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May 12, 2020

VIA ELECTRONIC FILING

Ms. Kimberley A. Campbell, Chief Clerk
North Carolina Utilities Commission
4325 Mail Service Center
Raleigh, North Carolina 27699-4300

RE: Duke Energy Progress, LLC's Direct Testimony and Exhibits
Docket No. E-2, Sub 1220

Dear Ms. Campbell:

Please find enclosed Duke Energy Progress, LLC's Direct Testimony and Exhibits of Kenneth Jennings and Steven Holmes, Direct Testimony of Jack McNeill and Direct Testimony of Scott Jennings in the above-referenced proceeding.

Certain information in the testimony and exhibits of Kenneth Jennings and Steven Holmes constitutes trade secret, and confidential, proprietary, and commercially sensitive information. Such confidential information is being filed under seal pursuant to N.C. Gen. Stat. § 132-1.2. Parties to the docket may contact the Company regarding obtaining copies pursuant to an appropriate confidentiality agreement.

If you have any questions, please do not hesitate to contact me. Thank you for your assistance with this matter.

Sincerely,

Jack E. Jirak

Enclosure

c: Williams Solar, LLC

CERTIFICATE OF SERVICE

I certify that a copy of Duke Energy Progress, LLC's Direct Testimony and Exhibits of Kenneth Jennings and Steven Holmes, Direct Testimony of Jack McNeill and Direct Testimony of Scott Jennings, in Docket No. E-2, Sub 1220, has been served by electronic mail, hand delivery or by depositing a copy in the United States mail, 1st Class Postage Prepaid properly addressed to:

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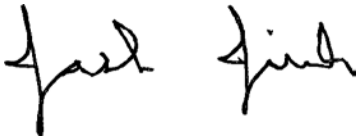
This the 12th day of May, 2020.



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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

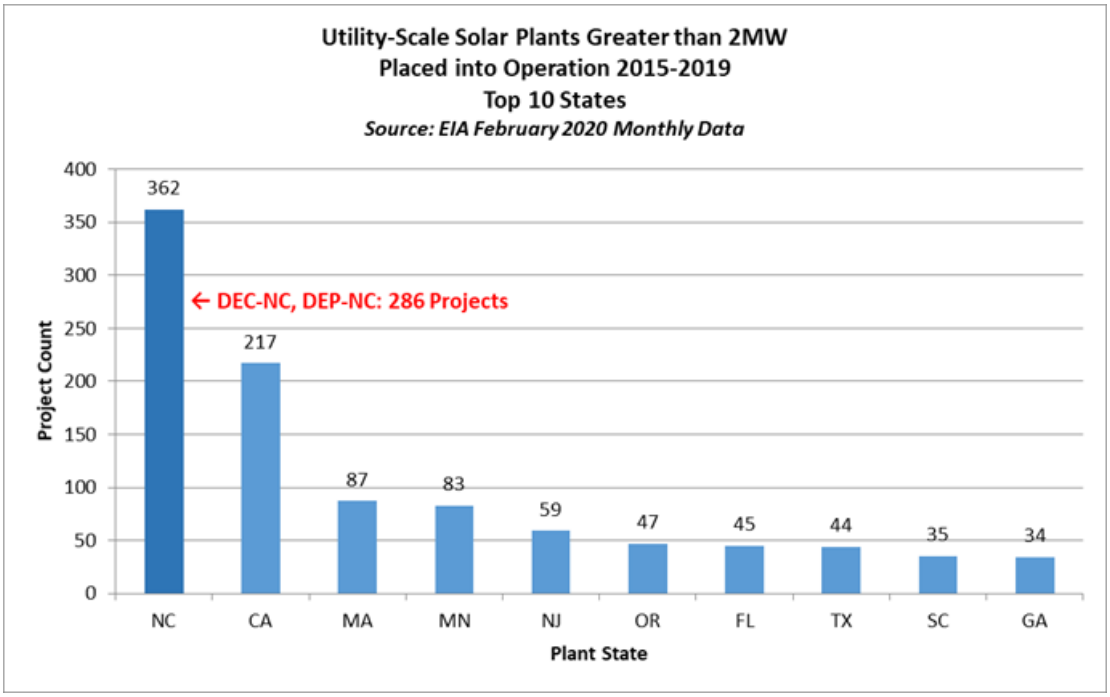
study process. As another example, because many Interconnection Customers have goals to energize projects by the end of a given calendar year, Duke has exerted considerable effort during the year-end holiday season to complete construction of as many projects as reasonably possible.

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



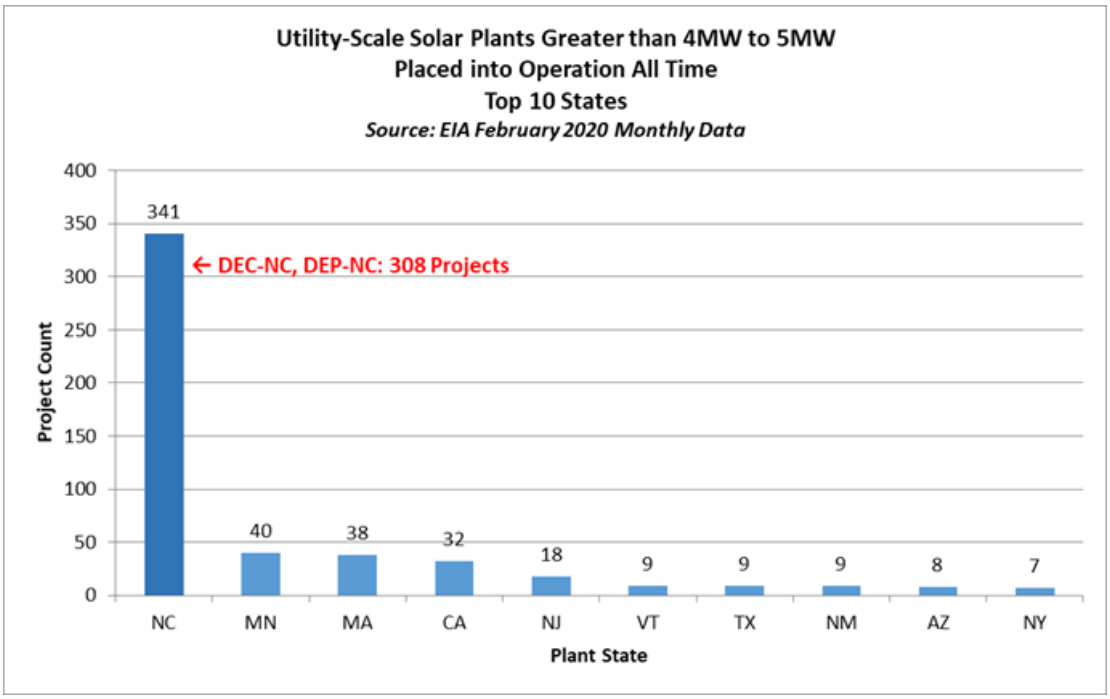
As demonstrated above, the scale of what Duke has achieved in terms of total utility-scale interconnection far exceeds the accomplishments of other states and utilities across the United States.

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**] [redacted] [**End Confidential]** different substations. Of those [**Begin Confidential**] [redacted] [**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**] [redacted] [**End Confidential]** projects currently in queue were the first project on a substation. On [**Begin Confidential]** [redacted] [**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]** **[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]** **[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.

AACE INTERNATIONAL RECOMMENDED PRACTICE

96R-18

COST ESTIMATE CLASSIFICATION SYSTEM – AS APPLIED IN ENGINEERING, PROCUREMENT, AND CONSTRUCTION FOR THE POWER TRANSMISSION LINE INFRASTRUCTURE INDUSTRIES

AACE INTERNATIONAL

AACE® International Recommended Practice No. 96R-18

COST ESTIMATE CLASSIFICATION SYSTEM – AS APPLIED IN ENGINEERING, PROCUREMENT, AND CONSTRUCTION FOR THE POWER TRANSMISSION LINE INFRASTRUCTURE INDUSTRIES

TCM Framework: 7.3 – Cost Estimating and Budgeting

Rev. July 31, 2019

Note: As AACE International Recommended Practices evolve over time, please refer to web.aacei.org for the latest revisions.

Any terms found in AACE Recommended Practice 10S-90, *Cost Engineering Terminology*, supersede terms defined in other AACE work products, including but not limited to, other recommended practices, the *Total Cost Management Framework*, and *Skills & Knowledge of Cost Engineering*.

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PURPOSE

As a recommended practice (RP) of AACE International, the *Cost Estimate Classification System* provides guidelines for applying the general principles of estimate classification to project cost estimates (i.e., cost estimates that are used to evaluate, approve, and/or fund projects). The *Cost Estimate Classification System* maps the phases and stages of project cost estimating together with a generic project scope definition maturity and quality matrix, which can be applied across a wide variety of industries and scope content.

This recommended practice provides guidelines for applying the principles of estimate classification specifically to project estimates for engineering, procurement, and construction (EPC) work for electrical power transmission lines infrastructure facilities. This document supplements the generic cost estimate classification RP (17R-97 [1]) by providing:

- A section that further defines classification concepts as they apply to the power transmission line infrastructure industries.
- A chart that maps the extent and maturity of estimate input information (project definition deliverables) against the class of estimate.

As with the generic RP, the intent of this document is to improve communications among all the stakeholders involved with preparing, evaluating, and using project cost estimates specifically for the power transmission line infrastructure industries.

The overall purpose of this recommended practice is to provide the power transmission line infrastructure industries with a project definition deliverable maturity matrix that is not provided in 17R-97. It also provides an approximate representation of the relationship of specific design input data and design deliverable maturity to the estimate accuracy and methodology used to produce the cost estimate. The estimate accuracy range is driven by many other

variables and risks, so the maturity and quality of the scope definition available at the time of the estimate is not the sole determinate of accuracy; risk analysis is required for that purpose.

This document is intended to provide a guideline, not a standard. It is understood that each enterprise may have its own project and estimating processes, terminology, and may classify estimates in other ways. This guideline provides a generic and generally acceptable classification system for the power transmission line infrastructure industries that can be used as a basis to compare against. This recommended practice should allow each user to better assess, define, and communicate their own processes and standards in the light of generally-accepted cost engineering practice.

INTRODUCTION

For the purposes of this document, the term *power transmission line infrastructure industries* is assumed to include greenfield or brownfield sites for overhead, buried and submarine transmission of electrical power in the infrastructure industries. High voltage is typically >100kV but may be less (e.g., 33 or 66kv) if long distance with light electrical loads. This excludes power supply and distribution scope within a process plant, mining facility, building complex or other facility site. It also excludes power generation facilities and substations. The defining deliverables of those excluded project scopes are covered in other RPs (e.g., 18R-97 for process plants [2]).

Power transmission is considered an element of the infrastructure industry. The Construction Industry Institute has provided a good definition of infrastructure in its Project Definition Rating Index for Infrastructure Projects as follows [3]:

"A capital project that provides transportation, transmission, distribution, collection or other capabilities supporting commerce or interaction of goods, services, or people. Infrastructure projects generally impact multiple jurisdictions, stakeholder groups and/or a wide area. They are characterized as projects with a primary purpose that is integral to the effective operation of a system. These collective capabilities provide a service that is made up of nodes and vectors into a grid or system."

Using this definition, power transmission lines are a vector or linear scope element that connects substation or other facility nodes at its terminations. The substation nodes may be part of or associated with a generation, consuming or interconnection facility. As such, transmission projects are often executed as part of a program that also involves node project scope or facility operational changes (or at least considerations for integrated system commissioning and startup). As the definition states, a distinguishing feature of these projects is that they often traverse wide areas, cross country or subsea, which puts an emphasis on the definition of routing, land ownership and conditions, and establishing right-of-way (ROW). Associated scope definition challenges include defining stakeholder, permitting and regulatory requirements. Buried and submarine installations increase the focus on the protection philosophy and strategies affecting cable selection, armoring and joint considerations. While many distinguish power transmission (higher voltage, long distances) from power distribution (short distance, lower voltage connections to retail customers), the principles of estimating these elements are similar; i.e., the RP applies to both.

The main physical power transmission line scope elements are conductors and their support structures if installed overhead. Main installation elements include land clearing if over land (including forestry if applicable), foundation and structure erection and conductor stringing if overhead, or trenching, laying and horizontal boring if subsurface or subsea. Special scope elements are involved with crossings of water, road, rail and so on and at terminations. Because conductor (e.g., aluminum) and structure (e.g., steel) material costs are usually a significant cost element, these project estimates are particularly sensitive to escalation uncertainty. In general, the more developed the route, the more complex the installation will be. In urban areas, visual appeal and concern for safety and health can be major issues. Installation in remote location and/or difficult or environmentally sensitive terrain creates its own

challenges. Subsea installation adds the need for bathymetry[1] and metocean[2] studies and specialized installation equipment and vessels. Before any installation work can begin in an area, stakeholder consultation must be advanced (sometimes requiring agreements with local populations with rights), and appropriate land and ROW must be acquired which creates unique scheduling as well as cost challenges.

For the purpose of estimate classification then, the main scope definition deliverables are associated with defining the power requirements (i.e., kV), the conductors and structure, and the routing. Conductors can vary widely in content (copper, aluminum, etc.) and insulation. Overhead structures may be wood, concrete, composite or steel in various configurations with various foundation designs including pilings, concrete and so on. The route's land or subsea characteristics and the nature of developments drive the need for special design features and execution strategies. Operability and maintainability considerations may also affect ROW and access design. Brownfield and revamp projects add their own concerns for interface with existing elements, crowded working conditions, etc. For each scope definition decision, stakeholder requirements need to be considered.

Power substation projects are usually associated with transmission projects. However, substations being equipment-centric and located on a facility site have physical and defining characteristics similar to process plant projects (e.g., reliance on one-line diagrams, plot plans, etc.).

Power transmission is usually a regulated industry if not government owned. As environmental concerns increase, the design and installation becomes more complex (e.g., mitigation and management plans, construction plans with seasonality, etc.) and the regulation of projects becomes more rigorous. In respect to classification, the regulation becomes critical as the stage-gate process is increasingly driven by the regulators and not by owner economic concerns. For example, the regulator or agency with authority may dictate that final engineering cannot proceed until after the routing is finalized and the utility submits a *maximum* and reasonable cost to the agency. In some cases, this gate may require design deliverables be more or less advanced than the Classification Table 3 stages. In these situations, one should assess the governing stage-gate process and decide what class the estimate will be for each gate. For example, one may find the gate is somewhere between the RP's class; say between Class 3 and 2. If so, one would designate the estimate as "Class 2 with Exceptions" and describe which deliverables are not to full class definition at that decision gate. This is also true if the stage gate system is defined by 30/60/90 percent design reviews (or other percentages) where percent design completion may not have much relationship to the status of any particular deliverable (e.g., definition at 30% design review may not be adequate for Class 3 and hence the associated estimate would be Class 3 with Exceptions as noted).

This guideline reflects generally-accepted cost engineering practices. This recommended practice was based upon the practices of multiple major power utility companies as well as published references and standards [4]. Company and public standards were solicited and reviewed, and the practices were found to have significant commonalities. These classifications are also supported by empirical industry research of systemic risks and their correlation with cost growth and schedule slip [5].

This RP applies to a variety of project delivery methods such as traditional design-bid-build (DBB), design-build (DB), construction management for fee (CM-fee), construction management at risk (CM-at risk), and private-public partnerships (PPP) contracting methods.

COST ESTIMATE CLASSIFICATION MATRIX FOR THE POWER TRANSMISSION LINE INFRASTRUCTURE INDUSTRIES

A purpose of cost estimate classification is to align the estimating process with project stage-gate scope development and decision-making processes.

[1] The study of underwater depth of lake or ocean floors.
[2] A combination of meteorology and oceanography.

