION AS TO THE REASONABLENESS OF THE ACTUAL COSTS OF THE WILLIAMS SOLAR PROJECT CLAIMED BY DEP?

A. No. I want to be clear that my testimony only relates to the reasonableness of, and basis for, the cost estimates provided by DEP to Williams Solar. I have not independently formed an opinion regarding what the "right" number should be except to say that DEP did not utilize a process designed to generate the "right" estimated cost. Additionally, for purposes of this testimony, I have assumed the reported dollar amount of, and have not independently evaluated, information provided in discovery by DEP relating to actual construction costs it incurred in connection with other interconnection projects. Whether these actual costs were reasonably and appropriately incurred is not the subject of my testimony.

Q. CAN YOU SUMMARIZE THE BASIS FOR YOUR OPINIONS?

A. My opinions expressed herein are based on my education, experience, and review of project records and materials exchanged by the parties. My opinions do not and should not be construed as providing legal conclusions.

My opinions presented generally identify examples of the project records and other documents on which I relied in reaching my conclusions and opinions. I also reviewed many documents, in addition to those on which I have explicitly relied. *See* Exhibit CEB-2 (listing of documents reviewed).

II. DEP'S INITIAL ESTIMATE

Q. HAVE YOU REVIEWED THE INITIAL ESTIMATE FOR SYSTEM UPGRADES AND INTERCONNECTION FACILITIES PROVIDED BY DEP TO WILLIAMS SOLAR AT THE SYSTEM IMPACT STUDY REPORT PHASE?

A. Yes. This estimate was provided to Williams Solar on January 28, 2019 in connection with its delivery of the System Impact Study Report. *See* E-mail from Lee P. Winter, Duke Energy, to Williams Solar dated Jan. 28, 2019, transmitting System Impact Study Report, Facilities Study Agreement, and Request for Information (attached as Exhibit CEB-3). It should be noted that, although the report was not transmitted until January 28th, the actual date of the System Impact Study Report was December 20, 2018. *Id.* It is unclear to me why it took DEP more than thirty days to transmit the report to Williams Solar after it was officially released in December 2018.

Q. WHAT WAS THE AMOUNT OF THE INITIAL ESTIMATE PROVIDED BY DEP?

A. DEP's Initial Estimate for the project was $774,000 for System Upgrades and $60,000 for Interconnection Facilities.

Q. WHAT WAS THE SCOPE OF WORK FORMING THE BASIS OF DEP'S INITIAL ESTIMATE?

A. The scope of work associated with DEP's Initial Estimate consisted of:

- Reconductoring approximately 2.5 miles of overhead line;
- Relocating a hydraulic recloser;
- Installing an electronic recloser;

- Removing one 25A fuse;
- Installing three 50A fuses;
- Installing seven 25A fuses; and
- Installing seventy-one high fault tamer fuses.[1]

The System Upgrade costs were broken down as follows:

Transmission Upgrades	$0
Substation Upgrades	$0
New Line Construction/Reconductoring	$705,000
Protection Upgrades/Sectionalization	$69,000
Other	$0

See Exhibit CEB-4 (System Impact Study Report, at Table 4 p. 17). This summary indicates that the great majority of the estimated costs relate to the reconductoring work as opposed to the fuse swap-outs, which would be consistent with my expectations.

The Interconnection Facilities costs were not broken down, but the facilities required were specified in the January 28, 2019, e-mail to Williams Solar. *See* Exhibit CEB-3.

Q. WHAT PROCESS DID DEP USE IN PROVIDING ITS INITIAL ESTIMATE TO WILLIAMS SOLAR?

A. Based on my review of information provided by DEP, it appears that DEP employed one or more spreadsheet-type templates—referred to as the SIS Estimation Tool Rev0—that rely on compatible unit cost data based on historical

[1] *See* System Impact Study Report, at 16, attached as Exhibit CEB-4 (referenced page numbers refer to the page numbers of the PDF file). *See also* Internal DEP e-mail dated December 19, 2018, transmitting the System Impact Study for Williams Solar, LLC, attached as Exhibit CEB-5 (identifying cost estimate for DEP's system upgrades, including Estimated Construction Hours of 5,157 hours).

work order cost information from DEP's project management database to develop the Initial Estimate.

DEP describes its procedure as follows:

> First, the System Impact Study estimated cost *[sic]* are based on reviewing the upgrades identified in the System Impact Study Report with the existing conditions and any current proposed non-DER upgrades in the DEP Graphical Information System (GIS) and a per mile cost estimation sheet. The SIS Estimation Tool Rev0 (which is being produced in DEP's response to Request for Production of Documents No. 5), has typical system upgrade project cost estimates on a per mile basis. These estimated cost data inputs to the cost estimate sheet were developed by the Capacity Planning Department based on overhead distribution line construction completed in DEP on a per mile cost basis. This cost estimation sheet is utilized to estimate costs for both internal overhead distribution line construction projects, as well as System Impact Study estimates for generator interconnections. The Capacity Planning Department also more recently developed the SIS Estimation Tool Rev0 based on completed projects. The cost data relied upon by DEP in generating cost estimates in the cost estimate tool is based upon the following categories of procured costs:
>
> a. Overhead Contractors (Labor/Equipment) – The contractors completing those projects were selected on a competitive basis and were required to satisfy DEP's qualifications including safety, construction quality, presence in our region, ability to scale, cost and other factors.
>
> b. Material/Parts – Duke obtains competitive pricing for material purchases and performs a technical and commercial evaluation to determine the best overall evaluated pricing to select an approved supplier or in many cases multiple suppliers. Duke periodically reviews market conditions to assess indices relative to raw material cost and perform cost modeling for approved price adjustments.
>
> c. Engineering Labor - Pike Engineering is an engineering contractor for both Duke Energy Progress and Duke Energy Carolinas. Their rates for engineering labor were competitively bid.

Respondent Duke Energy Progress, LLC's Responses to Complainant's First Set of Interrogatories and Requests for Production of Documents, at Interrogatory No. 1-3 (attached as Exhibit CEB-6).

In its Supplemental Responses, DEP made clear that the revised SIS Estimation Tool was not utilized in preparation of the Williams Solar Initial Estimate:

> Finally, DEP clarifies its response to Request No. 1-3 to confirm that the Capacity Planning Department developed "SIS Estimation Tool Rev0" and provided it to Pike Engineering in 2015. This tool was created using completed distribution work orders completed prior to 2015. In June 2019, the Duke Energy Distributed Generation Team updated the spreadsheet to "SIS Estimation Tool Rev1." This update was implemented to more accurately estimate system upgrade costs.

Duke Energy Progress, LLC, Supplemental Responses to Complainant's First Set of Interrogatories and Requests for Production of Document, at Interrogatory No. 1-3 (attached as Exhibit CEB-7). This clarification by DEP indicates that the historic cost data utilized by DEP in preparing the Initial Estimate was, at a minimum, four years old at the time the Initial Estimate for Williams Solar was prepared in December 2018.

This is further confirmed by DEP's Response to Interrogatory No. 1-6, in which DEP provided its response with respect to line item type historic cost data for similar projects, if any, used by DEP in developing estimated costs for Preliminary Estimated Upgrade Charge. DEP's response was as follows:

> The creation of the "SIS Estimation Tool Rev0" tool originated in work order designs created in the late 1990's or early 2000's for general distribution work. Sometime between 2000 and 2005, the work orders were converted to the Work Management Information

> System (WMIS) and the format of the "SIS Estimation Tool Rev0" tool was developed. Work orders were created in WMIS on various types of construction needed to complete System Improvement projects. The work orders were based upon generic work orders historically and were initially refreshed annually through a labor intensive manual process. Each year, if a new type of System Upgrade was needed, a new work order would be created to cover the need. These work orders correspond to "historic cost data for similar projects" referenced in DEP's Answer.
>
> In recent years, an adjustment factor was added to the SIS Estimation Tool Rev0 to increase labor costs based experienced changes in labor expense. As more time passed between the latest revision of the estimates used to feed the tool and the application of the tool, a decision was made to increase the base labor factor to keep up with rising labor charges.

See Exhibit CEB-6, at No. 1-6. In its Supplemental Response to this interrogatory, DEP further confirmed that its Initial Estimate was reliant on stale input data:

> . . . DEP clarifies its initial Response to confirm that adjustment factors were added prior to 2015 and in June 2019. From the time Pike Engineering received the SIS Estimation Tool Rev0 in 2015 through June 2019, no changes were made in the form of adjustment factors, or line item costs. Cosmetic changes were made for the purposes of ease of use as explained in DEP's supplemental response to Request No. 1-1; however, line item costs and adjustment factors remained the same.

DEP's clarification confirms that the cost data relied upon by DEP in the preparation of the Initial Estimate in December 2018 had not been changed since prior to 2015, a minimum of four years.

Q. WHAT IS YOUR UNDERSTANDING OF THE PURPOSE OF DEP'S INITIAL ESTIMATE?

A. DEP's Initial Estimate was supposed to identify and detail impacts to DEP's electric distribution system associated with interconnecting the proposed Williams Solar generating facility, and to identify System Upgrades and Interconnection

Facilities needed to interconnect and correct any system problems identified in the study. As required by Sections 4.3.5 and 4.3.6 of the Commission's Interconnection Procedures, these estimates are intended to provide a preliminary non-binding estimate of the cost and length of time necessary to provide the Interconnection Facilities and System Upgrades.

Q. IN YOUR EXPERIENCE, WHEN A PROPERTY OWNER OR DEVELOPER IS CONSIDERING A PROJECT, WHAT IS THE PURPOSE OF AN EARLY CONSTRUCTION ESTIMATE OR CONSTRUCTION BUDGET?

A. The purpose of an early project estimate is to provide the project developer a reliable and reasonable basis for evaluating the viability of the project and making an informed investment decision as to whether to move forward to the next step in project development. Stated another way, it would serve no purpose—and would be actively harmful to the project developer—to provide an early estimate that was completely without basis and that the estimator knew was unreasonable and unreliable. Confirming the importance of the preliminary estimate to the interconnection process, the Commission's Interconnection Procedures require interconnection customers to provide payment or financial security equal to the cost of the Network Upgrades identified in the preliminary estimate as non-refundable prepayment in order to proceed to the Facilities Study phase. *See* Interconnection Procedures, sec. 4.3.9.

Q. DID YOU FIND EVIDENCE THAT DEP INTENDED THAT WILLIAMS SOLAR WOULD RELY ON ITS INITIAL ESTIMATE IN MAKING

DECISIONS AS TO WHETHER TO MOVE FORWARD WITH THE PROJECT?

A. Yes. In its January 28, 2019, e-mail transmitting the Initial Estimate DEP stated:

> "[T]he purpose of this email is for a decision to be made whether or not to continue moving forward with the project for the final costs or to withdraw. … At this current stage your options are: Continue with the interconnection process by completing and returning the attached documents to be received within sixty (60) calendar days form the date of this email – March 29, 2019; or you can Withdraw by replying to this email."

Exhibit CEB-3. It could not be clearer that DEP intended that Williams Solar rely on the Initial Estimate in making decisions about whether to continue making investments on the project.

Q. IN CREATING ITS INITIAL ESTIMATE, DID DEP INCLUDE ANY OVERHEAD EXPENSES IN THE ESTIMATE?

A. The Initial Estimate, as transmitted to Williams Solar in the explanatory e-mail and accompanying System Impact Study Report (*see* Exhibit CEB-3), did not include a line item or cost category identifying DEP's overhead expenses.

However, DEP's discovery responses indicate that overhead was included in the Initial Estimate. In response to Interrogatory 1-1, DEP states that "labor, materials, and overhead are included in the $774,000 estimate based on work management data available as of the issuance date of System Impact Study report for Williams Solar." *See* Exhibit CEB-4.

Q. IN CREATING ITS INITIAL ESTIMATE, DID DEP APPLY ANY CONTINGENCY FACTOR IN THE ESTIMATE?

A. No. There is no indication from the documents provided in discovery that DEP included a contingency factor or contingency costs in its Initial Estimate.

Q. DID DEP ATTEMPT TO IMPROVE ITS ESTIMATION PROCESS FOR SYSTEM IMPACT STUDIES?

A. It depends what you mean by "improve." DEP's discovery responses explain that in June 2019, DEP introduced a new estimating tool for use in the system impact study process. However, this "new" tool is apparently identical to the old tool used to generate the Initial Estimate for Williams Solar, except in one respect: the spreadsheet's output, as summed in cell J13, is multiplied by a factor of two. Compare Exhibit CEB-8 ("Williams Solar Estimation Tool SIS.xlsx") with Exhibit CEB-9, ("SIS Estimation Tool Rev1.xlsm") (multiplying the "Total Cost Estimate" by 2); *see also* DEP's Responses to Williams Solar's Interrogatory No. 1-7 "Also in June 2019, . . . DEP determined that the SIS Estimation Tool Rev 1 needed to have an additional contingency factor of 2.0 added . . . ."). In my opinion, simply multiplying the gross output of an estimate based on outdated source data by 2.0 is not consistent with industry practice.

Moreover, DEP's referring to this factor of 2 to increase estimated cost as a "contingency" is not consistent with the way that term is used in construction estimating. The "contingency" represented by DEP's use of a factor of 2 represents adding a 100% contingency. However, this factor is not truly a contingency. A contingency applies when there is uncertainty about exactly what work will be required to complete a project. The factor of 2.0 does not reflect a lack of information about the required scope of work. It is really more what could be called

a "fudge factor" designed to account for an apparent recognition that the underlying estimate is simply unreasonable and unreliable.

III. DEP'S REVISED COST ESTIMATE

Q. PLEASE SUMMARIZE THE REVISED ESTIMATE PROVIDED TO WILLIAMS SOLAR?

A. DEP provided its Revised Estimate to Williams Solar on July 30, 2019. *See* e-mail from Lee P. Winter to Williams Solar dated July 30, 2019 (attached as Exhibit CEB-10). This Revised Estimate substantially increased forecasted costs, projecting $1,388,374.26 for Network Upgrades costs—comprised of $1,297,546.03 in upgrade costs and $90,828.22 in state sales tax—and $196,495.13 in Interconnection Facilities costs. In the Revised Estimate, DEP stated that Williams Solar would be required to begin paying for the estimated Interconnection Facilities costs immediately upon execution of the Interconnection Agreement.

Q. DID DEP PROVIDE ANY FURTHER BREAKDOWN OR EXPLANATION OF THESE COSTS?

A. By e-mail on July 30, 2019, Williams Solar requested additional information about the revised estimate, including "a detailed cost break down of every item in the [scope of work] so that we can understand what exactly is driving this substantial increase in costs. Exhibit CEB-11. DEP responded that it "cannot provide this level of detail." DEP did state that $1,181,873.33 of the costs was attributable to new line construction/reconductoring, and $115,672.21 was attributable to protection upgrades/sectionalization.

Q. IN DISCOVERY IN THIS CASE, DID DEP PROVIDE ANY FURTHER BREAKDOWN OF THESE COSTS?

A. Yes. DEP disclosed that the costs include the following general categories:

- Labor;
- Labor Overheads;
- Vehicle and Equipment Costs;
- Vehicle and Equipment Overheads;
- Material Costs;
- Material Overheads;
- Contingency

See Exhibit CEB-6, at Interrogatory No. 1-2. More specifically, DEP disclosed that the estimates for each of these cost components was as follows:

Estimated Labor Costs Total (LC)	$	725,040.00
Estimated Vehicle / Equipment Total (VC)	$	290,016.00
Estimated Total Material Costs (EMC)	$	289,490.03
Estimate	$	1,297,546.03

Total Labor Costs (LC) for Project			
LC	$3,180 x 1 crew x 4 people per crew times 38 weeks		=$483,360
Contingency	$483,360 x 0.30		=$ 96,672
Overheads	$580,032 x .025		=$145,00
Total Labor Costs (LC)			**=$725,040**
Vehicle Cost (VC			
Cost per Man Week = ($30 x 5 x 8) x 1.06			=$ 1,272
VC	$ 1,272 x 1 crew x 4 people per 38 weeks		=$ 193,344
Contingency	$193,344 x .020	=$ 36,689	
Overheads	$232,013 x .025	=$ 58,003	
Total VC (with Inflation and Overheads)			**=$290,016**
Estimated Material Costs			
$143,328 x 1.06 inflation assumption for 2 years			=$151,927
Material Overheads $151,927 x .04875			=$ 74,065
Sub Total $151, 927 + $74,065			=$ 225,992
Contingency	**$225, 992 x 0.20**	**=$ 45,198**	
Overheads	$45,198 x .025		=$ 11,300
Total EMC (with Inflation and Overheads)			**=$282,490**

See Exhibit CEB-6, at Interrogatory No. 1-2.

Q. WHAT WAS THE DOLLAR AMOUNT OF INCREASE IN THE REVISED ESTIMATE OVER DEP'S INITIAL ESTIMATE?

A. DEP's Revised Estimate for System Upgrade costs was $614,374.26 (or 79.4%) more than the Initial Estimate. As discussed above, this is well outside the norm for industry accepted deviation from an initial project cost estimate. On its face, this unexplained, substantial deviation from the initial estimate raises significant questions.

Q. WERE THERE ANY MATERIAL DIFFERENCES IN THE SCOPE OF WORK FROM THE INITIAL ESTIMATE THAT MIGHT EXPLAIN THIS DIFFERENCE?

A. No. DEP did not identify any differences in scope of work from the Initial Estimate and confirmed by e-mail on July 31, 2019, that "[t]he scope of work has not changed." Exhibit CEB-11. Typically, one would expect that revisions in cost estimates would be driven by changes in the project design and scope, as it is quite common for projects to evolve over time or to be more or less complicated than originally envisioned. Where the scope does not change, one would expect that the revised estimate would be very similar to the original estimate.

Q. WHAT PROCESS DID DEP USE IN GENERATING ITS REVISED COST ESTIMATE FOR THE WILLIAMS SOLAR PROJECT?

A. DEP initially developed estimated costs through its Maximo software platform. Then, DEP applied what it refers to as its "Revised Estimating Tool (RET)" to the costs derived from Maximo in order to arrive at the costs presented in its Revised Estimate. Exhibit CEB-6, at Interrogatory No. 1-3.

Q. DO WE KNOW HOW MUCH OF THE REVISED ESTIMATE CAME FROM MAXIMO AND HOW MUCH CAME FROM THE RET?

A. Yes. Of the $1,297,546.03 in system upgrade costs, $679,419.31 was estimated by Maximo and $618,126.72 resulted from the RET. Exhibit CEB-12 at p. 7. That is, DEP's Maximo software produced an estimate for system upgrades that was approximately $95,000 less than the Initial Estimate. The cost increase seen in the Revised Estimate is entirely a result of application of the RET, increasing the costs derived from Maximo by 91%, or nearly double.

Q. ARE YOU FAMILIAR WITH THE MAXIMO SOFTWARE?

A. Yes. I have a general familiarity with Maximo based on its use by one of MBP's public agency clients in North Carolina. In addition, I consulted with colleagues within MBP who have more detailed familiarity with the application of Maximo. Maximo, an IBM product, is an "intelligent asset maintenance and operations platform" that permits users to uniquely identify each asset (device, equipment, cable, etc.) in the user's functional system. The unique asset identifier can then be linked with product cost, technical and operational data for use in operating, maintaining/servicing, updating, expanding and planning for replacement of individual assets or groups of assets. This software platform can be used to initiate work orders for maintenance, repair, or replacement of existing assets, as well as for acquiring and installing new assets. The software platform has the functionality to provide cost estimates based on cost data loaded into and stored or accessed through links with data outside the system. As a software platform aimed at enterprise asset management, Maximo has limited estimating capabilities that are

focused on asset repair and replacement, projecting replacement costs based on the initial costs of the asset as entered in Maximo.

Q. YOU STATED THAT THE REVISED ESTIMATE WAS GENERATED BY DEP'S "REVISED ESTIMATING TOOL." PLEASE DESCRIBE THAT TOOL AND YOUR UNDERSTANDING OF HOW IT WAS USED BY DEP IN PROVIDING THE ESTIMATE.

A. The RET is not an industry standard cost estimating tool. DEP has indicated that the RET "applied a multivariate analysis to accounting data documenting cost differences between estimates and actuals for 100+ vintage 2015-2018 commercially operating distribution interconnection projects in DEP and DEC." DEP's Response to Interrogatory No. 1-15. However, the reality is that it is a spreadsheet created by DEP's internal personnel specifically for the purpose of "plussing up" the cost estimates generated by DEP's regular cost estimation tool for distribution projects like Williams Solar's in order to achieve the desired increase in estimated cost. The tool employs blunt-force multipliers to take the costs generated by Maximo and increase them by specified factors or sums.

Q. HOW DOES THE RET WORK?

A. DEP provided what appears to be a copy of the RET in discovery, Exhibit CEB-13 ("Copy of Time and Expense Template.xlsx"), as well as a presentation apparently given at a training regarding the use of the RET, Exhibit CEB-14 ("Cost Estimation Tool Presentation.pptx"). The presentation explains that the data is added to the RET from Maximo work orders. The "Example" worksheet, column AJ, shows that the estimate created by the RET tool simply takes the Maximo output and

multiplies it by relevant figures in the "T and E Assumptions" worksheet to arrive at an adjusted estimate.

Q. DID DEP HAVE EXPERIENCE IN USING THE RET PRIOR TO APPLYING IT THE WILLIAMS SOLAR INTERCONNECTION PROJECT?

A. No. According to DEP, the planners began to use the updated cost estimate tool for all distribution project facilities studies in DEP commencing on or about July 30, 2019. *See* DEP's Response to Interrogatory No. 1-15. Coincidentally, this is the same day the Revised Estimate was provided to Williams Solar, meaning, at best, Williams Solar was something of a "test subject" for the new estimating tool. E-mails produced in discovery indicate that DEP did not even begin training on the use of the RET until August 2019. Exhibit CEB-15 (July 30, 2019 e-mail scheduling "the first of two (potentially three . . .) trainings" for August 1, 2019); CEB-16; CEB-17; CEB-18 (August 8, 2019 e-mail stating, "The tool is to be used beginning now. The tool is operational and should be used on projects going forward from today."). Thus, at the time the Williams Solar Revised Estimate was issued, DEP had not yet trained its employees in the use of the tool. And, obviously, DEP had no data regarding whether the estimate produced by the RET would pan out in practice.

Q. WHAT FACTORS DID DEP USE IN THE RET TO "PLUS UP" THE REVISED ESTIMATE?

A. DEP included in the Revised Estimate state sales tax, inflation, contingency, and overhead expenses based on multipliers or factors applied to its basic estimated costs.

Q. IN TERMS OF DOLLARS, HOW MUCH DID DEP'S OVERHEAD CALCULATIONS ADD TO THE REVISED ESTIMATE?

A. DEP applied varying levels of overhead for different components of cost. The total dollar amount of overheads included in the Revised Estimate is $288,376, broken out as follows:

- Overhead on labor costs plus contingency at 25% for a total of $145,008.
- Overhead on vehicles costs plus contingency at 25% for a total of $58,003.
- Overhead on materials costs at 48.75% for a total of $74,065.
- Overhead on contingency applied to materials at 25% for a total of $11,300.

See Exhibit CEB-6, at Interrogatory No. 1-2.

Q. IN TERMS OF DOLLARS, HOW MUCH DID DEP'S CONTINGENCY FACTOR ADD TO THE REVISED ESTIMATE?

A. DEP's Revised Estimate included a total of $178,559 for contingency, broken out as follows:

- Contingency on labor costs at 20% for a total of $96,672.
- Contingency on vehicles costs at 20% for a total of $36,689.
- Contingency on materials costs plus materials overhead at 20% for a total of $45,198.

See Exhibit CEB-6, at Interrogatory No. 1-2.

Q. IN TERMS OF DOLLARS, HOW MUCH DID DEP INCLUDE FOR STATE SALES TAX IN THE REVISED ESTIMATE?

A. DEP included $90,828.22 in its Revised Estimate for state sales tax. *See* Exhibit CEB-6, at Interrogatory No. 1-2.

Q. YOU PREVIOUSLY DISCUSSED THE MAXIMO TOOL USED BY DEP. IS THAT SOFTWARE HELPFUL IN PUTTING TOGETHER A CONSTRUCTION COST ESTIMATE?

A. It can be. However, the accuracy, reasonableness and reliability of any cost estimate produced though Maximo is dependent upon the validity of the cost database from which the software sources or draws costs to compile an estimate. By that I mean that if the cost data is outdated and not current, or the underlying analysis of labor effort or equipment and materials resources is not current, the cost estimates produced will be of little or no value in predicting or forecasting to a reasonable degree of certainty the expected costs at completion of construction a project.

Q. BASED ON YOUR REVIEW OF THE DOCUMENTS, WAS DEP USING MAXIMO IN A WAY THAT WOULD ASSIST DEP IN PROVIDING RELIABLE AND REASONABLE CONSTRUCTION COST ESTIMATES?

A. No, because the cost data DEP had loaded into Maximo was out of date—i.e., four years old. Based on DEP's responses and documentation provided thus far, DEP was not updating the historical cost data in Maximo and its other cost estimating tools from its experience on actual interconnection construction projects. Instead,

DEP's revised estimating tool essentially assumes that the data output by Maximo is *not* reliable.

That the estimated costs DEP derives from Maximo are not reliable is supported by other documents provided in discovery. DEP internal communications from June 10, 2019, discussed research on estimate calculations in Maximo compared to what is "real world." June 10, 2019 DEP internal e-mail, attached as Exhibit CEB-19. The hourly labor rate used in Maximo was roughly based on 4 men and 2 trucks. Hours for each compatible unit (CU) was roughly based on Work Management Information System (WMIS) plus 20%, with WMIS based on a 3-man crew. Currently base crew size is 5 men but due to ramp up efforts in late 2017 and throughout 2018 crews were generally 6 men including a foreman with 2 bucket trucks, 1 line truck and 1 pick-up truck. DEP concludes the communication stating, "[T]his would explain the estimates from Maximo being nearly 50% below the actuals. The labor cost is the largest contributing factor in the overrun. This looks to be an opportunity within our Maximo program that needs to be addressed as soon as possible." More problematically, rather than fixing the underlying Maximo data, DEP put together the RET to simply multiply the Maximo output by certain factors.

IV. ANALYSIS AND OPINIONS

Q. HAVE YOU FORMED AN OPINION, OR OPINIONS, AS TO WHETHER DEP'S INITIAL ESTIMATE OF SYSTEM UPGRADE COSTS AND INTERCONNECTION FACILITIES COSTS WAS FAIR AND

REASONABLE AND CONSISTENT WITH PREVAILING STANDARDS FOR CONSTRUCTION ESTIMATES?

A. Yes, I have formed several opinions regarding DEP's Initial Estimate for the Williams Solar interconnection project based on my industry experience and review of the documents.

Opinion 1 – DEP's Initial Estimate was an unreliable forecast of the total System Upgrade and System Interconnection costs associated with the Williams Solar project.

In fact, the evidence indicates that, across the board, DEP believes its own costs estimates at the Initial Estimate phase are unreliable forecasts or predictions of the total costs of construction that DEP will later seek to recover from interconnection customers for System Upgrades and Interconnection Facilities costs. DEP expects interconnection customers like Williams Solar to make a crucial investment decision to move forward, or not, with an interconnection project based on cost estimates that DEP itself believes are unreliable and unreasonable.

This opinion is based on the fact that DEP's cost estimating processes and procedures at the Initial Estimate phase produced costs estimates that are substantially lower than DEP's cost estimates at the Revised Estimate phase, a difference that is not within the expected range of accuracy for cost estimates when compared to the custom and practice of industry. In fact, DEP's historical cost estimating records (CONFIDENTIAL DR No. 1-17 Williams Solar, attached as Exhibit CEB-21) for projects other than the Williams Solar interconnection project shows that the average claimed increase in estimated costs from DEP's Initial

Estimate to its Revised Estimate is <BEGIN CONFIDENTIAL> [redacted] <END CONFIDENTIAL> the amount of the Initial Estimate.

Moreover, DEP's historical cost estimating record for projects other than the Williams Solar interconnection project shows that the average increase in claimed estimated costs from DEP's Initial Estimate phase through to its Construction Cost Notice Total phase is <BEGIN CONFIDENTIAL> [redacted] <END CONFIDENTIAL>. Thus, in all phases of its cost estimating process, DEP has historically underestimated the costs it would ultimately claim it was entitled to recover from Interconnection Customers.

Most notably, in the time span between DEP's Initial Estimate in January 2019 and its Revised Estimate in July 2019, DEP along with Duke Energy Carolinas, LLC identified a combined cost exposure of approximately $30 million arising from the unreliable results coming from DEP's cost estimating performance. *See* June 6, 2019 internal DEP e-mail chain "Re: DEP and DEC Exposure," attached as Exhibit CEB-20.

Opinion 2 – DEP knew, or should have known, at the time of its preparation of the Initial Estimate, in or about of December 2018, that its cost estimation procedures would result in a cost estimate that was unreliable and unreasonable, as DEP had been investigating discrepancies between its cost estimates and actual construction costs for nearly a year. Further, DEP knew, or should have known, that DEP's historical cost data relied upon in preparation of the Initial Estimate was, at that time, a minimum of four years old.

In DEP's Response to Williams Solar's Interrogatory No. 1-14, DEP described the chronological sequence of and individuals participating in its investigation into the accuracy and reasonableness of its cost estimates for independent generator interconnection projects, as had been referenced in DEP's Answer and Motion to Dismiss at pages 4 and 5. DEP claims it had observed discrepancies between estimated construction costs and actual construction costs for distribution interconnection projects coming on line during the fourth quarter of 2017.

This means that the Initial Estimate (and Revised Estimate) for the projects for which discrepancies had been noted were prepared well before the end of 2017, when DEP has identified it was aware of discrepancies between earlier estimated costs of interconnection projects and actual construction costs.

In DEP's Responses to Williams Solar's Interrogatory No. 1-7, DEP confirmed that the cost data it relied upon for Preliminary Estimated Upgrade Charges was not updated in the time period between January 1, 2015 and June 2019. DEP's update to this cost data in June 2019 came well after the Initial Estimate was provided to Williams in January 2019. Further, DEP explained that the updated System Impact Study Report cost estimating tool "SIS Estimation Tool Rev1" was not created until June 2019. Also, DEP represents that in June 2019 it updated SIS Estimation Tool Rev1 with "an additional contingency factor of 2.0", after DEP had completed a number of generator interconnection Final Accounting Report (FAR) true ups. *See* DEP's Response to Williams Solar's Interrogatory No. 1-7.

Q. HAVE YOU FORMED AN OPINION, OR OPINIONS, AS TO WHETHER DEP'S REVISED ESTIMATE OF SYSTEM UPGRADE COSTS WAS REASONABLE AND CONSISTENT WITH PREVAILING STANDARDS FOR CONSTRUCTION ESTIMATES OF THIS KIND?

A. Yes, I have an opinion based on my industry experience and review of the documents.

Opinion 3 - DEP's Revised Estimate was an unreliable forecast of the total cost DEP will seek to recover from Williams Solar at the completion of interconnection construction.

The method used by DEP to generate the Revised Estimate results in unreliable forecasts of the total costs of construction that DEP seeks to recover from Interconnection Customers for System Upgrades and Interconnection Facilities costs. DEP expects Interconnection Customers to make a second crucial investment decision to move forward, or not, with an interconnection project from the Facilities Study Report phase into the Interconnection Agreement phase based on cost estimates that are unreliable and unreasonable.

DEP's RET does not produce estimates based on historical experience with similar projects as one would expect. Rather, it takes Maximo estimates based on apparently outdated historical experience with similar projects and multiplies the admittedly unreliable and unreasonable Maximo output by factors that DEP apparently derived from some sort of "multivariate analysis." I have never seen an estimate created in this way. It is disconcerting that the starting assumption of DEP's process is that the underlying data (Maximo output) is outdated and

unreliable. I am not aware of any statistical analysis that would allow one to "correct" bad historical data and this approach is not consistent with reasonable construction estimating procedures. What DEP has done with its RET brings to mind the phrase "garbage in, garbage out," a phrase that captures the idea that no computation can "fix" the problems that arise when inputs are unreliable. Rather than generating an estimate from first principles using the 2015-2018 data in DEP's possession, DEP has cobbled together a Frankenstein's monster, the only function of which seems to be to generate higher estimates than what Maximo produces with an admittedly outdated database.

DEP's effort to break down the multipliers it uses to adjust the Maximo output into categories like "overheads" and "contingencies" seems to me to be window dressing. The multipliers are really just that—gross up multipliers. In that light, the multipliers used in the RET are really no different from the "additional contingency factor of 2.0" that DEP added to the SIS Estimation Tool Rev1.

Q. HAVE YOU FORMED AN OPINION AS TO WHETHER THE WAY DEP INCLUDED OVERHEAD EXPENSES IN ITS REVISED ESTIMATE WAS REASONABLE AND CONSISTENT WITH PREVAILING STANDARDS FOR CONSTRUCTION ESTIMATES OF THIS KIND?

A. Yes, I have an opinion based on my industry experience and review of the documents.

Q. WHAT IS THAT OPINION?

A. **Opinion 4** – DEP's application of overhead expenses at the purported rate of 25% after the inclusion of "contingency" in its cost estimating process is contrary to

industry custom and practice and unreasonably inflates the contingency. More particularly, DEP applied overhead to materials costs at the rate of 48.75%, then computed contingency at the rate of 20%, and further added another 25% of overhead to the contingency applied to materials costs. In addition, DEP's application of overheads to the estimated costs of work to be performed by DEP's contractors and/or subcontractors indicates the potential duplication of overhead costs charged by DEP to the Interconnection Customers for a project.

Q. DO YOU HAVE ANY RECOMMENDATIONS FOR THIS ISSUE WITH REGARDS TO ADDRESSING THIS ISSUE GOING FORWARD?

A. Although my testimony criticizes the manner in which DEP has applied overhead costs in arriving at its cost estimates, I have not reviewed the specific manner in which DEP has calculated its overhead costs and allocated them across different interconnection tasks—nor has DEP provided this information in discovery. To the contrary, all evidence indicates that, at least as applied to Williams Solar, DEP allocated overheads through "blunt force"—not through a specific analysis of estimated cost. I would encourage the Commission to explore this issue in a more general proceeding since it is an issue that cuts across all projects and potentially impacts ratepayers as well.

Q. HAVE YOU FORMED AN OPINION AS TO WHETHER THE WAY DEP APPLIED A CONTINGENCY FACTOR IN ITS REVISED ESTIMATE WAS REASONABLE AND CONSISTENT WITH PREVAILING STANDARDS FOR CONSTRUCTION ESTIMATES OF THIS KIND?

A. Yes, I have an opinion based on my industry experience and review of the documents made available thus far.

Q. WHAT IS THAT OPINION?

A. **Opinion 5** –Based on DEP's purported level of engineering design definition of work scope for use in preparing its Revised Estimate, I would expect the application of contingency would be minimized and certainly less than the 20% contingency applied by DEP. This suggests DEP's apparent use of contingency as merely a factor to increase estimated costs rather than the intended purpose in industry for contingency to represent the risk of unknown circumstances. Moreover, DEP had been constructing interconnection projects for a minimum of four to five years and had data from its actual costs of construction in comparison to its estimated costs at the Facility Study phase. As such, DEP knew the work required to actually construct interconnection projects and its application of a contingency at 20% was too high.

Contingency as a component of a cost estimate should be at its largest dollar amount when the definition of work scope for the project is limited and at its smallest amount when the full scope of work is defined. The Revised Estimate is at a greater level of maturity, thus the expected range of estimation in comparison to actual cost of construction is narrowed, and the contingency should be low.

V. DEP'S ATTEMPT TO IMPROVE COST ESTIMATING

Q. HAVE YOU FORMED ON OPINION ON WHETHER DEP HAS IMPROVED ITS PROCESSES FOR COST ESTIMATING ON UPGRADE PROJECTS?

A. Yes, I have an opinion based on my industry experience and review of the documents.

Q. WHAT IS THAT OPINION?

A. **Opinion 6 –** If DEP has in fact improved its cost estimating procedures, that improvement was not evident from any of the documents I have reviewed to date and, in any event, it came too late to be relevant to estimates prepared by DEP for Williams Solar.

First, as to estimation at the System Impact Study stage, the Initial Estimate, DEP is simply multiplying estimates based on pre-2015 data by a factor of 2. DEP's new estimating procedure simply is not consistent with any reasonable estimating practice of which I am aware.

Second, as to estimation at the Facilities Study stage, the Revised Estimate, DEP, in its Revised Estimating Tool, has taken an approach that appears more sophisticated than the simple factor of 2 applied at the System Impact Study stage. However, in reality the changes DEP made by the time the Williams Solar Revised Estimate was produced were simply multipliers applied to Maximo output. This does not seem to be an improvement except in the sense that the previous estimates may now be unreliable and unreasonable in a different way.

