Duke Energy Carolinas
Response to
North Carolina Public Staff Data Request
Data Request No. NCPS 225

Docket No. E-7, Sub 1214

Date of Request: **March 6, 2020**
Date of Response: **March 9, 2020**

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The attached response to North Carolina Public Staff Data Request No. 225-1, was provided to me by the following individual(s): Karen Ann Ralph, Lead Planning & Regulatory Support Specialist, and was provided to North Carolina Public Staff under my supervision.

Camal O. Robinson
Associate General Counsel
Duke Energy Carolinas

North Carolina Public Staff
Data Request No. 225
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Item No. 225-1
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Request:

1. On page 7 of Oliver's Rebuttal, witness Oliver argues that SOG Connectivity and SOG Capacity should be qualified as Extraordinary in Type because "all of the major components of SOG work together …. The benefits outlined in the SOG cost-benefit analysis cannot be achieved by leaving out capacity and connectivity." Please respond to the following questions.
a. Please describe how SOG Capacity and SOG Connectivity provide "significant new capabilities" to the grid, and are thus deserving of a 3.0 on the Transformative metric. This response should identify what "significant new capabilities" are provided by SOG Capacity and Connectivity components, relative to a circuit without SOG, and why DEC considers them to be "significant" as opposed to "limited" when assigning the metric score.
b. When assigning SOG Capacity and SOG Connectivity a 2.0 on the Timing metric, please describe why DEC believes these two aspects of the SOG program are "new work", in light of the nearly $38 million of spend on SOG from 2018-2019 identified in Public Staff witnesses Williamsons' Table 2.
c. Is it DEC's position that the SOG Capacity and SOG Connectivity projects cannot be deployed without accounting deferral?
d. If accounting deferral were granted for SOG Segmentation and Automation and SOG ADMS, but not for SOG Capacity and SOG Connectivity (as the Public Staff recommends), please describe the estimated impact on the total SOG deployment over the GIP timeline. This discussion should, at a minimum, address the following:
i. How many fewer circuits DEC would implement SOG on each year;
ii. What the estimated reduction in annual spend would be in each category;
iii. What the estimated reduction in benefits would be from the entire program;
iv. The existing level of inventory associated with SOG deployment (i.e., number of automated switches) that DEC has procured in anticipation of SOG rollout; and
v. How DEC would determine which circuits would be excluded from the 2020-2022 timeline in a reduced rollout scenario.

Response:

a. Please see Oliver Rebuttal Testimony page 7 line 6 through page 22.
b. Capacity and connectivity along with the other components of SOG bring the grid up to a new standard of operation that allows for a smart thinking grid with 2-way power flow capability. This new standard cannot be achieved without additional capacity and connectivity to create a networked grid.
c. See response to d below.
d. Granting or not granting an accounting deferral for the GIP requires speculation by the

Company on what the Commission may or may not order. Absent an understanding from an order the Company cannot speculate on future budget changes within the GIP and how it may affect specific projects/programs. Please see Oliver Direct Testimony page 52 line 17 through page 55 line 4.

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The attached response to North Carolina Public Staff Data Request No. 225-2, was provided to me by the following individual(s): Karen Ann Ralph, Lead Planning & Regulatory Support Specialist, and was provided to North Carolina Public Staff under my supervision.

Camal O. Robinson
Associate General Counsel
Duke Energy Carolinas

North Carolina Public Staff
Data Request No. 225
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Item No. 225-2

Request:

2. On page 8, witness Oliver describes the 44 kV System Upgrade subprogram by stating: "[w]ooden structures and other circuit assets on average are beyond their useful life and the rate of failures impacting customers is expected to increase over time." Please respond to the following questions.
a. Has the Company requested accounting deferral in any other instance when it is replacing aging assets that are beyond their useful life? If so, please describe these requests and their ultimate outcome.
b. For the entirety of DEC's 44 kV system, please provide the following information separately for North and South Carolina:
i. The expected useful life of a wooden pole.
ii. The expected useful life of a non-wooden pole (please provide this response for each type of non-wooden pole in use on 44 kV lines).
iii. The proportion of total poles that are wooden.
iv. The number of wooden poles that have been replaced annually in the past 10 years (if possible, exclude replacements due to vehicular accidents, Department of Transportation projects that require relocation or replacement, and storms).
v. The approximate number of wooden poles, broken down by asset age into the following buckets (note that the variable "X" refers to the useful life provided in response to subpart 2.b.i):
1. 0 - 10 years.
2. 11 - 25 years.
3. 26 - X years.
4. > X years.
c. Please describe how DEC considers the 44 kV System Upgrade subprogram as being "a core component of grid modernization" and deserving of a 3.0 on the Grid Architecture metric. Please provide a summary of all materials used in making this determination.
d. Please provide the cost of service allocation factors used for assets placed in service for the following nominal voltage classes:
i. 44 kV.
ii. 100 kV.
iii. 115 kV.
iv. 230 kV.
e. When a 44kV line segment is "uplifted" to 100 kV as part of this project, does that change the allocation factors for the assets placed in service on that line? Please describe how this project will affect the allocation of costs on the selected line projects.
f. If accounting deferral is not granted for this subprogram, please describe the estimated impact on deployment. This discussion should, at a minimum, address the following:

i. How many fewer line projects would be executed in the GIP timeline, compared to the number of projects included in the CBA;
ii. The estimated reduction in annual spend as a result of the deferral denial; and
iii. How DEC would determine which line projects would move forward in the GIP timeline.