Table 1 provides a summary of the characteristics of the five estimate classes. The maturity level of project definition is the sole determining (i.e., primary) characteristic of class. In Table 1, the maturity is roughly indicated by a percentage of complete definition; however, it is the maturity of the defining deliverables that is the determinant, not the percent. The specific deliverables, and their maturity or status are provided in Table 3. The other characteristics are secondary and are generally correlated with the maturity level of project definition deliverables, as discussed in the generic RP.[1] The characteristics are typical but may vary depending on the circumstances.

	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

This matrix and guideline outline an estimate classification system that is specific to electrical power transmission lines in the infrastructure industry. Refer to Recommended Practice 17R-97 [1] for a general matrix that is non-industry specific, or to other cost estimate classification RPs for guidelines that will provide more detailed information for application in other specific industries (e.g., RP 18R-97 for electrical substation facilities [2]). These will provide additional information, particularly the *Estimate Input Checklist and Maturity Matrix* which determines the class in those industries. See Professional Guidance Document 01, *Guide to Cost Estimate Classification.*[6]

Table 1 illustrates typical ranges of accuracy ranges that are associated with the power transmission line infrastructure industries. The +/- value represents typical percentage variation at an 80% confidence interval of actual costs from the cost estimate after application of contingency (typically to achieve a 50% probability of project cost underrun versus overrun) for given scope. Depending on the technical and project deliverables (and other variables) and risks associated with each estimate, the accuracy range for any particular estimate is expected to fall within the ranges identified. However, this does not preclude a specific actual project result from falling outside of the indicated range of ranges identified in Table 1. In fact, research indicates that for weak project systems and complex or otherwise risky projects, the high ranges may be two to three times the high range indicated in Table 1. [7]

In addition to the degree of project definition, estimate accuracy is also driven by other systemic risks such as:

- Level of familiarity with technology.
- Unique/remote nature of project locations and conditions and the availability of reference data for those.

- Complexity of the project and its execution.
- Quality of reference cost estimating data.
- Quality of assumptions used in preparing the estimate.
- Experience and skill level of the estimator.
- Estimating techniques employed.
- Time and level of effort budgeted to prepare the estimate.
- Market and pricing conditions.
- Currency exchange.
- Complexity and condition influence on system/grid power conditions.
- Regulatory, community, landowner, and political risks.

Systemic risks such as these are often the primary driver of accuracy, especially during the early stages of project definition. As project definition progresses, project-specific risks (e.g. risk events and conditions) become more prevalent and also drive the accuracy range.

Another concern in estimates is potential organizational pressure for a predetermined value that may result in a biased estimate. The goal should be to have an unbiased and objective estimate both for the base cost and for contingency. The stated estimate ranges are dependent on this premise and a realistic view of the project. Failure to appropriately address systemic risks (e.g. technical complexity) during the risk analysis process, impacts the resulting probability distribution of the estimated costs, and therefore the interpretation of estimate accuracy.

Figure 1 illustrates the general relationship trend between estimate accuracy and the estimate classes (corresponding with the maturity level of project definition). 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 determination, 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 -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. Research for power transmission projects has shown that industry has greatly underestimated risks and contingency for Class 5 and 4 estimates [4]. Environmental and political risk are increasing that becomes a particular concern when regulators require reporting of maximum costs or similar dictates related to accuracy. Refer to Table 1 for the accuracy ranges conceptually illustrated in Figure 1. [8]

Figure 1 also illustrates that the estimating accuracy ranges overlap the estimate classes. There are cases where a Class 5 estimate for a particular project may be as accurate as a Class 3 estimate for a different project. For example, similar accuracy ranges may occur for a Class 5 estimate of one project that is based on a repeat brownfield project with good history in an existing, approved ROW with few stakeholders, and a Class 3 estimate for a project involving new technology in a remote location, or environmentally sensitive region with stringent regulations and many stakeholders. It is for this reason that Table 1 provides ranges of accuracy values. This allows consideration of the specific circumstances inherent in a project, and an industry sector to provide realistic estimate class accuracy range percentages. While a target range may be expected for a particular estimate, the accuracy range should always be determined through risk analysis of the specific project and should never be pre-determined. AACE has recommended practices that address contingency determination and risk analysis methods. [9]

If contingency has been addressed appropriately approximately 80% of projects should fall within the ranges shown in Figure 1. However, this does not preclude a specific actual project result from falling inside or outside of the indicated range of ranges identified in Table 1. As previously mentioned, research indicates that for weak project systems, and/or complex or otherwise risky projects, the high ranges may be two to three times the high range indicated in Table 1.

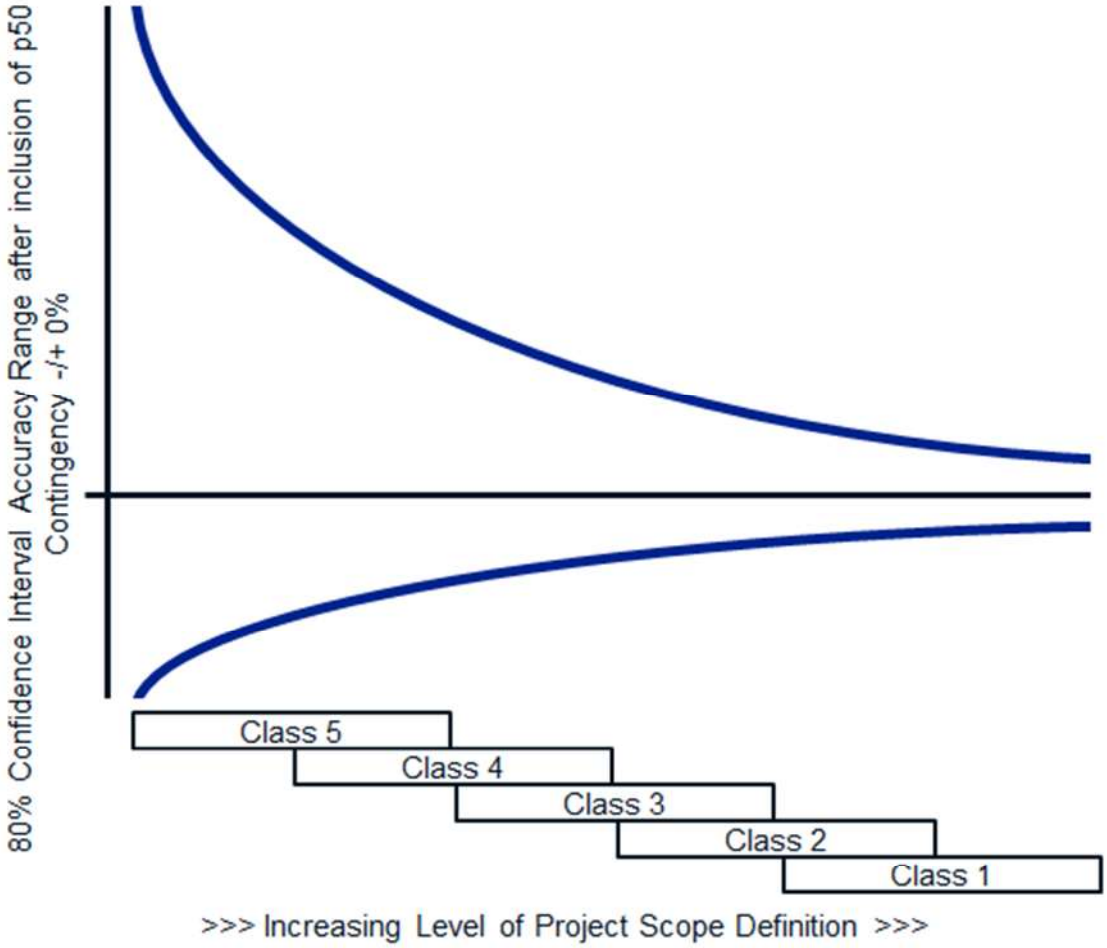

Figure 1 – Illustration of the Variability in Accuracy Ranges for Power Transmission Line Infrastructure Industry Estimates

DETERMINATION OF THE COST ESTIMATE CLASS

For a given project, the determination of the estimate class is based upon the maturity level of project definition based on the status of specific key planning and design deliverables. The percent design completion may be correlated with the status, but the percentage should not be used as the class determinate. While the determination of the status (and hence the estimate class) is somewhat subjective, having standards for the design input data, completeness and quality of the design deliverables will serve to make the determination more objective.

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CHARACTERISTICS OF THE ESTIMATE CLASSES

The following tables (2a through 2e) provide detailed descriptions of the five estimate classifications as applied in the power transmission line infrastructure industries. They are presented in the order of least-defined estimates to the most-defined estimates. These descriptions include brief discussions of each of the estimate characteristics that define an estimate class.

For each table, the following information is provided:

- **Description:** A short description of the class of estimate, including a brief listing of the expected estimate inputs based on the maturity level of project definition deliverables**.**

- **Maturity Level of Project Definition Deliverables (Primary Characteristic):** Describes a particularly key deliverable and a typical target status in stage-gate decision processes, plus an indication of approximate percent of full definition of project and technical deliverables. Typically, but not always, maturity level correlates with the percent of engineering and design complete.

- **End Usage (Secondary Characteristic):** A short discussion of the possible end usage of this class of estimate.

- **Estimating Methodology (Secondary Characteristic):** A listing of the possible estimating methods that may be employed to develop an estimate of this class.

- **Expected Accuracy Range (Secondary Characteristic):** Typical variation in low and high ranges after the application of contingency (determined at a 50% level of confidence). Typically, this represents about 80% confidence that the actual cost will fall within the bounds of the low and high ranges if contingency appropriately forecasts uncertainty and risks.

- **Alternate Estimate Names, Terms, Expressions, Synonyms:** This section provides other commonly used names that an estimate of this class might be known by. These alternate names are not endorsed by this recommended practice. The user is cautioned that an alternative name may not always be correlated with the class of estimate as identified in Tables 2a-2e.

CLASS 5 ESTIMATE	
Description: Class 5 estimates are generally prepared based on very limited information, and subsequently have wide accuracy ranges. As such, some companies and organizations have elected to determine that due to the inherent inaccuracies, such estimates cannot be classified in a conventional and systematic manner. 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 kV and length over approximate alternate routes on large scale maps is known at the time of estimate preparation. **Maturity Level of Project Definition Deliverables:** Key deliverable and target status: Line capacity (kV), general design concepts and routing alternatives agreed by business stakeholders. 0% to 2% of full project definition. **End Usage:** Class 5 estimates are prepared for any number of strategic business planning purposes, such as but not limited to market studies, assessment of initial viability, evaluation of alternate schemes, project screening, routing studies, evaluation of resource needs and budgeting, long-range capital planning, etc.	**Estimating Methodology:** Class 5 estimates generally use stochastic estimating methods such as gross unit costs (cost/length), factoring and other parametric and modeling techniques. **Expected Accuracy Range:** Typical accuracy ranges for Class 5 estimates are -20% to -50% on the low side, and +30% to +100% on the high side, depending on the technological and route complexity, and appropriate reference information and other risks (after inclusion of an appropriate contingency determination). Ranges could exceed those shown if there are unusual risks including volatile commodity markets and escalation (i.e., because of the proportion of commodity material content such as aluminum and steel). The range values will shift (show bias) to the extent that contingency included in the funding is over or underestimated. **Alternate Estimate Names, Terms, Expressions, Synonyms:** Ballpark, conceptual, gross, blue sky, back of envelope, high level, seat-of-pants, rough order of magnitude (ROM), idea study, indicative, scoping, prospect estimate, guesstimate, rule-of-thumb.

Table 2a – Class 5 Estimate

CLASS 4 ESTIMATE	
Description: Class 4 estimates are generally prepared based on limited information and subsequently have fairly wide accuracy ranges. They are typically used for project screening, determination of feasibility, concept evaluation, and preliminary budget approval. Typically, engineering is from 1% to 15% complete, and would comprise at a minimum the following: line capacity (kV), route topographic mapping with aerial photography, preliminary conductor and structure types with span lengths, and major environmental, community, regulatory and ROW concerns identified. In some cases, stakeholder consultation is in progress. **Maturity Level of Project Definition Deliverables:** Key deliverable and target status: Routing corridors defined with optimization underway with assumed conductor and structure types, span lengths and ground or subsea conditions. 1% to 15% of full project definition. **End Usage:** Class 4 estimates are prepared for a number of purposes, such as but not limited to, detailed strategic planning, business development, project screening at more developed stages, alternative scheme analysis, confirmation of economic and/or technical feasibility, and preliminary budget approval or approval to proceed to next stage. Usually there is only one major option carried forward for more detailed Class 3 estimate development.	**Estimating Methodology:** Class 4 estimates generally use stochastic estimating methods such as adjusted gross unit costs (cost/length) with adjustment for specific design elements or approximate unit or assembly costs for conductor, structures and other major elements, factored design and installation costs, and other parametric and modeling techniques. **Expected Accuracy Range:** Typical accuracy ranges for Class 4 estimates are -15% to -30% on the low side, and +20% to +50% on the high side, depending on the technological and route complexity, and appropriate reference information and other risks (after inclusion of an appropriate contingency determination). Ranges could exceed those shown if there are unusual risks including volatile commodity markets and escalation (i.e., because of the proportion of commodity material content such as aluminum and steel). The range values will shift (show bias) to the extent that contingency included in the funding is over or underestimated. **Alternate Estimate Names, Terms, Expressions, Synonyms:** Screening, top-down, feasibility, factored, pre-design, advanced study, basic engineering, planning, preliminary funding, concession license.

Table 2b – Class 4 Estimate

CLASS 3 ESTIMATE	
Description: Class 3 estimates are generally prepared to form the basis for budget authorization, appropriation, and/or funding. As such, they typically form the initial control estimate against which all actual costs and resources will be monitored. Typically, engineering is from 10% to 40% complete, and would comprise at a minimum the following: confirmed optimized route, specific conductor and structure types defined considering specific environment, soils, weather/wind and thermal characteristics, long lead orders ready to be placed. Quantities are identified at a reasonable level of detail. ROW title holders defined and negotiation in progress, and regulatory, permitting and stakeholder concerns addressed. Adequate definition to obtain firm construction bid unit pricing with execution and contracting plans defined. **Maturity Level of Project Definition Deliverables:** Key deliverable and target status: Route conditions (including weather/wind) confirmed by survey; structure types and numbers defined; all ROW title holders identified and negotiations in progress, major permit applications submitted, license applications and environmental impact statements (EIS) prepared, and execution plans agreed. 10% to 40% of full project definition. **End Usage:** Class 3 estimates are typically prepared to support full project funding requests, and become the first of the project phase control estimates against which all actual costs and resources will be monitored for variations to the budget. They are used as the project control budget until replaced by more detailed estimates. In many owner organizations, a Class 3 estimate is often the last estimate required and could very well form the only basis for cost/schedule control.	**Estimating Methodology:** Class 3 estimates generally involve more deterministic estimating methods than stochastic methods. They usually involve predominant use of unit cost line items, although these may be at an assembly level of detail rather than individual components. Factoring and other stochastic methods may be used to estimate less-significant areas of the project. **Expected Accuracy Range:** Typical accuracy ranges for Class 3 estimates are -10% to -20% on the low side, and +10% to +30% on the high side, depending on the technological and route complexity, and appropriate reference information and other risks (after inclusion of an appropriate contingency determination). Ranges could exceed those shown if there are unusual risks including volatile commodity markets and escalation (i.e., because of the proportion of commodity material content such as aluminum and steel). However, projects in existing, developed ROW may have tighter ranges. The range values will shift (show bias) to the extent that contingency included in the funding is over or underestimated. **Alternate Estimate Names, Terms, Expressions, Synonyms:** Budget, scope, sanction, semi-detailed, forced detail, authorization, preliminary control, front-end engineering and design (FEED), target estimate, concession license, bid, tender.