In DEP's Response to Interrogatory No. 1-15, DEP discussed the chronological sequence of updating its cost estimating methodology. With the commencement in first quarter 2018 of further investigation of observed discrepancies between estimated construction costs and actual construction costs for distribution interconnection projects coming on line during the fourth quarter of

2017, DEP did not begin to explore improvements to its existing estimating tools that were utilized for cost estimates prior to construction until the fourth quarter of 2018. In the third quarter of 2019, final approvals and instruction from within the Duke organization were to ensure the updated cost estimate tool was utilized for all interconnection facilities studies in DEP and DEC going forward. This was coincidental with DEP's July 30, 2019 issuance of its Revised Estimate for Williams Solar. Duke did not commence training its personnel in the use of its revised tool until early August 2019, after issuance of Williams Solar Revised Estimate, for use on projects going forward from that point in time.

DEP does claim that it made some data updates to labor hours and hourly labor costs in Maximo in Q4 2019. DEP has acknowledged that "[t]hese would not have had an impact on the development of cost estimates associated with cost estimates provided to Williams Solar." *See* DEP's Response to Interrogatory No. 1-10.

Q. HAVE YOU PROVIDED THE DOCUMENTS REVIEWED AND RELIED UPON BY YOU IN ARRIVING AT YOUR OPINIONS?

A. Yes. The documents relevant to my Testimony and that informed my opinions are identified herein and are attached as Exhibits.

Q. DOES THIS COMPLETE YOUR DIRECT TESTIMONY?

A. Yes.

BY MR. TYNAN:

Q Mr. Bolyard, do you have a summary of your testimony?

A Yes, I do.

Q Please go ahead and present it.

A Thank you. Good afternoon, Madam Chairwoman and Commissioners.

(WHEREUPON, the summary of CHARLES E. BOLYARD is copied into the record as read from the witness stand.)

Charles E. Bolyard's Summary of Direct Testimony

I am a principal in the firm McDonough Bolyard Peck, Inc. and currently serve as the Chairman of the firm's Board of Directors.

The firm specializes in construction management and consulting services, and I have been continuously employed with this firm for more than 30 years.

I have more than 46 years of experience in the construction industry in varying capacities and with increasing responsibility over projects for construction managers, contractors, owners, and construction consultants. My cost estimating experience includes direct responsibility for design and construction cost estimates as large as $3.3 billion, including power generation utility projects. Specifically with regard to power generation projects, I have experience evaluating cost estimates, including (1) comparing actual costs to estimated costs, (2) cost estimate updates, and (3) impacts to cost estimates arising from changes in scope, construction delays and disruptions.

I have testified frequently in various administrative and regulatory proceedings and have qualified as an expert witness on, among other things, cost estimating, cost management, actual costs of construction, and construction means and methods. Among my professional affiliations, I am a Member, Fellow and Past-President of AACE International, which promulgates cost estimation guidelines and best practices which are accepted throughout the industry.

In my direct testimony, I consider whether the cost estimates provided by Duke Energy Progress, LLC ("DEP") to Williams Solar, LLC ("Williams Solar") were reasonably developed. I also address DEP's claim that it investigated and resolved problems with its cost estimation procedures for interconnection project costs.

Based on my experience with appropriate methods of cost estimation in the construction industry, and my review of the documents provided by DEP in discovery, my conclusion is that neither estimate provided by DEP to Williams Solar was properly designed to yield fair, reasonable and reliable results.

First, in January 2019, DEP provided a System Impact Study estimate, which I refer to as the Initial Estimate, which was based on cost inputs that DEP knew, or should have known, were outdated and yielded results that were inconsistent with costs DEP claims it was experiencing on interconnection projects. The Initial Estimate estimated Upgrade costs in the amount of $774,000 and Interconnection Facilities costs of $60,000. This Initial Estimate reflected system upgrades including reconductoring of approximately 2.5 miles of overhead line, relocation of a hydraulic recloser, and installation of an electronic relcoser and various fuses. The estimate was created using a spreadsheet tool, referred to as the SIS Estimation Tool Rev0, which DEP admitted in its discovery responses was last updated prior to 2015 and was not updated between 2015 and July 2019. However, DEP's discovery responses indicate that DEP began investigating discrepancies between actual interconnection construction costs and its cost estimates in Q1 2018 for projects coming online in Q4 2017, indicating that DEP was aware by Q1 2018 that its cost estimates were outdated. Despite knowing that its data were outdated, DEP provided the Initial Estimate to Williams Solar intending that Williams Solar would rely on this estimate to make decisions about whether to continue investing in the project.

Second, approximately six months after the Initial Estimate was provided to Williams Solar, DEP provided its Facilities Study estimate, which I refer to as the Revised Estimate. The Revised Estimate substantially increased forecast costs, projecting

$1,388,374.26 for Network Upgrades costs—comprised of $1,297,546.03 in upgrade costs and $90,828.22 in state sales tax—and $196,495.13 in Interconnection Facilities costs.

The increased costs in the Revised Estimate did not result from changes to the scope of work described in the Initial Estimate. Instead, DEP derived the Revised Estimate first by using its Maximo software platform, and then by adjusting the output by applying labor, overhead, and contingency factors using a Revised Estimating Tool ("RET"), in what appears to be an arbitrary fashion intended simply to gross up the total cost. The manner in which overheads are applied the RET—after application of contingencies—is inconsistent with industry custom and practice and inflates the contingency. The 20% contingency rate applied by DEP through the RET, based on DEP's purported level of engineering design and site investigation performed prior to developing its Revised Estimate, is an excessive amount of contingency. I would expect the contingency applied in the Revised Estimate to be significantly less than the 20% used by DEP.

Finally, while DEP claims it has made efforts toward improving its cost estimating processes, by all appearances, these "improvements" are not consistent with industry practice. The "improvement" made to the System Impact Study estimating tool consists of multiplying the output of the prior version of the tool—which is based on pre-2015 data—by a factor of 2. This is not consistent with any reasonable estimating practice of which I am aware. Similarly, while it appears to be more sophisticated than a simple factor of 2, the "improvements" embodied in the RET are, in the end, simply multipliers applied to DEP's base estimate.

Thank you for your time.

Q (Mr. Tynan) Thank you, Mr. Bolyard.

MR. TYNAN: The witness is available for cross examination.

COMMISSIONER DUFFLEY: Mr. Jirak.

MR. JIRAK: Commissioner Duffley -- Chair -- I'm sorry. Excuse me. We are going to reserve cross examination for rebuttal.

COMMISSIONER DUFFLEY: So just crossing on rebuttal?

MR. JIRAK: Correct.

COMMISSIONER DUFFLEY: Commission questions? Chair Mitchell.

EXAMINATION BY CHAIR MITCHELL:

Q Good afternoon, Mr. Bolyard. Just a few questions for you. Do you know how much Williams Solar was charged by Duke to complete the System Impact Study?

A I don't recall a specific dollar amount. It may have been in the records, but it doesn't come to me at this point.

Q And a same question for the Facility Study?

A Again, I recall perhaps that information being in the documents that I reviewed, but I don't recall the specific amount.

Q Okay. In your testimony and I'm looking right now at Page 25.
A Yes, ma'am.
Q The sentence begins on line 16 and runs through line 20. But you basically said the difference between the estimates is not within the expected range of accuracy for cost estimates compared to the custom and practice of industry.
A Yes, ma'am.
Q What would have been, in your opinion, the expected range of accuracy?
A At the -- and I address that in my report. But the expected range of accuracy -- if you'll give me just a moment I'll identify where that is so that I can have the context.

(Witness peruses document)

So in reference to your question, the specific statements that I'm referring to are actually found in my rebuttal statement, beginning at Page 7, where I address the fact that the initial estimate would be typically a Class 4 estimate with a range of accuracy of minus 15 to percent plus 20 percent. And then the revised estimate which would be the Facility

Study estimate in my opinion is an estimate at Class 2 which would have minus 15 percent to plus 20 percent, and that is on Page 9 of my rebuttal filing.

Q Okay. So it sounds like, I mean, on the high side of that -- of those ranges is 20 percent; is that correct? Did I understand you correctly?

A Yes, ma'am.

Q In your direct testimony you also discuss, and specifically this is in your Opinion Number 5, it appears in your testimony on Page 31 just in this case you would like to refresh your recollection, but you talk about a 20 percent contingency applied by Duke.

A Yes, ma'am.

Q Can you help us understand sort of what is a contingency? I mean, what is it intended to cover?

A The contingency is intended to cover the cost of items that experience would tell you are going to incur on the project but you don't have a basis for actually estimating in detail or determining the cost of what it would take to satisfy those contingency items. So the contingency is added

after you have already determined all of your other costs on the project, you have totaled them up, and then you add the contingency to cover the things that you know are most likely to occur but you cannot yet define either technically and/or in cost.

Q Okay. So the contingency does not cover the passage of time if I understand you; is that correct? I mean, it's not intended to cover cost increases that are expected to occur due to the passage of time?

A Generally not.

Q Okay. And did -- are you aware of whether the utility included any factor in its -- in the development of its estimates to cover the passage -- the cost increases that would be expected to occur due to the passage of time?

A As I recall there was an escalation factor that was added in the determination of labor costs and perhaps equipment costs, and as I recall also with respect to materials.

Q And the escalation factor was utilized in both the development of the System Impact Study estimate as well as the Facility Study estimate?

A I recall it with respect to the Facility Study estimate. I don't recall that as a factor in System Impact Study estimate.

Q Okay. Thank you.

CHAIR MITCHELL: I have no additional questions.

COMMISSIONER DUFFLEY: Thank you. Commissioner Clodfelter.

COMMISSIONER CLODFELTER: Thank you.

EXAMINATION BY COMMISSIONER CLODFELTER:

Q Mr. Bolyard, can you hear me okay?

A Yes, sir.

Q I want to cut to the chase here. So in the early part of 2018, the testimony is that Duke first became aware of discrepancies between their actual field costs incurred and what they were producing through their estimation process, and they began the internal process of trying to identify the scope and extent of those discrepancies and the causes of those discrepancies. And I don't think you disagree with that; that is the fact. That's what happened.

So we now come to a point in late

2018, and Williams Solar says I'm ready for my System Impact Study. In your years of experience what should Duke Progress have done at that point?

A Well, the I guess the answer to your question, sir, I think would come in two parts. It's more than just what they would have done at that point. What they should have been doing was updating their cost database through time so that their costs that they were relying on for their estimates more appropriately reflected the costs that they were paying the contractors or paying internally to have the work done.

So then at the end of 2018, at the time of the System Impact Study duke should have advised Williams Solar this is our estimate based on the information that we have, but we are in -- you know -- in possession of knowledge that these estimates are not keeping up with construction costs and so there's going to be an increase in costs based on our cost history information.

So I hope that addresses your question, sir.

Q Well, it does. So let me probe it a little

further. So is that the industry practice? I'm in a -- I've got project after project. I've got multiple projects that are coming online. I'm bidding them out. I'm estimating them. They're in different phases of construction. It's an ongoing process. And I realize along the way that I've got a need perhaps to adjust my estimations. Is that the industry practice? Is that what you do? The next time you make an estimate do you tell the parties involved that hey things are in a little flux here? Is that the industry practice?

A Yes, sir, with respect to both my training and experience, and in the industry that's the practice that, if you have a concern about the viability of your cost data information and you're going to use that information to provide an estimate to someone who is going to make a project investment decision based on that information, then prudent conduct would be to advise the person to whom you're providing the estimate that this is the estimate based on our current database. We are in the process of reviewing that because we've seen that our actual

costs are increasing significantly above that database and, therefore, this particular estimate is subject to potentially a significant increase.

Q Thank you, sir. You've responded to my question. Thank you, sir.

COMMISSIONER CLODFELTER: That's all I have.

COMMISSIONER DUFFLEY: Thank you. Commissioner McKissick.

COMMISSIONER McKISSICK: Thank you, Commissioner. Several questions.

EXAMINATION BY COMMISSIONER McKISSICK:

Q As you're aware in the first quarter of 2018, Duke determined it was having a problem with its estimates being accurate compared to the final construction cost; is that correct?

A Yes, sir.

Q Now, it's my understanding from reviewing the testimony that's been prefiled is that they devised a -- I guess a Revised Estimating Tool and that Revised Estimating Tool was being used toward the last quarter of 2018; is that correct?

A No, sir, that doesn't comport with my understanding of the record.

Q Okay. Excuse me, 2019 -- okay, go ahead and

explain or clarify.

A Sure. So at the end of 2018 when a System Impact Study estimate was delivered to Williams Solar, for the System's Impact Study estimate, my understanding from reviewing the record is that that was based on a spreadsheet-type estimating approach that was last updated in or about 2015. And along with then the study that Duke had undertaken beginning in early 2018, they developed a separate cost estimating tool that they called the Revised Estimating Tool, the RET, which they applied to their cost estimates at the Facility Study phase but not at the System Impact Study phase. And that Revised Estimating Tool was developed by about the middle of 2019, near the end of July of 2019. And the distribution of that and training began somewhere near the end of July and early August of 2019, and the RET went into use broadly after that point in time. That's my generally understanding.

Q I'm looking back at my notes as well and I'm seeing the second quarter 2019 when they actually began using the tool.

Now, let me ask you this, assuming

that that tool was being utilized at that time and Duke had information in the first quarter of 2018 that it was a substantial disparity between what they were estimating and the actual project cost, do you believe that Duke should have approached Williams Solar about their findings at that time to make them aware that the estimate they had provided in the SIS was perhaps inaccurate?

A In my opinion, yes, sir.

Q And you also indicated that when you reviewed the SIS you would treat it as a Class 4 estimate; is that correct?

A Yes, sir.

Q And with a Class 4 estimate, could you state once again what you expect the range to be in terms of its accuracy?

A Yes. If you'll give me just one moment to make sure I don't misstate. It would be in the range of minus 15 percent, meaning 15 -- potentially 15 percent lower than actual cost to plus 20 percent meaning as much as 20 percent more than what the actual cost would be.

Q Now, if Duke was to state or indicate that they

thought it was a Class 5 estimate do you think that their assessment would be in error?

A Yes, sir, I would. I would certainly argue with their assessment. And I will explain in that the Class 5 estimate is an estimate that is delivered at a point in time when there is very little to no definition about what the project is going to entail. So you may have a general idea.

For example, in this case the solar facility to be interconnected was nominally 5 megawatts. So if you had information about what the cost was to interconnect a facility at 5 megawatts that's the basic type of information. Some people call it order of magnitude. Some people call it parametric. Some people call it by other names. But that's what the Class 5 represents.

So my disagreement with Duke's classification or Duke's opinion about the classification comes from the fact that when we have the System Impact Study and it's presented it counts 71 fuses, it counts reclosures, it counts three different sections of reconductoring that it measures to sometimes three decimal

points in terms of measuring mileage. So there is some definition beyond just 5 megawatts that we're going to interconnect to our system. And so because of that definition and the ability, or Duke to then rely on their compatible units or other information that they have to develop an estimate, that's why I believe the System Impact Study estimate is at a minimum a Class 4.

Q Okay. And could you explain a little bit further why you believe that the 20 percent contingency used by Duke when it was doing its feasibility study at that point in time was excessive?

A Customarily, as you move through the estimating process and you go from let's say Class 5 where there's no definition to Class 2 for example where you have quite a bit of definition about the project, then if you ask me what my contingency was at Class 5 it would be a greater contingency, whether by dollar amount or by percentage. As I progress through the increasing definition or further definition of the project, I have more information to rely upon and therefore I would expect that my contingency would shrink; it would be reduced. And so by the

time I get to the Facility Study estimate, which I understand from the descriptions by Duke is a point in time when they're ready to go out to industry and entertain discussions with contractors to actually perform the work, you're at a point in time where your contingency should be at its lowest. And as I represented in my testimony, my opinion would be that at that point in time the reasonable contingency would be 10 percent.

Q Okay. Now, have you had a chance to review documents produced by Duke relating to the difference between the SIS study cost as well as the feasibility study cost as well as the final cost for various interconnection projects?

A I reviewed, sir, two sets of information. One set of information comprised about 71 projects for which there was both a System Impact Study level estimate and a Facility Study estimate. And then out of that group of 71, as I recall there were about 43 projects for which there was a final cost information available.

The other set of projects that I recall reviewing was on the order of about 18 or

so projects and there was a totaling of what the actual cost was versus what the last estimate cost was, or the most current estimated cost had been before they went to construction. That's what I recall reviewing.

Q And when you reviewed those documents did you observe a pattern between what the SIS cost would be, the feasibility cost would be, and final cost would be relating to those sets or subsets of projects?

A Yes, sir, I did. So with respect to the grouping of projects that totaled 71 projects, the average difference in terms of percentage --

MR. TYNAN: Let me jump in and just remind the witness not to discuss DEP's confidential information with specifics.

THE WITNESS: Okay.

MR. TYNAN: Unless DEP wants to hear what he has to say on the specifics.

COMMISSIONER DUFFLEY: If we need to go -- we would need to break and go into confidential session.

MR. BREITSCHWERDT: Commissioner Duffley, as long as the witness is speaking on averages and

general information and not talking about project-specific information, we would view that as acceptable and not introducing confidential information. So I believe the question and where Mr. Bolyard was going was speaking to average information which we would find to be satisfactory and non-confidential for purposes of this hearing.

COMMISSIONER McKISSICK: And that was what I was seeking to avoid that problem.

THE WITNESS: Okay.

COMMISSIONER DUFFLEY: Thank you.

A So in the project grouping that I was describing, and you asked about pattern, so the pattern is that between the SIS estimate and the Facility Study estimate, the average increase was in the mid 90's percent. And then for the projects in that same grouping that also had actual costs the difference between the estimate at Facility Study and costs at construction completion was also in the mid 90's percent. So that's a pattern, a doubling between SIS and final construction in that grouping.

Q Thank you. And just one final question. Of course this does get into your rebuttal

testimony, what it dealt with -- and maybe you can speak to this more broadly -- I believe there was a file name that "I hate you" or something to that effect. Are you having recollections about that? That was from Page 13 in your rebuttal testimony?

A In my rebuttal testimony? I would have to look at the testimony to refresh my recollection. I don't recall that.

COMMISSIONER DUFFLEY: Commissioner McKissick, that is in Mr. Burke's rebuttal testimony.

COMMISSIONER McKISSICK: All right. I'm sorry. I'll withdraw that question. I apologize. No further questions at this time.

COMMISSIONER DUFFLEY: Commissioner Mitchell -- Chair Mitchell.

RE-EXAMINATION BY CHAIR MITCHELL:

Q Just a few more questions for you, Mr. Bolyard. I mean, you've indicated that it's your opinion that the utility should have been updating its cost database through time. How often should the utility have updated its cost data? On what interval?

A So that interval is dependent upon the speed or

the pattern with which they complete projects. For the owners that I have experience with that is an active and ongoing process, and they establish a pattern, and they update based on actual cost experience quarterly, or some twice per year. But they establish a pattern and they follow that pattern so that their cost data that they are relying on for their internal cost estimate is not outdated.

Q So in this instance, I mean, we have -- as I understand testimony from the DEP witnesses, I mean, they did endeavor to update their cost data but it was not until I believe 2018 or 2019 when that process was initiated. So is it your -- help me make sure I understand your opinion, they should have been updating on an ongoing basis or they should have updated before that point in time. When should Duke have endeavored to update its cost data?

A On an ongoing basis. And I think it's fair to say that they have an established pattern although it's not that well explained in the documents for updating their materials cost, but they don't have a similar pattern or haven't

identified a similar pattern of actions to update their labor cost and their equipment cost and the other things that would be driving, that they would glean from their actual cost experience on completed projects.

Q Okay. Thank you very much.

CHAIR MITCHELL: Nothing further.

COMMISSIONER DUFFLEY: Commissioner Brown-Bland.

COMMISSIONER BROWN-BLAND: Thank you.

EXAMINATION BY COMMISSIONER BROWN-BLAND:

Q Mr. Bolyard, Chair Mitchell asked you earlier about the cost of the System Impact Study and the Facility Study. Is that -- do you know whether that's a question for Mr. Burke?

A I'm not recalling the specific question. If you could help me a little more I could get it into context.

Q She asked you how much was Williams charged for the System Impact Study --

A She did, yes.

Q -- and the Facility Study.

A I don't recall those numbers. That would be something for Mr. Burke.

Q All right. And you indicated that you thought it was in our materials so if Mr. Burke cannot answer that for us, at a later time I would ask Williams counsel to point us to it if he knows -- if they know that we have it. And, if not, if ultimately we can't get it from either you or Mr. Burke then I would ask that it be provided in a late-filed exhibit.

COMMISSIONER BROWN-BLAND: That's all I have, Commissioner Duffley.

COMMISSIONER DUFFLEY: Thank you. Any other Commissioner questions? Commissioner Hughes.

EXAMINATION BY COMMISSIONER HUGHES:

Q This is just a quick follow up to Commissioner Mitchell's question. As far as simplified unit cost models where there's not an expectation to actually review actual projects, are you aware of a professional recommendation on a specific inflation index that should be used to update unit costs? Is there some standard practice of updating unit costs specifically when it's a simplified model and you don't have time to actually look at real project costs?

A There are some industry sources that provide

information at that level and they tend to be very generalized and are tied to either the U.S. Consumer Price Index or the commodities market, depending upon the nature of the project for U.S. based projects or overseas projects. So in my experience that's something that large owners undertake and do and they identify an index or a reporting mechanism that aligns closely with their type of work and then they continually monitor that index and adjust their inflation that they apply to their cost estimates and again it varies. Some do it quarterly. Some do it semi-annually. Some do it only on an annual basis.

COMMISSIONER HUGHES: Thank you.

COMMISSIONER DUFFLEY: Any other Commissioner questions? Okay. I have a few questions.

EXAMINATION BY COMMISSIONER DUFFLEY:

Q So Commissioner Hughes just asked you -- you've mentioned and testified here today that other companies that you have observed update this input information either quarterly or twice per year and sometimes annually. Is there

a reason -- does the size of the company matter and/or the scope of work matter? What are some determinative factors in deciding whether to update quarterly, twice a year, or annual basis, or longer?

A The general determining factor would be the size of the project in terms of monetary value and how frequently or how rapidly those projects are being let to market and being completed. So if you have smaller projects that are completed in reasonably short periods of time then you're going to have more information available in a shorter period of time that would support updating on a more frequent basis. If your projects are large and they're going to take three years, four years, five years to finish each individual project then you're not going to have the cost experience information on those projects in the same frequency in order to support a periodic update of your cost database.

Q Thank you. And I believe you and Chair Mitchell were speaking about the expected accuracy range, and I think you were referring to a chart from the Association for the Advancement of Cost

Engineering or AACE.

In your testimony you stated that for this project that you thought it was a Class 4 -- the System Impact Study estimate should be a Class 4 estimate, and you stated that the expected accuracy range should be from negative 15 percent to plus 20 percent. And I'd just like to understand what factors you use on modifying that down from the AACE -- let me make sure I got that -- AACE because the AACE for a Class 4 estimate gives an expected accuracy range from negative 15 percent to plus 50 percent. Can you explain how you're not at the plus 50 percent but rather the plus 20 percent?

A I would think that may well be an error on my part in speaking, because it should be at the -- the Class 4 should be at the higher percentage. And I didn't realize that I had spoke to both of them at plus 20.

Q So your change, it should be plus 50?

A I would have to look at the table, but as I recall that's correct. If you'll give me just a moment --

Q Yes. Take your time.

A (Peruses document.)
Yes, I misspoke. At the Class 4 it would be plus 50.
Q Thank you. And then with respect to the 20 percent contingency, I know you've testified that this is high, have you seen other utilities across the country have a 20 percent contingency?
A In my experience, yes, ma'am. I've seen other utilities who have 20 percent contingency, perhaps even slightly higher than that. Where the circumstances are that the scope of work is very much undefined or they're at a stage of the project where they're trying to get what is termed an "indicative estimate", they're trying to get an indication of what the cost might be. So at that point in time the contingency would be at the 20 percent range or perhaps higher.
Q And can you explain that you -- so your testimony is that it should be less than 20 percent. You view that 20 percent as high. What do you think the contingency factor should be for a Class 4 estimate?
A I would think -- and let me look just a moment to make sure that I don't confuse my testimony. I

have said that at the -- you asked me about Class 4, and I think my testimony has been focused on what it would be at Class 2 with respect to the Facility Study estimate.

So with the Class 2, in my opinion, that the contingency and appropriate contingency based on the definition of the project would be 10 percent added on. At the Class 4, if there was a contingency to be added then I would expect that a Class 4 that contingency might be appropriate somewhere in the range of 20 to 25 percent, again depending upon what the scope definition of the project is.

Q Thank you. And I have one more question on Page 20 of your direct testimony.

A Yes, ma'am.

Q You note that the RET, or R-E-T, is not an industry standard estimating tool. Does the use of a customized tool impact your analysis of what class the Facility Study's estimate should be under the ACEE (sic) cost estimating framework?

A No, ma'am.

Q And could you expound on your answer, please?

A Yes. So, again, based on my experience with a

large number of owners and contractors, many folks have proprietary cost estimating software platforms they've developed themselves. However, in developing those softwares and how they apply them they still are guided by the AACE recommended practices for their industry segment with respect to how they classify their cost estimates.

Q Thank you. And I actually did have one more question. On Page 24 of your testimony.

A Yes, ma'am.

Q I think your testimony maybe discusses that this concept of revising, revising the inputs. Do you know how long, I mean, do you have an opinion of how long it would take DEP to revise all of the inputs to Maximo?

A I do not. That's not something that I've analyzed. What I can tell you is that in my experience with other entities, that they have a staff that is full-time dedicated to the maintenance and support of their cost estimating systems including providing updates for their cost database. It's an ongoing process.

Q Okay. Thank you. And when they're revising --

with the companies, just based on your experience, the companies that you see revise their inputs on an annual basis. I mean, do they make the -- you know, I would say customers aware? Are all parties aware that they are doing this on an annual basis?

A So I would say that most but I won't represent to you that all of those entities have an ongoing quality control program. And so their quality control program establishes or states the minimum frequency to which they're going to update their cost database for example. And so if they fall out of compliance with that planned sequence of updating then they notify or speak with the people to whom they're providing estimates and say, you know, here's the estimate. This is the best information we have. It's not up-to-date and so we need to talk about what that means or what impact that has on what the final cost of the project might be.

Q Thank you.

COMMISSIONER DUFFLEY: So questions on -- unless there are other Commissioner questions, last call. Commissioner McKissick.

RE-EXAMINATION BY COMMISSIONER McKISSICK:

Q Yes. And what I'm reviewing right now is the -- I guess the Jennings/Holmes Exhibit 1 which -- it's Exhibit 1, it's Page 6 where it has the classification of these estimates that are done, 1 through 5, and I couldn't find it earlier as I would have preferred --

(Shuffling of papers.)

Do you see that matrix of estimating classes?

A Yes, sir.

Q All right. Now, earlier when you were discussing this being a Class 4 you talked about the level of maturity of the project and the definition of it and what it entailed. Now here when it talks about a Class 4 and it talks about the maturity level of project definition it rates it between 1 to 15 percent.

Now, when Williams Solar was having the SIS done, would it have fallen into that 1 to 15 percent category or was there more or less information known based upon information that's available to you?

A Based on information that's available in the

record for me to review it's going to be at the 15 percent or better. And the reason I say that, sir, is because the basic scope definition states that the project up to the Facility Study estimate.

Q Okay. And, of course, the low range in terms of expected rate accuracy is 15 to 30 percent; is that correct?

A Yes, at Class 4; yes, sir.

Q And the high range is 20 to 50 percent?

A Yes, sir.

Q Would you have any reason to believe that this, based upon the definition of the project, should have been higher than a Class 4?

A At the SIS level?

Q Yes.

A And so are you asking if at that level the estimate should have been classified at a level three? Is that -- am I understanding your question correctly?

Q Yes, sir, some other level. That would appear to be the next level.

A I think the Class 4 is an appropriate level of classification for the estimate at the SIS study.

Q Very good. Thank you.

COMMISSIONER McKISSICK: I have no further questions.

COMMISSIONER DUFFLEY: And we're going to take our afternoon break right now. I apologize to Kim Mitchell. We went a little over the 90 minutes. So we will break.

Sean, please turn off everyone's -- please turn your cameras off. We will return at 3:30. And, Sean, please turn off everyone's mics.

(A recess was taken at 3:15 p.m., until 3:30 p.m.)

COMMISSIONER DUFFLEY: Thank you. We will come back on the record.

And just to clarify for the record, Commissioner McKissick was asking questions, a question of Mr. Bolyard right before the break and the exhibit that he was referring to in his questions is the Jennings/Holmes Exhibit Number 1. Is this correct, Commissioner McKissick?

COMMISSIONER McKISSICK: That is correct. In their prefiled testimony with the exhibits that were attached, it was Exhibit Number 1 and it was on Page 6 out of 18.

COMMISSIONER DUFFLEY: Thank you, Commissioner McKissick.

And are there any other Commission questions?

COMMISSIONER McKISSICK: Not at this time.

COMMISSIONER DUFFLEY: Questions?

Mr. Tynan, are you speaking to the Court? You're still on mute. There you go.

MR. TYNAN: No, Madam Chair. I was asking -- there's some noise outside the room here. I was just trying to quiet it down before we got back on the record.

COMMISSIONER DUFFLEY: Thank you. Questions on Commissioner's questions. We'll begin with Duke, DEP.

MR. JIRAK: Commissioner Duffley, nothing from Duke at this time.

COMMISSIONER DUFFLEY: Mr. Tynan.

MR. TYNAN: I have just a couple of questions.

REDIRECT EXAMINATION BY MR. TYNAN:

Q Mr. Bolyard, Chair Duffley was asking you about the accuracy range you would expect from a Class 4 estimate and there was some back and forth

about what percentage variation you would expect. I would refer you to your rebuttal testimony at Page 7 and ask you to clarify what exactly you think the accuracy range should have been for a Class 4 estimate, specifically the System Impact Study estimate that Duke, DEP, provided to Williams Solar?

A Okay. Thank you. With respect to the range of accuracy that's identified in the AACE recommended practice for a Class 4 estimate there's a broad range. And the question that I understood and responded to previously was that the lowest end of that range was minus 30 percent and the highest end of that range was plus 50 percent.

With respect to the SIS estimate, or System Impact Study estimate that Duke prepared, given my review of the level of definition that was provided by DEP at the System Impact Study estimate, the quantification of materials that went along with that estimate, and the fact that that didn't change, and Duke has acknowledged that that didn't change as they moved to the Facility Study estimate, to me

represents that that was a very well-thought-out and defined scope of work.

And so what you pointed me to on Page 7 of my rebuttal is the expression of my opinion that the Class 4 estimate, as represented by the SIS estimate that DEP provided to Williams Solar, really is representative of the upper end of both or the narrowest margin within that Class 4 estimate range which is minus 15 percent to plus 20 percent. Does that clarify?

Q Yes. And is the range of accuracy that you would expect for the SIS estimate also affected by the relative experience that DEP has in estimating interconnection project costs?

A Yes, particularly since they have remarked about the depth of their experience on interconnection projects. Yes.

Q Mr. Bolyard, Chair Duffley also asked you how often in your opinion DEP should have been updating Maximo. Do you remember that question?

A Yes.

Q Do you know from the documents produced in discovery and DEP's discovery responses when DEP implemented Maximo?

A Generally in the timeframe of November 2017.
Q Is it --
MR. TYNAN: I have no further questions.
COMMISSIONER DUFFLEY: Thank you. And we have admitted his prefiled testimony and exhibits. Is there any other cleanup matters, Mr. Tynan?
MR. TYNAN: No, Madam Chair.
COMMISSIONER DUFFLEY: Thank you. And thank you, Mr. Bolyard, for testifying this afternoon. We appreciate it.
A You're quite welcome. Thank you.
(The witness is excused)
COMMISSIONER DUFFLEY: Okay. Is the Complainant complete with their witnesses?
MR. TRATHEN: Yes. Madam Chair, Williams Solar has completed its witnesses.
COMMISSIONER DUFFLEY: Thank you. We will move to the Respondent, DEP.
MR. JIRAK: Thank you, Commissioner Duffley. Just briefly, as a preliminary matter, at this time and out of an abundance of caution, and in accordance with the Commission's June 11th, 2020 Order I would just move the record -- into the record the direct testimony of Mr. Jack McNeill.

COMMISSIONER DUFFLEY: The Commission will move Mr. McNeill's prefiled testimony and any exhibits into the record.

MR. JIRAK: Thank you, Commissioner Duffley.

(WHEREUPON, the prefiled direct testimony of JACK McNEILL is copied into the record as if given orally from the stand.)

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

DOCKET NO. E-2, SUB 1220

In the Matter of: Williams Solar, LLC, Complainant v. Duke Energy Progress, LLC, Respondent	))))))))))	**DIRECT TESTIMONY OF JACK MCNEILL, P.E. FOR DUKE ENERGY PROGRESS, LLC**

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Jack McNeill, P.E., and my business address is 411 Fayetteville Street, Raleigh, North Carolina 27601.

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

A. I am the Director of Asset Management for Duke Energy Progress ("DEP" or "the Company"). In my current position, I manage the distribution asset engineering functions for DEP's eastern North Carolina and South Carolina service areas. My team includes management and engineers performing Capacity Planning, Maintenance and Reliability Strategy, as well as the Duke Energy Distributed Generation team that performs System Impact Studies and technical assessment of queued distributed energy resource ("DER") projects requesting interconnection to the Company's distribution system.

Q. PLEASE BRIEFLY DESCRIBE YOUR EDUCATIONAL BACKGROUND AND EXPERIENCE.

A. I received a Bachelor of Science degree in Electrical Engineering from North Carolina State University in 1985 and began employment with Virginia Electric and Power Company in Charlottesville, Virginia. As my career progressed, I joined Carolina Power and Light ("CP&L") in September of 2000. I am a registered Professional Engineer licensed to work in the State of North Carolina. My initial employment with CP&L/Progress Energy (now DEP) was in reliability engineering where I monitored daily reliability metrics and provided strategic direction to local leadership for targeted system reliability improvements. Since 1985, my utility engineering experience has all been

focused on the distribution system, and my leadership experience has spanned the reliability, asset management, protective device coordination and design and distributed energy resources disciplines.

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

A. Yes. I appeared before the North Carolina Utilities Commission ("Commission") on March 5, 2020 to review DEP's progress on the Hot Springs Microgrid in Docket No. E-2, Sub 1185.

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

A. The purpose of my testimony is to provide the Commission a general overview of DEP's System Impact Study process under the North Carolina Interconnection Procedures ("NC Procedures")[1], and specific information on DEP's initial processing of Williams Solar's Interconnection Request through System Impact Study. In addition, I respond to the direct testimony offered by Jonathan Burke and Charles Bolyard on behalf of Williams Solar critiquing the process by which DEP arrived at the preliminary cost estimate provided to Williams Solar as part of the System Impact Study.

[1] All capitalized terms not otherwise defined here shall have the meaning assigned to them in the NC Procedures and, unless otherwise specified, all section references are to the NC Procedures, as most recently approved in the June 2019 Interconnection Order. *See Order Approving Revised Interconnection Standard and Requiring Testimony and Reports*, at 60, 66 Docket No. E-100, Sub 101 (June 14, 2019) ("June 2019 Interconnection Order").

Q. ARE YOU SPONSORING ANY EXHIBITS WITH YOUR DIRECT TESTIMONY?

A. No. However, my testimony does reference certain documents filed as Exhibits by Williams Solar, including: 1) Exhibit JB-1, which is the January 28, 2019 System Impact Study transmittal e-mail; and 2) Exhibit JB-2, which is the System Impact Study Report issued to Williams Solar.

Q. PLEASE SUMMARIZE YOUR TESTIMONY.

A. The preliminary System Impact Study cost estimate provided to Williams Solar by DEP was developed in good faith and in a manner consistent with DEP's then-current and reasonably developed cost estimating methodology. DEP, along with Duke Energy Carolinas, LLC ("DEC" and together with DEP, "Duke") proactively investigated cost discrepancies occurring on actual construction projects and developed changes to both the Facilities Study and the System Impact Study cost estimating methodologies to produce estimates that are reasonably consistent with actual project costs. These changes are reflective of Duke's broader efforts to evolve and improve the Company's overall interconnection practices and policies in response to an unparalleled wave of utility-scale solar generating facilities requesting interconnection to the Company's distribution system.

I. OVERVIEW OF THE SYSTEM IMPACT STUDY PROCESS AND DEVELOPMENT OF PRELIMINARY COST ESTIMATES

Q. AS BACKGROUND, PLEASE PROVIDE THE COMMISSION A GENERAL OVERVIEW OF THE DISTRIBUTED GENERATOR INTERCONNECTION STUDY PROCESS AS ESTABLISHED BY THE NC PROCEDURES.

A. Section 4 of the NC Procedures establishes the multi-phased study process that the Company follows to study larger generator interconnections and to design the utility system upgrades required to mitigate identified power quality or reliability impacts to the local distribution system or transmission system. For simplicity, I have broken the Section 4 process out into three phases.

Phase I. After an Interconnection Request is submitted, a scoping meeting is held with the Interconnection Customer prior to commencing the Study process (NC Procedures § 4.1). The scoping meeting agenda covers topics related to the physical layout of the site, crosschecking the data included in the Interconnection Request application form, and discussions of preliminary interdependency with other Interconnection Customers as well as potential hurdles the project may encounter as the study process begins.