Response:

Response
a. The Company is unaware of another instance where a deferral was requested for replacing aging assets that were beyond their useful life.
b. DEC Transmission does not segregate and track data by NC and SC, therefore all data presented is representative of the entire region
i. 40 years, per generally accepted industry guidance
ii. 80 years for steel/concrete, per generally accepted industry guidance
iii. 54,476 out of 76,391
iv. Over the past 10 years DEC has replaced approximately 1,000 wood poles annually as part of the wood pole inspection and condition assessment program. When wood poles are replaced one for one a new wood pole is installed; when line segments are rebuilt then wood poles are replaced with steel poles. Below are the approximate annual replacement quantities:
• 2019- 704
• 2018- 589
• 2017- Unknown
• 2016- 1140
• 2015- 1872
• 2014- 2101
• 2013- 1274
• 2012- Unknown
• 2011- 603
• 2010- 733
v. The majority of wood poles in the Duke Energy Transmission Asset Management System do not have installation dates recorded, therefore these quantities must be estimated.
1. 0 - 10 years: 10,000
2. 11 - 25 years: 8,000
3. 26 - 40 years: 6,000
4. > 40 years: 30,000
c. The 44kV circuits are part of the core backbone of the DEC transmission system. Many customers in the DEC service territory are supplied by radial served 44kV lines,

which means any interruption emanating from the circuit has a direct impact on the customer's power quality. A single pole or conductor failure on this circuit can result in power outages for thousands of retail customers as well as numerous commercial and industrial customers. Transforming these circuits into a highly reliable system that is also capable of supporting the distributed generation grid of the future is a core component of grid modernization. 44kv sub-transmission is no longer considered a standard for new transmission infrastructure.

d. These assets are all classified as Transmission FERC 350-359 and therefore are allocated at Transmission Demand which would be 52.6634% to NC Retail

i. 44 kV.

ii. 100 kV.

iii. 115 kV

iv. 230 kV

e. No.

f. Please see response to Public Staff Data Request 225-1d.

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The attached response to North Carolina Public Staff Data Request No. 225-3, was provided to me by the following individual(s): Karen Ann Ralph, Lead Planning & Regulatory Support Specialist, and was provided to North Carolina Public Staff under my supervision.

Camal O. Robinson
Associate General Counsel
Duke Energy Carolinas

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Request:

3. On page 8, witness Oliver states: "The 44 kV System Upgrade subprogram under Transmission H&R both protects the 44 kV system from extreme weather and begins to pave the way for more DER interconnections. This system is not just being rebuilt like-in-kind, it is being transformed into a system that will withstand higher wind and ice loading, higher magnitude lightning strikes, and better resistance to both animal and vegetation caused outages. These improvements will directly reduce customer outage impacts." Please explain and provide the following:
a. What are the rating increases that will be obtained, for the retrofit of 44 kV structures to the 100kV structures, when comparing the mitigation impacts for lightning strikes, higher wind, and ice loading?
b. Explain what is meant by "pave the way for more DER interconnection."
c. Based on the responses to question a. and b. above, please identify if the 44 kV Upgrade program is being implemented to either handle increased contingencies from weather or to handle congestion from DER interconnection customers.
d. The Company states that is the "system is not being rebuilt like-in-kind." Please describe if the grid's technology implementation has been stagnant over the last 30 years, or if the Company has been installing new equipment (when the previous equipment fails or for new builds) over this time period.
e. The last sentence quoted above suggests that customer outages on these targeted 44 kV Upgrade programs are too high. What is the Company's baseline for customer outage data, leading to a project being selected for this 44 kV Upgrade program?

Response:

a. Transmission circuits are designed to all applicable standards, which may include: ASCE, IEEE, ANSI, and NESC. BIL, or Basic Insulation Level, is one of the primary design features than changes when circuits are designed to the 100kV standard. This means that the spacing between conductor phases and all phase to ground clearances (insulator length, etc.) will increase, therefore being capable of withstanding higher surge voltages from lightning strikes and other fault sources such as vegetation and animals. Transmission poles are also hardened significantly when replaced with steel or concrete and re-designed to current structural standards and loading capable of supporting 100kV conductor; the replacement structures will be able to withstand higher loads compared to the original design.
b. DER interconnections to the 44kV system may currently be restricted, depending on the size of the generation, due to circuit capacity. When the circuit is rebuilt to the 100kV standard, the current carrying capacity of the conductor is increased. If a DER

interconnection is then requested to a rebuilt circuit, only modifications in the substations may be required, since the conductor itself is already capable of higher loads. In this sense the 44kV rebuilt projects pave the way for future, additional interconnections to this system.

c. The 44kV system is being rebuilt to improve customer power quality and reliability of service in both “blue-sky” and storm conditions.

d. Duke Energy is actively involved in industry groups and maintains pace with modernizing developments of the electric grid from both an equipment and infrastructure standpoint. The modernization of the 44kV system is not a standard progression or simple utilization of newer technology, it is a complete redesign which will deliver a step change increase in the reliability of the DEC system.

e. Duke Energy does not use a baseline anticipated number of outages, or number of outage minutes, when developing reliability improvement plans for its Transmission system. Duke Energy monitors equipment failures that result in outages, equipment failures that do not result in outages, industry trends, material condition, and customer feedback to determine where and when investments are warranted.