Table 2c – Class 3 Estimate

CLASS 2 ESTIMATE	
Description: Class 2 estimates are generally prepared to form a detailed contractor control baseline (and update the owner control baseline) against which all project work is monitored in terms of cost and progress control. For contractors, this class of estimate is often used as the bid estimate to establish contract value. Typically, engineering is from 30% to 75% complete, and would comprise at a minimum the following: final routing, specific structure designs, conductors ordered, most ROW obtained, permits and licenses obtained, contracts in place and construction in progress. **Maturity Level of Project Definition Deliverables:** Key deliverable and target status: Specific route conditions surveyed, specific structure designs; most ROW, permits and licenses obtained; and supply and installation contracts issued. 30% to 75% of full project definition. **End Usage:** Class 2 estimates are typically prepared as the detailed contractor control baseline (and update the owner control baseline) against which all actual costs and resources will now be monitored for variations to the budget and form a part of the change management program.	**Estimating Methodology:** Class 2 estimates generally involve a high degree of deterministic estimating methods. Class 2 estimates are prepared in great detail, and often involve tens of thousands of unit cost line items. For those areas of the project still undefined, an assumed level of detail takeoff (forced detail) may be developed to use as line items in the estimate instead of relying on factoring methods. **Expected Accuracy Range:** Typical accuracy ranges for Class 2 estimates are -5% to -15% on the low side, and +5% to +20% on the high side, depending on the technological and route complexity, and appropriate reference information and other risks (after inclusion of an appropriate contingency determination). Ranges could exceed those shown if there are unusual risks. The range values will shift (show bias) to the extent that contingency included in the funding is over or underestimated. **Alternate Estimate Names, Terms, Expressions, Synonyms:** Detailed control, execution phase, master control, engineering, tender, change order estimate.

Table 2d – Class 2 Estimate

CLASS 1 ESTIMATE	
Description: Class 1 estimates are generally prepared for discrete parts or sections of the total project rather than generating this level of detail for the entire project. The parts of the project estimated at this level of detail will typically be used by subcontractors for bids, or by owners for check estimates. The updated estimate is often referred to as the current control estimate and becomes the new baseline for cost/schedule control of the project. Class 1 estimates may be prepared for parts of the project to comprise a fair price estimate or bid check estimate to compare against a contractor's bid estimate, or to evaluate/dispute change orders and claims. Typically, overall engineering is from 65% to 100% complete (some parts or packages may be complete and others not) and would comprise virtually all engineering and design documentation of the project, and complete project execution and commissioning plans. **Maturity Level of Project Definition Deliverables:** Key deliverable and target status: All deliverables in the maturity matrix complete. 65% to 100% of full project definition. **End Usage:** Generally, owners and EPC contractors use Class 1 estimates to support their change management process. They may be used to evaluate bid checking, to support vendor/contractor negotiations, or for claim evaluations and dispute resolution. Construction contractors may prepare Class 1 estimates to support their bidding and to act as their final control baseline against which all actual costs and resources will now be monitored for variations to their bid. During construction, Class 1 estimates may be prepared to support change management.	**Estimating Methodology:** Class 1 estimates generally involve the highest degree of deterministic estimating methods and require the greatest amount of effort. Class 1 estimates are prepared in great detail, and thus are usually performed on only the most important or critical areas of the project. All items in the estimate are usually unit cost line items based on actual design quantities. **Expected Accuracy Range:** Typical accuracy ranges for Class 1 estimates are -3% to -10% on the low side, and +3% to +15% on the high side, depending on the technological and route complexity, and appropriate reference information and other risks (after inclusion of an appropriate contingency determination). Ranges could exceed those shown if there are unusual risks. The range values will shift (show bias) to the extent that contingency included in the funding is over or underestimated. **Alternate Estimate Names, Terms, Expressions, Synonyms:** Full detail, release, fall-out, tender, firm price, bottoms-up, final, detailed control, forced detail, execution phase, master control, fair price, definitive, change order estimate.

Table 2e – Class 1 Estimate

ESTIMATE INPUT CHECKLIST AND MATURITY MATRIX

Table 3 maps the extent and maturity of estimate input information (deliverables) against the five estimate classification levels. This is a checklist of basic deliverables found in common practice in the power transmission line infrastructure industries. The maturity level is an approximation of the completion status of the deliverable. The degree of completion is indicated by the following descriptors.

General Project Data:

- **Not Required:** May not be required for all estimates of the specified class, but specific project estimates may require at least preliminary development.

- **Preliminary**: Project definition has begun and progressed to at least an intermediate level of completion. Review and approvals for its current status has occurred.

- **Defined**: Project definition is advanced, and reviews have been conducted. Development may be near completion with the exception of final approvals.

Technical and ROW Deliverables:

- **Not Required (NR)**: Deliverable may not be required for all estimates of the specified class, but specific project estimates may require at least preliminary development.

- **Started (S):** Work on the deliverable has begun. Development is typically limited to sketches, rough outlines, or similar levels of early completion.

- **Preliminary (P):** Work on the deliverable is advanced. Interim, cross-functional reviews have usually been conducted. Development may be near completion except for final reviews and approvals.

- **Complete (C):** The deliverable has been reviewed and approved as appropriate.

	ESTIMATE CLASSIFICATION				
	CLASS 5	**CLASS 4**	**CLASS 3**	**CLASS 2**	**CLASS 1**
MATURITY LEVEL OF PROJECT DEFINITION DELIVERABLES	**0% to 2%**	**1% to 15%**	**10% to 40%**	**30% to 75%**	**65% to 100%**
General Project Data:					
Project Scope Description	Preliminary	Preliminary	Defined	Defined	Defined
Voltage (kV) and Circuits	Preliminary	Preliminary	Defined	Defined	Defined
Routing	Preliminary	Preliminary	Defined	Defined	Defined
System/Grid Planning including Substation and Interconnect Locations	Preliminary	Preliminary	Defined	Defined	Defined
Right-of Way (ROW) Strategy	Preliminary	Preliminary	Defined	Defined	Defined
Soils, Hydrology, Meteorology, and Oceanographic Studies	Not Required	Preliminary	Defined	Defined	Defined
Integrated Project Plan	Not Required	Preliminary	Defined	Defined	Defined
Stakeholder Management Plan	Not Required	Preliminary	Defined	Defined	Defined
Stakeholder Consultation/Requirements	Not Required	Preliminary	Defined	Defined	Defined
Project Master Schedule	Not Required	Preliminary	Defined	Defined	Defined
Escalation Strategy	Not Required	Preliminary	Defined	Defined	Defined
Work Breakdown Structure	Not Required	Preliminary	Defined	Defined	Defined
Project Code of Accounts	Not Required	Preliminary	Defined	Defined	Defined
Procurement/Contracting Strategy	Not Required	Preliminary	Defined	Defined	Defined
Technical and ROW Deliverables:					
Route Mapping/Survey/Topography/Bathymetry	S/P	P/C	C	C	C
Tower/Structure Location/Spotting	NR	S/P	P	C	C
Land/ROW Title Negotiation	NR	S/P	P/C	C	C
Conductor, Insulator, Grounding, Joint Design (including protection for buried or subsea)	S	P	C	C	C
Foundation/Structure (Tower) Design	S	P	C	C	C
Foundation/Structure (Tower) Discipline Drawings	NR	S/P	P	C	C
Crossings and Borings Design and Drawings	NR	S/P	P	C	C
Civil/Site Preparation/Access Road Discipline Drawings	NR	S/P	P	C	C
Substation Interface Design	NR	S/P	P	C	C
Specifications and Datasheets	NR	S	P	C	C

Table 3 – Estimate Input Checklist and Maturity Matrix (Primary Classification Determinate)

BASIS OF ESTIMATE DOCUMENTATION

The basis of estimate (BOE) typically accompanies the cost estimate. The basis of estimate is a document that describes how an estimate is prepared and defines the information used in support of development. A basis document commonly includes, but is not limited to, a description of the scope included, methodologies used, references and defining deliverables used, assumptions and exclusions made, clarifications, adjustments, and some indication of the level of uncertainty.

The BOE is, in some ways, just as important as the estimate since it documents the scope and assumptions; and provides a level of confidence to the estimate. The estimate is incomplete without a well-documented basis of estimate. See AACE Recommended Practice 34R-05 *Basis of Estimate* for more information [10].

PROJECT DEFINITION RATING SYSTEM

An additional step in documenting the maturity level of project definition is to develop a project definition rating system. This is another tool for measuring the completeness of project scope definition. Such a system typically provides a checklist of scope definition elements and a scoring rubric to measure maturity or completeness for each element. A better project definition rating score is typically associated with a better probability of achieving project success.

Such a tool should be used in conjunction with the AACE estimate classification system; it does not replace estimate classification. A key difference is that a project definition rating measures overall maturity across a broad set of project definition elements, but it usually does not ensure completeness of the key project definition deliverables required to meet a specific class of estimate. For example, a good project definition rating may sometimes be achieved by progressing on additional project definition deliverables, but without achieving signoff or completion of a key deliverable.

AACE estimate classification is based on ensuring that key project deliverables have been completed or met the required level of maturity. If a key deliverable that is indicated as needing to be complete for Class 3 (as an example) has not actually been completed, then the estimate cannot be regarded as Class 3 regardless of the maturity or progress on other project definition elements.

An example of a project definition rating system is the *Project Definition Rating Index* developed by the Construction Industry Institute. It has developed several indices for specific industries, such as IR113-2 [12] for the process industry and IR115-2 [11] for the building industry. Similar systems have been developed by the US Department of Energy [13].

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7. J. K. Hollmann, Project Risk Quantification, Sugarland, TX: Probabilistic Publishing, 2016.
8. AACE International Recommended Practice No. 104R-19, Understanding Estimate Accuracy, Morgantown, WV: AACE International, Latest revision.
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12. Construction Industry Institute (CII), PDRI: Project Definition Rating Index – Industrial Projects, Version 3.2 (113-2), Austin, TX, December 1, 2009.
13. U.S. Department of Energy (DOE), *Project Definition Rating Index Guide for Traditional Nuclear and Non-Nuclear Construction Projects*, DOE G 413.3-12, July 22, 2010.

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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.	)))))))	WILLIAMS SOLAR, LLC'S RESPONSES TO DUKE ENERGY PROGRESS, LLC'S FIRST DATA REQUEST TO WILLIAMS SOLAR, LLC

Pursuant to the Rules of Practice and Procedure of the North Carolina Utilities Commission ("Commission"), Williams Solar, LLC ("Williams Solar") hereby submits this response to Respondent Duke Energy Progress, LLC ("DEP", or "the Company" or "Duke") First Data Request to Williams Solar, LLC.

INTERROGATORIES

1-1. Page 1 of Williams Solar's Complaint states that the grounds for the Complaint include ". . . other violations of statutes and Commission Orders . . ." in addition to alleging that the Company has failed to complete the System Impact Study and Facilities Study delivered to Williams Solar in good faith. However, the Complaint does not identify any other violations of statutes or Commission Orders. Please identify and describe in detail the legal and factual basis for any "other violations of statutes and Commission Orders" that Williams Solar alleges has occurred.

Response:

In this proceeding, Williams Solar is seeking Commission review of whether DEP's cost estimates have been made and provided in good faith. Nevertheless, as recited in the Complaint, DEP refused to study Williams Solar in parallel with the relevant project A. In part because of the foregoing, DEP failed to review the Williams Solar interconnection request within the timelines set forth in the N.C. Interconnection Procedures, or within any reasonable extension of those timelines. DEP also introduced a number of technical barriers relating to the interconnection process that have delayed and prevented

interconnection to its system, including by attempting to alter the applicable ONAN rating for substations in order to avoid DEP's obligations under HB 589. Williams Solar considers these actions to violate DEP's obligations under state law and PURPA.

1-2. Describe in detail Williams Solar's efforts to develop the planned solar generating facility, including dates of significant milestones in the development process, as well as any contracts entered into by or on behalf of Williams Solar. As part of your response, identify all documents evidencing or relating to such development efforts.

Response:

Date	Event/Milestone
8/11/16	Williams Solar, LLC formed with North Carolina Secretary of State ("NCSOS")
8/15/16	CPCN Submitted to NCUC
8/17/16	Pre App submitted to DEP for interconnection information
8/18/16	Lease Agreement fully executed with 2-year development period
8/19/16	Interconnection Request submitted to DEP
8/26/16	Interconnection Request receipt acknowledged by DEP
9/8/16	SISA executed by Williams Solar with no countersignature by DEP
10/25/16	CPCN Order Issued
10/27/16	Notice of Commitment to Sell the Output filed by Williams Solar, LLC
10/28/16	FERC 556 filed with NCUC
03/28/17	Annual registration filed by Williams Solar with NCSOS
03/31/17	Annual certification filed by Williams Solar with NCUC
08/24/17	LEO acknowledgement by DEP of Williams Solar's Notice of Commitment to Sell
1/31/18	Settlement Agreement with Duke executed
04/03/18	Annual registration filed by Williams Solar with NCSOS
04/20/18	Annual certification filed by Williams Solar with NCUC
5/15/18	Mitigations Options "Pass" Notification received from DEP
7/2/18	First lease extension exercised by Williams Solar
1/3/19	Petition for Variance filed with Johnston County by Williams Solar
1/17/19	Memorandum of Lease Recorded with Johnston County
1/28/19	System Impact Study completed by DEP, report received
2/27/19	Johnston County Board of Adjustment Hearing on Local Variance Request resulted in denial decision. Appeal process initiated.
2/27/19	Fully executed FSA received from DEP

03/20/19	Williams Solar, LLC's Petition for *Writ of Certiorari* filed in Johnston County Superior Court
03/22/19	Annual certification filed by Williams Solar with NCUC
04/05/19	Annual registration filed by Williams Solar with NCSOS
6/24/19	Hearing at Johnston County Superior Court for Appeal on Variance
7/1/19	Second lease extension exercised by Williams Solar
7/2/19	Offer to Purchase and Contract with ELA, LLC executed for additional land needed to accommodate Williams Solar and Johnston County Zoning
7/30/19	Facilities Study completed by DEP
7/31/19	Johnston County Superior Court Order on Variance entered (denied)
8/26/19	Construction Planning Meeting with DEP
9/10/19	Notice of Dispute executed by Williams Solar
10/3/19	E911 Address Issued
10/10/19	Interconnection Agreement tendered to Williams Solar
10/24/19	NCUC Complaint filed with Utilities Commission by Williams Solar
12/2/19	First Amendment to extend Offer to Purchase and Contract with ELA, LLC executed
	NCUC denied DEP's motion to dismiss
1/24/20	Amended CPCN Order Issued
04/03/20	Annual registration filed by Williams Solar with NCSOS
04/15/20	Annual certification filed by Williams Solar with NCUC

Williams Solar objects to this request to the extent it seeks identification of documents or data containing privileged attorney-client communications or work product. Williams Solar further objects to this request because identification of "all documents evidencing or relating to" these development efforts would be unduly burdensome and not reasonably calculated to lead to the discovery of admissible evidence having any relevance to this proceeding. Williams Solar further objects to producing documents already in the possession of DEP. Notwithstanding the foregoing objections, Williams Solar identifies the documents referred to in the foregoing table being produced with these responses.

1-3. Describe in detail each of the "multiple technical barriers to entry to its regulated distribution system" alleged by Williams Solar in Paragraph 9 of the Complaint. As part of your response, identify all documents evidencing or relating to such allegations.