Phase II. The study process begins with the first study of the Section 4 interconnection process, the System Impact Study (§ 4.3). In System Impact Study, DEP models the impacts of the proposed Generating Facility on the Company's System and provides preliminary estimates of the cost and timing required if the Interconnection Customer wants to proceed with

interconnection. The Duke Distributed Generation organization is responsible for completing the System Impact Study.

Phase III. The System Impact Study process is then followed by the more detailed Facilities Study evaluation, which provides the Interconnection Customer a more detailed cost estimate prior to Duke undertaking initial construction planning and drafting and delivering an Interconnection Agreement to the Interconnection Customer under Section 5. Company Witness Scott Jennings addresses the Facilities Study process.

Q. PLEASE ELABORATE ON THE SYSTEM IMPACT STUDY PROCESS UNDER THE NC PROCEDURES.

A. The System Impact Study determines the electrical system impacts that would be created by the interconnection and parallel operation of a proposed Generating Facility and identifies the Upgrades required to mitigate any identified impacts. The technical portion of the System Impact Study is broken down into three main evaluations. Evaluations 1 and 3 are the portions of the System Impact Study that identify any necessary Upgrades on the System, while evaluation 2 may result in the identification of the need for the Interconnection Customer to install equipment internal to their proposed Generating Facility.

Evaluation 1. DEP first completes the distribution voltage and thermal/loading modeling and analysis of the proposed interconnection. This initial modeling evaluation analyzes the steady state impacts of interconnecting the proposed Generating Facility to the existing distribution system. If adding the Generation

Facility to the existing distribution system causes system reliability or adverse performance issues, Upgrades are required to mitigate the issues identified. The Upgrades identified in this portion of the System Impact Study generally make up the vast majority of total Upgrade costs assigned to the Interconnection Customer through System Impact Study. As part of the mitigation option process (which is not contemplated by the NC Procedures and is discussed further below), the Company provides its first non-binding preliminary cost estimate to the Interconnection Customer after this initial evaluation. This preliminary cost estimate is intended to allow Interconnection Customers to make decisions regarding whether to continue with System Impact Study or to withdraw.

Evaluation 2. The Transformer Inrush Evaluation studies the impacts when DER sites are re-energized by the Duke Energy distribution system after disconnection. During this magnetizing inrush event, current flow is many times the normal full load current of the transformer. The high current flows can generate significant harmonics and a rapid voltage change. If a proposed generation facility fails specified technical criteria in the Transformer Inrush Evaluation, the Company then provides solutions for the Interconnection Customer to mitigate the impact to the System. These solutions are typically devices installed within the physical DER site and require the Interconnection Customer to update its Facility design and to submit an updated electrical one-line diagram. The Company does not provide a cost estimate for these devices as they are the responsibility of the Interconnection Customer. This portion of

the study evaluates the potential for impacts to adjacent customers' power quality experience and assures no effects of voltage flicker arise in accordance with Good Utility Practice.

Evaluation 3. The short circuit modeling and protective coordination analysis is the last piece of the System Impact Study. This modeling evaluates the proposed Generating Facility's impact to existing protective coordination. Devices that need to be replaced or upgraded as a result of adding the proposed Generating Facility to the System are included in the Upgrade costs assigned to the Interconnection Customer.

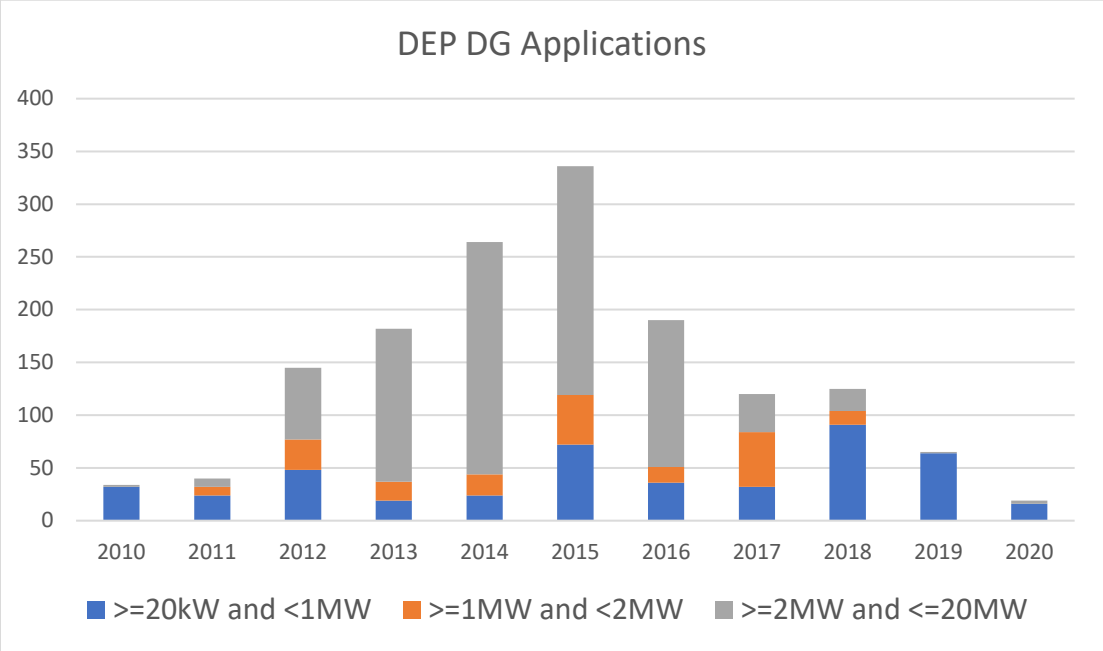
System Impact Study Report. The required Upgrades identified in the voltage and thermal/loading modeling and analysis, Transformer Inrush Evaluation and short circuit modeling and protective coordination analysis are combined within the System Impact Study Report and issued to the Interconnection Customer along with a preliminary estimate of costs. Constructing the System Upgrades identified in the System Impact Study would permit the Generating Facility to reliably interconnect, while maintaining system safety, power quality and performance. The cost estimates provided in the System Impact Study are preliminary in nature and are then further evaluated in the Facilities Study.

Q. PLEASE EXPLAIN DEP'S OVERALL EFFORTS TO ADMINISTER THE SECTION 4.3 SYSTEM IMPACT STUDY PROCESS.

A. DEP alone has likely received more utility-scale solar distribution Interconnection Requests and processed more utility-scale solar distribution System Impact Studies than any other utility in the country due to North

Carolina's unparalleled growth in utility-scale solar generating facilities seeking to interconnect to the Company's distribution system. The challenges of this volume of Interconnection Requests and Duke's nation-leading interconnection efforts are further detailed in the testimony of DEP witnesses Kenneth Jennings and Steven Holmes. Figure 1 shows the significant growth in utility-scale interconnection requests between 2012 and 2016, when Williams Solar entered the DEP interconnection queue.

Figure 1



As detailed in the testimony of DEP Witnesses Kenneth Jennings and Steven Holmes, Duke has invested significant resources and exerted significant efforts to process this wave of utility-scale solar distribution Interconnection Requests. Duke added study engineering resources, including increasing external engineering contractors from 5 in 2014 to over 30 by 2017. In 2018, Duke also reorganized internally, creating a Distributed Generation Team focused on

processing System Impact Studies and analyzing DER-related power quality and reliability impacts. Since forming in 2018, the Distributed Generation Team along with external contractor support have processed over 350 distribution-connected utility-scale solar Interconnection Customers through System Impact Study. Today, the vast majority of the remaining distribution level utility-scale solar Interconnection Requests are interdependent, and study work cannot progress until interdependencies clear.

Q. HAS DUKE ALSO STRIVED TO PROVIDE FLEXIBILITY TO INTERCONNECTION CUSTOMERS AS THE COMPANY'S TECHNICAL STANDARDS AND REQUIREMENTS APPLICABLE TO STUDYING GENERATOR INTERCONNECTION REQUESTS WITHIN SYSTEM IMPACT STUDY HAVE EVOLVED?

A. Yes. Duke witnesses Gary Freeman and John Gajda recently explained in testimony filed in the proceeding to review modifications to the NC Procedures in Docket No. E-100, Sub 101 ("NCIP Proceeding") how Duke has undertaken significant efforts over the past few years to ensure that the technical standards applied during System Impact Study are appropriately protective of power quality, reliability and operational safety across the power system.[2] However, in order to provide flexibility to Interconnection Customers in an effort to facilitate more interconnections, Duke began voluntarily offering mitigation options in late 2016. Mitigation options provide Interconnection Customers

[2] *See* Direct Testimony of Gary Freeman, at 13, Docket No. E-100, Sub 101 (filed Nov. 19, 2018); Direct Testimony of John Gajda, at 45-54, Docket No. E-100, Sub 101 (filed Nov. 19, 2018).

optionality in terms of Generating Facility size and the associated Upgrade cost if the Interconnection Customer's Generating Facility as proposed in the Interconnection Request is cost prohibitive or not feasible under Duke's generally applicable technical standards, such as the Method of Service Guidelines. Common mitigation options offered to Interconnection Customers include downsizing the project MW capacity, to relieve voltage rise, RVC, or capacity limitations that could not be mitigated with Upgrades at the project's requested full capacity. As Duke's witnesses explained in the NCIP Proceeding, Duke's efforts in offering mitigation options within System Impact Study accommodates Interconnection Customers and reduces project withdrawals but also lengthens the study process and therefore has a "downstream" impact on interdependent projects that are forced to remain on hold for longer periods of time as a result of the mitigation option process. The provision of mitigation options demonstrates how Duke has acted in good faith to develop solutions to connect additional utility-scale solar generating facilities to the distribution system but also how efforts intended to provide more flexibility to Interconnection Customers often result in unintended consequences throughout the interconnection queue.

Q. WILLIAMS SOLAR WITNESS BURKE ALLEGES AT PAGE 29 OF HIS TESTIMONY THAT DUKE HAS RAISED TECHNICAL BARRIERS THAT HAVE INCREASED COSTS FOR INTERCONNECTION CUSTOMERS AND DELAYED THE TIMEFRAME OF COMPLETING THE INTERCONNECTION STUDY PROCESS. HOW DO YOU RESPOND?

A. I do not agree with Witness Burke's characterization of Duke's technical polices as "technical barriers." As detailed in the testimony of DEP Witnesses Kenneth Jennings and Steven Holmes, DEP has exerted substantial effort to process the unparalleled volume of new Interconnection Requests, while also fulfilling its obligation to ensure that interconnecting these vast quantities of uncontrolled power export Generating Facilities to the distribution system does not increase the risk to retail customers of localized power quality impacts or distribution system reliability risks. As recently described in the NCIP Proceeding by Duke Witnesses Gary Freeman and John Gajda, Duke is operating in a "living laboratory" in terms of the scale and penetration of the utility-scale solar resources connected to its distribution system, which has necessitated continual review and evolution of its technical standards to mitigate potential reliability and power quality risks and to proactively manage potential future challenges in planning and operating the distribution and transmission system. These technical standards are not "technical barriers" as characterized by Witness Burke but, instead, represent Duke's application of Good Utility Practice to ensure continued reliability and power quality for all customers on the system.

Q. HOW HAS THE COMMISSION ADDRESSED DUKE'S APPLICATION OF THE TECHNICAL STANDARDS AND REQUIREMENTS THAT DUKE APPLIES DURING SYSTEM IMPACT STUDY?

A. In June, 2019, the Commission's Order in the NCIP Proceeding approving the current NC Procedures held that "the Duke Utilities have applied reasonable judgment and have taken appropriate steps in light of the facts known to establish the Method of Service Guidelines and other technical standards, as a reasonable implementation of Good Utility Practice."[3] The Commission further directed Duke "[w]hen evaluating an Interconnection Customer's impact to the System under Good Utility Practice, Utilities should ensure that electric service is not degraded or adversely impacted . . . . [and] should continue to evolve Good Utility Practice, when needed, to ensure that electric service to existing and future retail customers is not adversely impacted." The Commission also directed Duke to continue to promote transparency in terms of the technical standards being applied through the quarterly Technical Standards Review Group, which Duke continues to do today.

[3] *June 2019 Interconnection Order*, at 50.

Q. A CENTRAL ISSUE RAISED BY WILLIAMS SOLAR IN THE COMPLAINT RELATES TO DEP'S SYSTEM IMPACT STUDY COST ESTIMATING PROCESS. PLEASE EXPLAIN DEP'S APPROACH TO DEVELOPING COST ESTIMATES DURING SYSTEM IMPACT STUDY.

A. DEP develops the preliminary cost estimates during System Impact Study based upon historic cost data for similar distribution projects. Cost estimates are provided to the Interconnection Customer at two milestones in the System Impact Study process. As I described above, the voltage and thermal/loading modeling analysis yields the vast majority of required Upgrades. Once this first evaluation segment is complete, the Interconnection Customer is provided with mitigation options and given an option regarding how to proceed with the remainder of the System Impact Study. The initial mitigation options communication outlines to the Interconnection Customer methods of connecting and a preliminary cost of System Upgrades associated with that connection type. These preliminary cost estimates are based on unit costs and a labor factor used consistently for every Interconnection Request in the DEP service territory. The System Impact Study Report then provides the second preliminary Upgrade cost estimate to interconnect the Generating Facility. This cost estimate includes all costs identified in the mitigation options, as well as any additional costs of Upgrades identified in the Evaluation 3 short circuit modeling and protective coordination analysis.

Q. ARE THE SYSTEM IMPACT STUDY COST ESTIMATES CONSIDERED FINAL OR DETAILED COST ESTIMATES?

A. No. The NC Procedures expressly contemplate that the preliminary cost estimates developed during System Impact Study are "preliminary," "non-binding" and "high level estimates" and are not based on detailed engineering or site visits. Specifically, "Preliminary Estimated Interconnection Facilities Charge" is defined as "[t]he estimated charge for Interconnection Facilities that is developed using high level estimates including overheads and is presented in the System Impact Study Report." The definition further clarifies that "[t]his charge is not based on field visits and/or detailed engineering costs."[4] Similarly, "Preliminary Estimated Upgrade Charge" is defined as "[t]he estimated charge for Upgrades developed using high level estimates including overheads and is presented in the System Impact Study Report."[5]

Sections 4.3.5 and 4.3.6 of the NC Procedures reiterates these definitions by stating that the Preliminary Estimated Upgrade Charge is a "preliminary indication of the costs and length of time" that would be necessary to correct any System problems identified in those analyses and implement the interconnection, and that the Preliminary Estimated Interconnection Facilities Charge is a "preliminary non-binding indication of the costs and time that would be necessary to provide the Interconnection Facilities." Similar language is used to describe these estimated charges in the System Impact Study

[4] NC Procedures, at Attachment 1 Glossary.
[5] *Id.*

Agreement.[6] Thus, the structure of the NC Procedures establishes that the initial cost estimates provided in the System Impact Study Report are preliminary, non-binding and "high level" in nature, and may be substantially revised during the subsequent, more detailed Facilities Study process.

Q. DOES DEP MAKE GOOD FAITH EFFORTS TO CONVEY THE PRELIMINARY NATURE OF THESE COST ESTIMATES TO INTERCONNECTION CUSTOMERS?

A. Yes. While the vast majority of Interconnection Customers proceeding under the Section 4 process are familiar with the NC Procedures, it is DEP's standard practice to include general information in the transmittal email when delivering System Impact Studies, as part of the Company's good faith effort to inform Interconnection Customers regarding the preliminary nature of the System Impact Study cost estimate. The following information was provided in Williams Solar's System Impact Study:

> The results of the System Impact Study Report for the interconnection costs which do not account for the terrain that DEP personnel will encounter to connect your renewable generation project to the DEP grid. Please be advised that these preliminary costs are based on a grid program, that is used to evaluate the connection to the grid. To that end, these are the baseline costs to connect the facility to the grid based on the proposed route by DEP that should be most cost effective and more easily to secure right-of-way for the project. Please note the project owner will have the option to choose the route of the infrastructure and point-of-delivery (POD) knowing that costs can potentially increase. The purpose of this email is for a decision to be made whether or not

[6] *See* NC Procedures, at Attachment 7 System Impact Study Agreement, PP 12-13.

> to continue moving forward with the project for the final costs or to withdraw.

See Williams Solar Exhibit JB-1. Accordingly, DEP makes clear to Interconnection Customers that the preliminary cost estimates provided during System Impact Study are baseline costs estimated at a high level that do not take into account all project or location specific information.

Q. WHY IS A HIGH LEVEL UNIT COST ESTIMATING FRAMEWORK APPROPRIATE DURING SYSTEM IMPACT STUDY?

A. During System Impact Study, the primary goal is to identify the System Upgrades necessary to permit a proposed Generating Facility to interconnect, while maintaining power quality, reliability and operational safety. By its very nature, the System Impact Study is an analytical modeling process that preliminarily engineers the Interconnection Facilities and Upgrades required to complete the interconnection without evaluating specific site conditions or completing detailed design work. Accordingly, it is reasonable and appropriate to use generic unit costs and generic labor adjustment factors for cost estimation within the System Impact Study process in order to allow the study engineer an efficient means of generating a Preliminary Estimated Upgrade Charge for review by the Interconnection Customer. The Interconnection Customer can then evaluate whether to continue to proceed through the interconnection study process to a more detailed level of engineering and design during Facilities Study estimate or withdraw.

Q. PLEASE DESCRIBE THE COST ESTIMATING PROCESS DEP HAS HISTORICALLY USED DURING SYSTEM IMPACT STUDIES TO DEVELOP PRELIMINARY UPGRADE AND INTERCONNECTION FACILITIES COST ESTIMATES.

A. To efficiently manage the significant number of Interconnection Requests progressing through System Impact Study, DEP has relied upon a standardized cost estimating process to develop the preliminary estimates provided to Interconnection Customers in System Impact Study Reports. Since at least 2015, DEP study engineers and/or third party contractors supporting System Impact Studies have used a spreadsheet-based cost estimating tool now referred to as "SIS Estimation Tool Rev0," which uses DEP's historical unit cost of completing similar scopes of work. The engineer developing the System Impact Study would input the Upgrades and Interconnection Facilities identified as required to complete the interconnection during the evaluation phases of the System Impact Study into the SIS Estimation Tool Rev0 spreadsheet to compute an estimated cost. DEP used SIS Estimation Tool Rev0 until June 2019 when DEP replaced it with SIS Estimation Tool Rev1.

Q. IS WITNESS BURKE CORRECT THAT "DEP DID NOT MODIFY THE PROCEDURE OR TOOLS USED FOR ESTIMATING SYSTEM IMPACT STUDY COSTS DURING THE PERIOD 2015 THROUGH 2019"?[7]

A. Yes. Mr. Burke is correct that from 2015 until June 2019 when SIS Estimation Tool Rev1 was implemented, no changes were made to the SIS Estimation Tool Rev0 spreadsheet.

Q. CAN YOU EXPLAIN WHY DEP DID NOT UPDATE THE SIS ESTIMATION TOOL REV0 SPREADSHEET DURING THIS PERIOD?

A. Each preliminary estimate developed in System Impact Study is subsequently updated in the Facilities Study. Therefore, over time, the Distributed Generation group responsible for System Impact Study cost estimating has monitored the Facilities Study cost estimate results to ensure reasonable accuracy and alignment between the preliminary and more detailed cost estimates. Because the System Impact Study cost estimating was producing estimates consistent with Facilities Study, no updates were deemed necessary.

Q. WHAT CAUSED DUKE TO BE AWARE OF THE NEED TO MAKE CHANGES TO BOTH ITS SYSTEM IMPACT STUDY AND FACILITIES STUDY COST ESTIMATES?

A. As explained in substantial detail by DEP Witnesses Kenneth Jennings, and Scott Jennings, Duke became aware of a pattern of substantial cost discrepancies between Facilities Study cost estimates and actual construction

[7] Witness Burke Direct, at 25.

costs in early 2018. As a result, Duke worked diligently during the second half of 2018 and into 2019 to identify the cause of the discrepancies and to develop a solution that would ensure improved accuracy of Duke's interconnection cost estimates.

Q. WHAT WAS THE PRIMARY SOLUTION IDENTIFIED BY DUKE?

A. The Revised Estimating Tool or "RET"—which is described in extensive detail in the testimony of DEP witnesses Kenneth Jennings, Steven Holeman and Scott Jennings—was the solution implemented by Duke to improve the accuracy of the Facilities Study cost estimates. Duke devoted substantial resources toward investigation, development, and testing of the RET, which resulted in Duke having a higher degree of confidence in the accuracy of the RET-produced Facilities Study cost estimates that are ultimately the estimated costs included in Interconnection Agreements.

Q. WHY DID DUKE FOCUS ITS SUBSTANTIAL EFFORTS ON IMPROVING THE ACCURACY OF ITS FACILITIES STUDY COST ESTIMATE?

A. The impetus behind the investigation and efforts to identify a solution was the observed discrepancy between the Facilities Study cost estimate (which is the estimated cost that is identified in the Interconnection Agreement) and the actual costs. Therefore, Duke focused its efforts on developing a solution that would better ensure the accuracy of the Facilities Study cost estimate.

Q. WAS DUKE AWARE THAT THE SYSTEM IMPACT STUDY COST ESTIMATING METHODOLOGY WOULD NEED ADJUSTMENT?

A. Yes. Given that the estimates produced in System Impact Study were consistent with the estimates that had previously been generated by Maximo in Facilities Study, Duke recognized that once the Company finalized a plan to adjust the Maximo-produced estimates in Facilities Study, an adjustment would be needed to the SIS Estimation Tool Rev0.

Q. PLEASE DESCRIBE HOW DUKE'S EFFORTS IN CONNECTION WITH THE RET INFLUENCED ITS DECISION WITH RESPECT TO ADJUSTMENTS TO THE SYSTEM IMPACT STUDY COST ESTIMATION.

A. Given the substantial resources devoted to developing, refining and testing the RET, and in light of the fact that Duke had based the RET on recent, actual project costs and therefore had a higher degree of confidence in the accuracy of the RET, Duke took a simpler approach to updating the System Impact Study cost estimating tool both for the sake of efficiency and timeliness. Stated differently, because Duke had developed the RET through substantial efforts and the RET was producing improved cost estimates for purposes of Facilities Study, the Distributed Generation team responsible for competing System Impact Studies adjusted the SIS Estimation Tool Rev0 spreadsheet to align with the RET.

Q. WHY WAS A SIMPLE MULTIPLIER UTILIZED?

A Once again, Duke had confidence that the RET was now producing improved cost estimates for purposes of Facilities Study. Therefore, in the interest of efficiency and making a timely change, the multiplier was implemented into the SIS Estimation Tool Rev1. And because the multiplier resulted in cost estimates that are generally in alignment with the more detailed estimates now being developed by the RET in Facilities Study, Duke considers the resulting cost estimate to be consistent with the NC Procedures' requirement to provide a "high level estimate" during System Impact Study.

Q. PLEASE DISCUSS THE TIMING OF THE CHANGES TO THE SIS ESTIMATION TOOL REV0.

A. The changes to the SIS Estimation Tool Rev0 were implemented in approximately the same time frame as the implementation of the RET. Duke did not implement changes to the SIS Estimation Tool Rev0 until June 2019 for the same reasons it did not implement a change to the Facilities Study estimating process until approximately that same time: it had not completed the investigation and development of a solution until this point in time. While Williams Solar criticizes Duke for not adjusting its cost estimation processes earlier, the reality is that substantial time was needed to ensure that Duke had a complete picture of the issue, fully understood the underlying causes, and developed and vetted a solution before implementing such solution. With respect to the SIS Estimation Tool, Duke simply leveraged its work on the RET to ensure a more accurate System Impact Study cost estimate.

Q. WITNESSES BOLYARD AND BURKE BOTH CRITICIZE AND QUESTION THE ACCURACY OF THE SIS ESTIMATION TOOL REV1.[8] HOW DO YOU RESPOND?

A. I disagree with their critiques. As I discuss above, the SIS Estimation Tool Rev1 results are reasonably consistent with the estimates produced by the RET. Witness Burke alleges that the adjustment demonstrates "DEP's intention…to merely increase the cost burden for developers—not to arrive at a good faith estimate of actual costs."[9] To the contrary, Duke expended substantial efforts to improve the accuracy of the estimates provided in Facilities Study and then adjusted its System Impact Study cost estimation methodology to produce substantially similar cost estimates. Based upon the alignment between the RET-produced cost estimates and those produced by SIS Estimation Tool Rev1, I continue to support DEP's use of the SIS Estimation Tool Rev1 as a reasonable preliminary cost estimating tool to be used during System Impact Study. DEP is also committed to continuing to evaluate the accuracy of the preliminary cost estimates generated through the SIS Estimation Tool Rev1 to ensure this alignment continues.

[8] Witness Burke Direct, at 26; Witness Bolyard Direct, at 15.
[9] Witness Burke Direct, at 26.

II. DEP'S PROCESSING OF WILLIAMS SOLAR'S INTERCONNECTION REQUEST AND DEVELOPMENT OF SYSTEM IMPACT STUDY COST ESTIMATES

Q. PLEASE PROVIDE A GENERAL OVERVIEW OF DEP'S PROCESSING OF WILLIAMS SOLAR'S SYSTEM IMPACT STUDY.

A. Williams Solar initially entered System Impact Study in late October 2016, and was designated as an interdependent Project B on the Newton Grove 230kV substation. At the time Williams Solar entered the queue, the Newton Grove substation already had five utility-scale solar power export projects totaling 15.542 MW requesting interconnection, with three of those projects (totaling 8.58 MW) on the same circuit as Williams Solar.

Consistent with DEP's generally applicable interdependency study process, Williams Solar's System Impact Study was delayed by the study of the interdependent Project A until the Project A selected a mitigation option. This occurred in July 2017, and DEP then commenced evaluation of Williams Solar, which was further delayed due to disputes lodged by the solar industry in the fall of 2017 over whether the Method of Service Guidelines represented Good Utility Practice and should be applied to existing Interconnection Customers. The System Impact Study resumed in early 2018 and a Mitigation Options Pass email was delivered to the Interconnection Customer on July 15, 2018, indicating that the proposed Generating Facility could be accommodated at the full requested size (4.992 MW) under the applicable Method of Service Guidelines and associated technical standards. During the next phase of the study process, the Interconnection Customer elected to provide additional data

for DEP to complete a Transformer Inrush Evaluation to assess the need to mitigate transformer inrush magnetizing currents. On July 23, 2018, the Transformer Inrush Evaluation results were shared with the Interconnection Customer. On September 4, 2018, the Interconnection Customer notified DEP how they planned to proceed, a series of technical documentation changes were made, and the final Transformer Inrush Evaluation mitigation was provided on November 7, 2018. After receiving additional updated documentation from the Interconnection Customer, DEP completed the protection study on December 18, 2018. The System Impact Study Report was released to DET Account Management on December 20, 2018. The timeline for completing Williams Solar's System Impact Study is typical for a preliminarily-interdependent project that entered the study phase around the same timeframe.

Q. PLEASE DESCRIBE THE SIS REPORT AND COST ESTIMATE DELIVERED TO WILLIAMS SOLAR.

A. As identified in the Compliant, DEP's assigned Account Manager issued Williams Solar's System Impact Study Report on January 28, 2019. The System Impact Study Report outlines the impacts to the existing distribution system caused by the proposed Generating Facility and the System Upgrades required to mitigate those impacts. The System Upgrades are detailed in the results section of the Report, which identifies a Preliminary Estimated Upgrade Charge of $774,000.00.

The required distribution Upgrades consisted of 2.5 miles of circuit reconductor for a total cost of $706,000. Associated protection device changes

make up the additional $68,000, bringing the System Upgrades estimate to a full amount of $774,000. A generic cost estimate for Interconnection Facilities of $60,000 was also identified in the System Impact Study Report. The Williams Solar System Impact Study Upgrade cost estimate was generated using the SIS Estimation Tool Rev0, and, therefore, does not reflect Duke's adjusted SIS Estimation Tool Rev1 process discussed above.

Q. IN YOUR OPINION, DID DEP ACT IN GOOD FAITH IN PROCESSING WILLIAMS SOLAR'S SYSTEM IMPACT STUDY AND DEVELOPING THE COST ESTIMATES PROVIDED IN THE SYSTEM IMPACT STUDY REPORT?

A. Yes. The cost estimate was provided in good faith utilizing the then-approved cost estimation tool. As described above and extensively in the testimony of DEP Witnesses Kenneth Jennings, Steven Holmes and Scott Jennings, Duke proactively investigated the cause for observed substantial cost increases and took a disciplined approach to developing solutions to correct the issue.

Q. DO YOU BELIEVE DEP HAS ADHERED TO GOOD UTILITY PRACTICE IN ADMINISTERING THE SYSTEM IMPACT STUDY PROCESS?

A. Yes. DEP has an obligation to adhere to Good Utility Practice under the NC Procedures, with the objective of developing reasonable preliminary cost estimates for Interconnection Customers. Duke has exerted significant effort since 2015 to evolve the technical standards applied during System Impact Study in response to the unparalleled level of DER requesting to interconnect

to Duke's distribution system. Duke has also exerted tremendous effort to add resources and to more efficiently process hundreds of utility-scale Interconnection Customers through System Impact Study since 2015. DEP acknowledges that the preliminary cost estimates provided to Williams Solar in System Impact Study are not representative of the costs DEP now projects to incur to interconnect Williams Solar based upon Duke's revised cost estimating methodologies, but this change in cost estimating methodologies is but one more example of the many ways in which Duke has evolved and improved its interconnection process in the face of unprecedented circumstances. As the Commission recognized in approving the current NC Procedures, managing the "increased levels of DER will necessitate evolving practices as regards Good Utility Practice" and DEP is committed to continuing to assess and, when needed, improving the System Impact Study preliminary cost estimating process under the NC Procedures.[10]

Q. WILLIAMS SOLAR ASKS THE COMMISSION TO REQUIRE DEP TO RENDER A REVISED COST ESTIMATE. WOULD IT BE REASONABLE TO REVERT BACK TO THE $774,000 PRELIMINARY SYSTEM UPGRADES COST ESTIMATE PROVIDED TO WILLIAMS SOLAR IN THE JANUARY 2019 SYSTEM IMPACT STUDY REPORT?

A. Absolutely not. It would be unjust and unreasonable to deviate from the NC Procedures and to base Williams Solar's Interconnection Agreement Upgrade and Interconnection Facilities costs on the most preliminary, and, by function

[10] *June 2019 Interconnection Order*, at 50.

of the process, less developed estimate provided under the NC Procedures. It would be especially unreasonable in these circumstances where the Company has disclaimed the accuracy of that estimate. The System Impact Study does not fully study the proposed interconnection of a generating facility, as it is preliminary and renders cost estimates that are less accurate than cost estimates provided during Facilities Study. Therefore, establishing Williams Solar's, or any Interconnection Customer's Upgrade or Interconnection Facilities costs, based upon a preliminary System Impact Study cost estimate, would be unreasonable.

Q. DOES THIS CONCLUDE YOUR PRE-FILED DIRECT TESTIMONY?

A. Yes.

MR. JIRAK: At this time, DEP would call the panel of Kenneth Jennings, Steven Holmes and Scott Jennings.

COMMISSIONER DUFFLEY: Okay. Gentlemen, I will affirm all of you at the same time.

KENNETH JENNINGS, STEVEN HOLMES and SCOTT J. JENNINGS;
having been duly affirmed,
testified as follows:

COMMISSIONER DUFFLEY: Thank you.

MR. JIRAK: Thank you, Commissioner Duffley. If it's all right with you, I will start with the testimony of Kenneth Jennings and Steven Holmes.

DIRECT EXAMINATION BY MR. JIRAK:

Q Mr. Kenneth Jennings, please state your name and title for the record?

A My name is Kenneth Jennings, General Manager of Renewable Integration for Duke Energy.

Q Thank you. And Mr. Holmes, would you please state your name and title for the record?

A Yes. My name is Steve Holmes. I am the Director of the Enterprise Project Management, Center of Excellence, at Duke Energy.

Q Thank you.

MR. JIRAK: And, Commissioner Duffley, I'll

pause there to make sure that everyone is able to hear all of the witnesses adequately.

COMMISSIONER DUFFLEY: I would like to hear from the Commissioners. I had a hard time hearing the second witness.

COMMISSIONER CLODFELTER: Mr. Holmes needs to speak up just a bit.

COMMISSIONER GRAY: Agree.

MR. JIRAK: Maybe pull that -- does that mic move a little closer?

THE WITNESS: (Mr. Holmes) Can you hear me now?

COMMISSIONER CLODFELTER: That's fine. Thank you. Yes.

COMMISSIONER GRAY: Thank you.

MR. JIRAK: Great. Thank you.

BY MR. JIRAK:

Q Mr. Jennings, along with Mr. Holmes, did you prepare and cause to be filed in this proceeding direct testimony and exhibits?

A (Mr. K. Jennings) I did.

Q Mr. Holmes, did you assist in the preparation of this testimony?

A (Mr. Holmes) I did.

Q And do either of you have any changes to make to your testimony at this time?
A (Mr. K. Jennings) I do.
Q Go ahead, Mr. Jennings.
A (Mr. K. Jennings) On Page 11, line 22, I'd like to replace the number 2,058 with 1,611. And then again on Page 12, line 1, making the same replacement. And the reason for the discrepancy is it's my understanding that there is some transmission projects that were identified in that total and we were trying to isolate the distribution projects that were -- that have been requested.

MR. TRATHEN: Mr. Jirak, this is Marcus Trathen. Could you give that number again?

MR. JIRAK: Sure. Go ahead, Mr. Jennings.

THE WITNESS: (Mr. K. Jennings) The first one or the second one?

MR. TRATHEN: Both of them.

THE WITNESS: (Mr. K. Jennings) 2,058 and the second one is 1,611.

BY MR. JIRAK:
Q Mr. Holmes, do you have any corrections to make to your testimony at this time?

A (Mr. Holmes) I do not.
Q Mr. Jennings, if I were to ask you the same questions today in your testimony today with the -- recognizing the changes that have been made, would your answers remain the same?
A (Mr. K. Jennings) Yes.
Q Mr. Holmes, if I were to ask you the same questions contained in your testimony today, would your answers remain the same?
A (Mr. Holmes) Yes.

MR. JIRAK: Commissioner Duffley, at this time I would request that the prefiled direct testimony of the panel of Mr. Kenneth Jennings and Steven Holmes be copied into the record as if given orally from the stand.

COMMISSIONER DUFFLEY: Thank you. At this time we will accept Mr. Jennings and Mr. Holmes direct prefiled testimony consisting of 75 pages and six exhibits. It's copied into the record as if given orally from the stand and the exhibits are marked for identification as premarked in the filing and will be received into evidence.

MR. JIRAK: Thank you very much, Commissioner Duffley. I will also note that there is

a seventh exhibit, a supplemental exhibit that was filed yesterday in response to the Commission's Order as well, if we can move that into the record.

COMMISSIONER DUFFLEY: The supplemental exhibit filed yesterday will be introduced and entered into the record.

MR. JIRAK: Thank you, Commissioner Duffley.

(WHEREUPON, K. Jennings/Holmes Exhibits 1 - 6 and Confidential K. Jennings/Holmes Exhibit 7 are marked for identification as prefiled and received into evidence. Confidential Exhibit filed under seal.)

(WHEREUPON, the prefiled direct testimony of KENNETH JENNINGS and STEVEN HOLMES is copied into the record as if given orally from the stand.)

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

DOCKET NO. E-2, SUB 1220

In the Matter of: Williams Solar, LLC, Complainant v. Duke Energy Progress, LLC, Respondent	))))))))))	**DIRECT TESTIMONY OF KENNETH JENNINGS AND STEVEN HOLMES FOR DUKE ENERGY PROGRESS, LLC**

Q. MR. JENNINGS, PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Kenneth Jennings, and my business address is 411 Fayetteville Street, Raleigh, North Carolina 27601.

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

A. I am employed by Duke Energy Carolinas, LLC ("DEC") as General Manager of Renewable Integration and Operations. As an employee of DEC, I also allocate a portion of my time to Duke Energy Progress, LLC ("DEP" and together with DEC, "Duke" or "the Companies"). The team assigned to me performs interconnection and operations work in both DEP and DEC.

Q. PLEASE BRIEFLY STATE YOUR EDUCATIONAL BACKGROUND AND EXPERIENCE.

A. I received an A.A.S. in Manufacturing Technology, and a B.S. in Manufacturing from Northern Kentucky University in 1991 and 1993, respectively. I also completed a Master's Degree in Business Administration from Thomas More College in 2005. Prior to joining Cinergy Corp. (Cinergy), I was employed by Philips Services Corporation as a Project Engineer where I performed process design and conducted large project estimates related to mill services at steel companies. I began working for Cinergy, now a subsidiary of Duke Energy Corp. in 1999 working in the Engineering and Construction Group of Cinergy Generation Resources, LLC. I have held positions such as Manager of Business Analysis; Station Performance Engineer at Miami Fort Station in North Bend, Ohio; Technical Analysis Engineer in the Business Development Support

Group; and Condition Based Maintenance Team Lead over thermal performance of all Cincinnati Gas & Electric generation facilities in Cincinnati. In April of 2006, Cinergy Corporation was acquired by Duke Energy Corp., at which time I was promoted to the position of Director of RTO Market Services. In that role I was designated as the Duke Energy PJM member's committee representative with voting rights in PJM stakeholder processes.