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The attached response to North Carolina Public Staff Data Request No. 225-4, was provided to me by the following individual(s): Karen Ann Ralph, Lead Planning & Regulatory Support Specialist, and was provided to North Carolina Public Staff under my supervision.

Camal O. Robinson
Associate General Counsel
Duke Energy Carolinas

North Carolina Public Staff
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Item No. 225-4

Request:

4. On page 8, witness Oliver states: "Along with the installation of steel and concrete structures, re-conductoring these circuits to the 100 kV voltage standard increases circuit capacity and paves the way for future DER interconnections without the need to upgrade lines."
a. Have any of the 44 kV Upgrade circuits been identified as overloaded, either currently or within the next 5 years?
b. How many new interconnection customers are projected to be interconnected to 44 kV lines over the next five years?
c. For each 44 kV Upgrade circuit, what is the estimated load of new interconnection customers projected to be interconnected to the 44 kV lines over the next five years?
d. How will interconnection customers pay their share of the interconnection costs if these lines are going to be upgraded to handle their load years in advance?

Response:

a. The 44kV rebuild projects in the Grid Improvement Plan (GIP) are being driven by reliability improvement needs, not capacity needs. None of the listed 44kV rebuild projects have been identified as overloaded in our planning studies for the next five years.
b. In North Carolina, there are a total of 14 generator interconnection projects (13 Solar, 1 Biomass) shown in the queue that are proposing to connect to a 44kV line. Of these, 8 projects have signed interconnection agreements and the remaining 6 projects are still in the queue process. We cannot predict how many customers will be connected to the 44kV circuits in the future.
c. For the 44kV upgrade circuits listed only the Rockford 44kV line has generator interconnection projects proposed. There are two projects with signed interconnection agreements of roughly 22 MW each. We cannot predict the future location and amount of load to interconnect at any level on the transmission system. Those decisions are at the discretion of the interconnection customer.
d. As discussed above, the line rebuilds in the GIP are being driven by reliability improvement needs. Any future interconnection requirements would be borne by developers.

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The attached response to North Carolina Public Staff Data Request No. 225-5, was provided to me by the following individual(s): Karen Ann Ralph, Lead Planning & Regulatory Support Specialist, and was provided to North Carolina Public Staff under my supervision.

Camal O. Robinson
Associate General Counsel
Duke Energy Carolinas

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Item No. 225-5
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Request:

5. On page 9, witness Oliver describes the electronic recloser replacement program. Please respond to the following questions.
a. How long have electronic reclosers been considered the "new industry standard"? Provide all materials referenced in your response.
b. Please provide the number of electronic reclosers that have been deployed by DEC's North Carolina service territory in the last two years.
c. Does DEC consider it Good Utility Practice to deploy oil-filled reclosers in the field today? If so, please provide the approximate number of oil-filled reclosers deployed annually in the last ten years and explain why DEC continues to deploy oil-filled reclosers despite referring to them as "obsolete" on page 10 of Oliver Direct Exhibit 4.
d. If accounting deferral is not granted for this subprogram, please describe the estimated impact on deployment. This discussion should, at a minimum, address the following:
i. How many fewer reclosers would be deployed in the GIP timeline;
ii. The estimated reduction in annual spend as a result of the deferral denial; and
iii. How DEC would determine where the reduced number of reclosers would be deployed.

Response:

a. Electronic three phase reclosers have been an available option since the mid-1980s but became the preferred industry standard as utilities have seen the need for automation and remote control. Electronic reclosers are vacuum interruption devices and have no internal oil as compared to hydraulic models. Real-time operational information such as current per phase, voltage per phase, var flow per phase, health condition of the device, on-board battery health, fault information and interrupter status by phase is remotely available.
b. 934 based on Company GIS records where a three-phase recloser is considered a single installation in this analysis.
c. The Company continues to consider oil-filled reclosers as option for smaller models. DEC NC has deployed oil-filled reclosers at approximately 500 locations per year over the last ten years in like-for-like replacement during the 6-year scheduled maintenance cycles. However the company is transitioning to electronic reclosers for all locations 140A or larger.
d. . Please see response to Public Staff Data Request 225-1d.

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The attached response to North Carolina Public Staff Data Request No. 225-6, was provided to me by the following individual(s): Karen Ann Ralph, Lead Planning & Regulatory Support Specialist, and was provided to North Carolina Public Staff under my supervision.