Response:

DEP's circuit stiffness test, flicker limit policy, decreased substation capacity using a unilateral change to ONAN limits for DEP substations after HB589, broad introduction of anti-islanding test/screen, elimination of dedicated circuits as GUP, elimination of double-triple circuits as GUP, elimination of single-phase regulators at/near substations to control voltage as GUP, and introduction of the Method of Service Guidelines (which contain a number of new technical requirements, new planning barriers and assumptions, enhanced engineering discretion of study input assumptions, including requirements relating to new LVR policy, new planning limits introduced on distribution and transmission circuits, etc.) all created additional barriers to interconnection that did not previously exist at the time of Williams Solar, LLC's interconnection submission, nor during the period in which DEP should have processed its interconnection studies according to the NCUC interconnection standard applicable at the time. *See, e.g.,* Elk Solar, LLC, Notice of Dispute dated November 29, 2018 to DEP and Public Staff (with detailed recitation of Technical Barriers). All documents evidencing or relating to such allegations are in the possession of DEP.

1-4. Describe in detail the basis for Williams Solar's allegations in Paragraph 17 of the Complaint that DEP "was aware that Williams Solar (like other solar project developers) would use the cost estimate provided at the System Impact Study stage to determine whether to proceed with project analysis and thereby incur additional costs." As part of your response, identify all documents evidencing or relating to such allegations.

Response:

DEP is well aware that the purpose of the cost estimate provided at the System Impact Stage is to allow the developer to determine whether to proceed with additional project development and analysis, including incurring additional development costs at risk prior to receipt of its interconnection agreement and power purchase agreement from DEP. As DEP stated in the transmittal e-mail for the System Impact Study estimate provided to Williams Solar:

> 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.

Any other documents evidencing or relating to DEP's awareness of the purpose of the cost estimate provided at the System Impact Study stage are in the possession of DEP.

1-5. Provide a timeline and describe in detail all material development costs (exceeding $5,000) incurred by or on behalf of Williams Solar in furtherance of development of the proposed generating facility. Williams Solar's response should describe (i) the development cost incurred, (ii) the date of incurrence, (iii) identify the entity that incurred the costs, and (iv) to whom the costs were paid. As part of your response, please identify the total development costs incurred through the date Williams Solar filed the Complaint.

Response:

See response to request 1-2 for a project development timeline. Total costs incurred through 10/24/2019 were $103,995.52. Further responding, Williams Solar incurred the following costs exceeding $5,000:

Cost	Purpose	Date	Payee
$25,000.00	DEP IR Study Deposit	9/8/2016	DEP
$6,248.00	Permitting and zoning	4/4/2019	Fox Rothschild LLP
$13,500.00	Site control	6/27/2019	ELA, LLC
$18,861.11	Permitting and zoning	7/22/2019	Fox Rothschild LLP
$13,250.00	Site control	12/14/2019	ELA LLC
$13,250.00	Site control	1/14/2020	ELA LLC
$7,510.00	Interconnection legal expense	11/15/2019	Brooks Pierce LLP
$7,000.00	Interconnection legal expense	1/20/2020	Brooks Pierce LLP
+$5000 each	Interconnection legal expenses (continuing)	Ongoing	Brooks Pierce LLP

In addition, as explained in response to interrogatory 1-6, in furtherance of this project, Williams Solar entered into an option to acquire real estate which contemplates substantial additional investment and which Williams Solar regards as part of the overall non-ITC tax eligible project costs based on the assumptions of the initial estimate provided by DEP. Finally, there are also certain costs that have not been accounted for in the above summary, including supply, contracting, legal and financing costs that have been shared among multiple projects, a portion of which are attributable to Williams Solar. To the extent Williams Solar

determines these costs exceed $5,000, Williams Solar will supplement this response.

1-6. To the extent not clearly provided in response to Interrogatory 1-5, provide a timeline and describe in detail all development costs supporting Williams Solar's allegation in Paragraph 20 of the Complaint that "Williams Solar invested over $100,000 in development costs since receipt of the SIS Report." Williams Solar's response should describe (i) the development cost incurred, (ii) the date of incurrence, (iii) identify the entity that incurred the costs, and (iv) to whom the costs were paid. As part of your response, identify all documents evidencing or relating to such allegations.

Response:

See response to Interrogatory 1-5. Between the issuance of the SIS report and the filing of the Complaint, Williams Solar paid $63,174.36 in costs, as shown in the following table:

Cost	Purpose	Date	Payee
$1,137.50	Site control	2/27/2019	Kirkland Appraisals, LLC
$3,914.00	Permitting and zoning	3/2/2019	Fox Rothschild LLP
$1,137.50	Permitting and zoning	3/4/2019	Chris Sandifer
$46.00	Permitting and zoning	3/4/2019	Chris Sandifer
$6,248.00	Permitting and zoning	4/4/2019	Fox Rothschild LLP
$1,349.27	Permitting and zoning	5/6/2019	Fox Rothschild LLP
$500.00	Permitting and zoning	5/10/2019	ARC Design & Consulting LLC
$297.50	Site control	5/12/2019	Smithson Mills, Inc.
$40.00	Site control	5/30/2019	Hedrick Murray Bryson Kennett & Mauch PLLC

$999.62	Site control	6/3/2019	Smithson Mills, Inc.
$3,018.61	Permitting and zoning	6/12/2019	Fox Rothschild LLP
$13,500.00	Site control	6/27/2019	ELA, LLC
$164.69	Site control	7/1/2019	Smithson Mills, Inc.
$5,000.00	Site control	7/4/2019	Carol W. Williams & Joyce W. Burchette
$18,861.11	Permitting and zoning	7/22/2019	Fox Rothschild LLP
$114.30	Administrative	8/1/2019	CSC
$187.26	Permitting and zoning	8/15/2019	Fox Rothschild LLP
$1,659.00	Interconnection legal expense	10/14/2019	Brooks Pierce
$5,000.00	Site control	10/15/2019	ELA, LLC

In addition, to date Williams Solar has paid $45,000 to acquire and extend an option to purchase an interest in additional real estate necessary to support the solar power plant planned capacity. This interest, which was obtained in July 2019 after receipt of the initial cost estimates, is viewed by Williams Solar as part of the overall project development costs based on the assumptions of the initial estimate provided by DEP and would require an additional investment by Williams Solar of **[BEGIN CONFIDENTIAL]** [redacted] **[END CONFIDENTIAL]**. This additional investment was premised on the presumed good faith of the information provided by DEP upon tender of the system impact study results. If Williams Solar had been aware that the actual reasonable interconnection costs would be more than 80% higher than those first estimated by DEP in the SIS, Williams Solar would not have proceeded with this additional investment. In this regard, the allegation in Paragraph 20 of the Complaint regarding the total amount of investment since receipt of the SIS Report was made in anticipation of the total project costs necessary to construct the project, including the costs of acquiring the additional real estate.

Williams Solar objects to this request to the extent it seeks identification of documents or data containing privileged attorney-client communications or work product. Williams Solar further objects to this request because identification of "all documents evidencing or relating to" these transactions would be unduly burdensome and not reasonably calculated to lead to the discovery of admissible evidence having any relevance to this proceeding. Notwithstanding the foregoing objections, Williams Solar identifies the invoices, contracts, or other billing statements relating to the costs identified in the foregoing table, which are being produced with these responses, along with a table summarizing all expenses.

1-7. Please explain in detail and provide the entire basis for Williams Solar's allegations in Paragraph 34 of the Complaint that "Based on the substantial increase in the estimated system upgrade costs as tendered in the Facilities Study report, the Williams Solar project has now become uneconomical." As part of your response, identify all documents evidencing or relating to such allegations.

Response:

Williams Solar is a project within a portfolio of 2 to 5 MWac projects under development by GreenGo Energy US, Inc., that has qualified for a standard offer contract, protection under House Bill 589 and the Settlement Agreement entered with DEP and filed with the NCUC. GreenGo is responsible for determining whether the projects it develops are commercially viable. In connection with this, GreenGo is charged with evaluating and procuring sites for solar projects, obtaining all necessary governmental authorizations, zoning, engineering, procurement, construction of the facilities, and achieving interconnection with the incumbent electric utility.

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. By its statement that the unexplained and

unanticipated substantial increase in project costs has rendered the project "uneconomical," Williams Solar intended to convey that its project assumptions did not contemplate a near doubling of upgrade and interconnection costs (already significantly higher than other DEP projects) and that if it had been aware that the costs would be, in actuality, at least 80% higher than those quoted by DEP, it would not have elected to proceed with the project as originally planned.

In support of this position, as of January 28, 2019, the initial projected interconnection and upgrade cost of the Williams Solar project of $834,000 (upgrade costs of $774,000 and interconnection facility costs of $60,000) was the highest estimated cost GreenGo had received for any project by over $200,000. Additionally, GreenGo updates and tracks its average costs ongoing (upgrade and interconnection facilities) for the DEP portfolio noting its general average per DEP project interconnection cost that reached interconnection agreement stage at $287,878. Despite the unusually high initial cost estimate at the SIS conclusion —which GreenGo assumed to be a good faith estimate— GreenGo determined that it could proceed with the Williams Solar project but that it was a marginal project based on those estimates. However, the Facility Study estimate included upgrade costs of approximately $1.4 million, with total estimated costs of nearly $1.6 million. Based on these increased costs, GreenGo determined that the project was not economically practical. On its face, those revised costs substantially exceeded GreenGo's expected average costs for DEP projects.

Additionally, based on GreenGo's experience and assumptions, federal investment tax credit ("ITC") eligible capital expenses typically run approximately $1 million to $1.5 million per megawatt DC of a proposed solar generation facility in North Carolina assuming variances in prices due to racking, civil and subsurface variations, etc. This translates to approximately $7 million to $10.5 million in ITC eligible costs for a 5 MW_{AC} facility (approximately 7 MW_{DC}). A rule of thumb used by GreenGo in analyzing solar development costs is that if a project's non-eligible expenses exceed 15% of the tax eligible expenses, that is indicia that the project may be uneconomical. Thus, a 5 MW_{AC} project like Williams Solar may be considered economical when non-tax eligible costs—which include interconnection costs, land acquisition costs, ROW costs and network upgrade costs—are less than approximately $1 million, but are generally considered uneconomical when such costs exceed approximately $1.5 million per 5MWac project. Using this rule of thumb, the interconnection and upgrade costs (alone) of nearly $1.6

million estimated for Williams Solar, by themselves, render the Williams Solar project uneconomical.

Williams Solar objects to this request to the extent it seeks identification of documents or data containing privileged attorney-client communications or work product. Williams Solar further objects to this request because identification of "all documents evidencing or relating to" the substantial increase in estimated upgrade costs would be unduly burdensome and not reasonably calculated to lead to the discovery of admissible evidence having any relevance to this proceeding.

1-8. Please explain in detail and provide the entire basis for Williams Solar's asserted "information and belief" in Paragraph 37 of the Complaint that ". . . given the proximity in time and disparity in amount of the estimates, Respondent's initial estimate of the cost of upgrades and its later estimated installed cost could not both have been made in good faith." As part of your response, identify all documents evidencing or relating to such allegations.

Response:

It is public record that DEP has significant experience providing cost estimates for solar facilities, as it had interconnected over 3,000 MW of solar capacity in its service territory, including over 140 MW of utility-owned solar generation facilities. See Duke Energy Progress 2019 Integrated Resource Plan Update, p. 43, filed in Docket No. E-100, Sub 157 on September 3, 2019. DEP has repeatedly touted this experience, *see, e.g.*, DEP's October 2, 2019 NOD Response, implying that it has special experience and expertise with solar interconnection. Based on this extensive experience, DEP presumably would be in the best position to accurately estimate interconnection costs.

No caveats were provided regarding the bona fides or legitimacy of the initial cost estimates received after the SIS was completed, nor did DEP indicate that it believed its initial cost estimates understated actual costs likely to be required with the facility study results. And those estimates at the SIS conclusion, albeit on the high end, were near the top range of estimated costs anticipated for the upgrades identified. Yet, the estimate for Williams Solar's upgrade costs after facility study completion nearly doubled in just six months. There are no project- or site-specific details that would reasonably cause the facilities study estimate to be substantially higher than the SIS estimate based on engineering considerations and the fact that no additional equipment or

scope of work was triggered. Rather, it appeared that the increased estimate was due to either (1) increased costs (labor, materials, etc.) that DEP knew, or should reasonably have known, about in December 2018—suggesting that DEP intentionally understated the interconnection costs at the SIS stage to create a "low-ball" estimate, and/or (2) the increased costs (labor, materials, overheads, contingency, etc.) relied upon in creating the facilities study estimate were intentionally overstated (or both).

Williams Solar objects to this request to the extent it seeks identification of documents or data containing privileged attorney-client communications or work product. Williams Solar further objects to this request because identification of "all documents evidencing or relating to" the substantial increase in estimated upgrade costs would be unduly burdensome and not reasonably calculated to lead to the discovery of admissible evidence having any relevance to this proceeding. Subject to and without waiver of these objections, Williams Solar identifies all documents produced by DEP in response to Williams Solar's data requests.

1-9. Please explain in detail and provide the entire basis for Williams Solar's allegations on pages 2-3 of Complainant's Reply and Motion to Dismiss that "DEP has a substantial incentive to delay interconnection and to make [interconnection] as expensive as possible for solar developers." As part of your response, identify all documents evidencing or relating to such allegations.

Response:

DEP, as the incumbent monopoly electric utility, is incentivized to (1) increase its rate base to maximize recovery from ratepayers and (2) sell as much electricity from DEP's own generation to maximize revenue. PURPA and North Carolina's implementing laws and rules require DEP to purchase electricity from qualified facilities, which has the effect of (1) decreasing the amount of generation assets DEP can build and deploy (thus decreasing DEP's rate base) and (2) decreasing the amount of electricity produced and sold from DEP's own generation assets. Thus, qualified facilities are a potential threat to DEP's profits, and DEP is incentivized to oppose and delay interconnection of qualified facilities.

In DEP's pending rate case, its witness Robert B. Hevert, spent significant effort describing the "competitive threat" DEP faces from complying with its obligations under PURPA, as identified by credit

rating agencies, including "'two specific challenges distributed solar generation creates for utilities: lost sales volume and a "foregone" need for new capacity.'" Corrected Direct Testimony of Robert B. Hevert, pp. 47-50 (quoting Copley, Michael, "Despite distributed generation's buzz, grid power 'here to stay,' Bernstein says," SNL Financial, July 21, 2014), available at https://starw1.ncuc.net/NCUC/ViewFile.aspx?Id=016332b2-e48f-4fc9-b624-61fc91660119. DEP's parent company also recognizes

> Federal and state regulations, laws and other efforts designed to promote and expand the use of . . . distributed generation technologies, such as private solar and battery storage, in Duke Energy service territories could result in customers leaving the electric distribution system, excess generation resources as well as stranded costs[.]

Duke Energy 2019 Annual Report and Form 10-K at p. 27, available at https://www.duke-energy.com/annual-report/_/media/pdfs/our-company/investors/de-annual-reports/2019/2019-duke-energy-annual-report.pdf.

Furthermore, House Bill 589 allows DEP to compete and satisfy up to 30 percent of its CPRE procurement volume through the utility's own development of renewable energy facilities. However, the total amount of CPRE procurement volume can be reduced by the amount of non-CPRE development, resulting in direct competition between DEP and non-CPRE projects for renewable energy development megawatts.

Williams Solar objects to this request to the extent it seeks identification of documents or data containing privileged attorney-client communications or work product. Williams Solar further objects to this request because identification of "all documents evidencing or relating to" the allegations would be unduly burdensome and not reasonably calculated to lead to the discovery of admissible evidence having any relevance to this proceeding.

DOCUMENT REQUESTS

1-1. Produce all documents and data identified in response to the foregoing Set 1 interrogatories.

Response:

Williams Solar will produce the responsive documents, except to the extent they have been publicly filed with the Utilities Commission or they have been produced by DEP in this proceeding.

1-2. Produce all documents and data (including, without limitation, communications, reports, and presentations) relied upon by Williams Solar evidencing, reflecting, or discussing the allegations referred to in Williams Solar's Complaint.