In 2014, Duke Energy divested its control of its Midwest Commercial assets, at which point I accepted the position of North Carolina Distributed Energy Strategy and Policy Director. In this role, I supported Duke as a subject matter expert in the NC HB589 renewable program stakeholder process. I also developed and designed renewable energy products and tariffs for compliance under HB589 requirements. In February of 2019, I was promoted to my current position. In this position I am responsible for DEP's and DEC's day-to-day management of interconnection operations, including compliance and administration of the North Carolina Interconnection Procedures ("NC Procedures"), the South Carolina Generator Interconnection Procedures, and the Federal Energy Regulatory Commission-jurisdictional large and small generator interconnection procedures. I am also directly responsible for much of the renewable generation compliance, renewable generation operations, engineering and operational impact studies, account management and customer relationips with respect to the industry changing implications of renewable

generation, distributed energy resources ("DER"), net energy metering, and QF/PURPA Interconnection queues across all six Duke regulated jurisdictions.

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE NORTH CAROLINA UTILITIES COMMISSION ("COMMISSION")?

A. No. I have not.

Q. HAVE YOU PROVIDED PREVIOUS TESTIMONY IN OTHER STATE REGULATORY COMMISSION PROCEEDINGS?

A. Yes, I have provided both written and hearing testimony on behalf of Duke Energy or one of its subsidiaries in Ohio, Indiana and Kentucky. These cases included Fuel Adjustment Clause proceedings, Off-System Sales Tracker proceedings, Rate Cases, and other state regulatory proceedings necessary to support the transition of the Duke Energy Ohio Transmission System from MISO to PJM.

Q. MR. HOLMES, PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Steven Holmes, and my business address is 400 South Tryon Street Charlotte, NC 28202.

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

A. I am employed by Duke Energy Business Services, LLC ("DEBS") as the Director of the Enterprise Project Management Center of Excellence. As an employee of DEBS, I support all Duke Energy Business entities, and the team that supports me provides guidance and training on the Enterprise Project Framework.

Q. PLEASE BRIEFLY STATE YOUR EDUCATIONAL BACKGROUND AND EXPERIENCE.

A. In 1985, I received a B.S in Civil Engineering from Loughborough University in England. I have been a certified Project Management Professional (PMP) since 1995, and a member of the American Association of Cost Engineers International (AACEI) member since 2011. As an AACEI member, I co-authored a TCM.1957, a published technical paper entitled "On a Mission to Improve Project Performance," which demonstrated how Duke Energy had developed sustainable and repeatable project practices and processes leveraging the AACEI Total Cost Management Framework. I am also a co-author on RISK.3479 "Variability in Accuracy Ranges: A Case Study in the US and Canadian Power Industry" to be published in June 2020. This paper discusses the variability in accuracy ranges for phased project cost estimates in the North American power industry focused on major power generation and overhead power transmission projects.

After graduating from university, my career has focused on Project Management and Project Controls processes and their application in multiple environments. From 1985 to 1994, I worked for Stone and Webster Engineering and MW Kellogg as a Project Controls Supervisor and Principal Scheduling Engineer. During this time I was responsible for all aspects of project control, including planning, scheduling, cost control, change management and work-hour estimates on projects including: Ethylene Plants, Offshore, Re-

instrumentation and Power. In 1994, I joined Integrated Management Systems Inc. (IMSI), a Michigan-based Project Management Consultant, providing services to the Automotive Industry. As an Account Manager, I was responsible for the delivery of client projects using Project Management methodologies. The projects included product development, manufacturing, construction, supply chain and IT projects for clients including Ford Motor Company, Calsonic Kansei and Arvin Meritor.

In 2006, I joined The Shaw Group as Project Controls Manager, responsible for managing cost, schedule and risk from engineering through handover to the client on two Duke Energy projects in North Carolina: a $240M Lump Sum Flue Gas Desulphurization Project at the Allen Steam Station and an 800MW Coal Fired Steam Station and Back-end Air Quality project at Cliffside. I was promoted to be the Director of Cost, responsible for the development, implementation and training of cost processes, procedures and systems that drive standardized best practices across the Power Sector portfolio on project scopes that ranged from Engineering Services ($20M) to full EPC ($6B). Some of my other achievements included the introduction of a new risk and contingency management process and the definition of standardized metrics that drove project performance improvements.

In 2013, I joined Duke Energy as a Project Director in the newly formed Project Management Center of Excellence, with a vision to “Become the Industry

Leader in Project Management" by establishing consistent, scalable processes, leveraging best practices and providing training, tools and oversight. In 2014, the Duke Energy Policy "Achieving Excellence in Project Management – The Duke Energy Enterprise Project Framework" was introduced including; a Project Delivery System which established a ranking process aligning resources and requirements; a Project Investment Lifecycle, which sets expectations of project maturity at key points, or gates and; a set PMCoE Enterprise Standards, which together document the requirements. The framework is heavily based on Project Management Institute and AACEI tenants. I was the original founder of the Project Management Utility Peer Group in 2015, growing it to include several North American utilities. In 2016, I became the Director of the PMCoE, responsible to maintain and adjust the framework, learning from best practices and benchmarking within and outside of the industry.

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE COMMISSION?

A. No. I have not.

Q. MR. JENNINGS, WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. The purpose of my testimony along with that of my colleague Steven Holmes, is to respond to the testimony of Williams Solar, LLC's ("Williams Solar") Witnesses Jonathan Burke and Charles Bolyard. I address the vast majority of issues, while, Mr. Holmes will address certain cost estimation and contingency issues based on his expertise on those issues. In addition to our testimony, DEP is also submitting the testimony of Jack McNeill and Scott Jennings, which

addresses specific details related to the System Impact Study and Facilities Study processes, respectively.[1]

Q. ARE YOU SPONSORING ANY EXHIBITS WITH YOUR DIRECT TESTIMONY?

A. Yes. My exhibits are attached to my testimony and are more fully discussed therein. The Exhibits included documents and information produced by Williams Solar in discovery. Where my Exhibit were created by Duke, they were created under my direction and supervision. I also refer to certain exhibits attached to the pre-filed testimony of Williams Solar's Witnesses.

Q. MR. JENNINGS, PLEASE SUMMARIZE DEP'S POSITION.

A. Williams Solar's Complaint must be considered within the larger context of the challenges faced and successes achieved by Duke with respect to North Carolina's generator interconnection process over the past decade. Specifically, Duke has been faced with a wave of utility-scale distribution-connected solar Interconnection Requests over a 4-5 year timeframe that is without parallel anywhere else in the country. In response to this "one of a kind" challenge, Duke has achieved nation-leading interconnection success—success that has only been achievable through the dedication of an immense amount of resources and Duke's diligent good faith efforts to administer the NC Procedures.

[1] All capitalized terms not otherwise defined here shall have the meaning assigned to them in the NC Procedures and, unless otherwise specified, all section references are to the NC Procedures, as most recently approved in the June 2019 Interconnection Order. *See Order Approving Revised Interconnection Standard and Requiring Testimony and Reports*, Docket No. E-100, Sub 101 (June 14, 2019) ("June 2019 Interconnection Order").

In the midst of such extraordinary efforts, Duke has continually evaluated and evolved best practices across all of its interconnection obligations and responsibilities, including through the refinement of its technical policies, development of entire teams dedicated to processing Interconnection Requests, substantial investments in technology and other efforts. Taken together, these efforts absolutely demonstrate Duke's good faith commitment to balancing its dual obligations of offering non-discriminatory interconnection service while seeking to ensure that power quality and reliability is maintained for all of its customers. This track record also clearly demonstrates that various aspects of the interconnection process will, by necessity, evolve over time as Duke gains more experience and identifies opportunities for improvement. Practices that were effective in 2010 when the interconnection queue had less than 100 MW of solar Interconnection Requests will require refinement when the amount of solar Interconnection Requests grows substantially—to over 6,741 MW in 2016 when Williams Solar entered the queue and to approximately 10,287 MW today. And when improvements are identified, they are implemented at a single point in time but will, in some cases, have differing impacts on different projects depending on the interconnection status of each project.

The interconnection cost estimation process is no exception to this general principle of continual improvement and evolution. As more concrete data regarding actual interconnection costs was collected, Duke appropriately assessed this information to determine whether its estimating practices similarly

required further refinement and improvement. This assessment was performed in a disciplined and deliberate manner, seeking to ensure that any changes implemented were based on a sufficient amount of data and that such changes would, in fact, result in more accurate estimates. In July 2019, Duke implemented a revised cost estimating methodology that had been developed through extensive efforts and internal review and was based almost entirely on actual cost data Duke had gathered from completed interconnections of Interconnection Customers to the Companies' distribution system. This revised cost estimating methodology is yet another example in which Duke has proactively sought to improve the interconnection process in the midst of continued, uninterrupted administration of the interconnection queue.

Ignoring the greater context of the overall interconnection process, Williams Solar essentially alleges that Duke's cost estimating was performed in bad faith. Yet, the entirety of Duke's interconnection success and the immense amount of resources dedicated to the efforts belie any suggestion that Duke has proceeded in bad faith. While it is true that the cost estimate received by Williams Solar increased substantially between System Impact Study and Facilities Study, the increase was primarily driven by the cost estimating improvements reasonably implemented by Duke as discussed above. What Williams Solar alleges to be evidence of bad faith—that its cost estimates increased substantially between System Impact Study and Facilities Study—is actually evidence of and the result of Duke's continual good faith efforts to manage North Carolina's

generator interconnection process. As will be demonstrated in my testimony and the testimony of DEP Witnesses McNeill and S. Jennings, DEP has processed Williams Solar's Interconnection Request in good faith and in accordance with the requirements of the NC Procedures.

Q. TURNING NOW TO YOU, MR. HOLMES, PLEASE SUMMARIZE YOUR TESITMONY.

A. Based on my extensive experience in the area of cost estimation practices, I provide background to the Commission regarding industry-accepted cost estimation frameworks and principles and further explain the uncertainty embedded in specific classes of estimates. I also testify regarding the common practice of including contingency amounts in construction cost estimates.

I. BACKGROUND: NORTH CAROLINA'S INTERCONNECTION PROCESS

Q. MR. JENNINGS, PLEASE PROVIDE GENERAL BACKGROUND ON THE GENERATOR INTERCONNECTION PROCESS IN NORTH CAROLINA?

A. As was discussed extensively in the recent Commission proceeding in Docket No. E-100, Sub 101 to update the NC Procedures ("NCIP Proceeding") the interconnection landscape in North Carolina is without comparison in terms of the number of utility-scale solar projects that have sought interconnection to DEP's as well as DEC's distribution systems. Since 2011, over 2,058 utility-scale solar projects (greater than 1 MW) have sought interconnection to the Companies' distribution system, of which over 828 were between 4 and 5 MW.

Of these 2,058 projects, about 500 have been connected, over 566 have either withdrawn or were canceled and over 291 are currently in the interconnection process and 91 are under construction. This amount of utility-scale distribution-connected projects, especially in DEP, is simply unparalleled in the entire country.

Q. IN WHAT WAYS DID THIS ASPECT OF NORTH CAROLINA'S INTERCONNECTION LANDSCAPE PRESENT FURTHER CHALLENGES?

A. Duke's nation-leading total interconnected utility-scale solar MW was more challenging to achieve because it occurred through the interconnection of hundreds of 4-5 MW distribution-level projects rather than larger transmission-connected projects (as has been the case in most other states). It requires far fewer resources to process, study, and construct the interconnection for a single 80 MW transmission-connected solar facility than sixteen 5 MW distribution-connected solar facilities. Each of the 5 MW solar facilities requires the same in-depth technical study process and the same extensive Interconnection Customer engagement. Further, the process of organizing, managing and closing out 16 different interconnection construction projects in 16 different locations across the distribution system is a much more challenging undertaking than executing a single construction project.

In sum, Duke has found itself in a "living laboratory" in that no other state in the country had anywhere close to the amount of distribution-connected utility

scale solar projects in development and requesting interconnection. Duke was therefore required to devote substantial resources to assessing and refining its interconnection policies and procedures to administer the queue while ensuring safe and reliable power for all customers. As further discussed by Duke's witnesses in the recent 2019 NCIP Proceeding, the significant and unparalleled growth of utility-scale QF solar facilities interconnecting to Duke's distribution systems in North Carolina has required Duke to continually reassess what constitutes Good Utility Practice and to develop new policies and technical standards applicable to these generating facility interconnections in order to mitigate the potential for localized power quality impacts and distribution system reliability risks.

Q. ARE YOU AWARE OF ANY OTHER STATE THAT HAS COMPARABLE LEVELS OF DISTRIBUTION-CONNECTED UTILITY-SCALE SOLAR PROJECTS?

A. No. As is demonstrated by data from the United States Energy Information Administration ("EIA"), the amount of utility-scale solar projects connecting to Duke's distribution system is not "normal" outside of North Carolina and, therefore, the Companies have been operating in a unique "living laboratory" of utility-scale solar deployment.

Q. PLEASE DESCRIBE THE EFFORTS MADE BY DUKE TO MEET THE CHALLENGES POSED BY NORTH CAROLINA'S UNIQUE GENERATOR INTERCONNECTION PROCESS.

A. Since 2015, the Companies have invested significant resources in continuing to fulfill their regulatory responsibility to manage the processing of new Interconnection Customers while continuing to meet their critically important public service responsibilities under North Carolina's Public Utilities Act to deliver safe and reliable electric service to our customers. As was described extensively by Duke witnesses in the NCIP Proceeding, the Companies' have invested in new technology and significantly increased the resources dedicated to supporting the North Carolina interconnection process since 2015. In fact, entire teams have been added to more efficiently process and manage the massive growth in utility-scale solar Interconnection Requests. Duke's witnesses in the NCIP Proceeding provided extensive details regarding the enormous increase in staffing as well as the significant investments in software platforms and new technology to improve efficiency and to enhance the Interconnection Customer's experience in the interconnection process.

Q. HAVE THE COMPANIES MADE REASONABLE AND GOOD FAITH EFFORTS TO ADMINISTER THE INTERCONNECTION PROCESS SINCE 2015?

A. Yes. I am proud of the process improvements the Companies have made to increase the efficiency of the interconnection process for Interconnection Customers while still ensuring a safe, reliable electrical system for all the Companies' customers. The Companies have also made good faith efforts to be responsive to Interconnection Customers' business goals. DEP Witness McNeill discusses the mitigation option process Duke has incorporated into the

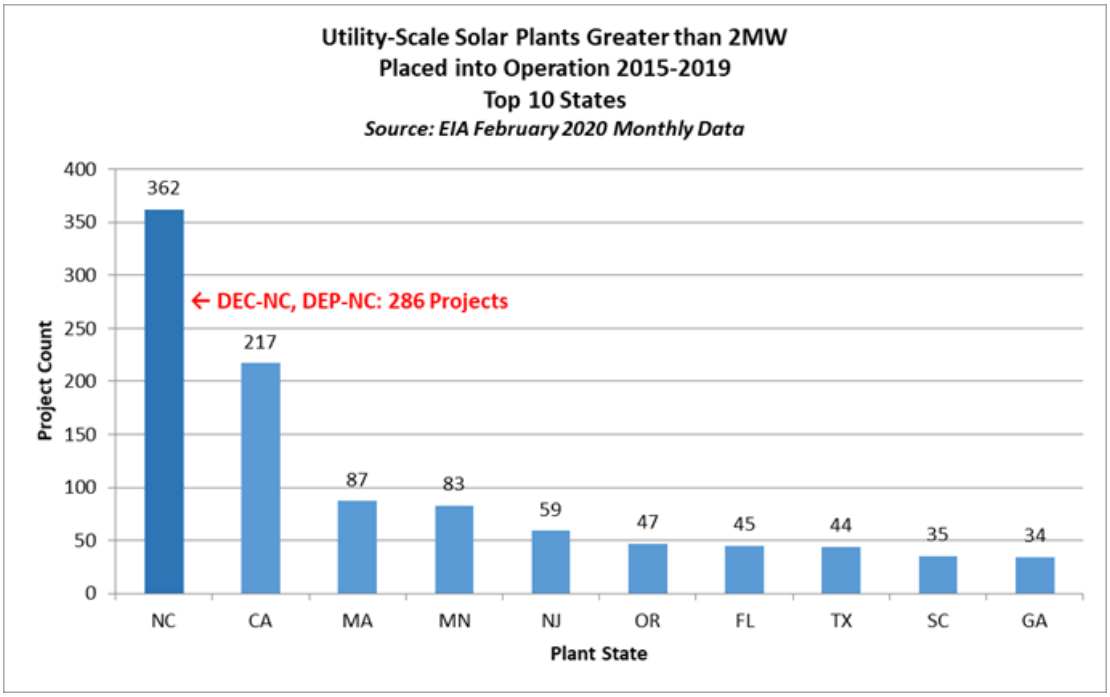
study process. As another example, because many Interconnection Customers have goals to energize projects by the end of a given calendar year, Duke has exerted considerable effort during the year-end holiday season to complete construction of as many projects as reasonably possible.

Q. PLEASE DESCRIBE DUKE'S ACCOMPLISHMENTS IN TERMS OF INTERCONNECTING UTILITY-SCALE SOLAR FACILITIES IN NORTH CAROLINA.

A. Despite the challenges described above, the facts undeniably show that the Companies have continued their nation-leading track record of interconnecting larger utility-scale solar projects. Data from the EIA tracking state-by-state growth in installed utility-scale solar shows North Carolina as a state, and the Companies by themselves, as national leaders in interconnecting utility-scale solar to the grid since 2015.

Since 2015, Duke, as a utility, has interconnected more utility-scale solar generating facilities than ***any other state in the country***. Figure 1 shows that during this timeframe, Duke has interconnected 69 more utility-scale solar projects above 2 MW than the entire state of California (which has nearly four times the population of North Carolina and three separate major investor-owned utilities) and almost eight times the number of utility-scale solar projects than the tenth leading state.

Figure 1



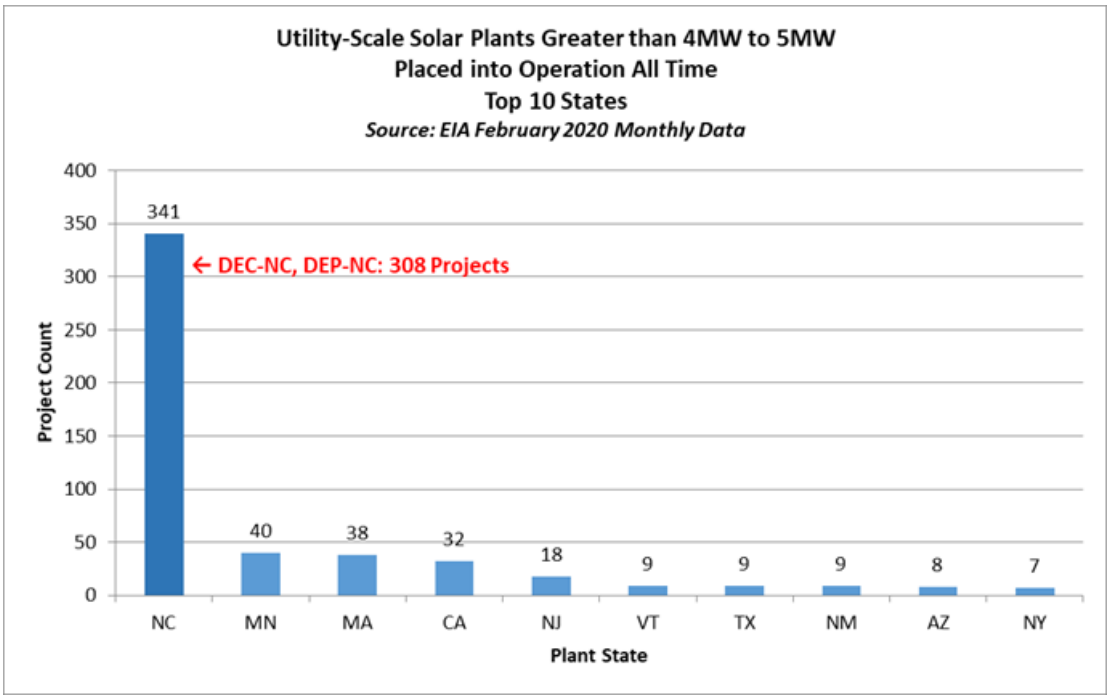
As demonstrated above, the scale of what Duke has achieved in terms of total utility-scale interconnection far exceeds the accomplishments of other states and utilities across the United States.

Q. HOW DOES THE NUMBER OF DUKE'S SUCCESSFUL SOLAR INTERCONNECTIONS BETWEEN 4 MW AND 5 MW COMPARE TO THE REST OF THE COUNTRY?

A. As shown in Figure 2 below, the amount of 4-5 MW solar generating facilities interconnected by Duke simply dwarfs all other states. Duke has interconnected nearly 8 times more 4-5 MW solar projects interconnected than Minnesota, the next closest state. New York is ranked tenth nationally with respect to 4-5 MW projects. Duke alone has interconnected 44 times more 4-5 MW projects than

New York. No other southeastern states are even in the top ten in this unique size range.

Figure 2



Q. HOW DOES THIS BACKGROUND PROVIDE CONTEXT TO THIS COMPLAINT?

A. The heart of Williams Solar's complaint is the allegation that Duke has not acted in good faith with respect to its obligations under the NC Procedures to study and provide cost estimates for the Williams Solar project. While Williams Solar's witnesses never precisely define "good faith," and I am not an attorney and therefore do no presume to define how good faith is understood in a legal context, one way to frame what constitutes "good faith" efforts are those efforts that are reasonable in light of the totality of the circumstances and consistent

with the overall structure of the arrangement. The greater context of Duke's efforts and achievements in administering the interconnection process in North Carolina shows that Duke has exerted extraordinary efforts to process over 1,100 utility-scale solar Interconnection Requests, including the **[Begin Confidential]** **[End Confidential]** distinct 2-5 MW projects in the GreenGo Energy US, Inc. ("GreenGo") portfolio of project development assets discussed by Witness Burke. Duke has treated GreenGo comparably to all other Interconnection Customers and has diligently administered all of its obligations under the NC Procedures. All of these ongoing efforts and overall accomplishments in studying and interconnecting an unparalleled number of utility-scale solar Interconnection Customers undercut Williams Solar's generalized allegations that Duke's actions in this case were not undertaken in good faith and were allegedly intended to serve as a barrier to interconnection of third-party QF generation.[2]

II. INTERCONNECTION COST ESTIMATION UNDER THE NC PROCEDURES

Q. PLEASE PROVIDE AN OVERVIEW OF THE SECTION 4 INTERCONNECTION STUDY PROCESS UNDER THE NC PROCEDURES?

A. As discussed in greater detail by DEP Witnesses Jack McNeill and Scott Jennings, Section 4 of the NC Procedures establishes the two-phased study

[2] Witness Burke Direct, at 29.

process that Duke follows to study larger generator interconnections and to design the utility system Upgrades required to mitigate identified power quality or reliability impacts to the local distribution system or transmission system associated with a new generator interconnection. At a very high level, Duke models the impacts of interconnecting a proposed Generating Facility to the system and develops a preliminary cost estimate during System Impact Study (§4.3). If the Interconnection Customer elects to continue through the interconnection study process, Duke would then complete a more detailed Facilities Study to develop more detailed Upgrade and Interconnection Facilities cost estimates (§4.4). If the Interconnection Customer elects to continue through the interconnection process after Facilities Study, Duke would then proceed to the construction planning and Interconnection Agreement development and execution process under Section 5 of the NC Procedures. The Interconnection Agreement specifies the estimated cost of the Interconnection Facilities and Upgrades (if any).

Q. WHAT HAPPENS IF THE ACTUAL COSTS OF THE INTERCONNECTION FACILITIES AND UPGRADES DIFFER FROM THE ESTIMATED COST IDENTIFIED IN THE INTERCONNECTION AGREEMENT?

A. The Interconnection Customer is only responsible for the actual cost of the Interconnection Facilities and Upgrades. Therefore, if the actual costs are below the estimate, the Interconnection Customer will be refunded through the Final Accounting process. If the actual costs are above the estimate, the

Interconnection Customer would be responsible for this additional cost. This approach of estimating costs subject to a final post-construction true up process is identical to the approach for FERC-jurisdictional interconnections.[3]

Q. PLEASE PROVIDE AN OVERVIEW OF HOW COST ESTIMATION FITS WITHIN THE INTERCONNECTION STUDY PROCESS.

A. The NC Procedures provide specific time frames for completion of the System Impact Study and the Facilities Study (subject to the "Reasonable Efforts" standard and extension during those periods of time in which Duke is awaiting a response from the Interconnection Customer or is not otherwise able to study a project due to factors outside of its control). During System Impact Study, the Companies' engineers conduct detailed modeling and technical analysis of the project to assess its impact on the electrical system and to identify the Interconnection Facilities and Upgrades needed to allow the safe and reliable interconnection of the facility to the grid. In light of the complex and technical nature of this analysis, the System Impact Study process does not contemplate the detailed design of the Interconnection Facilities and Upgrades or development of detailed cost estimate to interconnect the proposed Generating Facility.

The Facilities Study is intended to "specify and estimate the cost of the

[3] FERC has affirmed that an estimate for interconnection-related costs in an Interconnection Agreement is not "a fixed price or cost cap for the estimate" and that "[t]he [FERC's] precedent is clear that the costs in an LGIA are simply estimates and that Interconnection Customers are responsible for paying the actual costs of Interconnection Facilities and Network Upgrades." *Duke Energy Florida, LLC*, 165 FERC ¶ 61,230 at P 30 (2018).

equipment, engineering, procurement and construction work (including overheads) needed to implement the conclusions of the System Impact Studies and to allow the Generating Facility to be interconnected and operated safely and reliably." (§4.4.4). The Facilities Study results in Detailed Estimated Interconnection Facilities Charge and Detailed Estimated Upgrades charge which are estimated amounts "based on field visits and/or detailed engineering cost calculations." (Attachment 1, Glossary of Terms). It is worth noting, therefore, that while the Facilities Study estimate is intended to provide a more refined cost estimate, the Facilities Study is not intended to constitute the final engineering and design of the Interconnection Facilities or Upgrades or to trigger DEP to begin procurement. As is discussed in the testimony of DEP witness Scott Jennings, final design work to move the project from the Facilities Study detailed design to an "accepted design" for construction, as well as construction scheduling is completed after the Interconnection Customer executes the Interconnection Agreement. This context is important because Williams Solar witnesses Bolyard and Burke fail to acknowledge the crucial difference in the various types of cost estimates and how those differences influence the nature of the estimating methodology and, as discussed later in my testimony, the need to incorporate an appropriate level of contingency into the cost estimates.

Q. MR. HOLMES, PLEASE PROVIDE BACKGROUND ON COST ESTIMATION GENERALLY.

A. All construction cost estimates contain some level of uncertainty. Numerous

factors can influence the degree of uncertainty embedded in any particular construction cost estimate including but not limited to the level of design and engineering, the nature of the site, the timeline for completion of the construction, the amount of procurement completed, the certainty of future costs, *etc*.

Attached to my testimony as Jennings/Holmes Exhibit 1 is a document entitled "Cost Estimate Classification System – As Applied in Engineering, Procurement and Construction for the Power Transmission Line Infrastructure Industries" which is produced by the Association for the Advancement of Cost Engineering ("AACE"). I will refer to this document as the "AACE Cost Estimating Framework." AACE is a recognized authority on cost estimating practices and, in fact, this document was identified by Williams Solar in response to data requests from DEP concerning contingency.[4]

The AACE Cost Estimating Framework "provides guidelines for applying the general principles of estimate classification to project cost estimates" and "maps the phases and stages of project cost estimating together with generic project scope definition maturity and quality matrix."[5] The AACE Cost Estimating Framework groups cost estimates by "class," ranging from Class 5

[4] See Williams Solar's Response to DEP DR 2-19. Williams Solar's Responses to DEP's First Set of Data Requests (including both initial an supplemental responses) is being submitted as Jennings/Holmes Exhibit 2. Williams Solar Responses to DEP's Second Set of Data Requests is attached as Jennings/Holmes Exhibit 3.

[5] Jennings/Holmes Exhibit 1, at 1.

to Class 1 and specifies that the "maturity level of project definition is the sole determining (i.e., primary) characteristic of class."[6] Class 5 is the highest level cost estimate and has the most potential variability while Class 1 is the most accurate level of cost estimate and has the least amount of potential variability.

In general, cost estimates become more certain (and have less potential variability) as further project development work occurs. For instance, Table 3 located at page 14 of the AACE Cost Estimating Framework identifies more than 24 categories that can be used to assess the maturity level of project definition deliverables. In order to assess the class of estimate, it is necessary to review each such category and make a determination regarding the status of each item.

Q. PLEASE COMMENT GENERALLY ON WHAT THE AACE COST ESTIMATING FRAMEWORK IDENTIFIES WITH RESPECT TO ACCURACY RANGE OF THE VARIOUS CLASSES OF COST ESTIMATES.

A. Importantly, as is shown in Table 1 in the AACE Cost Estimating Framework at page 4, every cost estimate has an expected accuracy range. In lay terms, this means that every class of estimate has an expected variation of actual costs from the cost estimate. For instance, a Class 5 estimate has an expected accuracy range on the high side of +30% to +100%, while a Class 3 estimate

[6]Jennings/Holmes Exhibit 1, at 4.

has an expected accuracy range on the high side of +10% to +30%. For ease of reference, I have replicated Table 1 from page 4 of the AACE Cost Estimating Framework:

	Primary Characteristic	*Secondary Characteristic*		
ESTIMATE CLASS	**MATURITY LEVEL OF PROJECT DEFINITION DELIVERABLES** Expressed as % of complete definition	**END USAGE** Typical purpose of estimate	**METHODOLOGY** Typical estimating method	**EXPECTED ACCURACY RANGE** Typical variation in low and high ranges at an 80% confidence interval
Class 5	0% to 2%	Concept screening	Cost/length factors, parametric models, judgment, or analogy	L: -20% to -50% H: +30% to +100%
Class 4	1% to 15%	Study or feasibility	Cost/length, factored or parametric models	L: -15% to -30% H: +20% to +50%
Class 3	10% to 40%	Budget authorization or control	Semi-detailed unit costs with assembly level line items	L: -10% to -20% H: +10% to +30%
Class 2	30% to 75%	Control or bid/tender	Detailed unit cost with forced detailed take-off	L: -5% to -15% H: +5% to +20%
Class 1	65% to 100%	Check estimate or bid/tender	Detailed unit cost with detailed take-off	L: -3% to -10% H: +3% to +15%

Table 1 – Cost Estimate Classification Matrix for the Power Transmission Line Infrastructure Industries

Q. IN ADDITION TO THE EXPECTED ACCURACY RANGE, DOES THE AACE COST ESTIMATION FRAMEWORK ASSUME THAT A COST ESTIMATE WILL INCLUDE CONTINGENCY?

A. Yes. The AACE Cost Estimation Framework expressly addresses the need to include contingency in cost estimates prior to assessing the expected accuracy range. Stated differently, the accuracy range identified by AACE is on top of any contingency included in the cost estimate.[7]

[7] Jennings/Holmes Exhibit 1. *See e.g.*, P. 5 ("The goal should be to have an unbiased and objective estimate both for the base cost ***and for the contingency***" and "Depending upon the technical complexity of the project, the availability of appropriate cost reference information, the degree of project definition, ***and the inclusion of appropriate contingency***, a typical Class 5 estimate for an electrical transmission substation facilities project may have an accuracy range as broad as -50% to +100%, or as narrow as -

Q. PLEASE DISCUSS SYSTEM IMPACT STUDY COST ESTIMATES WITHIN THIS FRAMEWORK.

A. At the time of production of the System Impact Study cost estimate, Duke does not have detailed design engineering for the interconnection, a definitive materials list, or a construction schedule nor has it conducted a site assessment or any field engineering or right of way investigation (where necessary). As such, the System Impact Study cost estimate in most cases would be at a Class 5 estimate, which per AACEI, would have an expected variation of actual costs of up to +100% on top of any necessary contingency.

Q. PLEASE DISCUSS FACILITIES STUDY COST ESTIMATES WITHIN THIS FRAMEWORK.

A. At the time of production of the Facilities Study cost estimate, DEP will have performed substantial further design of the interconnection. However, such design will not be construction-ready and uncertainty will typically still remain with respect to important aspects of the construction process, including the potential need to address right of way issues, perform further detailed site investigation and establish a construction schedule. As such, the Facilities Study Cost estimates in most cases would be at a Class 3 estimate, which per AACEI, would have an expected variation of actual costs of up to +30% on top of any necessary contingency. In some cases depending on the complexity of the interconnection, the amount of additional design required after

20% to +30%. However, note that this ***is dependent upon the contingency included in the estimate*** appropriately quantifying the uncertainty and risks associated with the cost estimate")(emphasis added).

Interconnection Agreement execution, and the amount of uncertainty with respect to project definition deliverables, the Facilities Study cost estimate could be closer to a Class 4 estimate, which per AACEI, would have an expected variation of actual costs up to +50%.

Q. PLEASE COMMENT ON THE AACE COST ESTIMATION FRAMEWORK AS IT RELATES TO WILLIAMS SOLAR'S TESTIMONY.

A. First, while Williams Solar's witnesses apparently relied on AACE guidance,[8] there is no acknowledgment in their testimony that all cost estimates have a range of variability nor do they make a meaningful attempt to assess the maturity level of project definition deliverable in order to properly assess the class of the System Impact Study or Facilities Study cost estimates. Second, the Williams Solar's witnesses make blanket assertions regarding the appropriate level of contingency but offer no substantive details to support such assertions. For instance, Witness Bolyard states that the 20% contingency is "excessive" based on "DEP's purported level of engineering and site investigation."[9] But Williams Solar does not provide any detail regarding its assessment of the level of engineering and site investigation and does not acknowledge that further project design and other work does not occur until after execution of an Interconnection Agreement. When asked to provide evidence of the amount of contingency applied by other utilities at the Facilities

[8] Jennings/Holmes Exhibit 3, DR 2-19.
[9] Witness Bolyard Direct, at 6.

Study (or similar) step, Williams Solar refused.[10]

Q. MR. HOLMES, PLEASE SUMMARIZE YOUR TESTIMONY ON THIS ISSUE.

A. Reasonable experts can certainly reach different conclusions regarding the proper classification of the cost estimates in this case and even the precise amount of contingency to include in any given cost estimate. But there can be no dispute that all of the estimate classes have an embedded expected accuracy range that assumes potential variance in actual costs and that the AACE Cost Estimation Framework expressly contemplates the inclusion of contingency whenever uncertainty exist.

Q. MR. JENNINGS, PLEASE DISCUSS THE TRADE OFFS BETWEEN TIMING, COST AND ELIMINATION OF UNCERTAINTY AS IT RELATES TO CONSTRUCTION COST ESTIMATION.

A. Generally speaking, it is always possible to achieve reduced levels of uncertainty in a construction cost estimate, but that requires additional time, effort and cost in the estimating process. The NC Procedures balance these considerations in various ways. When it comes to the Facilities Study process, the NC Procedures do not contemplate full design of the identified Interconnection Facilities or any Upgrades. Furthermore, the timeline for the Facilities Study is not generally sufficient to allow for full design, the amount of study deposits is not sufficient to cover the cost of full design, and in Duke's

[10] Jennings/Holmes Exhibit 3, DR 2-19.

experience, developers have generally desired to exit Facilities Study as quickly as possible to obtain an Interconnection Agreement. It would certainly be possible to alter the NC Procedure to allow for full design and complete site assessment during Facilities Study and thereby achieve a higher degree of cost certainty, but such an approach would impose additional costs, require additional resources and would materially slow down the interconnection study process. And even then, such cost estimates would have an expected range of accuracy on top of any necessary contingency. The point here is that it is crucial to consider the overall context of each cost estimate and assess the level of uncertainty embedded in each estimate based on the nature of the estimate.

Q. HAS WILLIAMS SOLAR PROVIDED ANY EVIDENCE TO DEMONSTRATE THAT THE COMPANIES' INTERCONNECTION COST ESTIMATION METHODOLOGY DIFFERS FROM THE INTERCONNECTION COST METHODOLOGIES OF OTHER UTILITIES?

A. No. Williams Solar failed to provide any evidence concerning the interconnection cost estimation methodologies utilized by other utilities.[11]

III. RECENT PROCESS IMPROVEMENTS IN THE COMPANIES' INTERCONNECTION COST ESTIMATING PROCESSES

Q. WHEN DID DUKE FIRST BEGIN TO BE AWARE OF ACTUAL INTERCONNECTION COSTS SUBSTANTIALLY EXCEEDING THE

[11] Witness Burke Direct, at 30; Jennings/Holmes Exhibit 3, DR. 2-16; 2-18.