Camal O. Robinson
Associate General Counsel
Duke Energy Carolinas

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Data Request No. 225
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Item No. 225-6

Request:

6. On page 10, witness Oliver describes the Distribution System Intelligence program. Please respond to the following questions.
a. Generally, how does DEC currently monitor oil level and moisture ingression on its existing fleet of distribution transformers? This response should discuss the differences between current monitoring practices and procedures, and the monitoring proposed in the Distribution System Intelligence program.
b. If accounting deferral is not granted for this subprogram, please describe the estimated impact on deployment. This discussion should include and address, at a minimum, the following:
i. How the development and deployment of analytical tools would be affected;
ii. How the development and deployment of "systems" that "will help enable distributed intelligence" would be affected;
iii. How many fewer devices, and of what type, would be deployed in the GIP timeline;
iv. The estimated reduction in annual spend as a result of the deferral denial; and
v. How DEC would determine where the reduced number of devices would be deployed.

Response:

a. Currently, visual inspections are performed on substation T-D transformer banks to monitor oil level, which is part of the substation inspection competed every two months. Oil analysis is completed via grab sample on an annual frequency, to monitor both moisture levels and dissolved gas accumulation. Future system intelligence programs aim to install remote monitoring systems capable of collecting all of these parameters without manual intervention and providing alerts to grid operators and engineers of any deviations. This data would feed into the Health and Risk Management platform for detailed analytics and data processing in order to transition to a condition-based maintenance program and plan for "just-in-time" T-D transformer bank replacements.
b. Please see response to Public Staff Data Request 225-1d.

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The attached response to North Carolina Public Staff Data Request No. 225-7, was provided to me by the following individual(s): Karen Ann Ralph, Lead Planning & Regulatory Support Specialist, and was provided to North Carolina Public Staff under my supervision.

Camal O. Robinson
Associate General Counsel
Duke Energy Carolinas

North Carolina Public Staff
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Item No. 225-7

Request:

7. On page 10, witness Oliver describes the benefits of the Fuse Replacement subprogram, which includes saving momentary outages from reaching customers on the main feeder and faster restore times.
a. Has DEC performed any cost-benefit analysis, whether at a system or project specific level, to determine whether the deployment of Automatic Lateral Devices (ALDs) is cost-effective? If so, please provide all such analyses including technical references to support underlying assumptions; if not, please describe why not.
b. Please provide the number of ALDs that have been installed in DEC's North Carolina service territory annually over the last 10 years.

Response:

a. No. ALD is a Modernize project and as such does not require a CBA.

b. 25 units have been installed

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The attached response to North Carolina Public Staff Data Request No. 225-8, was provided to me by the following individual(s): Karen Ann Ralph, Lead Planning & Regulatory Support Specialist, and was provided to North Carolina Public Staff under my supervision.

Camal O. Robinson
Associate General Counsel
Duke Energy Carolinas

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Request:

8. On page 11, witness Oliver describes the DER Dispatch Tool. Please respond to the following questions.
a. Does DEC agree with Public Staff witnesses Williamsons' description of this program as something that will only be used in emergency situations for curtailment of solar facilities in more granular blocks, and not something that will manage energy storage or the forecasting of solar facilities (Williamsons Direct at 69)? Why or why not?
b. Please describe how a "more automated and refined toolset to optimize management of both utility and customer owned DERs to meet system stability requirements" will benefit ratepayers, compared to the current "rudimentary ability to quickly shed large blocks of solar generation in emergency conditions." Please provide any qualitative or quantitative analysis supporting your position.

Response:

A. DEC agrees that dispatch of Distributed Energy Resources such as solar facilities during emergency situations is the primary function of the DER dispatch tool.
B. Compared to the rudimentary tool currently deployed, the DER dispatch tool will allow more precise curtailment by facilitating management of smaller groups. This helps increase the equitability of curtailment and increases overall availability of solar generation to the benefit of ratepayers. Additionally, the increased automation provided by this new toolset will enhance the Company's operational effectiveness of Distributed Energy Resource Dispatch as DER interconnections, such as those of solar facilities, continue to expand throughout the Company's footprint.

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The attached response to North Carolina Public Staff Data Request No. 225-9, was provided to me by the following individual(s): Karen Ann Ralph, Lead Planning & Regulatory Support Specialist, and was provided to North Carolina Public Staff under my supervision.

Camal O. Robinson
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Request:

9. On page 12, witness Oliver cites the 2019 GAO report titled Critical Infrastructure Protection Actions Needed to Address Significant Cybersecurity Risks Facing the Electric Grid. Attached below is Appendix II, which is the GAO's Assessment of the Extent FERC-Approved Cybersecurity Standards Address the NIST Cybersecurity Framework. For each of the Cybersecurity subprograms DEC recommends be considered "Extraordinary Type", please describe which Core Function Category and Subcategory deficiency identified by the GAO is remedied by that program, and how.