Response:

Williams Solar objects to this request to the extent it seeks identification or production of documents or data containing privileged attorney-client communications or work product. Without waiving the foregoing objections, Williams Solar will produce responsive, non-privileged documents, except to the extent they have been publicly filed with the Utilities Commission or they have been produced by DEP in this proceeding.

1-3. Produce all documents and data (including, without limitation, communications, reports, and presentations) that Williams Solar intends to reference or rely upon in testimony or at the evidentiary hearing in this proceeding.

Response:

Williams Solar objects to this request to the extent it seeks identification or production of documents or data containing privileged attorney-client communications or work product. Williams Solar also objects to this request as premature. Williams Solar will provide documents and data it intends to use as exhibits prior to the evidentiary hearing.

1-4. For the period October, 2016 to present, please identify and produce all documents developed by or in the possession of Williams Solar or GreenGo concerning projections of, or reporting of, development costs,

interconnection costs, margins, profits, rate of return, internal rate of return, or return on equity of relating to development of the proposed generating facility.

Response:

Williams Solar objects to this request to the extent it seeks identification or production of documents or data containing privileged attorney-client communications or work product. Williams Solar further objects to the production of documents "concerning projections of, or reporting of, development costs, interconnection costs, margins, profits, rate of return, internal rate of return, or return on equity of relating to development of the proposed generating facility." The information sought is not relevant to any claim or defense presented in this case, and the request therefore is not reasonably calculated to lead to the discovery of admissible evidence. This case is concerned with the estimating methodologies used by DEP and whether the estimates provided to Williams Solar were made in good faith. The particulars of Williams Solar's financial data have no bearing on that question.

1-5. Produce any documents that support Williams Solar's allegations in Paragraph 34 of the Complaint that "Based on the substantial increase in the estimated system upgrade costs as tendered in the Facilities Study report, the Williams Solar project has now become uneconomical."

Response:

Williams Solar objects to this request to the extent it seeks identification or production of documents or data containing privileged attorney-client communications or work product. Williams Solar further objects to the extent that DEP seeks documents or data describing the finances of Williams Solar. As discussed in response to request 1-4, the particulars of Williams Solar's financial data is not relevant to any claim or defense presented in this action, nor is Williams Solar's decision-making process using that data.

Dated: April 15, 2020.

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Attorneys for Williams Solar, LLC

CERTIFICATE OF SERVICE

The undersigned, of the law firm Brooks, Pierce, McLendon, Humphrey & Leonard, L.L.P., hereby certifies that he has served a copy of the foregoing RESPONSES TO DUKE ENERGY PROGRESS, LLC'S FIRST DATA REQUEST TO WILLIAMS SOLAR, LLC via electronic mail to:

Jack E. Jirak
Associate General Counsel
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Raleigh, North Carolina 27602
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E. Brett Breitschwerdt
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This the 15th day of April, 2020.

Marcus W. Trathen

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.	)))))))	WILLIAMS SOLAR, LLC'S SUPPLEMENTAL RESPONSES TO DUKE ENERGY PROGRESS, LLC'S FIRST DATA REQUEST TO WILLIAMS SOLAR, LLC

Pursuant to the Rules of Practice and Procedure of the North Carolina Utilities Commission ("Commission"), Williams Solar, LLC ("Williams Solar") hereby submits this supplemental response to Respondent Duke Energy Progress, LLC ("DEP", or "the Company" or "Duke") First Data Request to Williams Solar, LLC.

INTERROGATORIES

Williams Solar supplements each of its responses to state that Jonathan Burke of GreenGo Energy US, Inc. sponsors each of Williams Solar's responses.

1-6. To the extent not clearly provided in response to Interrogatory 1-5, provide a timeline and describe in detail all development costs supporting Williams Solar's allegation in Paragraph 20 of the Complaint that "Williams Solar invested over $100,000 in development costs since receipt of the SIS Report." Williams Solar's response should describe (i) the development cost incurred, (ii) the date of incurrence, (iii) identify the entity that incurred the costs, and (iv) to whom the costs were paid. As part of your response, identify all documents evidencing or relating to such allegations.

Response:

See response to Interrogatory 1-5. Between the issuance of the SIS report and the filing of the Complaint, Williams Solar paid $63,174.36 in costs, as shown in the following table:

Cost	Purpose	Date	Payee
$1,137.50	Site control	2/27/2019	Kirkland Appraisals, LLC
$3,914.00	Permitting and zoning	3/2/2019	Fox Rothschild LLP
$1,137.50	Permitting and zoning	3/4/2019	Chris Sandifer
$46.00	Permitting and zoning	3/4/2019	Chris Sandifer
$6,248.00	Permitting and zoning	4/4/2019	Fox Rothschild LLP
$1,349.27	Permitting and zoning	5/6/2019	Fox Rothschild LLP
$500.00	Permitting and zoning	5/10/2019	ARC Design & Consulting LLC
$297.50	Site control	5/12/2019	Smithson Mills, Inc.
$40.00	Site control	5/30/2019	Hedrick Murray Bryson Kennett & Mauch PLLC
$999.62	Site control	6/3/2019	Smithson Mills, Inc.
$3,018.61	Permitting and zoning	6/12/2019	Fox Rothschild LLP
$13,500.00	Site control	6/27/2019	ELA, LLC
$164.69	Site control	7/1/2019	Smithson Mills, Inc.
$5,000.00	Site control	7/4/2019	Carol W. Williams & Joyce W. Burchette
$18,861.11	Permitting and zoning	7/22/2019	Fox Rothschild LLP
$114.30	Administrative	8/1/2019	CSC
$187.26	Permitting and zoning	8/15/2019	Fox Rothschild LLP

$1,659.00	Interconnection legal expense	10/14/2019	Brooks Pierce
$5,000.00	Site control	10/15/2019	ELA, LLC

In addition, to date Williams Solar has paid $45,000 to acquire and extend an option to purchase an interest in additional real estate necessary to support the solar power plant planned capacity. This interest, which was obtained in July 2019 after receipt of the initial cost estimates, is viewed by Williams Solar as part of the overall project development costs based on the assumptions of the initial estimate provided by DEP and would require an additional investment by Williams Solar of **[BEGIN CONFIDENTIAL]** [redacted] **[END CONFIDENTIAL]**. This additional investment was premised on the presumed good faith of the information provided by DEP upon tender of the system impact study results. If Williams Solar had been aware that the actual reasonable interconnection costs would be more than 80% higher than those first estimated by DEP in the SIS, Williams Solar would not have proceeded with this additional investment. In this regard, the allegation in Paragraph 20 of the Complaint regarding the total amount of investment since receipt of the SIS Report was made in anticipation of the total project costs necessary to construct the project, including the costs of acquiring the additional real estate.

Williams Solar objects to this request to the extent it seeks identification of documents or data containing privileged attorney-client communications or work product. Williams Solar further objects to this request because identification of "all documents evidencing or relating to" these transactions would be unduly burdensome and not reasonably calculated to lead to the discovery of admissible evidence having any relevance to this proceeding. Notwithstanding the foregoing objections, Williams Solar identifies the invoices, contracts, or other billing statements relating to the costs identified in the foregoing table, which are being produced with these responses, along with a table summarizing all expenses.

Supplemental Response:

Williams Solar supplements this response to clarify that to date it has paid a total of $45,000 to ELA, LLC to acquire and extend an option to purchase an interest in additional real estate necessary to support the solar power plant planned capacity. As reflected in its initial response to Interrogatory 1-6, $18,500 of

this total was paid prior to the filing of the Complaint in this matter. As reflected in Williams Solar's initial response to Interrogatory 1-5, an additional $26,500 was paid to extend the option after the filing of the Complaint in this matter.

Williams Solar further supplements this response to clarify that the purchase of the additional real estate will cost [BEGIN CONFIDENTIAL] [redacted] [END CONFIDENTIAL] beyond what Williams Solar has already spent to acquire and extend the option to purchase the additional real estate.

DOCUMENT REQUESTS

1-4. For the period October, 2016 to present, please identify and produce all documents developed by or in the possession of Williams Solar or GreenGo concerning projections of, or reporting of, development costs, interconnection costs, margins, profits, rate of return, internal rate of return, or return on equity of relating to development of the proposed generating facility.

Response:

Williams Solar objects to this request to the extent it seeks identification or production of documents or data containing privileged attorney-client communications or work product. Williams Solar further objects to the production of documents "concerning projections of, or reporting of, development costs, interconnection costs, margins, profits, rate of return, internal rate of return, or return on equity of relating to development of the proposed generating facility." The information sought is not relevant to any claim or defense presented in this case, and the request therefore is not reasonably calculated to lead to the discovery of admissible evidence. This case is concerned with the estimating methodologies used by DEP and whether the estimates provided to Williams Solar were made in good faith. The particulars of Williams Solar's financial data have no bearing on that question.

Supplemental Response:

Williams Solar confirms that it has not located any additional responsive documents, other than those it has already produced (see, e.g., WS_96-332 and WS_471-475; Filed Testimony of Jonathan Burke).

1-5. Produce any documents that support Williams Solar's allegations in Paragraph 34 of the Complaint that "Based on the substantial increase in the estimated system upgrade costs as tendered in the Facilities Study report, the Williams Solar project has now become uneconomical."

Response:

Williams Solar objects to this request to the extent it seeks identification or production of documents or data containing privileged attorney-client communications or work product. Williams Solar further objects to the extent that DEP seeks documents or data describing the finances of Williams Solar. As discussed in response to request 1-4, the particulars of Williams Solar's financial data is not relevant to any claim or defense presented in this action, nor is Williams Solar's decision-making process using that data.

Supplemental Response:

Williams Solar confirms that it has not located any additional responsive documents, other than those it has already produced (see, e.g., WS_96-332 and WS_471-475; Filed Testimony of Jonathan Burke).

Dated: May 4, 2020.

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Attorneys for Williams Solar, LLC

CERTIFICATE OF SERVICE

The undersigned, of the law firm Brooks, Pierce, McLendon, Humphrey & Leonard, L.L.P., hereby certifies that he has served a copy of the foregoing RESPONSES TO DUKE ENERGY PROGRESS, LLC'S FIRST DATA REQUEST TO WILLIAMS SOLAR, LLC via electronic mail to:

Jack E. Jirak
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This the 4th day of May, 2020.

Marcus W. Trathen

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.	)))))))	WILLIAMS SOLAR, LLC'S RESPONSES TO DUKE ENERGY PROGRESS, LLC'S SECOND DATA REQUEST TO WILLIAMS SOLAR, LLC

Pursuant to the Rules of Practice and Procedure of the North Carolina Utilities Commission ("Commission"), Williams Solar, LLC ("Williams Solar") hereby submits this response to Respondent Duke Energy Progress, LLC ("DEP", or "the Company" or "Duke") Second Data Request to Williams Solar, LLC:

INITIAL OBJECTIONS

As more specifically detailed below, Williams Solar objects to each Request in this Second Data Request as unduly burdensome and otherwise beyond the scope of discovery in this proceeding.

In its Order Scheduling Hearing issued January 24, 2020, the Commission set this matter for hearing, requiring the pre-filing of direct and rebuttal testimony, but not specifically addressing the conduct of discovery between the parties. The discovery that has been undertaken by the parties to date has been undertaken in a cooperative fashion, generally following the Rules of Civil Procedure.

Prior to Williams Solar filing its initial testimony, the parties neither discussed nor agreed to discovery on witness testimony. In fact, Williams Solar submitted a consent request for modification of the procedural schedule which would have converted this proceeding to a "paper" proceeding, with the simultaneous filing of affidavits, without any provision for discovery on those affidavits. *See* Complainant's Consent Request for Approval of Revised Procedural Schedule, filed April 14, 2020. Williams Solar subsequently submitted a consent alternative request proposing the extension of the then-existing pre-filed testimony deadlines. *See* Alternative Request for Extension of Time, filed April 15, 2020. Neither request contemplated conducting discovery on the submissions of the parties, and the Commission's Order

Granting Request for Extension of Time did not so provide. Furthermore, by e-mail on April 27, 2020, counsel for DEP argued that "DEP should not be unfairly prejudiced by having to file a Motion to Compel close in time to when our testimony is due." By all appearances, DEP was acknowledging the fact that the parties had not discussed or contemplated further discovery relating to testimony and were seeking to avoid discovery issues during the period "close in time" to when the parties' pre-filed testimony was due.

The current procedural schedule, mutually agreed by the parties, provides only seven days between DEP's submission and the deadline for submission of rebuttal testimony—insufficient time for DEP to provide substantive responses to any questions Williams Solar may have or for Williams Solar to review such responses and formulate rebuttal testimony. In this light, DEP is seeking, through self-help, to create an imbalance in discovery rights—arrogating to itself the ability to conduct discovery on Williams Solar's witnesses while not allowing the same rights for William Solar. If DEP had contemplated the need to conduct discovery on witness testimony, it should have discussed this with Williams Solar before the procedural schedule was fixed.

Moreover, Williams Solar objects to each request as unduly burdensome and not designed to discover admissible evidence. The issue in this case concerns the estimates **prepared by DEP** and provided by DEP to Williams Solar. In this regard, DEP is in sole possession of the information that is relevant to resolution of the complaint. While purporting to give Williams Solar just seven days to respond, DEP has served more than twice the number of interrogatories it served in its first set of requests. Adding to the burden, these requests are not remotely aimed at the question presented in this proceeding—whether DEP's Initial and Revised Estimates of system upgrade costs were reasonable and were provided to Williams Solar in good faith. Rather, DEP's new requests appear interested in questioning the reasonableness of Williams Solar's decision to rely on DEP's estimates in deciding to move forward with the Williams Solar project, a matter which is subject to cross-examination at the hearing.

INTERROGATORIES

Questions related to the Direct Testimony of Jonathan Burke

2-1 On page 1, Lines 18-20, Mr. Burke testifies that "In North Carolina, GreenGo is pursuing development of a portfolio of 2 to 5 MWAC projects . . ." Please identify (i) the number of Interconnection Requests and aggregate capacity (MWac) that GreenGo or affiliated entities have submitted to DEP since GreenGo's formation in 2016; and (i) the number

of Interconnection Requests and aggregate capacity (MWac) of GreenGo-affiliated Interconnection Customers in DEP that are either still under development and pending interconnection or installed and operating today.

Response:

Williams Solar incorporates by reference its Initial Objections. Williams Solar further objects to this Request as unduly burdensome and not reasonably calculated to lead to the discovery of admissible information because, among other reasons:

a) It purports to require Williams Solar to respond within seven days to a request that DEP failed to make earlier in this proceeding, when Williams Solar might have had reasonable time to respond. Specifically, GreenGo's portfolio was described in substantially the same terms in Williams Solar's April 15, 2020 discovery responses, *see* Response 1-7, but DEP did not seek additional information until April 30, 2020;
b) It seeks information about legally distinct companies and projects that are not parties to this proceeding; and
c) It seeks information that, by definition, is in the possession of DEP.

2-2 On Pg. 7, Lines 12-14, Mr. Burke states that the "reconductoring cost of $705,000 for approximately 2.5 miles of distribution line was higher than expected." Describe in detail any facts and identify any documents on which Mr. Burke relied in forming this opinion. Please identify any cost estimates received by GreenGo from any other utility or any entity (other than DEP or Duke Energy Carolinas, LLC ("DEC")) for the reconductoring or upgrading of any distribution line to facilitate the interconnection of a solar generating facility, including (1) date on which the estimate was provided, (2) the entity providing the estimate, (3) any written documentation concerning such estimate, (4) the location of such distribution line, (5) a description of the nature of the upgrade or reconductoring, (6) the length of the distribution line to be reconductored or upgraded.