ESTIMATES DEVELOPED DURING THE FACILITIES STUDY PROCESS AND INCLUDED IN EXECUTED INTERCONNECTION AGREEMENTS?

A. Duke first became aware of such cost exceedance during the first quarter of 2018 as Duke began to receive invoicing and close out recently completed generator interconnection construction projects.

Q. DID THE COMPANIES HAVE ENOUGH INFORMATION AT THAT TIME TO ALTER ITS INTERCONNECTION COST ESTIMATING PROCESSES?

A. No. While Williams Solar's witnesses are critical of the time it took to update its cost estimating methodologies, Duke did not have enough information at that time to justify a substantial change in its interconnection cost estimating process. Making such changes is not a simple, "flip the switch" exercise. Instead, Duke approached the issue with intentionality and deliberation, seeking to ensure that there was a clear pattern of consistent deviation from estimated costs before substantially modifying its cost estimation processes.

Q. WHAT FURTHER ACTIONS DID THE COMPANIES TAKE TO PROACTIVELY ADDRESS THE ISSUE?

A. In 2018 and into early 2019, Duke devoted substantial resources to fully assessing the cost exceedances that were occurring and understanding the scope and primary drivers. Duke had recently formed the Distributed Energy Technologies ("DET") organization to better manage the unparalleled volume of Interconnection Requests and increasing complexities of the generator

interconnection process. Within DET, Duke also established a new group focused on process, governance, and reporting functions ("DET PGR group"). In early 2018, the DET PGR group began compiling generation interconnection cost data as distribution interconnection construction projects were completed to assess identified discrepancies between estimated construction costs and post-construction invoicing for actual project costs. In the fall of 2018, Duke also commenced delivering formal Final Accounting Reports to Interconnection Customers and requiring actually-incurred Upgrade and Interconnection Facilities costs to be trued up.

After identifying a growing trend of actual construction costs significantly exceeding initial study process estimates in 2018, the DET PGR group in coordination with the Distribution Planning engineering and Distributed Generation engineering organizations also began development on a generator interconnection-specific estimating tool using the data collected by the DET PGR group. The tool—referred to as the Revised Estimating Tool or the "RET"—was developed by the end of 2018, and began to be shared within DET, Distribution Planning engineering, and Distributed Generation engineering for review and approvals in early 2019. After several months of review, the tool was approved for implementation, which first occurred in July 2019—meaning Duke identified, confirmed, analyzed, and developed a solution for the discrepancy, in less than a year, and then further reviewed that solution and implemented it within an approximately six month period.

Q. DO YOU BELIEVE THAT THE AMOUNT OF TIME IT TOOK DUKE TO DEVELOP AND IMPLEMENT THE RET WAS REASONABLE?

A. While I appreciate Witness Burke's and other Interconnection Customers' frustrations and desire that Duke would have completed its investigation and implemented the RET sooner, I do believe that Duke undertook a reasonable process to first investigate the cost discrepancies that were starting to arise between pre-construction cost estimates and post-construction invoices for completed interconnection work, all while continuing to meet all other regulatory obligations and process more generator interconnection requests than any other utility in the country. In these circumstances, a one and a half year time period to identify a major trend of cost discrepancies, assess the causes for such discrepancies, develop accurate and intentionally designed solutions to them, and implement such solutions on a Duke-wide basis is not unreasonable in my opinion.

Q. PLEASE PROVIDE MORE DETAILS ON THE RET.

A. As discussed in greater detail by DEP Witness Scott Jennings, the RET was developed by applying a multivariate analysis to accounting data documenting cost differences between estimates developed during Facilities Study and actual interconnection construction costs for a substantial number of vintage 2015-2018 commercially operating distribution interconnection projects in DEP and DEC.

Q. ARE THE ADJUSTMENTS MADE BY THE RET ARBITRARY?

A. Absolutely not. Witness Bolyard asserts that the RET cost estimation methodology developed was "not based on any new information…but based on

an arbitrary set of calculations applied by DEP for the sole purpose of generating a higher cost estimate." [12] Similarly, Witness Burke alleges that the "application of labor and equipment cost adjustments, contingencies, and overheads as applied in the RET are divorced from any actual consideration of the expected costs associated with the Williams Solar project."[13] Both of these statements are completely incorrect. As described above and in the testimony of Witness Scott Jennings, the very purpose of the RET was to improve the cost estimates to better align with actually-experienced project costs. Each adjustment made by the RET was based on Duke's review of actual cost data gathered by the Companies. There is nothing arbitrary about the RET.

Q. DO YOU BELIEVE THAT IT IS RELEVANT THAT THE FACILITIES STUDY ESTIMATE IS NOW DEVELOPED THROUGH A TWO STEP PROCESS?

A. No. Duke is confident that the two step process utilizing the Maximo outputs as adjusted by the RET provides an accurate forecast of potential costs that will be incurred based upon DEP's recent experience completing a substantial number of generator interconnection projects. Ultimately, what matters most is whether the estimate is reasonably accurate and not whether Duke's current solution involves a two-step process.

Q. WHAT EVIDENCE DOES DUKE HAVE TO DEMONSTRATE THAT THE RESULTS OF THE RET ARE ACCURATE?

[12] Witness Bolyard Direct, at 6.
[13] Witness Burke Direct, at 27.

A. Contrary to the assertion of witness Bolyard that the Facilities Study Estimate is an "unreliable and unreasonable forecast" of the cost to complete interconnection construction,[14] Duke's analysis shows that the RET does, in fact, provide improved forecasts of actual interconnection costs. Duke's ongoing benchmarking of completed interconnection construction projects is further discussed in the testimony of Witness Scott Jennings.

Q. WAS THE RET THOROUGHLY VETTED BEFORE IMPLEMENTATION?

A. Yes. Throughout 2Q 2019, Duke continued to assess the RET and perform testing to ensure accuracy. In addition, necessary management approval was also sought and subsequently obtained.

Q. PLEASE DISCUSS TIMING OF THE IMPLEMENTATION OF THE RET AND IMPACT OF SUCH TIMING ON WILLIAMS SOLAR SPECIFICALLY.

A. As discussed above, the Companies implemented the RET on July 30, 2019. The Companies have also implemented changes to the tool used to provide System Impact Study cost estimates. For Interconnection Customers like Williams Solar that had previously received a System Impact Study cost estimate using the older System Impact Study cost estimation tool but then received a Facilities Study cost estimate using the RET, it was inevitable that such projects would receive a substantially increased cost estimate. The

[14] Witness Bolyard Direct, at 28.

Companies certainly recognize that a substantially increased cost estimate will impact the economics of particular projects, but Duke absolutely stands behind its decision to implement the changes when it had fully assessed the issue and developed a tool that would improve the accuracy of its cost estimates.

Q. DOES THIS MEAN THAT THE EARLIER SYSTEM IMPACT STUDY ESTIMATES WERE NOT PROVIDED IN GOOD FAITH?

A. No. As discussed, the Companies were in the process of assessing this issue but had not yet determined how to modify its cost estimating processes at the time that System Impact Study cost estimate was provided to Williams Solar. This issue is addressed further in the testimony of DEP Witness McNeill.

Q. DOES DUKE INTEND TO CONTINUE TO MONITOR ACTUAL CONSTRUCTION COSTS AND THE ACCURACY OF THE RET?

A. Absolutely, yes. We are continuing to monitor this issue and if there is a sufficient amount of evidence demonstrating a consistent pattern of deviation, Duke will make appropriate adjustments to its cost estimating methodologies.

Q. PLEASE DISCUSS SOME OF THE MAIN DRIVERS OF THE INCREASE IN THE WILLIAM SOLAR'S FACILITIES STUDY COST ESTIMATE AS COMPARED WITH THE SYSTEM IMPACT COST ESTIMATE.

A. While DEP recognizes that the total increase from the System Impact Study cost estimate to the Facilities Study cost estimate was substantial, it is also important to note that a number of discrete line item—contingency, taxes, overheads, metering and commissioning—accounted for approximately 50% of

the total cost increase. The inclusion of contingency is consistent with industry practices and well justified for the reasons that will be discussed further below. And based on internal communications produced by Williams Solar in discovery, Witness Burke and GreenGo was aware, that taxes, overheads, metering and commissioning had not been included in the System Impact Study cost estimate but would be added to the total project costs.[15] The point is that while it is true that the Facilities Study cost estimate did increase substantially as compared with the System Impact Study cost estimate due to the Companies' implementation of an improved cost estimation methodology, it is also true that a substantial portion of the increase was foreseeable to Williams Solar and a further substantial portion of the increase that relates to a simple policy disagreement regarding the level of contingency that is appropriate to be included in a Facilities Study cost estimate.

Q. WHY IS IT APPROPRIATE TO INCLUDE CONTINGENCY IN THE FACILITIES COST ESTIMATE?

A. As discussed above, inclusion of contingency in a construction cost estimate is appropriate and consistent with industry-accepted cost estimation guidance. Witness Burkes states "[i]t surprises me that a company with as much experience as DEP would need to build in such a large contingency at the detailed design stage which under professional engineering norms should be closer to actual costs." Once again, this generalized assertion is not supported

[15] Jennings/Holmes Exhibit 4.

by any actual analysis of the specific stage of project maturity, does not acknowledge the various factors that introduce uncertainty into the cost estimate including the fact that final design has not been completed at the time of the Facilities Study cost estimate, makes no comparison with the level of contingency assumed by other utilities in the generator interconnection process[16] or attempt to identify what Witness Burke believes to be a reasonable contingency amount. The Companies' experience has shown that there are numerous factors that can result in higher than projected costs, including unforeseen site conditions or extreme weather conditions. Inclusion of contingency is appropriate to provide an indicator of the such potential risk on these construction projects.

Q. WILLIAMS SOLAR CRITICIZES THE OVERHEADS INCLUDED IN THE COMPANIES' COST ESTIMATES. WHAT ARE OVERHEADS?

A. Generally speaking, overheads are those indirect expenses incurred in connection with the provision of particular goods or services. It is a commonly accepted practice to allocate certain indirect expenses to capital projects in recognition of the fact that such expenses are incurred, in part, to support such capital projects.

Q. HOW WERE OVERHEADS APPLIED TO THE FACILITIES STUDY COST ESTIMATE?

A. Overheads were applied to the Facilities Study cost estimate in a manner

[16] See Jennings/Holmes Exhibit 3, DR 2-19. Williams Solar failed to provide any evidence regarding the contingency amounts applied by other utilities in the generator interconnection process at the Facilities Study (or similar) step.

consistent with the Companies' established practice and consistent with the manner in which overhead costs are actually assigned to both retail and interconnection-related distribution work. Witness Bolyard alleges that that the overheads were applied through "'blunt force.'"[17] While it is not clear what "blunt force" means in this context, what is clear is that the overheads included in the Facilities Study cost estimate were estimated in a manner consistent with the Companies' practice and reasonably designed to reflect the manner in which overheads will be assigned to the project if constructed. Similarly, Witness Burke has offered no evidence to substantiate his allegation that the overheads included in the Facilities Study cost estimate "are divorced from any actual consideration of the expected costs associated with the Williams Solar project."

Q. WHAT ARE THE TWO SEPARATE OVERHEADS INCLUDED IN THE FACILITIES STUDY ESTIMATE?

A. First, consistent with the Commission's direction for Duke to seek to recover all interconnection costs from Interconnection Customers, overheads are included in the cost estimate to cover the cost of the DET and other organizations solely dedicated to supporting the interconnection process. For purposes of this testimony, I refer to this type of overhead as "DET Administrative Overheads." Second, Duke also allocates general corporate overheads to interconnection distribution projects in the exact same manner as

[17] Witness Bolyard Direct, at 30.

overheads are allocated to retail distribution projects. I will refer to these as "General Corporate Overheads."

Q. PLEASE DISCUSS THE DET ADMINISTRATIVE OVERHEADS.

A. The need for DET Administrative Overheads is driven by the Commission's directive to recover all interconnection-related cost from Interconnection Customer to the greatest extent possible.[18] DET Administrative Overheads are primarily comprised of labor and technology costs incurred specifically to support the interconnection process that are not otherwise direct charged.

Q. WHAT SPECIFIC COSTS ARE INTENDED TO BE RECOVERED THROUGH THE DET ADMINISTRATIVE OVERHEADS?

A. DET Administrative Overheads include labor costs for personnel within DET that support the interconnection process (including accounting, technical standards, data management and reporting) but are not able to direct charge time to particular projects. DET Administrative Overheads also include the costs for the Renewable Service Center, which manages and processes interconnection related calls, applications, and payments for projects not covered by fees, along with costs for Asset Management. Finally, DET Administrative Overheads also cover technology costs, including Salesforce enhancement project costs not related to the projects covered by fees.

Q. WHEN DID THE COMPANIES FIRST IMPLEMENT THE DET ADMINISTRATIVE OVERHEADS?

[18] *See, Order Approving REPS and REPS EMF Riders and REPS Compliance,* at 19, Docket No. E-7, Sub 1106 (Aug. 16, 2016); *Order Approving REPS and REPS EMF Riders and REPS Compliance,* at 18, Docket No. E-2, Sub 1109 (Jan. 17, 2017); *2019 Interconnection Order,* at 18.

A. In response to the Commission's directives in DEP's 2017 REPS proceeding, the DET Administrative Overheads were implemented beginning April 1, 2018 after consultation with the Public Staff. A summary table identifying the Administrative Overheads (along with estimated commissioning costs) is available on Duke's website. The DET Administrative Overhead amounts have not been changed since initial implementation in April 2018. The continued need to recover these costs was described by the Companies' witnesses in the NCIP Proceeding.[19]

Q. DOES DUKE'S CURRENT ANALYSIS SHOW THAT IT IS FULLY RECOVERING THESE COSTS FROM INTERCONNECTION CUSTOMERS?

A. No. Starting with the directive from the Commission to remove $2.1 million of 2016 interconnection-related costs from the NC REPS Rider and to seek recovery from the Interconnection Customers driving the costs, the Companies have attempted to recover approximately $21.3 million of total interconnection-related costs from interconnection customers (exclusive of those costs recovered through specific fees). These costs cover 2016-2019 charges related to supporting the interconnection process across all relevant jurisdictions. Most of these charges are labor costs and therefore represent a cash outflow for the Companies. To date, the majority of Interconnection Customers have disputed the DET Administrative Overheads and refused to pay.

[19] *Direct Testimony of Jeff Riggins,* at 15-24, Docket No. E-100, Sub 101 (filed Nov. 19, 2018).

Q. HOW ARE THE DET ADMINISTRATIVE OVERHEADS ASSIGNED TO INTERCONNECTION CUSTOMERS?

A. The DET Administrative Overheads are assigned in a step manner as the Interconnection Customer progresses through each phase of the interconnection process. In 2017, Duke estimated the total interconnection-related costs that would be incurred from 2016-2020 and then made assumptions about volumes of projects in that same time frame that would go through various stages of study as well as how many would complete the entire construction phase. The complexity of the model was driven by the need to be able to provide consistency and transparency to Interconnection Customers. Because projects are withdrawn at various stages of the process, the Duke assigned less DET Administrative Overheads to projects that withdraw early in the process and an increasing allocation as the interconnection progresses from System Impact Study to Facilities Study to an executed Interconnection Agreement. The rationale for this approach is that the farther along an Interconnection Customer progresses in the interconnection process, the more resources have been dedicated to such project and therefore the more Administrative Overhead costs should be allocated. Thus, for example, a project that progress through to completion of System Impact Study is assessed a total of $12,000 while a project progressing through to completion of Facilities Study is assessed a total of $18,000 and project proceeding to execution of an Interconnection Agreement is assessed $20,000.

Q. TURNING NOW TO GENERAL CORPORATE OVERHEAD, PLEASE PROVIDE A GENERAL DESCRIPTION OF THE COST CATEGORIES CAPTURED BY GENERAL CORPORATE OVERHEAD.

A. General Corporate Overheads include the labor and expenses for groups that provide overall support of the work in the corporate groups and the business functions. The Duke distribution organization includes certain work groups that provide overall support to both O&M and capital work related to the distribution system.

Q. PLEASE EXPLAIN WHY IT IS APPROPRIATE TO ASSIGN GENERAL CORPORATE OVERHEADS TO DISTRIBUTION INTERCONNECTION WORK.

A. Distribution interconnection projects require the same support from management, resource management, work management and finance as all other distribution work. Therefore, it is appropriate that the interconnection work receive its equitable portion of the costs of these support functions.

Q. IS THE PRACTICE OF ALLOCATING GENERAL CORPORATE OVERHEADS TO DISTRIBUTION CONSTRUCTION PROJECTS WELL-ESTABLISHED?

A. Yes, the practice of allocating General Corporate Overheads to distribution projects is well-established, including to both retail and interconnection distribution construction projects.

Q. IS DUKE ALLOCATING GENERAL CORPORATE OVERHEADS TO INTERCONNECTION DISTRIBUTION WORK CONSISTENTLY

WITH THE ALLOCATION OF GENERAL CORPORATE OVERHEAD TO RETAIL DISTRIBUTION WORK?

A. Yes, the same methodology used to allocate General Corporate Overheads to retail distribution projects is also used to allocate General Corporate Overheads to distribution interconnection projects.

Q. ARE THE GENERAL CORPORATE OVERHEADS ASSUMED IN THE RET A REASONABLE ESTIMATION OF THE GENERAL CORPORATE OVERHEADS THAT WILL BE ALLOCATED TO AN INTERCONNECTION PROJECT THAT PROCEEDS TO CONSTRUCTION?

A. Yes, while actual General Corporate Overheads are determined on a monthly basis based on Duke's actual costs and the work performed in that month, the RET's forecast of General Corporate Overheads is a reasonable forecast based on a monthly average of actual General Corporate Overhead allocations.

Q. ONCE A PROJECT IS COMPLETED, WILL THE INTERCONNECTION CUSTOMER ONLY PAY THE ACTUAL GENERAL CORPORATE OVERHEADS?

A. Yes. In the true-up process, only the actual General Corporate Overheads are included.

Q. IS DUKE'S ALLOCATION OF GENERAL CORPORATE OVERHEADS INTENDED TO IMPROVE DUKE'S PROFIT MARGIN AS ALLEGED BY WITNESS BURKE?

A. Absolutely, not. The General Corporate Overheads are actual costs that must be allocated in a reasonable manner and it is appropriate for an Interconnection Customer to bear an equitable percentage of such costs.

Q. PLEASE EXPLAIN WHY THE RET APPLIES GENERAL CORPORATE OVERHEADS TO CONTINGENCY.

A. For the base cost estimate, the full projected General Corporate Overhead is allocated. However, the RET actually takes a conservative approach with respect to the allocation of General Corporate Overhead to the contingency amount.

The contingency amount included in the Facilities Study cost estimate is intended to capture the potential that additional costs may be incurred to construct the interconnection. For constructed projects, General Corporate Overheads will be allocated to the actual costs incurred. Therefore, if the project utilizes all or portion of the contingency amount, such actual costs will be allocated the General Corporate Overheads. However, for purposes of developing the cost estimate, the RET takes a more conservative approach and does not allocate the full General Corporate Overheads to the contingency amount in recognition of the fact that it is not certain that the entire amount of contingency amount will be used. This approach results in a lower cost estimate.

Q. PLEASE SUMMARIZE YOUR TESTIMONY WITH RESPECT TO OVERHEADS.

A. The Companies application of overheads in the Facilities Study cost estimate is consistent with (1) well-established overhead allocation practices, (2) the Companies' application of overheads to its retail distribution projects, and (3) the Commission's direction to recover interconnection-related costs from Interconnection Customers to the greatest extent possible

Q. WHAT DOES WITNESS BURKE OBSERVE WITH RESPECT TO INTERCONNECTION COSTS GENERALLY?

A. Witness Burke observes that interconnection costs have "increased significantly since 2016" and that such increases are "due in large part to raising technical barriers such as its LVR policy, elimination of mitigation options like dedicated and/or double-circuit options, changes to planning criteria and policies, as well as, new technical requirements that DEP and DEC have unilaterally added to the interconnection process, including direct transfer trip ("DTT"), line upgrades, and substation modifications…"

Q. PLEASE COMMENT ON THESE OBSERVATIONS.

A. In general, these issues are not directly relevant to this complaint given that Williams Solar is not challenging any of the technical screens applied to the project. But there are a few important points to be noted. First, Duke's technical policies and screens have been previously found by the Commission to be reasonable. What Witness Burke characterizes as technical barriers are, in actuality, Duke's reasonable study methodologies and practices to ensure that the safety, reliability and power quality of service to other customers is maintained. While it is true that Duke has unilaterally implemented such

policies, it also true that Duke is unilaterally responsible for ensuring reliable service to all customers. The Commission has recognized the differing perspective of the utility, on the one hand, which is responsible for long-term reliability and solar developers, on the other hand, whose primary focus is achieving interconnection irrespective of long-term grid impacts.[20] In its most recent order approving the current NC Procedures, the Commission recognized that Duke has applied reasonable judgment and has taken appropriate steps in light of the facts known to establish the Method of Service Guidelines and other technical standards, as a reasonable implementation of Good Utility Practice. [21]

Second, Duke has repeatedly affirmed that as penetration levels increase and the preexisting distribution and transmission capacity (paid for by retail and wholesale customers) is consumed by interconnecting generators, it will often be the case that distribution and transmission upgrades will become necessary to facilitate additional interconnection. Many areas across the Companies' distribution systems, especially in DEP, are already heavily saturated with utility-scale solar generating facilities. Therefore, the solutions to connect additional utility-scale solar generating facilities to the Companies' distribution system are increasingly complex and costly, generally involving a significant amount of new distribution line construction over new rights-of-way. Simply stated, the hundreds of previously interconnected solar resources have

[20] *June 2019 Interconnection Order*, at 50-51.
[21] *June 2019 NC Procedures Order*, at 50.

consumed substantial portions of the Companies' distribution capacity in certain areas of the state, which means that further interconnections in such areas will require more costly interconnection solutions. Therefore, it should come as no surprise to solar developers that interconnection costs will generally increase given these facts.

Third, there has been a general increase across the industry for interconnection costs. In fact, in Docket No. EMP-105, Sub 0, a witness on behalf of the applicant solar developer acknowledged the general industry-wide experience of "dramatic increases in interconnection costs across the industry" over the past few years.[22]

Q. HAS WILLIAMS SOLAR OFFERED ANY EVIDENCE THAT DEP's ESTIMATED COST FOR THE UPGRADES IS SUBSTANTIALLY HIGHER THAN ESTIMATED COSTS FROM OTHER UTILITIES FOR A SIMILAR SCOPE OF WORK?

A. No. Witness Burke asserts that "reconductoring cost of $705,000 for approximately 2.5 miles of distribution line was higher than expected," However, Williams Solar refused to provide any information to substantiate his

[22] *See e.g.*, Docket No. EMP-105 Sub 0 Transcript, at 39. ("…it's pretty typical broadly across the country, but specifically in the southeast, that there is a -- there has been a -- dramatic increases in interconnection costs across the industry."); Tr. 91 ("So you walked through at various times a number of factors that, to your understanding, were some of the reasons driving the increase in cost between system impact study and facility study cost estimates. And I just want to make sure we're clear on what those factors were. So one of the factors you stated, I think the first one was the -- your experience in the industry has led you to the belief that there has been actual cost increase for doing this type of work, not only in Duke, but you've gained that information from other sources as well, correct? 20 A (Bednar) Correct.").

"expectation" and, in fact, refused to identify (1) any evidence concerning the cost paid by GreenGo to any other utility or entity (other than Duke) for distribution reconductoring constructed for the interconnection of any solar facility and (2) any cost estimate provided by any utility or entity (other than Duke) to GreenGo for the reconductoring or upgrading of any distribution line to facilitate the interconnection of a solar generating facility or any other.[23] That is, Williams Solar has refused to provide any evidence to back up this general assertion of Witness Burke. DEP stands behind its estimated costs, particularly given that it is based on Duke's actual cost experience.

Q. WITNESS BURKE ALSO TESTIFIES REGARDING THE INTERCONNECTION TIMELINE FOR GREENGO'S PROJECTS. PLEASE COMMENT ON THIS ISSUE.

A. Witness Burke observes that "significant portion of our portfolio is still waiting for Duke to finalize the interconnection study results—four (4) years and counting…" Once again, this issue is not directly relevant to this proceeding, as Williams Solar is not alleging any violation of the NC Procedures with respect to timing. However, the issue of interconnection timelines was also extensively addressed in the recent NCIP Proceeding and the Companies offered extensive unrebutted testimony regarding the many factors that are

[23] Jennings/Holmes Exhibit 3, DR 2-2, 2-5, 2-17. While Williams Solar is a wholly owned subsidiary of GreenGo and Witness Burke (the President of Development for GreenGo) repeatedly makes reference to the general development experience of GreenGo as basis for his testimony, Williams Solar and GreenGo steadfastly refused to provide any discovery responses related to GreenGo's other affiliated companies or GreenGo's development activities and interconnection processing experience not related to Williams Solar.

outside of their control that can lead to extended interconnection timelines—including primarily the challenges of interdependency which are only exacerbated by factors such as delay in provision of information from developers, developer-requested extensions, cure periods, informal and formal disputes, developer requests for additional information. Summarily asserting that the total amount of time a project has been in the queue is evidence that the Companies are somehow failing its obligations under the NC Procedures is overly simplistic and ignores the myriad of factors that impact an Interconnection Customer's study and processing priority and the amount of time a project will remain in the queue.

Q. CAN YOU PROVIDE AN EXAMPLE FROM GREENGO'S PORTFOLIO?

A. GreenGo's "portfolio of 2 to 5 MWAC projects" as discussed by Witness Burke is situated on [**Begin Confidential**] [**End Confidential]** different substations. Of those [**Begin Confidential**] [**End Confidential]** substations, all but three have had more than one utility scale solar generator Interconnection Request on the same substation. Seventeen of these substations have had five or more utility-scale solar projects seek interconnection on the same substation. Three substations have had 10 or more requests at the same substation. Only [**Begin Confidential**] [**End Confidential]** projects currently in queue were the first project on a substation. On [**Begin Confidential]** [**End Confidential]** substations, GreenGo has the last project in the queue. This analysis shows that GreenGo's interconnection processing

experience is significantly impacted by the number of earlier-queued Interconnection Requests and the siting of its projects in increasingly saturated areas of the distribution system.

Q. WITNESS BURKE ALSO MAKES ALLEGATIONS THAT DEP IS APPROACHING THE INTERCONNECTION CONSTRUCTION COST ESTIMATING PROCESS WITH AN EYE TOWARD "PROFIT OPTIMIZATION" VERSUS APPLYING GOOD UTILITY PRACTICE.[24] PLEASE COMMENT ON THIS ASSERTION.

A. This statement is completely incorrect. In response to discovery, Williams Solar offered no evidence to support this assertion because none exists.[25] Duke's interconnection responsibilities and all of the related work are performed at cost and the NC Procedures do not permit Duke to earn any profit on this work. In fact, it is worth noting that the interconnection space is one area of Duke's business where Duke is required to take on risk (*i.e.*, the risks and challenges of implementing hundreds of construction projects all across its service territory) without any ability to earn a return. Related issues were considered in the NCIP Proceeding where a Public Staff witness observed that the Companies 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" and "[w]hile they pass these costs on to the developers and customers, they do not profit from any of it."[26]

[24] Witness Burke Direct, at 30.
[25] Jennings/Holmes Exhibit 3, DR 2-15.
[26] Public Staff Lucas Direct Testimony, at 8 Docket No. E-100, Sub 101 (filed Nov. 19, 2018).

In response to a data request on this issue, Williams Solar refused to provide any evidence to back up the assertion that DEP's cost estimation is "akin to profit maximation," oddly asserting that DEP should be responsible for explaining Williams Solar's assertion in this respect.[27]

Q. WITNESS BURKE MAKES A GENERAL ALLEGATION REGARDING WHETHER RETAIL INVESTMENTS ARE BEING MADE BY DUKE BASED ON ALLEGEDLY INACCURATE ESTIMATES. PLEASE RESPOND.

A. While this issue is not relevant to this complaint and it is not my area of expertise, given the nature of the allegation, I wanted to briefly respond. I have consulted with those Duke employees that are directly involved in this process and they have confirmed that Duke's overall distribution investment strategies are based on a different process and framework than is at issue in this proceeding. Therefore, Witness Burke's allegation in this respect is completely without merit.

IV. THE COMMISSION SHOULD NOT GRANT ANY OF WILLIAMS SOLAR'S REQUESTS FOR RELIEF

Q. PLEASE PROVIDE AN OVERVIEW OF DEP'S RESPONSE TO THE RELIEF REQUESTED BY WILLIAMS SOLAR.

A. As explained in great detail in this testimony and that of DEP Witnesses Scott

[27] Jennings/Holmes Exhibit 3, DR 2-15 (Responding that "DEP, not Williams Solar, is in the best position to explain to the Commission how and why DEP uses its monopoly control of the interconnection study process, among many others means, to thwart solar developers from interconnecting, or to maximize the costs of interconnecting, and thereby to maximize DEP's profit.").

Jennings and Jack McNeil, DEP has performed all of its obligations under the NC Procedures—including its specific obligations to provide costs estimates to Williams Solar—in good faith and in accordance with the requirements of the NC Procedures. Therefore, there is no basis to provide any of Williams Solar's requested relief. However, out of an abundance of caution, I will now address Williams Solar's specific requested relief[28] and further demonstrate why the Commission should reject all such requests.

Q. WILLIAMS SOLAR FIRST ASKS THE COMMISSION TO FIND THAT DEP FAILED TO ESTIMATE INTERCONNECTION COSTS IN GOOD FAITH. PLEASE RESPOND.

A. I disagree for the reasons previously discussed in this testimony. Williams Solar has failed to present any evidence showing that DEP's actions to estimate the Upgrade and Interconnection Facilities costs provided to Williams Solar in either the System Impact Study Report or Facilities Study Report were not developed and provided in good faith. The Companies' overall commitment to the interconnection processes and its nation-leading successes undercut any assertion that DEP has, in this particular instance, not performed its obligations in good faith. The fact that the Companies have taken a proactive approach to improving its cost estimating process which resulted in the increased cost estimate for Williams Solar is, in fact, evidence of the Companies' good faith efforts.

[28] The Complaint presents a number of potential requests for relief and, in addition, Witness Burke's testimony asks the Commission to grant "whatever relief the Commission may give within its authority . . ." Witness Burke Direct, at 24.

Good faith efforts do not require perfection and the mere existence of other reasonable views about how a particular obligation should have been performed does not mean that good faith efforts were not employed. While I am not an attorney, one way to think about this issue is to consider whether there is any evidence that the Companies have acted in "bad faith." That is, the opposite of "good faith" is "bad faith." My understanding is that "bad faith" typically involves some level of intentionality—a specific intent or motive to harm or deceive. Simply stated, there is no evidence that DEP had any specific motive to harm or deceive Williams Solar either when it delivered its System Impact Study cost estimate or the Facilities Study cost estimate. Instead, both cost estimates were produced in manner consistent with DEP's treatment of all Interconnection Customers and based on the estimating tools reasonably utilized at that time.

Q. WILLIAMS SOLAR NEXT ASKS THE COMMISSION TO ORDER DEP TO REFUND ALL CHARGES INCURRED BY WILLIAMS SOLAR IN CONNECTION WITH THE FACILITIES STUDY. PLEASE RESPOND.

A. There is no basis for this requested relief given that DEP has performed its obligations under the NC Procedures diligently and in good faith. The Facilities Study costs reflect the actual cost incurred by DEP to perform the study requested by Williams Solar and required by the NC Procedures. As explained earlier in my testimony, the Facilities Study cost estimate was based on actual data and did not result from any "intentional manipulation by DEP" as alleged

by Witness Burke.[29] As I also explain above, Duke spent significant time and resources in 2018 and early 2019 investigating the cost deviations from prior Maximo estimates and has updated the interconnection cost estimating process to provide more accurate estimates to Interconnection Customers. The RET is an interconnection project cost specific tool that is specifically based on Duke's recent actual cost analysis. DEP stands by the Upgrades and Interconnection Facilities cost estimates developed during Facilities Study as having been developed in good faith and representing DEP's current best estimate of the costs to safely and reliably interconnect the proposed Williams Solar Generating Facility.

Q. RELATED TO THIS REQUEST, WILLIAMS SOLAR ALSO ASKS THE COMMISSION TO "ISSUE AN ORDER ACCOUNTING FOR ALL MONETARY LOSSES INCURRED BY WILLIAMS SOLAR." DO THE NC PROCEDURES ADDRESS THE TYPES OF "LOSSES" FOR WHICH DEP COULD POTENTIALLY BE HELD LIABLE FOR IN ITS ADMINISTRATION OF THE INTERCONNECTION PROCESS?

A. Yes. Section 6.13 of the NC Procedures, entitled Limitation of Liability, provides:

> Each Party's liability to the other Party for any loss, cost, claim, injury, liability, or expense, including reasonable attorney's fees, relating to or arising from any act or omission hereunder, shall be limited to the amount of direct damage actually incurred. In no event shall either Party be liable to the other Party for any indirect, special, incidental, consequential, or punitive damages of any kind.

[29] Witness Burke Direct, at 33-34.

While I am not an attorney, this section seems to limit the liability of Utilities administering the NC Procedures (as well as for Interconnection Customers requesting interconnection under the NC Procedures) to "direct damages actually incurred" that may result from acts or omissions of the other Party.[30] This section is clear that "in no event shall either Party be liable to the other Party for any ***indirect***, ***special, incidental***, ***consequential***, or punitive damages of any kind." (emphasis added).

Q. WHAT ARE THE SPECIFIC LOSSES ALLEGED BY WILLIAMS SOLAR?

A. In the Complaint, Williams Solar alleges that it "invested over $100,000 in development costs since receipt of the [System Impact Study] Report," but does not provide any details.[31] On page 27 of his testimony, Witness Burke states more precisely that "Williams Solar spent external development costs of approximately $56,213.80, as described in more detail in Exhibit JB-5, between receipt of the [System Impact Study] report and receipt of the facilities study results."[32] Confidential Exhibit JB-5 is generally consistent with information produced in discovery in response to DEP Data Request 1-7, which categorizes these development costs as relating to legal and other services for "Permitting and Zoning" ($35,541.75) and maintaining "Site Control" of the project site

[30] While I am not an attorney, I have been advised by counsel that the Commission has previously held in other contexts that it does not have authority under the Public Utilities Act to award monetary damages, and I am not aware that this issue has been considered under the NC Procedures in the past.

[31]

[32] Witness Burke Direct, at 27.

($25,974.62). Williams Solar's responses to DEP's First Set of Data Requests are being produced as Jennings/Holmes Exhibit 2.

Q. DO YOU HAVE A PERSPECTIVE ON WHETHER THE ALLEGED LOSSES THAT WILLIAMS SOLAR HAS IDENTIFIED ARE REASONABLY CHARACTERIZED AS DIRECTLY RELATED TO GENERATOR INTERCONNECTION OR INDIRECT AND INCIDENTAL TO DEP'S ACTIONS TO ADMINISTER THE NC PROCEDURES?

A. While I am not an attorney, I think any reasonable use and understanding of the terms "direct" versus "indirect" or "incidental, or "consequential" in the context of the NC Procedures would delineate between the direct costs Williams Solar has incurred under the NC Procedures (such as study costs) as compared to other ongoing business efforts to develop the Williams Solar project that may be indirectly or incidentally related to the generator interconnection process but that are occurring independently of the interconnection process and solely under GreenGo's direction and outside of the jurisdiction of the Commission. Put another way, Section 1.1.1 of the NC Procedures explains that "[t]his Standard contains the requirements, in addition to applicable tariffs and service regulations, for the interconnection and parallel operation of Generating Facilities with Utility Systems in North Carolina." My understanding based on advice from counsel is that the Commission has full regulatory authority to oversee the interconnection process; however, the Commission does not have authority or ability to regulate the numerous other aspects of GreenGo's solar

project development business, including how GreenGo raises debt and equity capital to fund the development business, how GreenGo deploys capital in pursuit of developing projects, whether GreenGo elects to lease or purchase the project site for a given development project, GreenGo's business strategies for obtaining required permitting and zoning approvals, or the business decisions GreenGo makes relating to the selection of and contracting for equipment, procurement, and construction of a proposed generating facility. In my opinion, all of these business activities—specifically including GreenGo's investment decisions to extend site control and pursue a variance from zoning requirements—are independent of and only indirectly related to the interconnection process regulated by the Commission under the NC Procedures.

Q. DOES WITNESS BURKE PROVIDE ANY PERSPECTIVE ON THIS ISSUE?

A. Yes. Witness Burke testifies extensively about GreenGo's business strategies: "GreenGo is charged with evaluating and procuring prospective sites for solar projects, obtaining all necessary governmental authorizations, zoning, engineering, procurement, construction management and limited financing of the facilities, and achieving interconnection with the incumbent electric utility"[33] Further, in describing the "rule of thumb" that GreenGo applies in assessing whether to proceed with developing a solar project, Witness Burke explains that GreenGo's decision making is "[b]ased upon GreenGo's

[33] Witness Burke Direct, at 2.

experience and assumptions" in the solar development business and identifies how GreenGo analyzes both investments in "ITC eligible costs" such as panels and racking as well as "non-tax eligible costs—which include interconnection costs, land acquisition costs, ROW costs, system upgrades and network upgrade cost." In effect, Witness Burke is highlighting GreenGo's specialized expertise and application of business judgement in developing solar projects in GreenGo's "portfolio" that are only indirectly or incidentally related to Duke's processing of Williams Solar's request for interconnection and assignment of Interconnection Facilities and Upgrade costs.