GAO Report on
FERC Standards and

Response:

The Cybersecurity subprograms are aimed at protecting the tens of thousands of digital assets that fall outside of the FERC approved threshold and are therefore not required to adhere to any of the FERC Requirements (to the extent in which the programs produce security benefits that can extend beyond those assets and be leveraged to help improve security of assets within the FERC threshold they will be considered for use).
While these assets do not meet the threshold for FERC Requirements, Duke Energy believes it is important we take the appropriate steps to improve the security of those assets.
DEAS – Function: Detect (Develop and implement appropriate activities to identify the occurrence of a cybersecurity event); Category: Detection Processes and Security continuous monitoring - Deploying a platform and organization to enhance physical access control/monitoring and response capabilities for field control devices.
SADM – Function: Protect (Develop and implement appropriate safeguards to ensure delivery of critical infrastructure services); Category: Identity management, authentication, and access control - Deploying a platform to perform automated and remote Password Management, Access Logging, and Device/Event information retrieval for field devices.
Distribution Line Device Cyber Protection and Windows-based Change Outs: Function: Protect (Develop and implement appropriate safeguards to ensure delivery of critical infrastructure services); Category: Protective technology - Replacing vulnerable legacy equipment with new devices capable of supporting Cybersecurity best practices.

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The attached response to North Carolina Public Staff Data Request No. 225-10, was provided to me by the following individual(s): Karen Ann Ralph, Lead Planning & Regulatory Support Specialist, and was provided to North Carolina Public Staff under my supervision.

Camal O. Robinson
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Request:

10. On page 12, witness Oliver describes the Cybersecurity subprograms he recommends be considered Extraordinary Type in order to qualify for accounting deferral. If accounting deferral is not granted for these subprograms, please describe the estimated impact on deployment. This discussion should, at a minimum, address the following:
a. How many fewer physical protection systems would be deployed;
b. How many fewer Windows-based Change Outs would occur;
c. How the Secure Access Device Management program would be scaled back;
d. The estimated reduction in annual spend as a result of the deferral denial;
e. How DEC would determine how the reduced number of devices would be deployed; and
f. A qualitative or quantitative discussion of the increased risk of cyber-attacks that would result from a denial of accounting deferral.

Response:

a-f – Please see response to Public Staff Data Request 225-1d.

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The attached response to North Carolina Public Staff Data Request No. 225-11, was provided to me by the following individual(s): Karen Ann Ralph, Lead Planning & Regulatory Support Specialist, and was provided to North Carolina Public Staff under my supervision.

Camal O. Robinson
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Duke Energy Carolinas

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Request:

11. Does Mr. Oliver agree with the GAO statement/position that, "FERC standards do not fully address leading federal guidance for critical infrastructure cyber security"?
a. If so,
i. Please provide examples to support Mr. Oliver's agreement with GAO findings.
ii. Provide a cross reference to programs within in GIP that would be considered critical infrastructure.
1. Define what Mr. Oliver means by critical infrastructure.
2. Is it Mr. Oliver's opinion that critical infrastructure, as used within the construct of FERC standards and the GAO, would only apply to the transmission system and specific sub components and or locations specific to the transmission system?
iii. Are the FERC standards being continually revised?
1. Are any of the currently active/pending revisions to FERC standards identified by GAO addressed or updated to the leading federal guidance?
iv. On average, how long does it take for a FERC standard to be revised?
1. Does a FERC revision have to go through a board/committee/comment processes?
b. If not, please describe why not.

Response:

Agreement or disagreement on particular GAO statements was not the basis for the creation of the GIP Cybersecurity Programs. The GAO report was noted as an external governmental agency reference supporting the increasing threats to the grid and the need for additional Cybersecurity measures as outlined in the GIP.
Duke Energy agrees with the GAO report finding that an attack on "geographically dispersed systems that each fall below the threshold for complying with the full set of standards" represents a credible threat. Therefore, we are allocating resources to protect those devices in accordance with NIST CSF and industry best practice.
The distribution assets being deployed to optimize and modernize the grid do not meet the FERC threshold for bulk electric system assets therefore, the FERC Standards do not apply to them and there is no other regulatory standard for securing these assets.
Department of Homeland Security has identified 16 critical infrastructure sectors whose assets, systems, and networks, whether physical or virtual, are considered so vital to the United States that their incapacitation or destruction would have a debilitating effect on security, national economic security, national public health or safety, or any combination thereof. The energy sector has been identified as one of those critical sectors.

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The attached response to North Carolina Public Staff Data Request No. 225-12, was provided to me by the following individual(s): Karen Ann Ralph, Lead Planning & Regulatory Support Specialist, and was provided to North Carolina Public Staff under my supervision.

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Associate General Counsel
Duke Energy Carolinas

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Request:

12. How would witness Oliver compare the findings/recommendations in the GAO report to the Company's own internal ability to follow established FERC cybersecurity standards over the last 8 years?

Response:

Duke Energy remains committed to the safe and secure operation of all our assets. Within the last eight years we have created a Business Unit and central enterprise team dedicated to NERC CIP Program development and improvement. This team has been working in coordination with FERC and our Operational Business units to improve our compliance related controls and implement work processes. We will continue to work with FERC to ensure that all required controls are appropriately implemented and consistently executed.