Response:

Williams Solar incorporates by reference its Initial Objections. Williams Solar further objects to this Request as unduly burdensome and not reasonably calculated to lead to the discovery of admissible information because, among other reasons:

a) It purports to require Williams Solar to respond within seven days to a request that DEP failed to make earlier in this proceeding, when Williams Solar might have had reasonable time to respond. Specifically, DEP's estimate was described in substantially the same terms in Williams Solar's April 15, 2020 discovery responses, *see* Response 1-7, but DEP did not seek additional information until April 30, 2020; and
b) It seeks information about legally distinct companies and projects that are not parties to this proceeding.

Williams Solar further objects to the mischaracterization of Mr. Burke's testimony as an "opinion."

Subject to and without waiver of these objections, Mr. Burke's testimony is based on his personal knowledge of the solar industry in North Carolina and this particular project.

2-3 Identify all operational solar generating facilities with a nameplate capacity greater than 1 MW (AC) located outside of DEP's or DEC's service territory in which GreenGo has been involved in the project's development. For each project identified in this response, please identify the 1) facility name or unique identifier; 2) nameplate capacity (MWac) of the facility; 3) jurisdiction where project is located; and 3) utility to which the solar facility is interconnected

Response:

Williams Solar incorporates by reference its Initial Objections. Williams Solar further objects to this Request as unduly burdensome and not reasonably calculated to lead to the discovery of admissible information because, among other reasons:

a) It purports to require Williams Solar to respond within seven days to a request that DEP failed to make earlier in this proceeding, when Williams Solar might have had reasonable time to respond; and
b) It seeks information about legally distinct companies and projects that are not parties to this proceeding.

2-4 For all of the solar generating facilities identified in response to Request 2-3, identify those that are interconnected to the distribution system (*i.e.,* connected at or below 35 kV voltage).

Response:

Williams Solar incorporates by reference its Initial Objections. Williams Solar further objects to this Request as unduly burdensome and not reasonably calculated to lead to the discovery of admissible information because, among other reasons:

a) It purports to require Williams Solar to respond within seven days to a request that DEP failed to make earlier in this proceeding, when Williams Solar might have had reasonable time to respond; and
b) It seeks information about legally distinct companies and projects that are not parties to this proceeding.

2-5 For all of the solar generating facilities identified in the response to Request 2-4, please identify each facility which required reconductoring or upgrading of any distribution line to facilitate the interconnection of such solar generating facility. For each solar generating facility identified in this response, please also provide (1) a description of the nature of the upgrade or reconductoring, (2) the length of distribution line to be reconductored or upgraded to interconnect the facility, (3) the actual cost of such upgrade or reconductoring, (4) the entity responsible for constructing such required upgrade or reconductoring, and (5) the location of such distribution line (jurisdiction or interconnecting utility).

Response:

Williams Solar incorporates by reference its Initial Objections. Williams Solar further objects to this Request as unduly burdensome and not reasonably calculated to lead to the discovery of admissible information because, among other reasons:

a) It purports to require Williams Solar to respond within seven days to a request that DEP failed to make earlier in this proceeding, when Williams Solar might have had reasonable time to respond; and
b) It seeks information about legally distinct companies and projects that are not parties to this proceeding.

2-6 On page 13, Lines 18-22, Mr. Burke describes a "rule of thumb" GreenGo utilizes for assessing the economics of distribution connected solar projects. Specifically, Mr. Burke explains that "a 5 MWAC project like Williams Solar may be considered economical when non-tax eligible costs—which include interconnection costs, land acquisition costs, ROW costs, system upgrades and network upgrade costs—are less than approximately $1 million, but would generally be considered uneconomical when such costs approach $1.5 million or more." Describe in detail the total non-tax eligible costs incurred or projected to be incurred to place Williams Solar into commercial operation, including but not limited to, the categories identified in Mr. Burke's testimony and identify any documents responsive to this request.

Response:

Williams Solar incorporates by reference its Initial Objections. Williams Solar further objects to this Request as unduly burdensome because, among other reasons:

a) It purports to require Williams Solar to respond within seven days to a request that DEP failed to make earlier in this proceeding, when Williams Solar might have had reasonable time to respond. Specifically, GreenGo's "rule of thumb" was described in substantially the same terms in Williams Solar's April 15, 2020 discovery responses, *see* Response 1-7, but DEP did not seek additional information until April 30, 2020.

Subject to and without waiver of these objections, Williams Solar has already provided a complete response to this Request in its Responses to DEP's First Set of Data Requests (e.g., Responses to Interrogatories 1-5, 1-6, 1-7) and the filed testimony of Jonathan Burke.

2-7 In relation to Mr. Burke's testimony on page 13, Lines 18-22 that "a 5 MWAC project like Williams Solar may be considered economical when non-tax eligible costs—which include interconnection costs, land acquisition costs, ROW costs, system upgrades and network upgrade costs—are less than approximately $1 million, but would generally be considered uneconomical when such costs approach $1.5 million or more", please identify whether any other planned distribution-connected solar projects under development by GreenGo in North Carolina were determined to be uneconomical from January 1, 2019, to present. For each project identified in this response, please specifically 1) identify whether GreenGo made the determination to terminate development

and/or withdraw the Interconnection Request due to the level of "non-tax eligible costs" identified through the development process or due to other non-cost factors (or some combination of factors); 2) identify the estimated non-tax eligible costs for each project identified; and 3) where non-cost factors in the development process impacted GreenGo's decision to terminate development and/or withdraw the Interconnection Request, please describe in detail the specific non-cost factors.

Response:

Williams Solar objects to this Request as unduly burdensome and not reasonably calculated to lead to the discovery of admissible information because, among other reasons:

a) It purports to require Williams Solar to respond within seven days to a request that DEP failed to make earlier in this proceeding, when Williams Solar might have had reasonable time to respond. Specifically, GreenGo's "rule of thumb" was described in substantially the same terms in Williams Solar's April 15, 2020 discovery responses, *see* Response 1-7, but DEP did not seek additional information until April 30, 2020; and
b) It seeks information about legally distinct companies and projects that are not parties to this proceeding.

2-8 In relation to Mr. Burke's testimony on page 14, beginning on Line 19, describing the "parcel of land (Property) on which the project would be developed," please provide the following information:
a) The acreage of the Property.
b) Whether GreenGo is currently developing any other 5 MW solar projects in DEP or DEC on acreage less than or equal to the acreage of the Property. If so, please identify the project and the acreage of the other project(s)'s site. If not, please identify the acreage for the two projects currently under development by GreenGo in DEP or DEC that are closest in acreage size to the Property.

Response:

Williams Solar incorporates by reference its Initial Objections. Williams Solar further objects to this Request as unduly burdensome and not reasonably calculated to lead to the discovery of admissible information because, among other reasons:

a) It purports to require Williams Solar to respond within seven days to a request that DEP failed to make earlier in this proceeding, when Williams Solar might have had reasonable time to respond; and
b) It seeks information about legally distinct companies and projects that are not parties to this proceeding.

Subject to and without waiver of these objections, the acreage of the Property is approximately 30 acres.

2-9 Please describe in detail the "special design considerations" for developing Williams Solar on the Property as referenced by Mr. Burke on page 14, Line 20, and how GreenGo factored the irregular shape and size of the property into consideration in pursing development of the Williams Solar project.

Response:

Williams Solar incorporates by reference its Initial Objections. Williams Solar further objects to this Request as unduly burdensome and not reasonably calculated to lead to the discovery of admissible information because, among other reasons:

a) It purports to require Williams Solar to respond within seven days to a request that DEP failed to make earlier in this proceeding, when Williams Solar might have had reasonable time to respond.

2-10 Describe in detail any facts and identify any documents that support Mr. Burke's allegation of "uncontrolled and undocumented allocation of soft costs (overheads and not actuals) by DEP outside of regulatory supervision to improve its profit margin by removing unallocated or "stranded" costs. . ." as stated on page 28, Lines 6-9 of Mr. Burke's testimony. As part of Williams Solar's response to this request, please specifically explain Mr. Burke's use of the terms "profit margin" and "'stranded' costs."

Response:

Williams Solar incorporates by reference its Initial Objections. Williams Solar further objects to this Request as unduly burdensome and not

reasonably calculated to lead to the discovery of admissible information because, among other reasons:

a) It purports to require Williams Solar to respond within seven days to a request that DEP failed to make earlier in this proceeding, when Williams Solar might have had reasonable time to respond.

Subject to and without waiver of these objections, Williams Solar directs DEP to DEP's discovery responses in this matter. Mr. Burke intended the terms "profit margin" and "stranded costs" to have their customary meaning. To the extent DEP requires a further definition of "stranded costs," *see* https://en.wikipedia.org/wiki/Stranded_costs.

2-11 Describe in detail any facts and identify any documents that support Mr. Burke's allegation of "the possibility" of a "discriminatory set of circumstances—cost controls for DEP, but not for its independent power producing competitors . . ." as stated on page 33, Lines 7-11 of Mr. Burke's testimony.

Response:

Williams Solar incorporates by reference its Initial Objections. Williams Solar further objects to this Request as unduly burdensome and not reasonably calculated to lead to the discovery of admissible information because, among other reasons:

a) It purports to require Williams Solar to respond within seven days to a request that DEP failed to make earlier in this proceeding, when Williams Solar might have had reasonable time to respond.

Subject to and without waiver of these objections, Williams Solar directs DEP to DEP's discovery responses in this matter.

2-12 Describe in detail the work performed by Enerlytic Engineering LLC for Williams Solar as identified in the two expense line items dated September 25, 2018, as set forth in Exhibit JB-5. As part of your response, please identify and produce all correspondence or other documents provided by Enerlytic Engineering LLC to Williams Solar relating to the scope of work paid for by Williams Solar through these invoices.

Response:

Williams Solar incorporates by reference its Initial Objections. Williams Solar further objects to this Request as unduly burdensome and not reasonably calculated to lead to the discovery of admissible information because, among other reasons:

a) It purports to require Williams Solar to respond within seven days to a request that DEP failed to make earlier in this proceeding, when Williams Solar might have had reasonable time to respond.

2-13 Describe in detail the work performed by Chris Sandifer for Williams Solar as identified in the expense line items dated March 14. 2019, as set forth in Exhibit JB-5. As part of your response, please identify and produce all correspondence or other documents provided by Chris Sandifer to Williams Solar relating to the scope of work paid for by Williams Solar through these two invoices.

Response:

Williams Solar incorporates by reference its Initial Objections. Williams Solar further objects to this Request as unduly burdensome and not reasonably calculated to lead to the discovery of admissible information because, among other reasons:

a) It purports to require Williams Solar to respond within seven days to a request that DEP failed to make earlier in this proceeding, when Williams Solar might have had reasonable time to respond.

2-14 On page. 27, Lines 20 – 22, Mr. Burke states "…it 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." Please identify and describe in detail the "engineering norms" that Mr. Burke is referencing and identify any documents responsive to this request.

Response:

Williams Solar incorporates by reference its Initial Objections. Williams Solar further objects to this Request as unduly burdensome and not reasonably calculated to lead to the discovery of admissible information because, among other reasons:

a) It purports to require Williams Solar to respond within seven days to a request that DEP failed to make earlier in this proceeding, when Williams Solar might have had reasonable time to respond.

Subject to and without waiver of these objections, Williams Solar directs DEP to the filed testimony of Charles Bolyard and its responses to Interrogatories 2-18 through 2-21 below. This testimony is also based on Mr. Burke's personal knowledge, including his engineering experience and training.

2-15 On page 30, Lines 12-14, Mr. Burke states "…it does concern me in that it suggests that DEP's new estimating process is not grounded in rational risk management nor good utility practice but more akin to DEP profit optimization…" Please identify and describe in detail what is meant by the phrase "rational risk management" as it relates to interconnection cost estimation. Please describe in detail any facts and identify any documents that support Mr. Burke's assertion that "DEP's new estimating process…[is] more akin to DEP profit optimization." Please explain in detail how DEP allegedly maximizes its profit through the interconnection study process.

Response:

Williams Solar incorporates by reference its Initial Objections. Williams Solar further objects to this Request as unduly burdensome and not reasonably calculated to lead to the discovery of admissible information because, among other reasons:

a) It purports to require Williams Solar to respond within seven days to a request that DEP failed to make earlier in this proceeding, when Williams Solar might have had reasonable time to respond.

Subject to and without waiver of these objections, Williams Solar directs DEP to DEP's discovery responses in this matter. 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.

2-16 On page 34, Lines 4 - 5, Mr. Burke states that DEP's cost estimation "does not conform to good utility practice." Please describe in detail any facts and identify any documents that support Mr. Burke's assertion. Please (1) describe in detail the interconnection cost estimation methodology that Mr. Burke believes does constitute good utility practice, (2) identify the particular utilities or other entities that Mr. Burke asserts have implemented interconnection cost estimation methodologies that conform to good utility practice, (3) produce documentation concerning the methodologies identified in subpart (2), and (4) produce interconnection cost estimates received by GreenGo from the utilities or other entities identified in subpart (2).

Response:

Williams Solar incorporates by reference its Initial Objections. Williams Solar further objects to this Request as unduly burdensome and not reasonably calculated to lead to the discovery of admissible information because, among other reasons:

a) It purports to require Williams Solar to respond within seven days to a request that DEP failed to make earlier in this proceeding, when Williams Solar might have had reasonable time to respond.

Subject to and without waiver of these objections, Williams Solar directs DEP to DEP's discovery responses in this matter, to the filed testimony of Charles Bolyard, and to Williams Solar's responses to Interrogatories 2-18 through 2-21 below.

2-17 On page 3 of Exhibit JB-6, Mr. Fred Flagstad refers to a "'rule of thumb'" that the cost for "line upgrades" is "$150-250K per Mile." Please identify in detail the basis for this assertion and provide specific examples where GreenGo has paid for line upgrades to facilitate the interconnection of a solar generating facility and, in each such instance, identify (1) the nature of such line upgrade, (2) the location of such line upgrade, (3) the utility or other entity responsible for such line upgrade, (4) the date when such line upgrade was completed and (4) the actual cost of such line upgrade.

Response:

Williams Solar incorporates by reference its Initial Objections. Williams Solar further objects to this Request as unduly burdensome and not reasonably calculated to lead to the discovery of admissible information because, among other reasons:

a) It purports to require Williams Solar to respond within seven days to a request that DEP failed to make earlier in this proceeding, when Williams Solar might have had reasonable time to respond; and
b) It seeks information about legally distinct companies and projects that are not parties to this proceeding.

Subject to and without waiver of these objections, Williams Solar states that the "basis" for this "rule of thumb" is GreenGo's experience and knowledge of the solar industry in North Carolina.

Questions related to the Direct Testimony of Charles Bolyard

2-18 On page 7, Lines 2-3, Mr. Bolyard states that DEP's "improvements" to the cost estimating process are not consistent with industry practice." In relation to this statement, please (1) describe in detail the interconnection cost estimation methodology that Mr. Bolyard believes constitutes industry practice for conducting generator interconnection studies, (2) identify the particular utilities or other entities that Mr. Bolyard asserts have implemented interconnection cost estimation methodologies that conform with industry practice in conducting generator interconnection studies, and (3) identify and produce documentation concerning the methodologies identified in subpart (2).

Response:

Williams Solar incorporates by reference its Initial Objections. Williams Solar further objects to this Request because it assumes, without basis, that the methodology for estimating costs on a generator interconnection construction project is materially different than the methodology for estimating costs on other construction projects. Williams Solar further objects to this Request because it seeks confidential business information about other generator interconnection studies to which Mr. Bolyard does not, and would not, have access.

Subject to, and without waiver of, the foregoing specific and general objections, Williams Solar responds as follows:

The basic components and methodology for construction cost estimating are consistent across industries. *See, e.g.*, TOTAL COST MANAGEMENT (TCM) FRAMEWORK, Second Edition (published by AACE International); THE SKILLS AND KNOWLEDGE OF COST ENGINEERING, Sixth Edition 2015 (published by AACE International). Of course, each project is different,

and the construction estimating process for each project must take account of the specifics of the project and any regulatory requirements that might affect the development of the cost estimate.