Witness Burke also described how GreenGo is directly responsible for project development activities independent of the utility's generator interconnection process when asked in discovery to explain the allegation in the Complaint that "the Williams Solar project has now become uneconomical," stating:

> GreenGo's decision regarding any specific project are driven by consideration of the economics of the project—which includes the costs incurred to develop the project and to achieve interconnection with the incumbent utility. There is no "one size fits all" financial template that applies to all projects within its portfolio; rather GreenGo is charged with managing its portfolio with a view to maximizing the potential profitability for its investors of the portfolio as a whole. GreenGo designed its projects based on projected costs in accordance with its and its employees' development experience, along with publicly available information.[34]

[34] Jennings/Holmes Exhibit 2, DEP 1-7.

All of this testimony points to the fact that GreenGo's solar development business and investment strategy relies upon its business judgement and is only indirectly and incidentally related to Duke's administration of NC Procedures.

Q. IF THE COMMISSION WERE TO ACCEPT GREENGO'S POSITION THAT THESE PROJECT DEVELOPMENT COSTS COULD CONSTITUTE DIRECT DAMAGES, WOULD THERE BE ANY LIMIT TO THE TYPES OF DEVELOPMENT COSTS THAT A SOLAR DEVELOPER COULD ARGUE THAT DUKE WAS RESPONSIBLE FOR?

A. No. If GreenGo's investments to extend a lease option and acquire additional property or to direct their legal counsel to pursue a variance from a county's land use regulations can be viewed as directly related to Duke's administration of the NC Procedures, then seemingly any development-related costs could be pursued as direct damages and the limitation of liability provision in the NC Procedures would be without meaning. It also introduces significant risk for Duke that other future changes to the interconnection process to evolve technical standards and other aspects of Good Utility Practice could be viewed as directly damaging an Interconnection Customer's project development investment.

Q. HOW DO YOU RESPOND TO WITNESS BURKE'S ALLEGATIONS THAT DUKE'S SYSTEM IMPACT STUDY COST ESTIMATE CAUSED GREENGO TO INCUR ALLEGED "UNNECESSARY COSTS"?

A. Witness Burke attempts to paint a picture where a single factor in the development process—DEP's admittedly significant increase in interconnection costs between the System Impact Study Report and Facilities Study Report—was the sole determining factor in GreenGo's assessment of whether to continue to pursue development of the Williams Solar project as part of GreenGo's development portfolio. However, DEP's review of Williams Solar's discovery indicates a much more complex picture with respect to Williams Solar's other key development decisions and other factors outside of DEP's control impacted the viability of the project.

First, as Witness Burke admits, Williams Solar was, at best, a "marginal project" that was "close to the economically viable line for GreenGo" and, according to discovery produced by GreenGo, was the "highest estimated cost GreenGo had received for any project by over $200,000."[35]

Second, the vast majority of Williams Solar's expenses in 2019 were caused by GreenGo's business decision to site the proposed facility on a very narrow 28-acre parcel of land ("Original Property") that did not allow the proposed 5 MW_{AC} Williams Solar project to be constructed to meet Johnston County's mandatory solar project setback requirements. Witness Burke testifies that "[i]f these zoning setbacks were enforced and no variance was allowed, Williams

[35] Jennings/Holmes Exhibit 2, DR 1-7.

Solar could not be constructed at full size even after down-sizing within NCIP limits."[36] Therefore, it was GreenGo's original development planning that put Williams Solar in the position of either withdrawing and refiling its Interconnection Request or pursuing a variance from the zoning regulation from the Johnston County Board of Adjustment ("Johnson County BOA").

Q. WHEN DID WILLIAMS SOLAR FILE A PETITION FOR THE VARIANCE?

A. According to Williams Solar's responses to discovery, Williams Solar filed the petition for variance on January 3, 2019, approximately 3 weeks before receiving the System Impact Study Report. So it would be illogical to argue that this business decision, which was the start of a process that resulted in a substantial amount of development costs, was influenced by the cost estimates subsequently identified in the System Impact Study Report. It is also unclear why GreenGo elected to wait over two and a half years after initially being issued a Certificate of Public Convenience and Necessity to seek the variance.

Q. WAS WILLIAMS SOLAR SUCCESSFUL IN OBTAINING THE VARIANCE?

A. No. The Johnston County BOA denied the variance on February 27, 2019. In denying the variance, the Johnson County BOA specifically found that Williams Solar had failed to prove that any experienced "hardship does not result from the actions taken by the Applicant, i.e., the Applicant's refusal to

[36] Witness Burke Direct, at 15.

consider or evaluate a smaller solar energy generation facility that produces less than 5 megawatts"[37]

As Witness Burke testifies, "Williams Solar and its legal counsel then pursued an appeal of the decision denying the variance."[38] On July 31, 2019, the Johnston County Superior Court issued its Order upholding the Johnston County BOA's decision. The Court's Order found in pertinent part:

> 17. In particular, the Board's findings in the written Order based upon Petitioners' evidence and testimony found that Petitioners claimed an unnecessary hardship from the potential economic consequences for Petitioners if a smaller-than-desired solar farm was built, the need for Petitioners to re-file an application with Duke Energy for a smaller solar farm in compliance with the setbacks, and the lack of consideration given by Petitioners to the construction of a smaller solar farm on the property despite it being possible to do so under the required setbacks.
>
> 18. As a result of these findings, the Board properly concluded in the written Order that Petitioners had failed to show the claimed hardship was unnecessary, was a result of conditions peculiar to the property rather than personal circumstances, and was not otherwise the result of its own action. [Citations omitted.][39]

In sum, Williams Solar was denied the right to construct the proposed generating facility on the Original Parcel as proposed in its Interconnection Request due to its own business decision to construct a 5 MW_{AC} facility on a property on which the project did not conform to the applicable setback requirements.

Q. HOW DID WILLIAMS SOLAR RESPOND?

[37] Jennings/Holmes Exhibit 5.
[38] Witness Burke Direct, at 15.
[39] Jennings/Holmes Exhibit 6

A. Williams Solar elected to expend more project development funds in July 2019 to enter into a purchase agreement to acquire an interest in a second, adjacent 30 acre parcel of property at a total cost of **[Begin Confidential]** [redacted] **[End Confidential]** ("Additional Property"). Most recently, in December 2019, GreenGo entered into an amended offer to purchase to extend the due diligence period by agreeing to pay an additional (non-refundable) $26,500 towards the cost of the Additional Property. In total, Williams Solar has now expended a total of $45,000 to acquire and extend the option to purchase the Additional Property and still owes **Begin Confidential]** [redacted] **[End Confidential]** to acquire the Additional Property.[40] Williams Solar's costs to extend the land lease on the Original Property and to acquire the Additional Property are the other major category of development expenses incurred by Williams Solar in 2019.

Q. DOES WILLIAMS SOLAR'S ACQUISITION OF THE ADDITIONAL PROPERTY NOW ALLOW ENOUGH ACREAGE TO CONSTRUCT THE PLANNED 5 MW_{AC} SOLAR PROJECT?

A. Yes. The two parcels combined (totaling roughly 60 acres) now provides Williams Solar sufficient acreage to construct the proposed generating facility if it elects to do so. However, I am surprised that Williams Solar attempted to site a 5 MW_{AC} solar facility on the 28 acre Original Property, especially considering its very narrow configuration. Below is the map provided by

[40] Jennings/Holmes Exhibit 2, Supplemental DR 1-6

Williams Solar in its November 11, 2019, Petition to amend its CPCN in Docket No. SP-8274, Sub 0, to expand the proposed generating facility on to the Additional Parcel:

Q. DOES WITNESS BURKE ASSERT THAT CONTINUING TO INVEST IN THE ADDITIONAL PROPERTY WAS A REASONABLE

INVESTMENT DECISION SIX MONTHS AFTER DUKE ISSUED THE FACILITIES STUDY REPORT?

A. Yes. Witness Burke suggests that "[u]sing the rule of thumb [GreenGo uses for project investments] . . . Williams Solar would still be within what GreenGo would consider a marginal, but economically viable project" after expending these additional funds to acquire the Additional Parcel. It is puzzling that Williams Solar alleges on the one hand that the project is not viable due to increased interconnection costs identified in Facilities Study, but has continued to make substantial investments in such "a marginal project." If GreenGo has made a business decision to continue to pursue development of Williams Solar after receipt of the Facilities Study cost estimates, then the development costs GreenGo has incurred were—at least, according to GreenGo's business judgement—necessary costs and its decision to incur them was certainly not caused by Duke.

Q. HAS DEP ASKED WILLIAMS SOLAR TO PROVIDE MORE DETAILED INFORMATION ON ITS DETERMINATION THAT THE PROJECT IS ECONOMICALLY VIABLE?

A. Yes. While Witness Burke testifies regarding GreenGo's approach to assessing economic viability, Williams Solar has refused to provide further information to substantiate the economics of the projects. In its discovery, DEP asked Williams Solar to provide "projections of, or reporting of, development costs, interconnection costs, margins, profits, rate of return, internal rate of return, or return on equity . . . for Williams Solar as well as any documents addressing

GreenGo's contention that 'the Williams Solar project has now become uneconomical.'" Williams Solar has largely refused to answer suggesting this information is not relevant.[41] Without such information, it is impossible for the Commission to fully assess the economics of the project or understand the complete financial picture of the project.

In sum, Williams Solar has pursued business decisions that it believes are reasonable and in its own best interest; however, its decision-making regarding whether to continue to incur project development expenses was not caused by DEP and, to date, Williams Solar's actions indicate that it is not even clear that GreenGo has made a final determination regarding the viability of the Williams Solar project.

Q. PLEASE SUMMARIZE YOUR TESTIMONY ON THIS ISSUE.

A. While I do not claim to be an expert on the economics of solar project development nor do I have sufficient information to fully assess each and every decision that GreenGo made with respect to the Williams Solar project (particularly given that Williams Solar has not provided sufficient information to allow for complete analysis), what is clear is that there are a myriad of inter-related and complex business factors influencing the particular development decisions made by a solar developer and there is no basis in the current regulatory structure for the Commission to attempt to assess all such factors or

[41] Jennings/Holmes Exhibit 3 Williams Solar Responses to Requests for Production 1-4 and 1-5.

effectively place all or a portion of such risks on Duke through the interconnection process.

Q. WILLIAMS SOLAR NEXT ASKS THE COMMISSION TO ORDER DEP TO REVIEW AND PROCESS ALL INTERCONNECTION REQUESTS IN ACCORDANCE WITH THE NC PROCEDURES AND IN GOOD FAITH, USING COMMERCIALLY REASONABLE ACTUAL COST DATA. PLEASE RESPOND.

A. DEP is not opposed to the Commission ordering this request for relief. However, I also believe it is unnecessary and would not impose any obligations on DEP's administration of the NC Procedures that differ from DEP's responsibilities today. As required by the NC Procedures, DEP applies reasonable efforts and Good Utility Practice in processing Interconnection Requests and has designed the updated cost estimating process based upon Duke's extensive actual experience interconnecting new Generating Facilities to its system. Duke is committed to continuing to improve the cost estimating process in the future based upon this actual experience as well as other information that becomes known to Duke. This approach is commercially reasonable and conforms to the requirements of the NC Procedures. As discussed above, Duke's updated cost estimating process has been designed to reflect Duke's recent actual cost data specific to generator interconnection construction.

Q. WILLIAMS SOLAR NEXT ASKS THE COMMISSION TO ORDER DEP TO RENDER A REVISED COST ESTIMATE AND TO ISSUE A NEW

EXECUTABLE INTERCONNECTION AGREEMENT. PLEASE RESPOND.

A. Williams Solar's Complaint requests that the Commission "require [DEP] to promptly render a revised cost estimate and executable interconnection agreement within seven business days of the order."[42] However, through testimony, Witness Burke further clarified this request, stating that the Commission should issue an "order requiring DEP to promptly render a revised facilities study estimate capped at DEP's initial SIS estimate, adopting a rebuttable presumption that any actual costs exceeding 110% of the revised estimate are unreasonable, requiring DEP to provide an executable interconnection agreement with a projected in-service date within six months after posting of required funds, and requiring DEP to provide Williams Solar with a standard offer Power Purchase Agreement subject to preservation of the economic benefits of the entire 15-year term afforded by HB 589."[43]

In response to Williams Solar's initial request in its Complaint, there is no basis for DEP to render a revised cost estimate, as DEP supports the Upgrade and Interconnection Facilities cost estimates developed in the Facilities Study as a reasonable "best estimates" for inclusion in the Interconnection Agreement. Despite Witness Burke's apparent concerns about the legitimacy of the Facilities Study cost estimates,[44] DEP has never wavered from its position that

[42] Complaint, at 10.
[43] Witness Burke Direct, at 34.
[44] Witness Burke Direct, at 27.

such cost estimate was reasonably accurate and appropriate for inclusion in the Interconnection Agreement. DEP has delivered an executable Interconnection Agreement to Williams Solar after completing the construction planning process, as required by the NC Procedures. Williams Solar can proceed with interconnection at any time.

Moreover, it would also not be reasonable (or in the best interest of Williams Solar) to require DEP to include a lower cost estimate in the Interconnection Agreement that does not reflect DEP's current best estimate of Interconnection Facilities and Upgrade costs to interconnect Williams Solar. This is because the Interconnection Agreement provides that the Interconnection Customer is 100% responsible for the actual costs of the Upgrades and Interconnection Facilities, which are charged prospectively at the time the Interconnection Agreement is executed and are then trued up through the Final Accounting process after construction is completed.[45] Accordingly, including a lower revised cost estimate in the Interconnection Agreement today simply means there is an increasing likelihood that Williams Solar will be required to pay a true up after construction is completed.

Q. WOULD YOU NOW PLEASE ADDRESS WITNESS BURKE'S MORE SPECIFIC REQUEST THAT DEP BE REQUIRED TO ISSUE A REVISED FACILITIES STUDY REPORT AND INTERCONNECTION

[45] Interconnection Agreement, Sections 6.1.1 and 6.1.2

AGREEMENT "CAPPED AT DEP'S INITIAL SIS ESTIMATE" AND TO THEN IMPOSE A "REBUTTABLE PRESUMPTION THAT ANY ACTUAL COSTS EXCEEDING 110% OF THE REVISED ESTIMATE ARE UNREASONABLE."

A. This proposal is unreasonable for a number of reasons. First, it would require DEP to enter into an Interconnection Agreement that does not reflect DEP's more detailed and current best estimate of costs as required to be included in the Interconnection Agreement. The more detailed Upgrades and Interconnection Facilities Charges developed in Facilities Study are the cost estimates required to be included in the Interconnection Agreement. Witness Burke's proposal would also inequitably exclude a number of categories of costs that Williams Solar knew at the time the System Impact Study was issued would also have to be paid under a future Interconnection Agreement. As identified in Jennings/Holmes Exhibit 4 and introduced above, Witness Burke was aware in January 2019 that the System Impact Study estimates were "base estimates" for Interconnection Facilities and Upgrades and did not "include expected metering costs, overhead costs, etc. not included in the Report. Furthermore, the $834k is a pretax estimate. We are likely looking at a near $1 MM interconnection here." Finally, this proposal would require DEP to treat Williams Solar differently than all other Interconnection Customers in violation of the comparability provisions in Section 6.7 of the NC Procedures.

Q. WOULD WITNESS BURKE'S FURTHER REQUEST THAT DEP BE REQUIRED TO PROVIDE A REVISED INTERCONNECTION

AGREEMENT COMMITTING TO A "PROJECTED IN-SERVICE DATE WITHIN SIX MONTHS AFTER POSTING OF REQUIRED FUNDS" BE REASONABLE?

A. No. Six months to complete construction of approximately 2.5 miles of line reconductoring work as well as Interconnection Facilities would be unreasonably short even if Williams Solar was the first project in line for Upgrade construction. Williams Solar completed construction planning and received an Interconnection Agreement on October 10, 2019. Williams Solar is now, in effect, asking to be put at the front of the line in the construction queue because GreenGo elected to file a Complaint on October 24, 2019, instead of signing the Interconnection Agreement and proceeding to construction. It would be inconsistent with DEP's standard business practices and unfair to the numerous other Interconnection Customers that have timely signed their Interconnection Agreements and paid the Upgrade and Interconnection Facilities costs to move Williams Solar ahead of them to the front of the construction queue.

I would also mention that DEP's good faith efforts to accommodate developers' requests for expedited construction schedules to meet year-end deadlines or other project-specific financing milestones has been a contributing cause to the increased labor costs that DEP has experienced on interconnection projects relative to the general system construction costs over the past few years. Thus, it is both ironic and clearly unreasonable for GreenGo to initially demand a

revised Interconnection Agreement based upon unreasonably low preliminary System Impact Study cost estimates, and then to also demand that DEP expedite construction of the Williams Solar project.

Q. CAN YOU COMMENT ON WITNESS BURKE'S ADDITIONAL REQUEST THAT THE COMMISSION ORDER DEP TO PROVIDE WILLIAMS SOLAR A STANDARD OFFER PPA "SUBJECT TO PRESERVATION OF THE ECONOMIC BENEFITS OF THE ENTIRE 15-YEAR TERM AFFORDED BY HB 589"?

A. Yes. This request is also unreasonable for a number of reasons. First, while I recognize that interconnection of a QF generator is a prerequisite to a QF achieving commercial operation and generating revenue under a PPA, entering into a PPA is a separate process administered under different rules and requirements established by the Commission. The Commission-approved form of Interconnection Agreement is clear on this point. Section 1.3 of the Interconnection Agreement entitled "No Agreement to Purchase or Deliver Power or RECs" makes clear that the interconnection process culminating in the Interconnection Agreement is focused on ensuring that a proposed Generating Facility is safely and reliably interconnected to the Utility's System and "does not constitute an agreement to purchase or deliver the Interconnection Customer's power . . ." Witness Burke's request should be rejected on that basis alone.

Perhaps equally importantly, there are a number of false premises in Witness Burke's testimony that make this request even more unreasonable. Witness Burke refers to HB 589 and Williams Solar being a "Covered Project" a number of times in his testimony, without really providing the Commission any explanation or context for what this means.[46] Section 1. (c) of HB 589 provided, in pertinent part, that certain QFs that otherwise would be eligible for the rate schedules and PPA terms and conditions approved by the Commission in Docket No. E-100, Sub 140 ("Sub 140 Agreement"), but have failed to commence delivery of power to DEC or DEP on or before September 10, 2018, would, despite that failure, remain eligible for a Sub 140 Agreement "unless the nameplate capacity of the generation facility when taken together with the nameplate capacity of other generation facilities connected to the same substation transformer exceeds the nameplate capacity of the substation transformer." DEP and a number of Interconnection Customers, including Williams Solar, agreed in the Settlement Agreement filed with the Commission on January 2, 2018, in Docket No. E-100, Sub 101, that Williams Solar is a "Covered Project" for purposes of meeting the "below nameplate of the substation transformer" grandfathering requirement of Section 1.(c) of HB 589. However, what is equally clear under Section 1.(c) of HB 589 is that "[t[he term of a power purchase agreement eligible for such rate schedules and terms and conditions pursuant to this section shall commence on September 10, 2018, and

[46] Witness Burke Direct, at 1, 13.

shall end on the date that is 15 years after the commencement date." Therefore, the Commission does not have authority to modify and extend the old Sub 140 Agreement terms under HB 589, as requested by Witness Burke. Moreover, it would be unreasonable to do so, because the 15 year Fixed Term avoided cost rates approved in the 2014 Sub 140 proceeding were approximately 60% higher than DEP's currently available 10 year standard offer rates. Therefore, any further extension of these now very stale rates would unjustly increase costs to DEP's customers who ultimately pay for QF energy and capacity through the annual fuel clause.

Q. DO YOU HAVE ANY OTHER COMMENTS ON WITNESS BURKE'S REQUEST TO EXTEND THE OLD SUB 140 PPA TERM TO PROVIDE ADDITIONAL ECONOMIC BENEFITS TO WILLIAMS SOLAR?

A. Briefly, I would reiterate my earlier testimony that the QF development process is a speculative business and that neither DEP nor DEP's customers should be responsible for guaranteeing that Williams Solar and its investors receive economic benefits that exceed what is provided for under North Carolina's framework for implementing PURPA. HB 589 essentially extended eligibility for Sub 140 Agreements beyond September 10, 2018, but mandated that the 15-year term commence on that date. As discussed above, Williams Solar lost its zoning appeal in July 2019 and did not even obtain approval to construct the proposed Generating Facility on the acquired Additional Property until December 2019. Therefore, it is completely infeasible that Williams Solar could have commenced delivering power by September 10, 2018, as required

by HB 589, even if DEP had already provided Williams Solar an Interconnection Agreement. Therefore, despite Witness Burke's testimony that Williams Solar is allegedly not receiving the full economic benefit under HB 589, Williams Solar was definitively not in a position to begin delivering power on September 10, 2018.

Q. FINALLY, WILLIAMS SOLAR ASKS THE COMMISSION TO FINE DEP THE MAXIMUM OF $1,000 PER DAY IN PENALTIES FOR NON-COMPLIANCE WITH THE NC PROCEDURES AS ALLOWED BY N.C. GEN. STAT. § 62-310(A). PLEASE RESPOND.

A. As I have explained above, DEP has fully complied with its obligations under the NC Procedures and such compliance has been subject to extensive and fulsome oversight by the Commission, including through a recent full evidentiary proceeding concerning every aspect of the interconnection process. The overwhelming evidence in this case shows that Duke has, in good faith and through substantial efforts, achieved nation-leading interconnection success while also continually reviewing its practices and methodologies and identifying targeted opportunities for improvement in a disciplined and deliberate manner. While I have been advised by counsel that the Commission has the authority to penalize a regulated utility for violating the Public Utilities Act or refusing to conform to or obey any rule, order or regulation of the Commission, there is no basis to penalize DEP as requested by Williams Solar. Therefore, this request should also be denied.

Q. DOES THIS CONCLUDE YOUR PRE-FILED DIRECT TESTIMONY?

A. Yes.

MR. JIRAK: At this time, I would also introduce Mr. Scott Jennings as well.

BY MR. JIRAK:

Q Mr. Jennings, will you please state your name and title for the record?

A My name is Scott Jennings and I am Director of Area Operations for DEP.

Q Thank you, Mr. Jennings. Did you also prepare and cause to be filed in this proceeding direct testimony?

A I did, yes. Thank you.

Q And do you have any changes that you would make to your testimony at this time?

A I do not.

Q And if I were to ask you the same questions contained in your testimony today, would your answers remain the same?

A Yes, they would.

MR. JIRAK: Commissioner Duffley, at this time I would request that the prefiled direct testimony of Mr. Scott Jennings also be copied into the record as if given orally.

COMMISSIONER DUFFLEY: His direct prefiled testimony consisting of 26 pages is copied into the

record as though given orally from the stand.

MR. JIRAK: Thank you very much.

(WHEREUPON, the prefiled direct testimony of SCOTT J. JENNINGS is copied into the record as if given orally from the stand.)

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

DOCKET NO. E-2, SUB 1220

In the Matter of: Williams Solar, LLC, Complainant v. Duke Energy Progress, LLC, Respondent	))))))))))	**DIRECT TESTIMONY OF SCOTT J. JENNINGS, P.E. FOR DUKE ENERGY PROGRESS, LLC**

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Scott J. Jennings, P.E., and my business address is 1451 Military Cutoff Road, Wilmington, North Carolina 28403.

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

A. I am employed by Duke Energy Progress, LLC ("DEP" or "the Company") as the Director of Wilmington Area Operations. Prior to moving into this role on January 1, 2020, I was Director of Design Engineering for the Coastal Zone of DEP, which included oversight of the engineering design work associated with both general electric distribution system improvements and generator interconnection work.

Q. PLEASE BRIEFLY STATE YOUR EDUCATIONAL BACKGROUND AND EXPERIENCE.

A. I received a Bachelor of Science degree in Mechanical Engineering from Clemson University in 2002 and began employment with South Carolina Electric & Gas Company in Columbia, South Carolina as a Distribution Engineer upon graduation. In 2007 I accepted a distribution engineering position with Duke Energy in Charlotte, and have worked for either Duke Energy Carolinas, LLC ("DEC" and, together with DEP, "Duke"), DEP or Duke Energy Business Services since that time. I am a registered Professional Engineer licensed to work in the States of North and South Carolina. I have worked in various roles involving the design, project management, construction and operations of electric distribution systems throughout my career in the utility industry. In addition, from 2013 through 2017, I served in a role as Senior

Project Manager responsible for the functional design and business implementation of Duke's current Work and Asset Management system, Maximo.

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE COMMISSION?

A. No, I have not.

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

A. The purpose of my testimony is to respond to allegations set forth in the testimony of Williams Solar Witnesses Jonathan Burke and Charles Bolyard regarding DEP's execution of the Facilities Study process under the North Carolina Interconnection Procedures ("NC Procedures"),[1] and to provide the Commission specific information on DEP's processing of Williams Solar's Interconnection Request during Facilities Study. In addition, I provide support for Duke's recent efforts to update Facilities Study cost estimates and explain why the Facilities Study cost estimate provided to Williams Solar is reasonable. Finally, I affirm that DEP's Facilities Study cost estimate, provided to Williams Solar on July 30, 2019, was developed in good faith and represents DEP's current best estimate of the costs to safely and reliably interconnect the proposed Williams Solar Generating Facility.

[1] All capitalized terms not otherwise defined here shall have the meaning assigned to them in the NC Procedures and, unless otherwise specified, all section references are to the NC Procedures, as most recently approved in the June 2019 Interconnection Order. *See Order Approving Revised Interconnection Standard and Requiring Testimony and Reports*, Docket No. E-100, Sub 101 (June 14, 2019) ("June 2019 Interconnection Order").

Q. ARE YOU SPONSORING ANY EXHIBITS WITH YOUR DIRECT TESTIMONY?

A. No, I am not. My testimony does, however, reference certain of Williams Solar's pre-filed Exhibits, including JB-4 (July 30, 2019 facilities study result e-mail) and Exhibit CEP-19 (internal DEP email dated June 10, 2019).

Q. PLEASE SUMMARIZE YOUR TESTIMONY.

A. My testimony provides an overview of the Facilities Study process under the NC Procedures, and then addresses how DEP conformed in all respects with the NC Procedures in conducting the Facilities Study for Williams Solar. The substantial increase in estimated Upgrades costs between System Impact Study and Facilities Study was entirely due to the implementation by Duke of a new cost estimation tool. My testimony explains how this new Revised Estimating Tool or "RET" was a result of the proactive efforts by Duke to assess the factors driving cost increase on actual projects and was designed specifically to reflect Duke's actual construction cost experience in interconnecting a nation-leading quantity of utility scale solar projects to its distribution system. Duke's modification to the Facilities Study cost estimation methodology has resulted in improved cost estimates for Interconnection Customers, and Duke stands behind both the revised estimating methodology and the timing of its decisions.

I. OVERVIEW OF FACILITIES STUDY PROCESS UNDER NC PROCEDURES

Q. PLEASE EXPLAIN THE FACILITIES STUDY PROCESS UNDER THE NC PROCEDURES.

A. The overall interconnection process is described by DEP witnesses Kenneth Jennings and Steven Holmes and the initial System Impact Study process is described by DEP Witness Jack McNeill. Once an Interconnection Customer receives the System Impact Study Report, it can elect to execute a Facilities Study Agreement and proceed to a more detailed Facilities Study or withdraw their Interconnection Request. (§ 4.4.1) The Facilities Study is administered under the Facilities Study Agreement and Section 4.4 of the NC Procedures. At a high level, the Facilities Study is a more detailed engineering and cost estimating process as compared to System Impact Study and includes initial engineering design work. After completing the Facilities Study, Duke issues a Facilities Study Report estimating the cost of the equipment, engineering, procurement and construction work (including overheads) required to build the Upgrades and Interconnection Facilities identified in the System Impact Study necessary to interconnect the proposed Generating Facility. (§ 4.4.4). If the Interconnection Customer elects to proceed to the Section 5 Construction Planning and Interconnection Agreement phase of the interconnection process, the cost estimates developed in the Facilities Study then become the Detailed Estimated Upgrade Charge and Detailed Estimated Interconnection Facilities Charge included in the Interconnection Agreement delivered to the Interconnection Customer. (§ 5.2.1).

Importantly, in accordance with NC Procedures, the Facilities Study does not always result in the final engineering and design of the interconnection. This

structure is established due partially to the short timeframe allowed to complete the Facilities Study and the potential that the Interconnection Customer will not execute an Interconnection Agreement. DEP witnesses Kenneth Jennings and Steven Holmes describes the tradeoffs between timing, cost and uncertainty as it relates to the interconnection process overall and cost estimating specifically. Final design work to move the project from the Facilities Study detailed design to an "accepted design" for construction, as well as construction scheduling and other construction-related decisions are completed after the Interconnection Customer executes the Interconnection Agreement and commits to fund the Upgrades and Interconnection Facilities.

Q. PLEASE EXPLAIN THE PROCESS DEP FOLLOWS DURING FACILITIES STUDY TO DEVELOP THE COST ESTIMATES DELIVERED IN THE FACILITIES STUDY REPORT.

A. Once an Interconnection Customer elects to move into Facilities Study and executes a Facilities Study Agreement, a Distribution Engineering Technologist is assigned the responsibility to review the scope of work for the identified Interconnection Facilities and Upgrades and perform more detailed engineering required to design the proposed interconnection. The Facilities Study often involves a field visit which provides the opportunity to perform a more detailed engineering estimate taking into account actual facility and site conditions. Based on this more detailed engineering, the Distribution Engineering Technologist then creates preliminary work orders reflecting the scope of work that serve as inputs into the Company's engineering and construction cost

estimating tool, referred to as "Maximo." Through this process, the Company then produces an estimated cost for the full scope of work based on estimated system-average labor and material costs. DEP has also recently integrated a generator interconnection-specific Revised Estimating Tool ("RET") as part of the Facilities Study process to address certain cost factors specific to DEP's experience constructing generator Interconnection Facilities and Upgrades. I will discuss the RET in more detail later in my testimony.

Q. PLEASE EXPLAIN THE MAXIMO TOOL THAT DEP USES TO DEVELOP THE FACILITIES STUDY COST ESTIMATE.

A. Maximo is a standardized design and cost estimating IT system develop by IBM and is used all Duke operating companies as well as other utilities in the industry. DEP uses Maximo to design and estimate the costs of distribution construction projects throughout its service territory, including for customer additions, grid reliability improvements, as well as generator interconnections. Specific to this case, DEP uses Maximo during Facilities Study to design and estimate the cost of interconnecting independently-owned distributed generating facilities to the distribution system, such as Williams Solar.

Maximo, in conjunction with a MicroStation-based graphical design tool, Bentley Open Utilities Designer ("BOUD"), is used to develop schedulable tasks, bills of material, and cost estimates. Compatible units are used as the basis for the design process, specifically for purposes of developing an estimate

of the materials and labor hours required to perform the scope of work for a given design.

Q. WHEN DID DEP BEGIN USING THE MAXIMO TOOL TO DEVELOP GENERATOR INTERCONNECTION COST ESTIMATES?

A. DEP began using the Maximo and BOUD tools on a system-wide basis for all work order design and cost estimations in November 2017. Prior to this date, DEP used a similar system called Work Management Information System ("WMIS") for the same purposes. DEP transitioned from WMIS to Maximo as part of the integration of systems and processes after the Duke Energy-Progress Energy Merger. DEC has used Maximo for similar functions since 2010.

Q. PLEASE FURTHER EXPLAIN THE PROCESS FOR CREATING AND SELECTING COMPATIBLE UNIT INPUTS IN THE MAXIMO TOOL.

A. In both the legacy WMIS system and now Maximo, the project design and cost estimating process involves selection of compatible units, which represent the scope of work being performed. The compatible unit library used in both systems contained a combination of material only compatible units, labor only compatible units, and combination material/labor compatible units. The selection process for compatible units is based on DEP's currently published Distribution Standards manual, which specifies the materials and equipment used for approved styles of installations.

Most compatible units on a design are associated with primary material items used, such as poles, conductor, switches, *etc*. Each of these compatible units

captures what material item numbers and how many labor hours are required to perform the work associated with the compatible unit. Material only compatible units are less common, and associated with minor items such as hardware and connectors in which the labor hours are associated with a higher-level compatible unit. Finally, labor only compatible units are added to a design to capture anticipated labor time that is not reflected in material only compatible units. Examples of labor only compatible units are hand digging for poles or anchors, transferring conductor, and laying wire out for reconductors. In addition to the material and labor compatible units noted above, designers have an opportunity to include "cost adder" compatible units to account for unique costs not associated with standard construction. Examples of when cost adder compatible units might be used are environmental permitting, controls and/or remediation, or other civil work such as asphalt/concrete removal or remediation.

Q. HOW ARE COMPATIBLE UNITS USED TO DEVELOP COST ESTIMATES?

A. Once a designer has tabulated the list of compatible units associated with a design for the given scope of work, they perform a step called "estimation" which calculates the total material and labor costs for the design. The design cost estimate is based on the following components: direct material costs, material overheads, direct labor costs, and labor overheads.

Material costs are estimated based on near real-time system average costs. Duke obtains competitive pricing for material purchases and performs both a technical and commercial evaluation to determine the best overall evaluated pricing to select an approved supplier or in many cases multiple suppliers before executing contracts for construction materials. Periodically, a review of market conditions is performed to assess indices relative to raw material cost and to perform cost modeling for approved price adjustments.

Labor costs are calculated in Maximo based on a summation of all the labor hours associated with the compatible units included on the design, the type(s) of construction resource (overhead, underground, *etc*.) required to perform the work, and the system average hourly labor rate associated with the type(s) of construction resources required. Labor hours are defined within Maximo for each unique task included within the design, such as installing poles, conductor, *etc*. System average labor rates are calculated for each Duke operating utility (*i.e.* DEP) on an annual basis and reflect the average blended labor rate for the percentage of internal and external (contract) construction resources utilized in each jurisdiction. As with materials, Duke obtains competitive pricing for labor contracts and performs both a technical and commercial evaluation to determine the best overall evaluated pricing to select an approved supplier or in many cases multiple suppliers before executing contracts for construction services.

Q. WITNESS BOLYARD SUGGESTS THAT MAXIMO IS NOT PROVIDING ACCURATE ESTIMATES BECAUSE THE HISTORICAL

MATERIALS AND LABOR COST DATA INPUTTED INTO MAXIMO HAVE NOT BEEN UPDATED SINCE 2015.[2] IS HE CORRECT?

A. No. Witness Bolyard is not correct as the system-wide materials and labor inputs into Maximo have been updated routinely over the past few years. Maximo was not even used by DEP until November 2017. And as I explain above, materials costs are estimated based on near real-time system average costs, while labor costs are assessed annually (or more often where experiences show that adjustments are required). Later in my testimony, I identify a recent example of DEP updating labor rates and hour assumptions in Maximo in the fall of 2019 based upon a review of DEP's actual experience. In summary, Witness Bolyard's repeated claim that the inputs to Maximo are "outdated" and not based upon "2015-2018 data" is simply not accurate.[3]

I also disagree with his contention that the Maximo estimates are "unreliable and unreasonable."[4] These estimates reflect DEP's historical experience in terms of system-wide materials and labor costs, and, in that sense, are reasonable and accurate for that purpose. However, as I discuss later in my testimony, the RET has been developed to address Duke's actual experience specific to recently-constructed generator interconnection costs, which have significantly exceeded the historical system-wide average cost estimates developed through Maximo.

[2] Bolyard Direct, at 23.
[3] Bolyard Direct, at 28-29.
[4] Bolyard Direct, at 28.

Q. HAS DUKE RECENTLY DETERMINED THAT THE SYSTEM AVERAGE MATERIALS AND LABOR COSTS IN MAXIMO WERE RESULTING IN AN UNDERESTIMATION OF DUKE'S COST OF COMPLETING GENERATOR INTERCONNECTIONS?

A. Yes. Witness Kenneth Jennings describes the investigation Duke undertook in 2018 and early 2019 to assess deviations between estimated and actual generator distribution interconnection project costs, as well as Duke's responsive actions to update the cost estimating process used for generator distribution interconnection customers. Among the factors identified for the deviation was higher than forecasted labor costs. First, Duke identified that average labor rates and hours to complete construction work was increasing across the system more rapidly than assumed in Maximo. Second, the Company also determined that labor costs for generator interconnection projects were consistently higher than the system average costs DEP is experiencing on other distribution work for the reasons explained further below. Other contributing factors include unforeseen site conditions requiring both additional material and labor costs, such as the need to replace additional poles, manage construction within existing rights of way, or construct lines in sub-optimal environments such as wet areas requiring specialized equipment. Maximo's more real time system-wide average costs estimates for general distribution work also did not account for multi-year lags between development of the estimates as well as overtime expense required to meet customer demands for specified in-service dates—often at year-end.