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North Carolina Public Staff Data Request
Data Request No. NCPS 225

Docket No. E-7, Sub 1214

Date of Request: **March 6, 2020**
Date of Response: **March 9, 2020**

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The attached response to North Carolina Public Staff Data Request No. 225-13, was provided to me by the following individual(s): Karen Ann Ralph, Lead Planning & Regulatory Support Specialist, and was provided to North Carolina Public Staff under my supervision.

Camal O. Robinson
Associate General Counsel
Duke Energy Carolinas

North Carolina Public Staff
Data Request No. 225
DEC Docket No. E-7, Sub 1214
Item No. 225-13

Request:

13. Please describe the Company's process for evaluating currently pending or future revisions to FERC cybersecurity standards.

Response:

The NERC CIP standards continue to develop as technologies evolve. The timeline allowed for a new requirement to be implemented, once approved by FERC, is typically one to two years. During this timeframe, Duke Energy reviews the new requirement(s) and updates the internal compliance program. The process to review and update the program includes participation by all NERC impacted groups. Duke Energy also conducts benchmarking to share best practices with peers in our industry to understand the impact.

Duke Energy Carolinas
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Docket No. E-7, Sub 1214

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The attached response to North Carolina Public Staff Data Request No. 225-14, was provided to me by the following individual(s): Karen Ann Ralph, Lead Planning & Regulatory Support Specialist, and was provided to North Carolina Public Staff under my supervision.

Camal O. Robinson
Associate General Counsel
Duke Energy Carolinas

North Carolina Public Staff
Data Request No. 225
DEC Docket No. E-7, Sub 1214
Item No. 225-14

Request:

14. Is it witness Oliver's position that the FERC cybersecurity standards are inadequate to protect against cybersecurity threats?

Response:

No. Current standards focus on the Bulk Electric System. The distribution assets being deployed to optimize and modernize the grid do not meet the FERC threshold for bulk electric system assets. Our approach to cybersecurity aligns with the NIST Cybersecurity Framework which provides guidance for companies across all critical infrastructures sectors.

Duke Energy Carolinas
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The attached response to North Carolina Public Staff Data Request No. 225-15, was provided to me by the following individual(s): Karen Ann Ralph, Lead Planning & Regulatory Support Specialist, and was provided to North Carolina Public Staff under my supervision.

Camal O. Robinson
Associate General Counsel
Duke Energy Carolinas

North Carolina Public Staff
Data Request No. 225
DEC Docket No. E-7, Sub 1214
Item No. 225-15

Request:

15. Given the dynamic nature of FERC cybersecurity standard revisions and the amount of revision specifically to FERC cybersecurity revisions/new standards, would it be prudent to install new equipment that may be above and beyond the FERC requirements, or perhaps not meet the FERC requirement?

Response:

Current FERC Cybersecurity standards focus on the Bulk Electric System. The distribution assets being deployed to optimize and modernize the grid do not meet the FERC threshold for bulk electric system assets, however they are vulnerable to cybersecurity threats.
Our approach to cybersecurity aligns with the NIST Cybersecurity Framework which provides guidance for companies across all critical infrastructures sectors. We believe it is in the best interests of our customers, our country, our company, and our industry to be proactive mitigating risks to our assets while we work with our regulators to develop and/or revise standards.

Duke Energy Carolinas
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The attached response to North Carolina Public Staff Data Request No. 225-16, was provided to me by the following individual(s): Karen Ann Ralph, Lead Planning & Regulatory Support Specialist, and was provided to North Carolina Public Staff under my supervision.

Camal O. Robinson
Associate General Counsel
Duke Energy Carolinas

North Carolina Public Staff
Data Request No. 225
DEC Docket No. E-7, Sub 1214
Item No. 225-16

Request:

16. On page 20, witness Oliver says that sensitivity analyses were not contemplated as a required function of the CBA process due to the concept of AACE estimate classes and the amount of combined operational and customer benefits. Please respond to the following question.
a. Did DEC find any issues or errors with the sensitivity analyses conducted in Public Staff witness Thomas' testimony in Tables 3, 4, 8 and 9? If so, please provide details as to any issues or errors found.

Response:

a. Duke Energy did not review the sensitivity values for errors in calculation; the Company will assume those are conducted accurately. However, there are certain issues with the assumptions of those sensitivity analyses:
i. For SOG (tables 3 and 4), there is no basis for projecting a 30% reduction in vegetation outages. In witness Oliver's rebuttal testimony, he explains that the potential reduction to vegetation related outages in the SOG'd portions of circuits would be approximately 2% once the 5/7/9 cycle is achieved. This 2% reduction in vegetation related outages would therefore have small impact on the fault rate used in the SOG CBA.
ii. For SOG and IVVC cost sensitivities (tables 8 and 9), there is no basis for utilizing the bounds of -50%/+100%. As stated in Duke Energy's response to PS DR 138-11, all estimates have an expectation of their maturity range that would place them in approximately the same accuracy range (-20% to +30%) regardless of AACE estimate class due to the overlapping nature of those ranges from Class 3 to Class 5. Given this, a much more indicative range selection of sensitivities for both the SOG and IVVC estimates would be -30% and -20% on the low side with +30% and +50% on the high side.