In general, however, in order to prepare a cost estimate, a cost estimator will first identify the location of the work and assess the level of definition (design development) available through which to ascertain the scope of work to be constructed. The cost estimator will set up a work breakdown structure that will guide the categorizing of quantities of work to be accomplished and costs associated with various aspects of the project.

If necessary, the cost estimator may choose to visit the site of the work to evaluate access, potential restrictions for mobilization of materials and equipment, special circumstances related to right of entry or right of way or easements, availability of space for marshaling of materials and equipment, features of the site related to safe working conditions, and any circumstances potentially arising from the noise of construction or environmental concerns that could impact the progress of the work and the cost of the project.

The cost estimator will then determine the measurement and counts of materials (materials quantity takeoffs) and work activities to be performed, which form the basis for the estimate of costs for temporary and permanent materials, labor, equipment, and incidentals to accomplish the defined scope of work.

The cost estimator also considers the elements of the scope of work, if any, for which there is little or no definition, but which are needed for overall completion of the project. The estimator will rely on personal experience, the experiences of others and historical costs from similar projects in estimating the costs for the project under consideration. The estimator then applies crew analysis, historical labor production data, or historical unit cost data to determine the effort and costs to install the materials or elements of the scope of work.

Once the costs of performing the defined scope of work are estimated, the estimator will evaluate and estimate overhead expenses in connection with the estimated time duration (schedule) applicable to the project.

The cost estimator will then compile and total the direct and indirect estimated costs and then evaluate the contingency, if any, to be applied for both known and unknown circumstances that have the potential to

increase the costs of the project. Lastly the cost estimator will apply consideration for profit or fee, if and as appropriate, and then add up all cost components into the total estimated price for the project.

2-19 On page 6, Lines 19-23, Mr. Bolyard states that "…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." Please identify all information and documents on which Mr. Bolyard relied in forming this opinion, including specifically identifying any knowledge or information that Mr. Bolyard possesses regarding the amount of contingency applied in the generator interconnection process by other utilities at the Facilities Study (or similar) step.

Response:

Williams Solar objects to this Request because it assumes, without basis, that the methodology for estimating costs on a solar interconnection construction project is materially different than the methodology for estimating costs on other construction projects.

Subject to, and without waiver of, the foregoing specific and general objections, Williams Solar responds as follows:

Mr. Bolyard's testimony is based on his experience, education, and training in the field of construction estimating. He also relied on the following:

- AACE International Recommended Practice 96R-18 Cost Estimate Classification System – As Applied in Engineering, Procurement, and Construction for the Power Transmission Line Infrastructure Industries

2-20 On page 6, Lines 7-8, Mr. Bolyard references his "experience with appropriate methods of cost estimation in the construction industry." Please identify all of Mr. Bolyard's experience in estimating construction costs within the context of the generator interconnection study process, including identifying the specific generator interconnection process and jurisdiction in which Mr. Bolyard has performed such generator interconnection construction cost estimations.

Response:

Williams Solar objects to this Request because it assumes, without basis, that the methodology for estimating costs on a solar interconnection construction project is materially different than the methodology for estimating costs on other construction projects.

Subject to, and without waiver of, the foregoing specific and general objections, Williams Solar responds as follows:

Mr. Bolyard's experience is detailed in his filed testimony.

2-21 On page 28, Lines 17-18, Mr. Bolyard states that "DEP's RET does not produce estimates based on historical experience with similar projects as one would expect." Please identify all documents and information on which Mr. Bolyard relied in forming this opinion.

Response:

Mr. Bolyard relied on the following documents in forming the referenced opinion:

- DEP's Response to Williams Solar Data Request 1
- DEP Supplemental Responses to Williams Solar First Requests
- DEP Answer and Motion to Dismiss
- True up labor calculation
- RE_DEP and DEC Exposure
- CONFIDENTIAL DEP Final Accounting Report Tracker Q3 2018
- FW REDACTED (Part 2 of 3)
- RE_slider solar onsite and offsite work order CUE
- Cost Estimation Tool – Revised – Copy
- Time and Expense Estimate Template
- SIS Estimation Tool Rev0
- SIS Estimation Tool Rev1
- CONFIDENTIAL DR No. 1-17 Williams Solar
- Cost Estimation Tool Presentation
- DET Time and Expense Estimate Tool – v2
- DET Time and Expense Estimate Tool – v3
- DET Time and Expense Estimate Tool – v4
- BLANK IPP MFC Request 4.0 with Admin Cost Formulas
- DET Time and Expense Estimate Tool
- Time and Expense Estimate – CONFIDENTIAL SOLAR FACILITY
- DR No. 1-3 Revised Estimating Tool Description – Williams Solar
- Facility Study Report Williams Solar LLC CHKLIST

- Overview of Revised Estimating Tool – Williams Solar (produced in Response to Data Request No. 1-3)
- E-mail correspondence "Re: Facility Study Report, Williams Solar, LLC CHKLIST, " between July 30, 2019, and August 16, 2019
- Copy of Time and Expense Template.xlsx
- July 30, 2019 email re: Cost Estimation Training
- August 1, 2019 email re: Cost Estimate Tool Presentation.pptx
- August 1, 2019 email re: Conference Line for Cost Estimation Training

DOCUMENT REQUESTS

2-1 Produce all documents and data identified in response to the foregoing Set 2 interrogatories, identifying which data request corresponds to each document produced.

Response:

Williams Solar incorporates by reference its Initial Objections. Williams Solar further objects to this Request as unduly burdensome and not reasonably calculated to lead to the discovery of admissible information because, among other reasons:

a) It purports to require Williams Solar to respond within seven days to a request that DEP failed to make earlier in this proceeding, when Williams Solar might have had reasonable time to respond.

Subject to, and without waiver of, the foregoing specific and general objections, Williams Solar is producing herewith a copy of AACE International Recommended Practice 96R-18 Cost Estimate Classification System – As Applied in Engineering, Procurement, and Construction for the Power Transmission Line Infrastructure Industries.

2-2 Produce any documents created by Williams Solar or GreenGo since November 7, 2019, that discuss, identify, assess or analyze interconnection-related costs to interconnect Williams Solar or other projects included in the "North Carolina portfolio of projects protected under HB 589" under GreenGo's management, as discussed on Page 29, Lines 8-11 of Mr. Burke's testimony. This request includes, but is not limited to, documents providing information similar to Confidential Exhibit JB-14 dated November 7, 2019.

Response:

Williams Solar incorporates by reference its Initial Objections. Williams Solar further objects to this Request as unduly burdensome and not reasonably calculated to lead to the discovery of admissible information because, among other reasons:

a) It purports to require Williams Solar to respond within seven days to a request that DEP failed to make earlier in this proceeding, when Williams Solar might have had reasonable time to respond;
b) It seeks information about legally distinct companies and projects that are not parties to this proceeding.

Dated: May 8, 2020.

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Attorneys for Williams Solar, LLC

CERTIFICATE OF SERVICE

The undersigned, of the law firm Brooks, Pierce, McLendon, Humphrey & Leonard, L.L.P., hereby certifies that he has served a copy of the foregoing RESPONSES TO DUKE ENERGY PROGRESS, LLC'S SECOND DATA REQUEST TO WILLIAMS SOLAR, LLC via electronic mail to:

Jack E. Jirak
Associate General Counsel
Duke Energy Corporation
P.O. Box 1551/NCRH20
Raleigh, North Carolina 27602
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Raleigh, North Carolina 27601
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This the 8th day of May, 2020.

Marcus W. Trathen

Christine Valcourt <cv@greengoenergy.com>

Interconnection Request Williams Solar, LLC CHKLIST 15007

Carl Siebing <cs@greengoenergy.com> Mon, Jan 28, 2019 at 1:01 PM
To: Jon Burke <jb@greengoenergy.com>, Frederik Flagstad <frederik@greengoenergy.com>

Gents,

We received the System Impact Study Report for 2250-024 - Williams Solar, LLC. This is the most expensive interconnection estimate we have received to date by about $200k.

Total estimated cost: $834,000 ($774,000 + $60,000). The main cost drivers appear to be:

1.) 2.5 miles of reconductoring.
2.) **71** new high-fault tamers are planned (high associated labor costs).

No DTT or new VT's are identified.

Add to this the expected metering costs, overhead costs, etc. not included in the Report. Furthermore, the $834k is a pre-tax estimate. We are likely looking at a near $1MM interconnection here.

There are 11 plus parcels between the POI and the sub. I do not readily see a viable option for reducing these costs. Please advise.

Br.
Carl

Carl Siebing | Development Analyst
GreenGo Energy US, Inc. | 1447 S. Tryon St., Suite 201, Charlotte, NC 28203
Email: cs@greengoenergy.com | Mobile: (312) 919 6249

[Quoted text hidden]

3 attachments

Williams System Impact Study Report with A.pdf
749K

Facility Study Agreement.pdf
107K

Request for Information.docx
17K

Filed in Johnston County
Planning Department
3-27-19 at 3:30 pm
Filed by: Stephanie Richter

NORTH CAROLINA	)	JOHNSTON COUNTY
	)	BOARD OF ADJUSTMENT
JOHNSTON COUNTY	)	CASE NO. 19-01

EXHIBIT 6

ORDER DENYING VARIANCE

This application for variance came before the Board of Adjustment for the County of Johnston (the "BOA) on February 27, 2019, after due notice, for a quasi-judicial hearing to consider Case No. 19-01 (the "Hearing"), submitted by Applicant, Williams Solar, LLC, and Owners, Carolyn W. Williams and Joyce W. Burchette, and identified as Parcel ID: 09J17036, located on Harper House Road, Newton Grove, in the Meadow Township of Johnston County, North Carolina. Based on the testimony of staff and the witnesses, the documentary evidence, the application and related materials, the exhibits, the Staff Report and other evidence and arguments presented at the Hearing, the BOA finds that the variance should be denied, and in support thereof, makes the following FINDINGS OF FACT and CONCLUSIONS OF LAW as required by N.C. Gen. Stat. §160A-388(e2):

FINDINGS OF FACT:

1. The subject property is comprised of approximately 30 acres and is located on Harper House Road, Newton Grove, in the Meadow Township of Johnston County, North Carolina, that property listed as having Tax Parcel Number 09J17036 (the "Property").

2. The Property is currently zoned Agricultural-Residential (AR), is undeveloped and surrounded by similarly zoned property that is used for residential, agricultural and commercial purposes.

3. The owners of the Property are Carolyn W. Williams and Joyce W. Burchette ("Property Owner"). The Applicant for the variance request, on behalf of the Property Owner, is Williams Solar, LLC (the "Applicant"). The Applicant was represented at the Hearing by Colin Tarrant, Esq.

4. The Applicant intends to seek a rezoning of the Property and apply for a special use permit to operate a solar energy facility as a utility facility on the Property. Pursuant to Section 14-123(c)(1) and 14-123(c)(3) of the Johnston County Land Development Code (the "LDC"), solar mounting devices, ground mounted equipment and accessory structures shall be set back at least 150 feet from all property lines.

5. According to the Planning Director, the aforementioned setback requirements have been in the LDC "for a while." The legislative history of LDC Section 14-123 demonstrates that section was adopted on September 6, 2011 and amended on September 1, 2015.

6. The Applicant's variance request seeks a reduction of setbacks for solar mounting

devices and accessory structures on three out of the four sides of the Property. Specifically, the variance requests seeks to: (a) reduce the setback along the western boundary by more than 60%, from 150 feet to 55 feet; and (b) reduce the setback along the eastern and rear boundaries by 70%, from 150 feet to 45 feet (the "Variance Request").

7. On February 27, 2019, the Hearing was held concerning the Variance Request.

8. At the Hearing, the Planning Director testified that a number of solar generation energy facilities have been approved and denied within Johnston County in recent years. To the Planning Director's knowledge, most, if not all, have adhered to the setback requirements in the LDC. The Planning Director was not aware of any variances of this size granted by the BOA from the 150 foot setback requirements for solar generation energy facilities.

9. At the Hearing, the Applicant presented testimony that compliance with the 150 foot setback would reduce the megawatts that could be generated on the Property, resulting in certain economic consequences, including a reduction of the 5 megawatt facility the Applicant hoped to develop on the Property. The Applicant also testified that compliance with the setback requirements would create personal circumstances that may require the Applicant to re-file their application with Duke Energy that was originally submitted in 2016 (after the setback restrictions in the LDC had been in place for since September 1, 2015).

10. The Applicant testified that it has developed smaller solar energy facilities on acreages of smaller size that produce 3 megawatts instead of the 5 megawatts that the Applicant would like to generate on the Property.

11. Much of the Applicant's testimony related to hardships that would result from the personal circumstances of the Applicant.

12. The Applicant did not, however, present substantial, competent and material evidence that any hardship created would be unnecessary or that the hardship results from conditions that are peculiar to the Property.

13. The Applicant's testimony and arguments that the width of the Property (east to west) is a hardship peculiar to this Property is not persuasive. By adopting a 150 feet setback from all property lines for solar mounting devices, ground mounted equipment and accessory structures, the clear legislative intent of the Johnston County Board of Commissioners was to only allow these types of solar energy generation facilities to be located and developed on parcels of land with sufficient size and width to accommodate these enhanced setbacks.

14. The Variance Request is a significant departure from the express terms and the spirit, purpose and intent of LDC Sections 14-123(c)(1) and 14-123(c)(3) in that it seeks to vary the setback requirements on 3 of the 4 sides of the Property for a total setback reduction between 60-70% on each of those sides of the Property.

CONCLUSIONS OF LAW:

Pursuant to the foregoing FINDINGS OF FACT, LDC Section 14-593 and N.C. Gen. Stat. 160A-388(d), the BOA makes the following Conclusions of Law:

1. The Variance Request should be denied because the Applicant/Property Owner has failed to submit competent, material and substantial evidence to establish that an unnecessary hardship would result from the strict application of LDC Sections 14-123(c)(1) and 14-123(c)(3) to the Property;

2. The Variance Request should be denied because the Applicant/Property Owner has failed to submit competent, material and substantial evidence to establish that, even if a unnecessary hardship exists, the hardship results from conditions that are peculiar to the Property and are not hardships resulting from conditions that are common to the neighborhood or the general public;

3. The Variance Request should be denied because the Applicant/Property Owner has failed to submit competent, material and substantial evidence to establish that, even if a unnecessary hardship exists, the hardship does not result from the actions taken by the Applicant, *i.e.*, the Applicant's refusal to consider or evaluate a smaller solar energy generation facility that produces less than 5 megawatts;

4. The Variance Request should be denied because the Applicant/Property Owner has failed to submit competent, material and substantial evidence to establish that the Variance Request is consistent with the spirit, purpose and intent of the LDC in maintaining 150 foot setbacks from all property lines for solar mounting devices, ground mounted equipment and accessory structures; and

5. The Variance Request should be denied because the Variance Request failed to receive a concurring vote of fourth-fifths of the BOA as mandated by N.C. Gen. Stat. § 160A-388(e)(1).

THEREFORE, based upon the foregoing, IT IS ORDERED that the application for a VARIANCE of Section 14-123(c)(1) and 14-123(c)(3) of the Johnston County LDC is DENIED.

Ordered this 27th day of March, 2019.

Craig Jones
CHAIRMAN

Stephanie Richter
SECRETARY

NOTE: If you are dissatisfied with the decision of this Board, an appeal maybe taken to the Superior Court of Johnston County within thirty (30) days after the date this Order is served on you. See the Johnston County Ordinance for further information.