Q. CAN YOU EXPLAIN WHY GENERATOR INTERCONNECTION PROJECT CONSTRUCTION COSTS ARE HIGHER THAN THE SYSTEM AVERAGE CONSTRUCTION COSTS?

A. It is largely a function of the more complex and higher cost scopes of work required to interconnect distributed generating facilities to the system. Duke is not routinely connecting new retail "load customers" 5,000 kW in size. Most of Duke's distribution construction work across the system is undertaken to provide retail service to new residential and commercial customers or to replace aging poles and other equipment as part of ongoing grid modernization efforts. By comparison, interconnecting a five MW_{AC} solar generator for parallel operation with the distribution system is a significant work scope often involving distribution line upgrades of one or more miles (as is the case with Williams Solar), meaning that these projects consistently require construction crews capable of completing heavy line construction and other more complex work. Construction crews assigned to complete generator interconnection projects must have the construction resources (manpower) and equipment (four wheel drive bucket trucks and diggers, wire pulling and tensioning equipment, and in some locations matting or tracked equipment for access) capable to complete these types of more complex and labor intensive tasks. Due to the more complex work scopes, the construction crews have a higher hourly cost burden relative to the system average costs in Maximo.

Q. WAS DEP ALSO UNDER-ESTIMATING LABOR COSTS BASED UPON SYSTEM AVERAGE COSTS FROM MAXIMO?

A. Yes. To provide a real world example, Witness Bolyard's testimony discusses a June 10, 2019, internal e-mail communication, produced by DEP in discovery, discussing how applying system average labor costs from Maximo was identified as the largest contributing factor to Duke's under-estimation of generator interconnection costs for two recently constructed solar projects.[5] The full email was included in Witness Bolyard's testimony as Exhibit CEB-19, and describes how the labor rate and labor hours assumptions within Maximo did not align with the construction crew resources being assigned to complete these generator interconnection projects. The email explains that the "hourly rate that Maximo uses, roughly based on 4 men and 2 trucks" while Duke "currently [has] a base crew size of 5 men but due to the ramp up efforts in late 2017 and throughout 2018 our crews were generally 6 men including a FM (2 bucket trucks, l line truck and 1 PU). The contract allows the vendor to bill us for equipment and total manhours, including the [General Foreman (GF)]. These 2 solar jobs had an average crew size of 6 men plus some time charged by a GF." The email concludes that "this would explain the estimates from Maximo being nearly 50% below the actuals. The labor cost is the largest contributing factor in the overrun." This email accurately explains Duke's recent experience that Maximo cost assumptions were not aligning with the real-world construction resources necessary to complete the more complex and lengthy generator interconnection work scopes, which was leading to higher than estimated costs.

[5] Witness Bolyard Direct, at 23-24.

Q. BASED ON ITS INVESTIGATION, HOW DID DUKE ADJUST ITS FACILITIES STUDY COST ESTIMATION PROCESS AS A RESULT OF THESE FACTORS?

A. In the fall of 2018, Duke began development of a revised cost estimation tool that could be used in conjunction with Maximo to develop improved estimates. Through the end of 2018 and into early 2019, Duke further refined the tool, conducted final testing, and received required management approvals to utilize the tool beginning in June 2019. This generator interconnection-specific cost estimating tool is referred to as the "Revised Estimating Tool" or the "RET."

Q. WHY WAS IT NECESSARY TO DEVELOP THE RET RATHER THAN UPDATE MAXIMO?

A. Based upon Duke's recent investigation of generator interconnection construction project cost deviations, DEP recognized the immediate need to develop a solution to accurately estimate the cost estimates being provided to Interconnection Customers using DEP's extensive recent generator interconnection project cost experience, while continuing to assess opportunities to update Maximo.

There are several variables that drive the lengthy timeline involved with making updates to Maximo:

- Updates to core data in Maximo are time consuming and require significant change management to over one thousand users across DEC and DEP when implemented.

- The labor duration and labor rate associated with performing distribution line construction tasks is impacted by many factors, including work methods and safety rule changes, labor strategy, resource availability, *etc*. Understanding the impact of these changes is frequently a reactive process demonstrated by cost actuals on completed projects.
- Maximo cost estimates are used for all types of Distribution construction work, including projects that result in Contribution in Aid of Construction ("CIAC") to DEP's residential, commercial and industrial customers. It is critical that updates to Maximo estimating process are thoroughly reviewed to ensure no undue burden to these customers.

As a result of these multiple factors, the RET was developed as an interim tool to immediately provide more accurate cost estimates to Interconnection Customers for generator interconnection projects.

Q. IS DUKE CONTINUING TO EVALUATE IMPROVEMENTS TO THE OVERALL MAXIMO COST ESTIMATING PLATFORM?

A. Yes. Duke continues to work towards a goal of updating Maximo to a point where it provides accurate Class 3 or 4 cost estimates for all types of projects, including but not limited to generator interconnections. Most recently, actions were taken in the third quarter of 2019 to make data updates to labor duration and labor rates utilized within Maximo to develop base project cost estimates. The impact of these actions resulted in direct labor cost estimate increases of

20-35% on DEP projects estimated in Maximo after mid-September 2019. Duke continues to perform analysis of completed project cost actuals relative to estimates to identify further improvement opportunities within Maximo.

Q. TURNING NOW TO THE RET, CAN YOU PLEASE DESCRIBE HOW THE RET WORKS?

A. The RET is a secondary cost estimating tool that tailors the system-average materials and labor compatible unit costs generated in Maximo to interconnection-specific work scopes based upon Duke's actual cost experience constructing these scopes of work. The primary adjustments made by the RET account for increased future costs by projecting inflation-impacted labor, material and equipment costs, modeling more likely resourcing and equipment requirements specific to generator interconnections, and adding a 20% contingency factor for the potential for unforeseen events, which Duke has identified as often being a contributing cause to cost increases. A detailed summary of the adjustments the RET makes to Maximo's system average estimates of materials, labor, and vehicles expenses are described in the document filed as Exhibit CEB-12.

Q. WITNESS BOLYARD ALLEGES THAT THE RET IS NOT AN "INDUSTRY STANDARD COST ESTIMATING TOOL."[6] HAS DEP DEVELOPED SIMILAR SECONDARY COST ESTIMATING TOOLS FOR OTHER UNIQUE SCOPES OF WORK?

[6] Witness Bolyard Direct, at 20.

A. Yes. Beginning in 2010**,** DEP developed and began implementing a similar mechanism for North Carolina Department of Transportation ("NCDOT")-requested distribution line relocations. Similar to the RET, Maximo (and, prior to 2017, WMIS) design estimates for DOT projects are run through a secondary estimating tool that was developed specifically based on actual costs experienced for NCDOT-requested projects. The DOT cost estimating tool similarly adds contingency and construction overheads to more accurately reflect experienced costs for NCDOT-specific project scopes.

Q. WITNESS BOLYARD ARGUES THAT THE RET IMPOSES "BLUNT-FORCE MULTIPLIERS" TO INCREASE THE MAXIMO COST ESTIMATES. IS THIS A FAIR CHARACTERIZATION?

A. No. Witness Bolyard insinuates that DEP simply "plussed up" the cost estimates without a rational basis for doing so.[7] I strongly disagree. The RET is designed to adjust the estimates generated by Maximo taking into account Duke's extensive recent experience constructing generator interconnection facilities. The RET targets areas of Maximo estimates that have been determined through Duke's recent investigation to reflect under-estimations of the costs Duke is actually experiencing on generator interconnection construction projects and to update these cost categories to provide the "best estimate cost, including overheads" required by the NC Procedures. For example, the RET adjusts labor hours and contractor hourly rates based upon Duke's determination that Maximo consistently underestimated the levels of

[7] Witness Bolyard Direct, at 21.

contractor resources and hourly rates used on generator interconnection projects. The RET also adjusts for increased contractor fleet expenses or "vehicle costs" estimated in Maximo based upon Duke's experience that this cost was not being fully recognized in Maximo estimates for recent generator interconnection project scopes of work. The RET also enables adjustments for project-specific categories of costs such as environmental, tree trimming and right of way costs that may or may not be required on a specific projects scope of work. Finally, the RET assigns overheads, as well as a 20% contingency. DEP Witnesses Kenneth Jennings and Steve Holmes address the overheads assumed in the Facilities Study cost estimate and describe the reasons for applying a contingency amount in Facilities Study cost estimates in accordance with industry standards.

Duke has also made adjustments to the RET as adjustments have been made to Maximo. As I explain above, Duke adjusted the labor rates and labor hours assumptions in Maximo in the fall of 2019. In response, Duke also made a complimentary adjustment in the RET.

Q. IF THE RET RESULTS IN FUTURE ESTIMATES EXCEEDING ACTUAL COSTS, WOULD DUKE CONSIDER REDUCING THE CONTINGENCY OR ADJUSTING THE OVERHEADS APPLIED TO THE CONTINGENCY AMOUNT IN THE FUTURE?

A. Potentially, if future experience suggests that Duke is now overestimating generator interconnection costs. If Duke determines that the full contingency

amount is not required on most interconnection projects, then it would be reasonable to either reduce the contingency or to adjust the overheads being applied to the contingency amount. Duke's goal is to achieve accurate costs estimates for Interconnection Customers and Duke is committed to continue to evaluate whether changes to the RET and/or Maximo better achieve this objective.

Q. WITNESS BOLYARD ARGUES THAT THE RET'S APPLICATION OF COST CATEGORIES SUCH AS OVERHEADS AND CONTINGENCY ARE "WINDOW DRESSING" AND "SEEM TO BE DESIGNED TO GENERATE HIGHER ESTIMATES" WITHOUT ANY REASONABLE AND RELIABLE BASIS. IS THIS ACCURATE?

A. No. I adamantly disagree with Mr. Bolyard's testimony that the RET is just a rudimentary gross up multiplier that produces unreliable and unreasonable results.[8] As I discuss above, the RET has been developed through in-depth review of the actual cost incurred in connection with the interconnection of numerous actual projects. While it is true that the RET results in higher estimates, they are also more accurate estimates.

Q. DOES DUKE BELIEVE THE UPDATED COST ESTIMATING PROCESS IS REASONABLE AND CONSISTENT WITH GOOD UTILITY PRACTICE?

A. Yes. Duke's updated cost estimating processes described in my testimony are driven by engineering standards and construction work methods that are

[8] Witness Bolyard Direct, at 28.

reasonable and consistent with good utility practice. During my career, I have had the opportunity to see firsthand details of Distribution Construction cost estimating practices at another utility (SCE&G) and at each of the legacy Duke Energy companies (*i.e.*, Duke Power, Cinergy, Progress Energy). In addition, I have had opportunities to benchmark with other electric utilities and have also worked closely with consultants experienced in implementing cost estimating tools with additional electric utilities across the United States. While there are nuances to the specific design standards used by each utility, the general process of utilizing standards based on compatible units to calculate bills of material and labor estimates, coupled with application of overhead rates, is consistent across the industry. Based upon my experience, I am confident that the methodology that Duke utilizes within Maximo to develop cost estimates is consistent with good utility practice, and further that the development and application of the RET is intended to supplement this practice based on Duke's specific recent experience with construction of generation interconnections. Looking ahead, Duke continues to evaluate the accuracy of the cost estimating process for generator Interconnection Customers and to assess Duke's material purchasing, labor strategy and contracts, and internal design and construction oversight processes, to ensure that all work is performed in the most efficient and cost effective manner possible for our customers.

II. WILLIAMS SOLAR FACILITIES STUDY COST ESTIMATE

Q. PLEASE PROVIDE AN OVERVIEW OF THE WILLIAMS SOLAR FACILITIES STUDY.

A. Williams Solar executed a Facilities Study Agreement on February 22, 2019. The Facilities Study consisted of an analysis of the estimated cost of the equipment, engineering, and construction work (including overheads) needed to build the Interconnection Facilities and Upgrades identified in the Williams Solar System Impact Study, necessary to accomplish William Solar's interconnection. In addition, the Facilities Study included an analysis of the construction time required to complete the installation of Interconnection Facilities and Upgrades.

As identified in the Complaint, DEP issued the completed Facilities Study Report to Williams Solar on July 30, 2019, which has been submitted to the Commission as Williams Exhibit JB-4. The Facilities Study Report estimated the installed cost of the System Upgrades to be $1,388,374.26, including North Carolina Sales Tax of 7%. The Facilities Study Report also estimated Interconnection Facilities and related costs for the Williams Solar project to be $196,495.13. The report explains that this total $196,495.13 is comprised of three costs subject to the North Carolina 7% Sales Tax and one cost that not subject to the tax. Specifically, the following three costs included in the Interconnection Facilities cost estimate were subject to the North Carolina Sales Tax of 7%: estimated construction cost of $116,419.10, estimated metering cost of $24,791.30, and administrative overhead (processing, technology, oversight, and management) cost of $20,000.00. The Facilities Study Report stated that with tax included, the total of these three costs amounts to $151,095.13. The

final cost accounted for in the total estimated Interconnection Facilities costs is an estimated commissioning cost of $24,000.00, which is not subject to the North Carolina Sales Tax of 7%. Once the Facilities Study Report was delivered, Williams Solar began to inquire about the discrepancy between the System Impact Study Report and Facilities Study Report, as opposed to executing an Interconnection Agreement and proceeding to project construction.

Q. PLEASE EXPLAIN WHY THE COST ESTIMATES PRODUCED DURING WILLIAMS SOLAR'S FACILITIES STUDY WERE SIGNIFICANTLY HIGHER THAN THE COST ESTIMATE PRODUCED DURING SYSTEM IMPACT STUDY.

A. As discussed extensively above and in the testimony of DEP witnesses Kenneth Jennings and Steven Holmes, the Company proactively implemented an improvement to its cost estimating process (the RET) in order to ensure that Interconnection Customers receive the best cost estimate possible. However, because Williams Solar received its System Impact Study estimate before the System Impact Study cost estimation was updated and then received a Facilities Study cost estimate utilizing the Company's improved process, the amount of increase in the cost estimate was substantial. Nevertheless, DEP stands behind its decision to implement the updated Facilities Study cost estimation process for Interconnection Customers that had already received System Impact Study preliminary estimates. Inevitably, Interconnection Customers that were situated like Williams Solar would see a substantial increase in the Facilities Study cost

estimate delivered after implementation of such a change. However, that does not change the fact that it was prudent and reasonable for Duke to update its process at that point in time at which it had finalized development of an improved cost estimation process and to use that updated cost estimating process for all Interconnection Customers. It is also worth noting, as is explained in more detail by DEP Witnesses Kenneth Jennings and Steven Holmes, that nearly half of the increase for Williams Solar is due to the combined impact of discrete items that Williams Solar understood were not included in the System Impact Study estimate and the addition of contingency in accordance with industry standards.

Q. WITNESS BOLYARD ALLEGES THAT DEP DID NOT HAVE ANY EXPERIENCE APPLYING THE RET PRIOR TO APPLYING IT TO WILLIAMS SOLAR. IS THIS ACCURATE?

A. No. While it is true that Williams Solar was one of the earliest projects where DEP applied the interconnection-focused RET to improve the accuracy of the Facilities Study cost estimate, it is an unfair characterization to say DEP had "no experience" using the RET and "had no data regarding whether the estimate produced by the RET would pan out in practice."[9] To the contrary, DEP developed the RET using actual cost data from dozens of generator interconnection construction projects completed over approximately a 12-month period. And, as further discussed by DEP Witness Kenneth Jennings and Steven Holmes, Duke personnel developed the RET over a months-long

[9] Witness Bolyard Direct, at 21.

investigation and analytical process designed to adjust the Maximo output for future generator interconnection construction projects based upon Duke's actual recent generator interconnection construction cost experience. Thus, when the RET was approved for use in July 2019, Duke had already spent significant time developing the tool and validating its accuracy by applying it to completed generator interconnection construction projects. I would also note that Williams Solar's testimony seems contradictory in this respect—arguing, on the one hand, that Duke failed to implement changes soon enough but then arguing on the other hand that Duke should have performed more testing prior to implementation.

Q. DOES DEP CONTINUE TO SUPPORT THE WILLIAMS SOLAR FACILITIES STUDY ESTIMATE AS REASONABLE AND APPROPRIATELY ACCURATE UNDER THE FACILITIES STUDY AGREEMENT AND FOR INCLUSION IN THE PROPOSED INTERCONNECTION AGREEMENT?

A. Yes. DEP believes the Facilities Study cost estimates provided to Williams Solar are accurate and stands behind its decision to provide all Interconnection Customers, including Complainant, with improved cost estimates no matter where in the interconnection process a particular Interconnection Customer may be.

Duke has, in good faith, updated its interconnection cost estimates to account for the factors discussed above. These efforts have been purposefully designed

to provide Interconnection Customers (including Williams Solar) with the best estimates possible during the initial study process prior to delivering an Interconnection Agreement, which contractually binds the Interconnection Customer to pay DEP's actual costs of delivering the Interconnection Facilities and Upgrades required to interconnect the Generating Facility.

Q. IN YOUR OPINION, DID DEP ACT IN GOOD FAITH IN PROCESSING WILLIAMS SOLAR'S INTERCONNECTION REQUEST DURING FACILITIES STUDY AND IN DEVELOPING THE WILLIAMS SOLAR FACILITIES COST ESTIMATE?

A. Yes. DEP at all times executed good faith in processing Williams Solar's Interconnection Request. The increase in the Facilities Study cost estimate for Complainant does not signal that either the Facilities Study estimate or the preliminary cost estimate provided during System Impact Study was not provided in good faith. Instead, the revised cost estimate provided during Facilities Study reflects Duke's good faith efforts to improve its cost estimation process for the benefit of all Interconnection Customers.

Q. DOES THIS CONCLUDE YOUR PRE-FILED DIRECT TESTIMONY?

A. Yes.

MR. JIRAK: At this time, Commissioner Duffley, with your permission I would ask that the witnesses now proceed with summaries. Each of the witnesses has prepared a summary and they'll go in order, starting with Mr. Kenneth Jennings, then Mr. Holmes, then Mr. Scott Jennings.

COMMISSIONER DUFFLEY: Please proceed.

COMMISSIONER BROWN-BLAND: Mr. Jirak. Mr. Jirak.

MR. JIRAK: Yes.

COMMISSIONER BROWN-BLAND: This is Commissioner Brown-Bland. Could you have Mr. Ken Jennings angle himself more so he's facing the camera, please?

MR. JIRAK: We all want to see his good side. I understand.

COMMISSIONER BROWN-BLAND: As much as possible. I realize you're trying to have some distance in the room. That's better. Thank you.

BY MR. JIRAK:

Q Go ahead.

(WHEREUPON, the summary of KENNETH JENNINGS is copied into the record as read from the witness stand.)

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION
DUKE ENERGY PROGRESS, LLC
DOCKET NO. E-2, SUB 1220

Ken Jennings – Summary of Pre-Filed Direct Testimony

Good morning Presiding Commissioner Duffley, Chair Mitchell, and Commissioners:

While this complaint deals with two cost estimates provided to a single Interconnection Customer, the issues at hand must be understood within the larger context of the unique interconnection landscape in the state of North Carolina and Duke's nation-leading interconnection success.

Simply put, Commissioners, the volume of utility-scale solar generators requesting interconnection to the Company's distribution system in North Carolina has been without comparison, and I would submit that so has Duke's efforts to successfully interconnect these new generating facilities to the grid. Since 2011, over 1,611 utility-scale solar projects (greater than 1 MW) have requested interconnection to the Companies' distribution system. Over 500 of these projects have been interconnected; while approximately 560 have either withdrawn or were canceled. Today, over 291 utility-scale solar projects are currently in the interconnection process and 91 are under construction. This amount of utility-scale projects connected to the distribution system, especially in DEP, has simply been unparalleled by any other utility in the entire country.

Since 2015, DEP and DEC, as a utility, have interconnected more utility-scale solar generating facilities than ***any other state in the country***. Figure 1 in my testimony presents data from the U.S. Energy Information Administration showing that during this timeframe, Duke has interconnected 69 more utility-scale solar projects above 2 MW than the entire state of California (which has nearly four times the population of North Carolina and three separate major investor-owned utilities). And Duke alone has connected almost eight times

the number of utility-scale solar projects than the tenth leading state. Again, these numbers are from the independent Energy Information Administration and are not in dispute.

Since 2015, the Companies have also invested significant resources in the effort to fulfill their regulatory responsibility of managing and processing new Interconnection Requests while continuing to meet the Company's critically important public service responsibilities under the Public Utilities Act to deliver safe and reliable electric service to our customers. Duke has invested in new technology and significantly increased the resources dedicated to supporting the generator interconnection process. In fact, entire teams have been added to more efficiently process and manage the massive growth in utility-scale solar Interconnection Requests. Along with the process improvements implemented by Duke, it has also been necessary to evolve the interconnection study policies and technical standards in the midst of what is essentially a living laboratory of unprecedented and unparalleled solar interconnection to the Company's distribution system. There were no "off the shelf" technical solutions because no other state in the country was facing a similar interconnection landscape.

The Company's cost estimation methodologies are now similarly being evolved to reflect experience gained from the Company's interconnection successes. Similar to the technical solutions, there were also no "off the shelf" cost estimation tools designed for utility-scale distribution interconnections. The Company utilized a reasonable set of tools to generate cost estimates, which have now been refined and improved based upon growing experience that Duke's cost estimates were not aligning with actual generator interconnection construction costs.

Importantly, the necessary data to assess the actual costs relative to the estimates was a lagging indicator. Interconnection studies are often completed multiple years before construction is completed and projects are energized and interconnected to the grid. This means that, in contrast with the issues that the Company was evolving on the front end of the study process, the timing of the Company's improvements to its cost estimating methodologies was dependent on completing a sufficient number of projects to have clarity regarding any areas of needed improvement.

Because every interconnection is unique, it was not enough to simply observe that a single project exceeded initial cost estimates. Instead, it was necessary for the Company to have a sufficient number of projects from which to identify a pattern of cost exceedances. Once a consistent pattern was identified, the Company took a disciplined proactive approach to identifying both the causes and a solution. It would not have been consistent with good utility practice to implement a hastily-developed solution that was not based on thorough investigation and rigorous testing. GreenGo seems to imply that the Company should have rushed out to change its estimating methodologies earlier but I do not believe it would have been prudent to do so until we had a complete understanding of the causes and a well-developed and thoroughly vetted solution.

The GreenGo witnesses refer to the revised methodology as arbitrary, but nothing could be further from the truth. Each and every piece of the revised cost estimation methodology was based on actual data gathered from completed projects. I also want to briefly state that DEP emphatically rejects Mr. Burke's allegations related to the supposed nefarious intent of the Company with respect to Williams Solar specifically and third-party interconnections generally. The conspiratorial tone of GreenGo's witness simply cannot

be reconciled with the reality of what has occurred in North Carolina in terms of interconnection over the past 3-5 years.

It has undoubtedly been the case that there have been issues of substantial disagreement between Duke and members of the development community, such as Mr. Burke. But the Commission itself has recognized, there is a difference of perspective on many of these technical issues between Duke—who has a legal obligation to ensure power quality, reliability and safety for all customers—and solar developers, who do not.

During the period of time in which GreenGo implies Duke has made a concerted effort to put up "roadblock after roadblock" to thwart interconnection, Duke has led the nation in the number of utility-scale solar interconnections while, at the same time, implementing new technical polices to ensure the long-term reliability of the system and to safeguard service to all customers.

While GreenGo's witnesses criticize the Company's technical policies, not one of those policies has ever been found to be inconsistent with Good Utility Practice. In fact, the very technical policies criticized by Mr. Burke—the Method of Service Guidelines—were found to be reasonable by the Commission and, in fact, the Commission directed Duke to ensure that such "guidelines evolve over time with increased penetration of distributed generation in order to ensure the safety, power quality, and reliability of the power delivery system for electricity."

Many of GreenGo's more extreme allegations are merely conclusory statements for which GreenGo offers no evidence and they are largely irrelevant to the central issues in this proceeding. For example, as I explain in my testimony, the extended interconnection timelines experienced by many of GreenGo's projects were caused by GreenGo's siting

decisions and not inaction—and certainly not "bad faith" actions—on the part the Company.

Furthermore I categorically and emphatically reject any assertion that the estimating methodology applied to the Williams study was at all based on personal animus.

The Company has applied its revised cost estimating methodology in a reasonable and non-discriminatory manner uniformly across all similarly situated interconnection requests in the Duke interconnection queue.

I will also note that while I believe it is an irrelevant distraction to the central issues in this proceeding, I have personally investigated the origin of the phrase "ihateyou" that apparently was embedded in electronic data in certain documents provided to Williams Solar as discussed by witness Burke in his rebuttal testimony. I have determined that the electronic data originated in files created by one individual working for a third party contractor and not in anything prepared by Duke personnel. This electronic data, once embedded in the files by the contractor, was propagated into other documents sent to other interconnection customers aside from Williams, further affirming that this was not directed at Williams Solar.

This occurrence resulted from the poor judgment of a single contractor and is not evidence of any personal animus towards Williams Solar or GreenGo. Duke personnel have apologized to Mr. Burke for the unprofessional nature of this embedded metadata and the contractor employee is no longer working on Duke generator interconnection projects.

Finally, while my pre-filed testimony addresses GreenGo's requested relief in substantial detail, for purposes of my summary, I will simply reiterate that there is no reasonable basis for the Commission to grant any of the relief requested. Duke has acted

in good faith in processing Williams Solar's interconnection request and will continue to do so if Williams Solar elects to proceed with signing the IA tendered to it in October of 2019.

I also want to briefly address at a summary level the issues identified by the Commission in their June 11th order and I along with my colleagues will, of course, be glad to answer more questions regarding such issues. First, I want to emphasize that Williams was treated in all respects in a comparable and non-discriminatory fashion with all similarly situated Interconnection Customers. When the Company updated its interconnection cost estimating methodologies in July 2019, as is described in my testimony, this new policy was applied in a uniform manner across the entire interconnection queue.

As I explained in my testimony, because Williams had already received its System Impact Study cost estimate prior to the Company's introduction of the Revised Estimating Tool, it was inevitable that there would be a substantial increase in its cost estimates. As the confidential Exhibit 7 that Duke filed yesterday shows, all similarly situated projects—that is, projects that received a System Impact Study estimate under the old methodology and a Facilities Study Cost estimate under the new methodology—received a similar cost increase.

Further to address the Commission's questions: once the Company implemented the revised cost estimating methodologies, all interconnection customers received estimates that, with all things being equal, were higher than would have been received under the old methodology. This was in part due to adding contingency and adjusting for inflation that increased costs. And as we have testified extensively, this new methodology was based on a thorough review of actual project costs and experience. Furthermore, we

have continued to assess the accuracy of the new methodology and such testing has demonstrated that the new methodology produces substantially more accurate results.

Finally, we have acknowledged in our testimony that the vast majority of projects that have interconnected in the past 2 years have experienced actual costs that have exceeded estimated costs by substantial percentages.

Once again, these interconnections are all unique and so the factors that have caused the costs exceedance also vary from project to project. For instance, we have identified instances in which unexpected ROW or permitting challenges have increased costs as well as instances in which overtime costs were incurred to meet Interconnection Customer's requested in-service dates. But we have also identified certain common causes—such as increases in materials costs and greater than expected labor costs—and we utilized that information to improve the accuracy of cost estimates going forward.

The Company acknowledges the pending Commission complaints concerning cost overruns and we take these issues very seriously and recognize the importance of solving the issue. In fact, we are in discussion right now with NCCEBA in the context of the queue reform discussions to identify a cost bounding framework that will provide more certainty to developers with respect to interconnection costs.

Commissioners, thank you for your patience with this lengthy summary. My colleagues Steven Holmes and Scott Jennings will now provide a summary regarding the issues addressed by their testimony.

This concludes my summary of my pre-filed direct testimony.

COMMISSIONER DUFFLEY: Thank you, Mr. Jennings.

Madam Court Reporter, if we could go off the record for just two minutes to discuss a logistical matter.

(OFF THE RECORD)

COMMISSIONER DUFFLEY: And we're back on the record. And, Mr. Jirak, you were -- I believe we had just ended with Mr. Kenneth Jennings summary.

MR. JIRAK: That's correct. And I hesitate to even ask it, but did -- were all the Commissioners able to hear the summary of Mr. Kenneth Jennings?

COMMISSIONER DUFFLEY: Yes.

MR. JIRAK: All right. Then at this time we'll move on and have the summary provided by Mr. Steven Holmes followed by Mr. Scott Jennings.

(WHEREUPON, the summary of STEVEN HOLMES is copied into the record as read from the witness stand.)

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION
DUKE ENERGY PROGRESS, LLC
DOCKET NO. E-2, SUB 1220

Steven Holmes – Summary of Pre-Filed Direct Testimony

Commissioner Duffley, Chair Mitchell and Commissioners:

Once again, my name is Steve Holmes and I am the Director of Duke's Enterprise Project Management Center of Excellence. My testimony provides general background on the topic of cost estimation and industry-accepted classifications of cost estimates established by the Association for the Advancement of Cost Engineering or "AACE".

The AACE classification framework defines so-called "classes" of cost estimate, each of which has an expected accuracy range dependent on a variety of project specific factors. In addition to such expected accuracy range, AACE guidance confirms that it is reasonable to include contingency to account for uncertainty and risks associated with a project.

During the interconnection study process, two separate cost estimates are provided—one at System Impact Study and a second at Facilities Study. At the time of production of the System Impact Study cost estimate, Duke does not have detailed design engineering for the interconnection, a definitive materials list, or a construction schedule nor has it conducted a site assessment or any field engineering or right of way investigation (where necessary). As such, the System Impact Study cost estimate in most cases would be at a Class 5 estimate, which per AACE, would have an expected variation of actual costs of up to +100% on top of any necessary contingency. At the time of production of the Facilities Study cost estimate, Duke will have performed substantial further design of the interconnection. However, such design will not be construction-ready and uncertainty will typically still remain with respect to important aspects of the

construction process, including the potential need to address right of way issues, perform further detailed site investigation and establish a construction schedule. As such, the Facilities Study Cost estimates in most cases would be a Class 3 estimate, which per AACE, would have an expected variation of actual costs of up to +30% on top of any necessary contingency.

In summary, industry-accepted guidance establishes the appropriateness of including a contingency amount to account for uncertainty and risks associated with a project and, even after inclusion of such contingency, cost estimates continue to have an expected accuracy range based on the maturity level of project definition deliverables.

This concludes my summary of my pre-filed direct testimony.

BY MR. JIRAK:

Q Thank you, Mr. Holmes.

Mr. Scott Jennings, please proceed.

A (Mr. S. Jennings) All right. Quick audio/video check. Good. All right. Thank you.

(WHEREUPON, the summary of SCOTT J. JENNINGS is copied into the record as read from the witness stand.)

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION
DUKE ENERGY PROGRESS, LLC
DOCKET NO. E-2, SUB 1220

Scott J. Jennings – Summary of Pre-Filed Direct Testimony

Commissioner Duffley, Chair Mitchell, and Commissioners:

Once again, my name is Scott Jennings and I am currently the Director of Wilmington Area Operations for DEP. Prior to moving into this role on January 1, 2020, I was Director of Design Engineering for the Coastal Zone of DEP, which included oversight of the engineering design work associated with both general electric distribution system improvements and generator interconnection work.

My testimony addresses the Facilities Study cost estimate provided to Williams Solar and, along with the testimony of my colleague Ken Jennings describes the actions taken by Duke to update its Facilities Study cost estimation methodology.

In July 2019, Duke implemented a revised Facilities Study cost estimation tool that is called the Revised Estimating Tool or the "RET." The RET was developed due to the fact that the Company's baseline distribution cost estimation tool—"Maximo"—was shown to be consistently underestimating the cost of distribution interconnection work. The reasons for this historic underestimation relate to unique aspects of the interconnection process and distribution interconnection work.

In general, generator interconnection work is more complex than the baseline or average distribution work historically estimated in Maximo. Generator interconnection work requires construction crews capable of completing heavy line construction and other work that is more complex than standard, baseline distribution work. As an example, the type of crew and complexity of work required to interconnect a retail customer is vastly different than the type of crew and complexity of work required to

reconductor 2+ miles of distribution line, as is the case for the Williams Solar project. Due to the more complex work scopes, the construction crews have a higher hourly cost burden relative to the system average costs in Maximo and the work scopes required more labor hours than was being forecasted in Maximo.

The Company also identified other factors contributing to the historic under-estimates of interconnection costs. For instance, the time period between cost estimates and actual construction for routine distribution work is much shorter than for interconnection distribution work, which in some cases can be a year or more. Therefore, an inflation factor was also utilized to capture the escalation in costs that has been occurring over time.

Finally, the RET includes a standard contingency amount of 20% in recognition of the fact that the Company has identified that some historic cost overruns were caused by factors not identified until after IA execution, such as right of way challenges and unforeseen site conditions requiring both additional material and labor costs, such as the need to replace additional poles, manage construction within existing rights of way, or construct lines in sub-optimal environments such as wet areas requiring specialized equipment.

It is also important to highlight that Interconnection Customers are responsible for only the actual costs of interconnection. Therefore, for instance, if no unforeseen site condition arise and the contingency amount is not used, Interconnection Customers receive a refund of all such amounts.

GreenGo's witnesses disparage the RET, alleging that the adjustments made by the RET are "arbitrary." Nothing could be further from the truth. Building on the cost

data gathered on actual completed projects, Duke designed the RET to account for the unique factors discussed above. Specifically, the RET adjusts the labor hours and costs as well as equipment costs based on actual cost data. The RET then also builds in inflation and contingency for all the reasons I explain above. Each and every adjustment in the RET is a result of Duke's actual observations regarding the cost and complexity of distribution interconnection work on completed projects.

As Mr. Ken Jennings has testified, Duke is in a living laboratory in terms of the volume of distribution-connected utility-scale solar projects and, as such, there is no "off the shelf" solution for estimating utility-scale distribution interconnections. Therefore, the RET is utilized to tailor the system-average materials and labor compatible unit costs generated in Maximo to interconnection-specific work scopes based upon Duke's actual cost experience constructing these scopes of work. The fact that our new Facilities Study cost estimating methodology relies on a two-step process whereby Maximo is used to generate certain baseline projections of labor hours and labor costs, which are then adjusted by the RET, does not mean that Maximo is flawed or that the Facilities Study estimates are invalid. Instead, the two tools work together to produce an estimate that Duke believes to be substantially more accurate than estimates previously provided. For the avoidance of doubt, my testimony supports the combined two-step cost estimating process—incorporating the interconnection-specific RET onto the general distribution Maximo estimates—as reasonable and consistent with Good Utility Practice.

Once Duke implemented the RET in July of 2019, this updated cost estimating process has been uniformly applied to all Interconnection Customers who received

Facilities Study cost estimates. Williams Solar has been treated like all other similarly situated Interconnection Customers.

Duke has also continued to monitor the accuracy of the RET-generated estimate and will make adjustments if it becomes apparent that the RET estimates are consistently inaccurate.

Duke's updated cost estimating processes described in my testimony are driven by engineering standards and construction work methods that are reasonable and consistent with Good Utility Practice. During my career, I have had the opportunity to see firsthand details of Distribution Construction cost estimating practices at another utility (SCE&G) and at each of the legacy Duke Energy companies. In addition, I have had opportunities to benchmark with other electric utilities and have also worked closely with consultants experienced in implementing cost estimating tools with additional electric utilities across the United States. While there are nuances to the specific design standards used by each utility, the general process of utilizing standards based compatible units to calculate bills of material and labor estimates, coupled with application of overhead rates, is consistent across the industry. Based upon my experience, I am confident that the methodology that Duke utilizes within Maximo to develop cost estimates is consistent with good utility practice, and further that the development and application of the RET is intended to supplement this practice based on Duke's specific recent experience with construction of generation interconnections.

This concludes my summary of my pre-filed direct testimony.

BY MR. JIRAK:
Q Thank you.
MR. JIRAK: Commissioner Duffley, the witnesses are available for cross examination.
MR. TRATHEN: Madam Chair, I would turn the mic over to Eric David.
COMMISSIONER DUFFLEY: Thank you, Mr. Trathen.
MR. DAVID: Thank you, Chair Duffley. I would like to direct my questions to Mr. Holmes. So if could make himself available on the microphone I would appreciate it.
THE WITNESS: (Mr. Holmes) Yes, I'm available.
MR. DAVID: Thank you.
CROSS EXAMINATION BY MR. DAVID:
Q Mr. Holmes, as I understand your prefiled testimony and the summary you just gave, you're not testifying specifically about the estimates that were given to Williams Solar by Duke, are you?
A (Mr. Holmes) I conducted an independent estimate review of the estimates.
Q So have you opined in your testimony about the

specific classification that you think should apply to the Williams Solar SIS estimate and the Facility Study estimate?

A Yes.

Q I'm sorry what was your answer.

A Yes.

Q All right. Let's look -- have you inspected the site? Have you gone to the Williams Solar proposed site?

A No.

Q Have you talked to any Pike engineers about their analysis of the Williams Solar project?