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The attached response to North Carolina Public Staff Data Request No. 225-17, was provided to me by the following individual(s): Karen Ann Ralph, Lead Planning & Regulatory Support Specialist, and was provided to North Carolina Public Staff under my supervision.

Camal O. Robinson
Associate General Counsel
Duke Energy Carolinas

North Carolina Public Staff
Data Request No. 225
DEC Docket No. E-7, Sub 1214
Item No. 225-17

Request:

17. On page 21, witness Oliver discusses the ICE model, stating that "the underlying data supporting the model is based on extensive utility customer surveys and has been validated multiple times through on-going updates by LBNL/Nexant." Please respond to the following questions.
a. The 2009 and 2015 LBNL Reports cited in witness Thomas' testimony were meta-analyses of existing data, meaning that the underlying surveys were aggregated and findings summarized. Please describe DEC's understanding of the "validation" process of the underlying data undertaken by LBNL and Nexant. Particularly, this response should summarize, with citations to relevant LBNL and Nexant reports, how the underlying data was "validated" and why witness Thomas' concerns about bias in the underlying data is not applicable.
b. When DEC uses the terms "validated multiple times" and "on-going updates by LBNL/Nexant", is it referring to any other interruption cost reports or updates beyond the 2009 and 2015 LBNL Reports cited in witness Thomas' testimony? If so, please provide those studies.

Response:

a. Each subsequent revision to the methodology of capturing a means to quantify customer reliability benefit values provides an additional measure of validation and improvement. Duke Energy is presuming the original statistical model development for providing a valuation process for customer reliability using a meta-analysis of the multiple utility surveys was presented in a 2003 report titled A Framework and Review of Customer Outage Costs: Integration and Analysis of Electric Utility Outage Cost Surveys1. These original findings were expanded upon in the 2009 report Estimated Value of Service Reliability for Electric Utility Customers in the United States2 with page xvi outlining improvements to the original study. Similarly, the 2015 follow-up Updated Value of Service Reliability Estimates for Electric Utility Customers in the United States3 page xi notes additional improvements to the product and process. In addition, LBNL continues to evolve the ICE Calculator as noted on their website4 regarding subsequent modifications to their underlying econometric model.
Addressing the bias concerns witness Thomas notes, specifically regarding certainty, region-specificity and verifiability, Duke Energy has noted their confidence that the ICE survey data as provided is appropriate to allow a reasonable interpretation of the relative customer value related to outage reduction.
b. Reference (a) above for all items considered.
1 Lawton, L., M. Sullivan, K. Van Liere, A. Katz, and J. Eto (2003). A Framework and Review of Customer Outage Costs: Integration and Analysis of Electric Utility Outage Cost Surveys. Lawrence Berkeley National Laboratory Report No. LBNL-54365.

2 Sullivan, M.J., M. Mercurio, and J. Schellenberg (2009). Estimated Value of Service Reliability for Electric Utility Customers in the United States. Lawrence Berkeley National Laboratory Report No. LBNL-2132E.
3 Sullivan, M.J., J. Schellenberg, and M. Blundell (2015). Updated Value of Service Reliability Estimates for Electric Utility Customers in the United States. Lawrence Berkeley National Laboratory Report No. LBNL-6941E.
4 https://icecalculator.com/recent-updates

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Date of Request: **March 6, 2020**
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The attached response to North Carolina Public Staff Data Request No. 225-18, was provided to me by the following individual(s): Karen Ann Ralph, Lead Planning & Regulatory Support Specialist, and was provided to North Carolina Public Staff under my supervision.

Camal O. Robinson
Associate General Counsel
Duke Energy Carolinas

North Carolina Public Staff
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Item No. 225-18
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Request:

18. On page 21, witness Oliver discusses the ICE model, stating that "The Company was able to pair detailed project related outage and customer data with the published ICE survey data to calculate customized individual project and program estimated customer savings." Did this process involve validating the cost per interruption figures published in the LBNL study with the cost per interruption quantified by actual DEC customers? If so, please provide all supporting documentation and work papers supporting this process.

Response:

No, this process did not imply comparison of cost per interruption figures. The detailed project related outage and customer data referenced is the historical outage information specific to the circuit/project scope along with the specific customers impacted. This is information contained within each individual CBA. This project specific data was used in conjunction with corresponding ICE data to determine the relative customer outage benefits.

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The attached response to North Carolina Public Staff Data Request No. 225-19, was provided to me by the following individual(s): Karen Ann Ralph, Lead Planning & Regulatory Support Specialist, and was provided to North Carolina Public Staff under my supervision.

Camal O. Robinson
Associate General Counsel
Duke Energy Carolinas

North Carolina Public Staff
Data Request No. 225
DEC Docket No. E-7, Sub 1214
Item No. 225-19

Request:

19. On page 22, witness Oliver states that the Company intends to track the actual customer reliability benefits from GIP programs by measuring CI and CMI saved for each program compared to expected CI and CMI. How will DEC control for other factors that influence CI and CMI (i.e., changes in vegetation management, number of storms, number of vehicular accidents, etc.) when verifying benefits?