19 CVS 958

STATE OF NORTH CAROLINA IN THE GENERAL COURT OF JUSTICE

JOHNSTON COUNTY SUPERIOR COURT DIVISION

WILLIAMS SOLAR, LLC, CAROLYN WILLIAMS and JOYCE BURCHETTE, *Petitioners,*	)	
v.	)	ORDER
JOHNSTON COUNTY, *Respondent.*	)	

THIS MATTER came on for hearing before the undersigned Senior Resident Superior Court Judge presiding during the June 24, 2019, session of Superior Court, Johnston County, upon Petitioners' Appeal in the Nature of Certiorari from the decision of the Johnston County Board of Adjustment denying Petitioners' request for variance. The Court has considered the written decision of the Board of Adjustment, the record evidence and record of proceedings, Petitioners' Petition for Writ of Certiorari, the Writ of Certiorari, the parties' briefs, and argument of counsel at hearing.

Procedural History

1. The property in question is located at Harper House Road, Newton

Grove, North Carolina (Tax Parcel Number 09J17036). Petitioners consist of the property owners, Carolyn Williams and Joyce Burchette, and the applicant, Williams Solar, LLC.

2. This action was commenced upon Petitioners filing a petition for variance (hereinafter "request for variance") with the Johnston County Planning Department on January 3, 2019. Petitioners requested that the setback requirements for solar mounting devices and accessory structures in the Johnston County Land Development Code be varied from the specific setback requirement of 150 feet from all property lines. Petitioners specifically requested the side and rear setbacks for the property be reduced to anywhere between 45 to 55 feet while maintaining the front setback at 150 feet.

3. On February 27, 2019, a quasi-judicial hearing before the Johnston County Board of Adjustment (hereinafter "the Board") was conducted wherein the Board received and considered Petitioners' presentation of evidence in support of the request for variance, as well as a report and testimony from the Johnston County Planning Department.

4. Following the presentation of evidence, the Board voted 3-2 in favor

of the request for variance; however, the request for variance was not granted because, as provided by N.C.G.S. § 160A-388(e)(1), the concurring vote of four-fifths of the Board was required to approve the variance. On February 28, 2019, the Board notified Petitioners via certified mail that the Board denied the request for variance at the hearing and that "[a] copy of the order and approved minutes will be provided . . . upon approval of said minutes by the Board of Adjustment at its March 27, 2019 meeting."

5. On March 22, 2019, Petitioners filed their Petition for Writ of Certiorari (hereinafter "the Petition") and, on the same date, the Clerk of Superior Court, Johnston County issued the Writ of Certiorari in accordance with N.C.G.S. § 160A-393(f). On March 26, 2019, Petitioners served upon Respondent the Petition and Writ of Certiorari via certified mail, return receipt requested. Service was complete on March 29, 2019.

6. On March 27, 2019, the Board reduced to writing its decision to deny the variance request when the Board entered its written Order Denying Variance (hereinafter "Order") reflecting the Board's determination of contested facts and their application to the applicable standards. The written Order was signed by the Board's Chairman and filed by the Board's Secretary in the Johnston County Planning Department on March 27, 2019. On March

28, 2019, the Board notified Petitioners of the Board's written Order and approved minutes, providing copies of both to Petitioners via certified mail.

7. On April 30, 2019, Respondent filed and certified the Record, consisting of eight exhibits. Petitioners' evidence at the hearing, as reflected in the Record and reviewed by the Court, was comprised of Petitioners' application for the request for variance (Exhibit 1); the Johnston County Planning Staff Report (Exhibit 2); minutes and testimony at the February 27, 2019, hearing (Exhibits 3 and 4); and, an Impact Study prepared by Petitioners' appraiser (Exhibit 8). Also included in the Record reviewed by the Court are the Board's February 28, 2019, notification letter (Exhibit 5); the Board's March 27, 2019, written order and notification letter (Exhibit 6); and, portions of the Johnston County Land Development Code (Exhibit 7).

Discussion

8. Chapter 153A, Article 18 of our General Statutes empowers counties to regulate planning and development throughout the county except as otherwise provided by statute. N.C.G.S. § 153A-320. Along these lines, a county may adopt zoning and development regulation ordinances, N.C.G.S. § 153A-340(a), and, upon doing so, "may provide that a board of adjustment may determine and vary their application," § 153A-340(c). When a county's

board of adjustment has been empowered to hear and decide matters properly before it, including requests for variances, the proceedings must comply with the requirements of Section 160A-388 of our General Statutes. N.C.G.S. § 153A-345.1(a) ("The provisions of G.S. 160A-388 are applicable to counties.").

9. As an initial observation, the Court notes that neither party before it has raised the issue that Petitioners filed the Petition for Writ of Certiorari before the Board's decision became effective pursuant to N.C.G.S. § 160A-388(e2)(1) and Petitioners did not file a subsequent or amended Petition within the thirty day window for appeal provided by N.C.G.S. § 160A-388(e2)(2). *Cf. Mannise v. Harrell*, 249 N.C. App. 322, 325, 791 S.E.2d 653, 656 (2016) (concluding that, because the appellant did not file a subsequent or amended notice of appeal following entry of the order, under such circumstances, "[a]n entered order did not exist when Defendant filed notice of appeal"); *see McCrann v. Vill. of Pinehurst*, 216 N.C. App. 291, 294, 716 S.E.2d 667, 670 (2011) (noting that the Court "see[s] no reason to treat the requirements for timely 'appeal' for judicial review under section 160A-388(e2) differently" than requirements for appeal from a civil judgment); *Hirschman v. Chatham Cnty.*, 250 N.C. App. 349, 356-57, 792 S.E.2d 211, 216 (2016) (observing that compliance with the statutory

requirements for filing the petition, like entry of notice of appeal, is jurisdictional).

10. Turning to the merits of Petitioners' claims on appeal raised by the Petition, when reviewing the decision of a decision-making board, the Court's scope of review is limited to ensuring that the rights of petitioners have not been prejudiced because the board's findings, inferences, conclusions, or decisions were, in relevant part, "[u]nsupported by substantial competent evidence in view of the entire record" or "[a]rbitrary or capricious." N.C.G.S. § 160A-393(k)(1)e.,f..

11. "The standard of review depends on the nature of the error of which the petitioner complains. If the petitioner complains that the Board's decision was based on an error of law, the superior court should conduct a *de novo* review. If the petitioner complains that the decision was not supported by the evidence or was arbitrary and capricious, the superior court should apply the whole record test." *Hopkins v. Nash Cnty.*, 149 N.C. App. 446, 448, 560 S.E.2d 592, 594 (2002) (internal citation omitted).

12. The whole record test "requires the reviewing court to examine the entire record to determine if the [board's] decision was supported by substantial evidence. The trial court may not consider evidence outside of the

record." *Northfield Dev. Co.*, 165 N.C. App. at 888, 599 S.E.2d at 924; *321 News & Video, Inc. v. Zoning Bd. of Adjustment*, 174 N.C. App. 186, 188, 619 S.E.2d 885, 886 (2005) ("[T]he trial court does not review the sufficiency of evidence presented to it, but rather reviews that evidence presented to the Board.").

13. When a county's board of adjustment has been empowered to hear and decide requests for variances, Subsection 160A-388(d) of our General Statutes provides that:

> When unnecessary hardships would result from carrying out the strict letter of a zoning ordinance, the board of adjustment shall vary any of the provisions of the ordinance upon a showing of all of the following:
>
> (1) Unnecessary hardship would result from the strict application of the ordinance. It shall not be necessary to demonstrate that, in the absence of the variance, no reasonable use can be made of the property.
>
> (2) The hardship results from conditions that are peculiar to the property, such as location, size, or topography. Hardships resulting from personal circumstances, as well as hardships resulting from conditions that are common to the neighborhood or the general public, may not be the basis for granting a variance.
>
> (3) The hardship did not result from actions taken by the applicant or the property owner. The act of purchasing property with knowledge that circumstances exist that may justify the granting of a variance shall not be regarded as a self-created hardship.
>
> (4) The requested variance is consistent with the spirit, purpose, and intent of the ordinance, such that public safety is secured, and substantial justice is achieved.

> No change in permitted uses may be authorized by variance. Appropriate conditions may be imposed on any variance, provided that the conditions are reasonably related to the variance. Any other ordinance that regulates land use or development may provide for variances consistent with the provisions of this subsection.

N.C.G.S. § 160A-388(d); *see* Johnston County, North Carolina, Land Development Code § 14-593(a). The petitioner "bear[s] the burden of proving their case and must show what type of variance they need and why the variance is needed." *Robertson v. Zoning Bd. of Adjustment*, 167 N.C. App. 531, 534, 605 S.E.2d 723, 726 (2004).

14. A board of adjustment's quasi-judicial decision to grant or deny a variance request must be "based upon competent, material, and substantial evidence in the record." N.C.G.S. § 160A-388(e2)(1). Competent, material, and substantial evidence "is evidence that is admissible, relevant to the issues in dispute, and sufficient to support the decision of a reasonable fact-finder." *Blair Invs., LLC v. Roanoke Rapids City Council*, 231 N.C. App. 318, 321, 752 S.E.2d 524, 527 (2013).

15. Petitioners' first claim raised by the Petition is that the Board's decision to deny the variance was not supported by competent, material, and substantial evidence in the record. Accordingly, the Court applies the whole

record test, examining all record evidence that both detracts from and supports the Board's decision to deny Petitioners' requested variance.

16. Despite Petitioners' contention that the Board was required to grant the request for variance because no competent, material, and substantial evidence was submitted in opposition to the request for variance, the Board did, in fact, base its decision upon evidence in the record: Petitioners' evidence.

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 actions. *See Lee v. Bd. of Adjustment*, 226 N.C. 107, 110, 37 S.E.2d 128, 131 (1946) (explaining it would be "erroneous to base a conclusion that the denial of an application would work an unnecessary hardship because the applicant could earn a better income from the type of building proposed"); *Turik v. Town of Surf City*, 182 N.C. App. 427, 434, 642 S.E.2d 251, 255 (2007) ("In the context of zoning, pecuniary loss alone is not enough to show an 'unnecessary hardship' requiring a grant of a variance." (quoting *Williams v. N.C. Dep't of Env't & Natural Res.*, 144 N.C. App. 479, 486, 548 S.E.2d 793, 798 (2001))).

19. Considering the entirety of the record evidence, the Court concludes that the Board's Findings of Fact in the written Order were supported by competent, material, and substantial evidence, and the Board's findings supported the Board's Conclusions of Law in the written Order wherein the Board concluded that Petitioners failed to show the existence of the conditions in Subsection 160A-388(d) necessary to grant a variance.

20. A board's "decision may be reversed as arbitrary and capricious only where the petitioner establishes that the decision was whimsical, made patently in bad faith, indicates a lack of fair and careful consideration, or fails to indicate any course of reasoning and the exercise of judgment."

Whiteco Outdoor Adver. v. Johnston Cnty. Bd. of Adjustment, 132 N.C. App. 465, 468-69, 513 S.E.2d 70, 73 (1999) (quotation and citation omitted). Furthermore, "[w]hen a Board action is unsupported by competent substantial evidence, such action must be set aside for it is arbitrary." *Stealth Props., LLC v. Town of Pinebluff Bd. of Adjustment*, 183 N.C. App. 461, 465, 645 S.E.2d 144, 147 (2007).

21. Petitioners' second claim raised by the Petition is that the Board's decision was arbitrary and capricious because there was no evidence supporting the Board's decision. As with Petitioners' first claim, the Court applies the whole record test, examining all record evidence that both detracts from and supports the Board's decision to deny Petitioners' requested variance.

22. The Court has already determined that the Board's decision was supported by competent, material, and substantial evidence. Furthermore, Petitioners have not otherwise established that the Board's decision to deny the request for variance was whimsical, made patently in bad faith, indicated a lack of fair and careful consideration, or failed to indicate any course of reasoning and the exercise of judgment. Accordingly, in considering the entirety of the record evidence, the Court concludes that the Board's decision

to deny Petitioners' request for variance was not arbitrary and capricious.

23. The Court notes that in Petitioners' memorandum of law in support of the Petition, Petitioners also allege that the Board's decision was in excess of the statutory authority conferred upon the Board, was inconsistent with applicable procedures specified by statute, and was otherwise affected by error of law. These allegations, though, were not raised by the Petition and largely rely on a contention as to the validity of the variance requirements in the County Land Development Code, which is a separate issue not properly a part of these proceedings. Therefore, the Court declines to address the merits of such allegations. N.C.G.S. § 160A-393(j) ("The court shall hear and *decide all issues raised by the petition*" (emphasis added)); *see Stealth Props., LLC v. Town of Pinebluff Bd. of Adjustment*, 183 N.C. App. 461, 465, 645 S.E.2d 144, 147 (2007) (noting "the construction of the Unified Development Ordinance is not properly before this Court, nor was it properly before the trial court"); *see also Sherrill v. Wrightsville Beach*, 76 N.C. App. 646, 649, 334 S.E.2d 103, 105 (1985) ("The constitutionality of the zoning ordinance is a separate issue not properly a part of these proceedings since the denial of the variance request never addressed the validity of the zoning ordinance.").

Accordingly, the Court, for the reasons stated herein, hereby

AFFIRMS the decision of the Johnston County Board of Adjustment to deny Petitioners' request for variance.

This the 29 day of July, 2019.

Imelda J. Pate
Superior Court Judge

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.

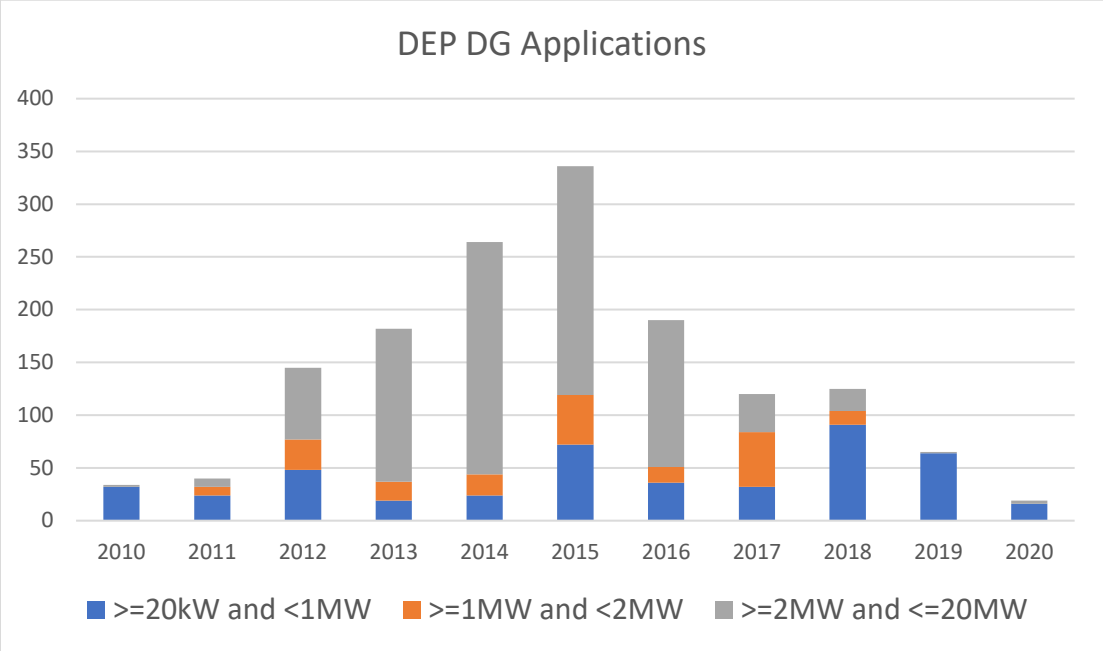
System Impact Study Report. The required Upgrades identified in the voltage and thermal/loading modeling and analysis, Transformer Inrush Evaluation and short circuit modeling and protective coordination analysis are combined within the System Impact Study Report and issued to the Interconnection Customer 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.

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.