A I have talked with the members of the project team; yes. And I --

Q The Duke members?

A Correct.

Q Have you looked at the specific engineering or deep drawings for the project?

A No.

Q So your analysis is just based on your discussions with Duke personnel?

A It's based on discussions. It's based on reviewing the estimate. And it's based on applying the AACE methodology.

Q And when you say reviewing the estimate, are you speaking of the SIS estimate or the Facility Study estimate?
A Both, but more specifically the Facility Study.
Q Can you turn to your prefiled testimony at Page 25, please, Mr. Holmes?
COMMISSIONER DUFFLEY: Mr. Holmes, if you could speak up a little bit.
THE WITNESS: (Mr. Holmes) Okay. Certainly.
BY MR. DAVID:
Q And let me know when you've got your testimony in front of you, sir.
A Yes, I have the testimony.
Q Terrific. And again, if you'll go to Page 25 and I want to look at lines 3 through 9. And I think this is similar to what you said in your summary, but would you please read into the record the answer you gave in lines 3 through 9 on Page 25 of your prefiled testimony?
A Certainly. The answer begins with *at the time of the production of the System Impact Study cost estimate, Duke does not have detailed design engineering for the interconnection, a definitive materials list, or a construction schedule nor*

has it conducted a site assessment or any field engineering or right-of-way investigation where necessary. As such, the System Impact Study cost estimate in most cases would be at a Class 5 estimate, which per AACE, would have an expected variation of actual cost of up to 100 percent on top of any necessary contingency.

Q This is still your testimony; no change to this testimony, correct?

A Correct.

Q Now, you say here in most cases the System Impact Study cost estimate would be a Class 5 estimate?

A Correct.

Q Do you apply that analysis to the Williams Study System Impact Study -- Williams Solar System Impact Study? Sorry.

A So I applied the analysis in general to the Facility Study estimate by looking at the Williams Solar estimate, yes.

Q I want to make sure I've got a clear answer on the record. I'm asking about the System Impact Study. And my question is --

A Impact Study, sorry.

Q It's okay. So when you say here in most cases it

would be a Class 5 is it your testimony that the Williams Study -- Williams Solar System Impact Study would be a Class 5?

A Yeah, I'd like to explain that in a little more detail if I could.

Q Sure. If you can give me a yes or no and then you can explain.

A I believe that a Class 5 generally would be the estimate classification based on the explanation I'm about to provide.

Q For Williams Solar?

COMMISSIONER DUFFLEY: Mr. Holmes, you seem to be trailing off at the end of your answers. If you could please keep your voice up.

THE WITNESS: (Mr. Holmes) I'm sorry.

COMMISSIONER DUFFLEY: Thank you. For the Court Reporter.

THE WITNESS: (Mr. Holmes) Let me try it without the headphones. Is that any better?

COMMISSIONER DUFFLEY: That's better. Thank you.

MR. DAVID: That's better.

THE WITNESS: (Mr. Holmes) Okay. I just need to find the volume to turn you up now. One

second. Okay.
BY MR. DAVID:
Q Thank you. Can you hear me okay?
A I can hear you okay. Yes.
Q So I just want to be clear because your prefiled testimony doesn't say that the Williams Solar System Impact Study is a Class 5. You're speaking generally that in most cases the System Impact Study would be a Class 5. I want to make sure we understand what your testimony is.
A So I'd like to explain the "in most cases" part, if I may?
Q Okay.
A So if I draw your attention to the -- my Exhibit 1 which was the AACE documentation and, in particular, at the bottom of Page 8 and I'll wait for you to recognize -- for you to get there and for the Commission also.
Q I'm there. Thank you.
THE WITNESS: (Mr. Holmes) Is the rest of the Commission good for me to proceed? Okay.
A So the bottom paragraph in that section indicates that the best approach for evaluating the cost of an estimate is to use the specific deliverables

to recognize for that type of project, for that type of estimate. And those deliverables are contained back in the same document on Page 16 in Table 3. So as you look down the list of Class 5, 4, all the way across to Class 1 documents, you'll see -- sorry -- classes of estimate, you'll see specific deliverables listed, and they are grouped into general project data and they are grouped into technical and right-of-way deliverables. For a project, it is possible that one of these deliverables, for instance, the tower/structure location/spotting deliverable, which is the second one under the technical and right-of-way deliverables --

Q I'm sorry. What page are you on, Mr. Holmes, for the --

A I'm sorry. I'm on Page 16. It should be Table 3.

Q I think that's Page 14. Sorry.

MR. JIRAK: I will note that the -- this is Jack Jirak -- and let me just note for everyone's benefit it looks like there's two -- for some reason, I'm not sure exactly how this has happened, but it looks like there's two page numbers. I think we may

have paginated the title or something. So the page we're looking at, at the top it's K. Jennings/Holmes Exhibit 1, Page 16 of 18, and then below it it also says 14 of 16. You'll know you're on the right page if you look and there's a large table that takes up the whole page and at the bottom it says Table 3.

MR. DAVID: Thank you for that clarification. I'm there now. Thanks.

MR. JIRAK: Commissioner Duffley, have the Commissioners had a chance to find that?

COMMISSIONER GRAY: Give it again, Jack, if you would.

COMMISSIONER DUFFLEY: Jack, could you start one more time?

MR. JIRAK: I will. So we are in Kenneth Jennings and Steven Holmes testimony. We are in Exhibit Number 1. This is the AACE summary document. And the page we're on -- at the top headers there's two sets of page numbers and so we're on a page number that is paginated as Page 16 of 18. It's the first number up in the upper right corner and right below it it also says 14 of 16, which I believe that's the original document numbers. And it's a large table. At the very top row it says "Estimate Classification",

and it's labeled at the very bottom of the large table as "Table 3 Estimate Input Checklist and Maturity Matrix".

COMMISSIONER GRAY: Thanks.

MR. JIRAK: Commissioner Duffley, if that's -- if you are good to go we will continue.

COMMISSIONER DUFFLEY: We're good to go.

MR. JIRAK: Thank you.

A (Mr. Holmes) Okay. Thank you. So, Eric, the point I was trying to make was that for any one of these given deliverables they could be at different levels of maturity for a project based on how important the deliverable is to the project.

So, for example, if there were clearly no structure location issues on a project, that deliverable would be considered as complete and -- for that project. Whereas, on another project it may have a bigger impact. That's why I use the term "in most cases".

BY MR. DAVID:

Q If you will go back, Mr. Holmes, to Page 10 of 18 or Page 8 of 16 in that same exhibit, there's a box at the top half of the page that says "Class

5 Estimate".

A Correct.

Q Page 10 of 18 or Page 8 of 16.

A Yes.

Q And in the description for the Class 5 estimate the AACE standard says *Class 5 estimates, due to the requirements of end use, may be prepared within a very limited amount of time and with little effort expended - sometimes requiring less than an hour to prepare. Often, little more than the proposed nominal kilovolts and length over approximate alternate routes on large scale maps is known at the time of estimate preparation*. Did I read that accurately?

A I believe so, yes.

Q And did you take that description into account in assessing the System Impact Study for Williams Solar as a Class 5?

A I explained that I -- I used the -- the deliverable was to drive my decision.

Q Could you turn -- if you would pull out the prefiled testimony of Williams Solar and in particular the exhibits to Mr. Bolyard's direct testimony?

A I'm going to need to request counsel help to have that. I don't have those documents now that we have moved to a new location.

MR. DAVID: Is it possible to get that?

MR. JIRAK: Yes, we are working on it.

MR. DAVID: And just to help you, I'm going to look at Exhibits 3 and 4 from Mr. Bolyard.

So for the Commission we're going to be looking at Exhibits CEB-3 from his direct testimony and Exhibit CEB-4 from his direct testimony. And to further situate while we're gathering the documents, the first is the transmittal email with the System Impact Study and the second is the System Impact Study report itself.

A (Mr. Holmes) Mr. David, could you refresh me which pages I'm looking at please?

BY MR. DAVID:

Q Yes, sir. So let's start with Exhibit CEB-3.

A CEB-3.

Q It's a two-page email.

A (Peruses document.)

Okay.

Q Do you have it?

A Yes.

Q And I'll represent to you that this is the transmittal from Duke to Williams Solar of the System Impact Study report. And you see in the middle in bold, underlined, it says *system upgrades* and it continues on, *upgrade estimate of $774,000*. Are you with me there? Right in the middle of the email.

A Yes.

Q Okay. And then under that it says *as a result of a completed feeder study, the following work scope must be designed and cost-estimated on its own work order separately*. And then it goes down from there with a series of reconductoring, sectionalizing/protection changes, and some 71 high fault tamer fuses that are required. Do you see all that?

A I do see that.

Q And what is a completed feeder study?

A I'm not a distribution connection specialist.

A (Mr. S. Jennings) If I may - this is Scott Jennings - I can probably jump in here and help provide some context on these questions.

Q We'll come back -- we'll give you a chance to come back to that in just a few minutes,

Mr. Jennings, if that's okay.

Mr. Holmes, if you'll look at CEB-4, the System Impact Study report, it's a 21-page document.

A (Mr. Holmes) Yes.

Q You said you reviewed this as part of your analysis of the classification, correct?

A I provided a cursory review to this, yes.

Q And so if you turn to Page 6, do you see an overhead picture of the Williams Solar site?

A Yes, I do.

Q If you turn to Page 9, is there a list of high fault tamers that need to be upgraded, and continues for two pages?

A I see a list of transformer ID's, yes.

Q And on Page 11 it says *a detailed listing of these system upgrades can be found in the results section below at Page 11 of 21*; do you see that?

A I do.

Q And if you turn to Page 16 of 21, that's the results page, correct?

A Yes.

Q And it's essentially recreating the email we were just looking at with the 71 high fault tamer

fuses that need to be installed and the other specific changes, correct?

A It lists the changes that were modeled that need to be -- occur.

Q Including model numbers and details about the circuits, et cetera, correct?

A Correct.

Q So now let's go back to Exhibit 1 which you were talking about earlier from your testimony which is -- which are the AACE standards.

A Yes.

Q Having reviewed the actual System Impact Study report and going back now to Page 10 of 18 or 8 of 16, wouldn't you agree that the detailed report that you looked at at the System Impact Study report stage is more likely a four than a five?

A Based on the analysis and the assessment that was conducted by myself and the team, I believe it to be a Class 5. AACE do indicate that you could call a class of estimate a Class 4 with exceptions. This may be a Class 4 with exceptions. Just going back to the table on Page 16 or 14, there are clearly some deliverables

under the Class 4 list that have not been met.
Q Do you believe that the System Impact Study that you looked at, the 21-page document, took more than an hour to prepare?
A I couldn't speak to that.
Q Go back now to your testimony at Page 25, if we could, and if you could read into the record your answer on lines 12 through 20.
A Twelve through 20.
Q Page 25 of your direct testimony; yes, sir.
A *At the time of production of the Facility Study cost estimate, DEP will have performed substantial further design of the interconnection. However, such design will not be construction-ready and uncertainty will typically still remain with respect to important aspects of the construction process, including the potential need to address right-of-way issues, perform further detailed site investigation and establish a construction schedule. As such, the Facilities Study cost estimates in most cases would be a Class 3 estimate, which per AACE, would have an expected variation of actual costs of up to* -- excuse

me -- *30 percent on top of any necessary changes -- at any necessary contingency* -- excuse me. Is that where you would like me to stop?

Q Yes, sir.

A Okay.

Q Is it your testimony, Mr. Holmes, that the Williams Solar Facility Study estimate is a Class 3 estimate.

A It's my testimony that the Facility Study cost estimates produced are a Class 3.

Q I'm asking about the one produced to Williams Solar.

A I have no reason to expect that the Williams Solar would be any different to any other Facilities Study estimate.

Q And if, in fact, the work that went into a Facility Study estimate was different than you characterized it in your answer, then your answer as to what the classification would be might be different as well, correct? For instance, if the right-of-way issues had been resolved then your answer would be different?

A The right-of-way issue is one of the deliverables. It would potentially move the

needle. It may just remove an exception to a Class 3 estimate.

Q If you could turn, Mr. Holmes, to the Williams Solar Cross Exhibit notebook and I would like you to you turn to Exhibit 32 in that notebook.

A I'm not sure I have that notebook. Sorry.

MR. JIRAK: We will have it to you momentarily.

MR. DAVID: Terrific. Thank you.

COMMISSIONER DUFFLEY: Mr. David, where do the Commissioners need to go while --

MR. DAVID: Yes. I'll say that again. Thank you, Chair Duffley. If you'll -- the notebook that says Potential Cross Exhibits from Williams Solar which has 30 some tabs in it, it will be tab 32 in that notebook.

COMMISSIONER DUFFLEY: Thank you.

MR. DAVID: And when you turn to it you should see the cover page of a transcript from a February 23rd, 2015 hearing in Docket Number E-100, Sub 101.

(Court Reporter requested Mr. David to speak up.)

MR. DAVID: I apologize. I will -- it is

rare that somebody tells me I'm not speaking loud enough, so I will do my best. Thank you.

BY MR. DAVID:

Q Mr. Holmes, when you have it in front of you I will proceed.

MR. JIRAK: Mr. David, just momentarily, which exhibit is this?

MR. DAVID: It's exhibit -- it should be tab 32 of that notebook. Exhibit 32.

COMMISSIONER DUFFLEY: Mr. David, are you marking it for identification?

MR. DAVID: Yeah, let's go ahead and do that, Chair Duffley. So we'll -- I'd like to mark for identification, I guess this is going to be Williams Solar Cross Exhibit -- would you like us to start with 1 or --

COMMISSIONER DUFFLEY: Sure. Why don't we call it Holmes Cross Exhibit.

MR. DAVID: Okay. So that will be Holmes Cross Exhibit 1.

(WHEREUPON, Holmes Cross Exhibit 1 is marked for identification.)

THE WITNESS: (Mr. Holmes) Okay. I have the document.

BY MR. DAVID:
Q Terrific. Do you know who Gary Freeman is, Mr. Holmes?
A I do not.
Q In your day-to-day work do you deal with the Interconnection Procedures issues on behalf of Duke?
A No.
Q So you would -- if Mr. Freeman did would you defer to his expertise on those issues?
A If he were the right person, yes.
Q If you could turn, Mr. Holmes, to -- and I will represent that this transcript is a transcript of a technical conference that was conducted by the Commission as I said on February 23rd, 2015, in connection with the reform of the Interconnection Procedures. If you'll turn to Page 36, there's a series of questions between Mr. Watson who's the counsel for the Commission and Mr. Freeman. The bottom of Page 36, Mr. Watson says, starting at line 17 --

MR. JIRAK: If I could interrupt briefly. I believe the witness will need some more time to review the document to get a sense for the entire context.

MR. DAVID: Sure.

MR. JIRAK: So, Mr. Holmes, take as much time as you need to review this document.

MR. DAVID: If it will help you, Mr. Holmes, I'm going to be asking you about the bottom of 36 and the very top of 38. Those are the only parts I'll be asking you about.

THE WITNESS: (Mr. Holmes) Okay. And I have no context as to this technical conference and probably wouldn't have understood much that occurred in it.

MR. DAVID: Okay. Let me know when you're ready to answer a question.

THE WITNESS: (Mr. Holmes) Who are Mr. Freeman and Mr. Watson?

MR. DAVID: Mr. Watson is General Counsel for the Utilities Commission at the time and Mr. Freeman is a Duke employee.

THE WITNESS: (Mr. Holmes) And what role did you say Mr. Freeman had?

THE WITNESS: (Mr. K. Jennings) He is no longer an employee of Duke. He was my predecessor in the role that I'm in.

THE WITNESS: (Mr. Holmes) Okay.

THE WITNESS: (Mr. K. Jennings) Yeah, Gary Freeman works for Strata now.

MR. DAVID: But as of 2015 he was a Duke employee at the time he was testifying; is that correct?

THE WITNESS: (Mr. K. Jennings) Correct.

MR. JIRAK: Commissioner Duffley, at this point maybe I'll just object to his line of questions. Mr. Holmes was not involved in the proceeding. He is not familiar with the individuals. He does not know the subject that's being covered at this technical conference. We're not provided the entirety of the transcript. We don't have the greater context for what was being discussed and what was the context. So I just think that this line of questioning has not been established from a foundational perspective. And Mr. Holmes has already said he's not familiar with this proceeding.

COMMISSIONER DUFFLEY: Mr. David.

MR. DAVID: Chair Duffley, with respect I haven't been able to ask a question because Mr. Jirak has asked to give the witness time. I think you'll see when I -- when we get to the discussion, Mr. Holmes has testified and he's put in a

classification, which is an important issue in this case, on the Facility Study report based on his understanding of certain facts. And I think these are admissions from a party opponent about the actual facts of the Facility Study estimate and so we think it's a fair line of questioning. If he doesn't know anything about it he can say that.

COMMISSIONER DUFFLEY: Well, Mr. David, I will allow you to ask a few more questions. If there's a point that you want to get to please get to it quickly.

And, Mr. Holmes, please try to answer the questions the best that you can.

THE WITNESS: (Mr. Holmes) Okay. You can go ahead, Mr. David.

MR. DAVID: Thank you. And thank you, Chair Duffley.

BY MR. DAVID:

Q So at the bottom of Page 36, Mr. Watson asked Mr. Freeman a question. *From reading the comments and reply comments and the proposed revisions, it sounded like there was some -- there was now some additional design work, in addition to procurement and installation, that*

has to go on even beyond the studies that doesn't happen until after you get the Interconnection Agreement.

Mr. Freeman says *not exactly sure what you're referring to, but let's go back and spend a couple of minutes on each study.*

And then if you flip ahead to Page 38, Mr. Freeman at line 1 says, *then we move into the Facility Study where we do the detail design work that I think you're referring to. So in my mind, the Facility Study is the engineering study, if you will, where you're actually going into the field, you actually determine if you got to change out poles, you know, what kind of reconductor work you've got to do, are there right-of-way issues that you need to resolve. So you start kind of narrowing in on a much more detailed cost estimate associated with the project.*

And so, Mr. Holmes, my question to you having read Mr. Freeman's testimony about what the Facility Study involves, does that change your opinion on whether it's a Class 5 classification in this case?

A (Mr. Holmes) I don't find the information specific enough to guide me one way or another.
Q If Mr. Freeman says that you're dealing with the right-of-way issues, you've got detailed engineering, that doesn't help you understand whether it's a Class 4 or a Class 5?
A I discussed with the Duke team when I formed my opinion of the class of estimate.
A (Mr. K. Jennings) I would say at the time Gary wouldn't have known what issues might have existed or knew whether or not there was a Class 5, because I don't think that Gary was engaged with the Center for Excellence. And so it wasn't until just before Gary left that, you know, the issues that we're discussing today were beginning to be identified.
Q Mr. Jennings, are you testifying that Mr. Freeman's testimony was wrong, factually wrong?
A I would say it was subjective and not explicit or exact.
Q You weren't in this role in 2015, were you?
A I was not.
Q So --

A I would say that the interconnection process wasn't anything in 2015 like it is today either.
Q Yes, sir.
Mr. Holmes, if you know and you may not know this because it doesn't sound like you work in this area directly, is the next step after the Facility Study a construction planning meeting?
A (Mr. Holmes) From reading testimony, it would appear so but that would be the first time that I've read it.
Q And do you know if Duke is required at a construction planning meeting to issue an Interconnection Agreement with construction milestones?
A I do not know that.
Q Let's turn to Exhibit 27 in that same notebook that you were just looking at.
MR. DAVID: And while you're getting that out I'll just ask that Exhibit 27 be marked as Holmes Cross Exhibit 2.
COMMISSIONER DUFFLEY: And, Mr. David, I apologize, I am going to rename what we identified as Holmes Cross Exhibit 1. There are only two parties in

this case so we will rename Holmes Cross Exhibit 1 to Williams Solar Cross Exhibit 1 and we'll go from there. Plus this is a panel as I understand it, so that will be renamed Holmes Cross Exhibit 1. And I'll let you introduce your second exhibit.

(WHEREUPON, previously identified Holmes Cross Exhibit 1 is renamed to Williams Solar Cross Exhibit 1.)

MR. DAVID: Thank you, Chair Duffley. So at Tab 27 of the potential cross exhibits is the rebuttal testimony of Gary Freeman on behalf of Duke Energy Carolinas, LLC, and Duke Energy Progress, LLC, in Docket Number E-100, Sub 101, an excerpt of that prefiled -- or of that filed testimony, and we would ask that it be marked as Williams Solar Cross Exhibit 2.

COMMISSIONER DUFFLEY: So marked.

(WHEREUPON, Williams Solar Cross Exhibit 2 is marked for identification.)

BY MR. DAVID:

Q Mr. Holmes, could you turn to what is marked as Page 26? So it will be the third page of the

exhibit but it's Page 26 of the testimony.

A Okay.

Q At line 11 Mr. Freeman in his prefiled testimony states *the Facilities Study includes any final modeling requirements, but most importantly for distribution projects, includes the field engineering design work and development of the construction work order and more detailed cost estimates. So, for example, an engineer might require several weeks to confirm existing right-of-way easements, obtain property owner approval for any pole line changes, obtain any new right-of-way, submit highway and in many cases railroad encroachment permits in addition to normal design, construction drawings, and work order estimates. For transmission projects these functions can take many months.*

So without further detail from Mr. Freeman on behalf of Duke as to what goes into the Facility Study estimate, does that change your opinion at all as to whether the Facilities Study estimate should be a Class 3 or a Class 2?

A When was this testimony?

Q This was in -- excuse me one second -- this was in January 8th, 2019.

A January 8th, 2019. Sir, I can't comment to this. I don't know if the Facility Study process has changed since this. I have no knowledge to that. I still haven't seen anything that -- if I run down the list of deliverables for a Class 3 estimate, I haven't seen anything written that will change my mind.

A (Mr. K. Jennings) Steven, we do know -- we do know that there are still several major components that are not identified yet at that point such as the resource contractor has not been identified or the resource -- the labor resource in anyway has been identified yet. A construction package has not been finalized. There may be a construction plan with some milestones and timelines but there's not a detailed construction plan.

We don't know what the environmental impacts are going to be. We can drive by but we don't -- we can't predict if the rain -- if rain is going to occur two months from now and require us to put matting down to support

equipment that's needed to get in around the poles or whatever. So there's a lot of factors that -- at that point of the design we don't necessarily eliminate risk, I guess is the point that I'm trying to make.

Q Yes, sir. Mr. Jennings, my question -- well, let me ask you this question. Are you providing an expert opinion or an opinion at all on behalf of Duke as to what the AACE classification of the Facility Study report or the System Impact Study report is?

A I've read Mr. Holmes' testimony and I've read the document that he has attached as an exhibit and I'm just referencing that.

Q Yes, sir. So I'd like to go back to Mr. Holmes who is providing the testimony about the classification and see if I can finish those questions with him.

A I understood this to be a panel so I was just trying to help.

Q Yes, sir, I appreciate that. Thank you.

So, Mr. Holmes, I want to ask you again, is it your testimony on the classification that you believe applies to the Williams Solar

estimates solely based on the deliverables table that's at Page 16 of 18 in your Exhibit 1?

A (Mr. Holmes) So it is based on the deliverables table. It is based on discussions with the project team. It is based on review of documents. And it's also confirmed by reviewing the performance of recently placed in-service projects as they compare to a rare estimate, if it had to be performed to those projects. And the cost performance distribution for those projects align very closely to a Class 3 estimate.

Q Well, it's not based on your knowledge of actual facts about what goes into a Facility Study cost estimate as of 2019?

A I'm not sure I agree with you.

Q Well you said you didn't know anything about what Mr. Freeman testified about in January of 2019 about the Facility Study estimate?

A There were still elements of an estimate that are actual facts that I do understand, though.

MR. DAVID: Chair Duffley, that's all I have. Thank you.

COMMISSIONER DUFFLEY: Thank you. Redirect?

MR. JIRAK: I apologize, Commissioner Duffley, our understanding was that the witnesses are being made available as a panel and we would conclude --

MR. DAVID: Sorry. That's right. I should have noted --

MR. JIRAK: -- conduct them all as a whole and then redirect them all as a whole for efficiency sake.

COMMISSIONER DUFFLEY: Very good. Thank you.

MR. DAVID: So, Chair Duffley, with that I will turn the microphone over to Mr. Trathen.

MR. TRATHEN: Okay. Thank you. This is Marcus Trathen. I have some questions that I would like to direct to Ken Jennings.

CROSS EXAMINATION BY MR. TRATHEN:

Q Can you hear me okay, Mr. Jennings?

A (Mr. K. Jennings) I can.

Q So if I refer to Mr. Jennings I'm referring to Mr. Ken Jennings for purposes of my line of questions.

If you would look at Page 9 of your testimony, please. Specifically lines 9 and

10, you see that you testify that various aspects of the interconnection process will, by necessity, evolve over time; do you see that?

A No. I'm looking at Page 9 in the bottom corner. So what does the Q and A begin with?

Q So Page 9, lines 9 and 10.

A Can you start with the Q so that I'll know I'm in the right --

Q The Q is on Page 8. *Mr. Jennings, please summarize DEP's position*?

A Please summarize --

MR. JIRAK: Give us one moment. We'll coordinate and make sure we've got the right copy in front of Mr. Ken Jennings.

What was the sentence you're quoting, Marcus, line 9?

MR. TRATHEN: Correct. Line -- the sentence that runs over from line 9 to 12, or 11. It starts with *this track record*.

THE WITNESS: (Mr. K. Jennings) Oh, I got it. Okay.

BY MR. TRATHEN:

Q Okay. Good. So again, Page 9 starting at line 9, the sentence *this track record also clearly*

demonstrates various aspects of the interconnection process, by necessity, will evolve over time. And that's your testimony, correct?

A Yes.

Q Okay. And as I understand it you are the person responsible for the day-to-day management of the interconnection process; is that right?

A So I manage the account management of the interconnection process. There are several components to it, but in general I would say yes.

Q Okay. And I assume that you would agree that Duke has an obligation to provide accurate estimates of construction costs to its interconnection customers?

A I do agree.

Q And so the customers need for accurate estimates hasn't changed between say 2016 and today, right?

A No, I would not think so.

Q And Duke is aware, is it not, that interconnection customers will make business decisions about their projects based on the estimates that they provide to the customer?

A So I am aware of that. I don't know if this is

the right time to talk about, you know, the timeline of things occurring and the fact that we didn't notify Williams Solar sooner. The issue that has been identified was identified almost simultaneously to the provision of the System Impact Study to Williams Solar.

One of the areas that -- you know, and I will tell you that from the beginning in my role as this -- in this position I was communicating with developers, almost from the first week, about cost estimating issues between Interconnection Agreement and final accounting review or final accounting reports. And my primary thought in February, January or February of 2019 was let's not -- let's not let developers make a decision about signing an Interconnection Agreement and paying money for the interconnection and not knowing the costs are going to be inaccurate until we've already got it constructed and then have an oh it's something significantly more than what they anticipated.

So granted, I understand that Williams Solar made a decision to move from one phase to another phase in the study process based

on mistakes that may have been made. However, my goal in the role that I was in at the time and the old -- the role that I'm still in was to try and manage the actual cash outflow impact as much as I could.

Q Okay. Thank you for that. And we'll get into that in a little more detail, but consistent with your answer, it is sort of a recurring theme in your testimony about Duke's attempts to be proactive here, and I believe you used that again in your summary this afternoon. How do you define that word? How are you -- I don't mean this to be a dictionary test. How are you using it? What's your -- what are you tend to convey about that?

A So I don't remember using it in my summary but perhaps I did. I do like the term. Proactive, to me, is taking action in advance of an issue. So to be quite honest, you know, I feel like trying to manage the cash outflow from developers signing Interconnection Agreements was a proactive as I could be at that moment.

I think the situation would be a lot different right now if we were talking about

Williams Solar constructing a project that costs $1.5 million and they thought it was going to be $734,000.

Q In fact, you have a number of those projects, do you not?

A I do and I'm working to resolve those as well.

Q If you would you turn to Pages 16 and 17 in your testimony, please.

A Sixteen and 17?

Q Yes.

A Okay.

Q And so you've got -- and you referred to this in your summary as well, you have some data here, Figures 1 and Figure 2 that speak to the level of interconnection in North Carolina, and interconnection activity over various time periods. In fact, you drew that data from EIA, and I think you referenced that, the U.S. Energy Information Administration; is that correct?

A Yes.

Q Did you put those charts together?

A I did not. One of my employees did.

Q And you referenced the term "utility-scale

interconnection". How do you define "utility scale"?

A Typically I refer to it as 1 megawatt or larger. I know we make a reference to 2 megawatts and larger when we compare to California in this reference.

Q Well, do you happen to know what the EIA definition of utility scale is?

A I do not.

Q Do you accept subject to check that it's consistent with what you just testified to, 1 megawatt or greater?

A Oh, yeah, I mean, I agree. That is typically -- that is typically what I characterize as 1 megawatt. The irony is that 95 percent of the distribution projects connected in DEC and DEP between are 4 and 5 megawatts, or 90 percent. I forget the reference. There's a reference to that in here as well.

Q And that's, in fact, why you used that metric in Figure 2, is it not, because that's the bulk of the interconnections that you see in North Carolina?

A From four to five you mean?

Q Yes.
A Well, I -- so when we reference numbers we think of these as systems, DEP and DEC, so there is really no line between North Carolina and South Carolina that stops the transmission system. So the standard contract in South Carolina is 2 megawatts, so we have quite a few of those as well.
Q Okay. Well, if you would focus on Figure 1 for a second, that depicts solar plants greater than two.
A Okay.
Q And would it surprise you to learn that if you move the threshold to 1 megawatt, consistent with your agreed-upon definition of utility-scale interconnection, would it surprise you to learn that if you did that that this same database that show that Minnesota has 405 projects to North Carolina's 431?
A No, I have not seen that. But I will say that I -- that's a new occurrence. It must have happened in the last year or two because I've seen the 1 megawatt chart before and I agree California was number one, North Carolina was

number two. I don't have the one that was last week.

I will say that North Carolina tends to lead in a lot of similar type metrics, for instance PURPA solar. I think North Carolina is number one in PURPA solar and has been for quite awhile. At one time North Carolina had 60 percent and higher PURPA stats in the country. We had more PURPA plants than 46 other states combined.

COMMISSIONER DUFFLEY: Mr. Trathen, when you move your papers around I saw the Court Reporter was having a hard time hearing Mr. Jennings' answer.

Do you need him to repeat his answer? Okay. You got it. Thank you.

MR. TRATHEN: I wish I could say that I won't do that again. I'm probably a chronic paper shuffler. So I'll try not to do that, but please let me know if you're hearing the effects.

BY MR. TRATHEN:

Q So, Mr. Jennings, with regards to California, consistent with what you just said, even if you accept how you all have framed it greater than 2 megawatts, would it surprise you to learn that

California has connected and it's nearly twice as much total capacity as Duke in the same time period?

A No, that wouldn't surprise me. They're a much larger state and they are number one in solar; we're only number two.

Q If you look at Figure 2 - we briefly referenced this - if you look at all projects in the 1 to 5 megawatt range, again would it surprise you to learn using this same data set that North Carolina has 504 projects, Minnesota has 406 projects, California has 375 projects, Massachusetts has 319 projects --

A Are these all projects -- are these all projects that are connected?

Q These are what's recorded on the same data base, utility-scale plants between 1 and 5 megawatts placed in operation all time.

A I will have to check. I would be surprised actually, but I will check.

Q Okay. So the data -- it's public data and it will show what it does. But if you accept the premise of the data as I just described it --

A I'm just shocked by it in general because I would

think if there were that many states with that much solar that we would not be number two in solar, and these states aren't even in the -- they're -- I'm not even sure they're in the top 10 with CIA, but I guess Massachusetts is.

Q They are all on your list.

A I get that.

Q Okay. So accepting that is true, it's really not accurate to say that North Carolina's experience is unprecedented, unparalleled, or without comparison, is it?

MR. JIRAK: I'm going to object to that question, Commissioner Duffley. First of all, Mr. -- the facts that have been thrown out now by Mr. Trathen have not been substantiated by evidence in this record, and Mr. Jennings has stated that he doesn't necessarily know where these numbers are coming from nor agree with them, and so I don't think further questions about what the numbers that haven't been substantiated mean are relevant to this proceeding. I also think there was a bit of a miscommunication with respect to the vintage of data and I'm not sure we're even making apples-to-apples comparisons at this point.

COMMISSIONER DUFFLEY: Mr. Trathen.
MR. TRATHEN: So my question was simply if you accept --
THE WITNESS: (Mr. K. Jennings) I don't accept it. Yeah, but I don't accept it. I have to see it. To the person that does this analysis for me it would shock me that the last time she shared that with me that it didn't represent what I'm expecting. But subject to check I will look.
MR. JIRAK: I also observed that I believe Figure 1 is showing what's been accomplished in a specific time period and we were highlighting thereby what's been accomplished in sort of wave of distribution projects in North Carolina in a four-year time period. I thought, Mr. Trathen, you were citing to all time numbers. So again, it seems like we're doing some mixing and matching and we don't really have the numbers in front of us to even really fully understand what's being asked.
MR. TRATHEN: That's fine. So the numbers will say what they do.
BY MR. TRATHEN:
Q So, Mr. Jennings, accepting the premise that North Carolina solar interconnection ranks among

the top in comparison to other states, I think that's fair, is it your testimony that the large number of interconnection requests that Duke has historically received somehow excuses its problems in rendering accurate processes?

A No. I don't think it excuses it necessarily. I think that what I was trying to illustrate here is that it's a challenge. We know that interconnection is a challenge. We're not the only utility in the country that is challenged with it. We've seen a number of queue reform efforts ongoing throughout the year. Those that are -- those other utilities that are currently embarking on queue reform efforts don't -- I'm not sure that they have as much solar connected as we do. So no I'm not asking -- I'm not saying that it's completely, you know, that it excuses everything otherwise we would have just continued to do what we were doing; no. When we identified a gap we immediately tried to work through that. We have tried to resolve it. We've tried to provide developers better information so that they don't end up in a bad place on the other side of construction when the construction is

already completed. That was the main goal of this.

Q So given Duke's extensive experience, wouldn't you actually expect Duke's estimates to be more accurate than a utility with less experience?

A So I -- I guess more experience would have -- should indicate better estimates. I think the problem is, and I highlight this in my testimony, that we didn't add a group that kind of monitored this until 2017. And it was really the issuance of the Order in the REPS case in 2017 in which the Commission said that we should do our best to allocate direct interconnection costs to interconnection customers. And so I think it was that mandate that moved us to examine more closely what the estimate, their Interconnection Agreement estimates were versus the actual and final accounting report. So as we moved through time that group began to put together data and started collecting basically actual to estimates.

By the end of 2018, we began to actually issue final accounting reports to developers and, I mean, those first few accounting reports that we issued, and I think

maybe it was five in 2018, they had significant deviations between the Interconnection Agreement and the final accounting report.

So in 2019, we began to collect more data and identify where the gap was. Once the gap was identified we began to work on a tool to true it up. Once we had sufficient testing data to demonstrate that we were going to provide better estimates we began doing that. And so by May of 2019, I think that we started issuing new estimates to customers that had the old methodology System Impact Studies. And I think as you mentioned, Williams Solar happened to be one that got one in July.

Q So, trying to work through the timeline here, and I think that this -- we'll cover it again -- I understand that you assumed your current job responsibilities in February of 2019; is that right?

A It was about then.

Q And prior to that did you have any responsibility for interconnection matters? I think you were in a policy position before that, correct?

A Well I -- before that I was the Director of North

Carolina Strategy and Renewable Strategy and Policy and so I worked pretty closely with Gary Freeman. I wasn't active in the interconnection world but I talked to Gary almost every morning.

Q And you've testified that Duke became aware about the problems with the estimates in Q1 of 2018; is that correct?

A I think we knew that we may have some issues earlier. It was really later in -- did you say early 2018 or later 2018?

Q I said Q1 of 2018.

A So that was about the time that the -- that the process governance and reporting team had begin to identify some variances between estimate and actual; yes.

Q And when did you become aware -- you joined the group in February of 2019, when did you become aware of the issue yourself?

A I don't recall. I probably knew something about it in -- later in 2018. I didn't understand the magnitude of the issue until early 2019.

COMMISSIONER DUFFLEY: Mr. Trathen, we've come to the end of the day. It's 5:31. I think this is probably a pretty good stopping point. We will

start back tomorrow at 9:30 a.m. Our producer will open up the WebEx, you should have received a second link to join, and she will open that up 30 minutes early so the WebEx will be open at 9:00 a.m.

And unless there is anything further, we'll be adjourned til tomorrow morning at 9:30 a.m.

(The proceedings were adjourned at 5:31 p.m. and will resume at 9:30 a.m. on Thursday, June 18, 2020)

C E R T I F I C A T E

I, KIM T. MITCHELL, DO HEREBY CERTIFY that the Proceedings in the above-captioned matter were taken before me, that I did report in stenographic shorthand the Proceedings set forth herein, and the foregoing pages are a true and correct transcription to the best of my ability.

Kim T. Mitchell

Kim T. Mitchell
Court Reporter