Response:

Storm impacts that exceed MED thresholds can be tracked separately and excluded from non MED impacts. When measured at a jurisdictional level, annual variability of vehicle accidents is normalized and will likely even out over a multi-year period. Increased Vegetation Management will reduce outage events. However, the effect is generally small for the GIP program benefits. See Oliver Rebuttal page 33 line 4 – 13.

Duke Energy Carolinas
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The attached response to North Carolina Public Staff Data Request No. 225-20, was provided to me by the following individual(s): Karen Ann Ralph, Lead Planning & Regulatory Support Specialist, and was provided to North Carolina Public Staff under my supervision.

Camal O. Robinson
Associate General Counsel
Duke Energy Carolinas

North Carolina Public Staff
Data Request No. 225
DEC Docket No. E-7, Sub 1214
Item No. 225-20

Request:

20. On page 24, witness Oliver states "The significant cost, resource, and time requirements of conducting such a study without a guarantee of greater statistical value seems unwarranted at this time." Please respond to the following questions.
a. Please provide an approximate estimate of the cost of conducting a limited interruption cost study, as recommended by witness Thomas.
b. Please explain when and under what circumstances the Company believes that updating the customer survey data would be warranted.

Response:

a. Without having discussions with leading Value of Service survey providers, it would be speculation at best to provide an estimate. However, the closest analogy found in industry publications is related to a similar survey process for quantifying long-duration customer outage values. In the discussion of time and costs required to produce a comprehensive WTP/direct-cost study, Roark (EPRI) estimates such a study "can cost $1 million or more for a large service territory and take a year to complete."1 Given the task of applying this methodology to additional durations and customer types, as well as comparing against any large, complex consultant engagement, this range of cost and time period would seem conservatively appropriate.
B. The Lawrence Berkeley National Laboratory: Updated Value of Service Reliability Estimates for Electric Utility Customers in the United States executive summary on page xi highlights the updates made in the 2015 report. The Company believes these were sound reasons to refresh the previous report information.

1Roark, J. (2018). Evaluating Methods of Estimating the Cost of Long-Duration Power Outages. In P. H. Larsen, A. H. Sanstad, K. H. LaCommare, & J. H. Eto (Eds.), Frontiers in the Economics of Widespread, Long-Duration Power Interruptions: Proceedings from an Expert Workshop (Draft). Berkeley, CA.

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The attached response to North Carolina Public Staff Data Request No. 225-21, was provided to me by the following individual(s): Karen Ann Ralph, Lead Planning & Regulatory Support Specialist, and was provided to North Carolina Public Staff under my supervision.

Camal O. Robinson
Associate General Counsel
Duke Energy Carolinas

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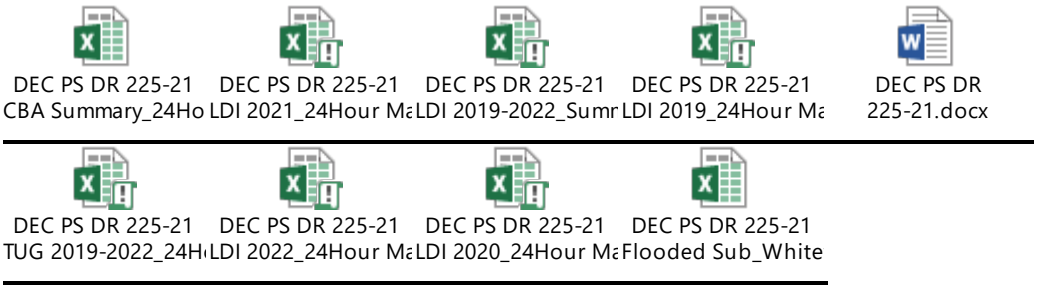
Item No. 225-21
Page 1 of 1

Request:

21. On page 25, witness Oliver states that capping the interruption costs at the 24-hour maximum value appears to "have a minor impact on the overall reliability benefit totals."
a. Please provide an estimate quantifying the total reduction in benefits resulting from this analysis for each individual GIP program impacted by capping the interruption costs of outages exceeding 24 hours (TUG, Whiteville substation replacement, and LDI). Please include all supporting work papers.
b. Please define what the Company considers a "minor impact".

Response:

See attachments.



Duke Energy Carolinas
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The attached response to North Carolina Public Staff Data Request No. 225-22, was provided to me by the following individual(s): Karen Ann Ralph, Lead Planning & Regulatory Support Specialist, and was provided to North Carolina Public Staff under my supervision.

Camal O. Robinson
Associate General Counsel
Duke Energy Carolinas

North Carolina Public Staff
Data Request No. 225
DEC Docket No. E-7, Sub 1214
Item No. 225-22

Request:

22. On pages 27-28, witness Oliver defends the inclusion of avoided capacity benefits, stating that these capacity benefits are not part of formal EE/DSM programs, and should not be subject to timing constraints for delivery of capacity. Further, witness Oliver states that SOG and IVVC capacity deferral is not intended to offset the capacity needs in the IRP. Please respond to the following question.
a. Please confirm or deny that DEC would consider new, incremental DSM programs to only include avoided capacity benefits in years after the first year the IRP shows a capacity need, consistent with new solar facilities selling their output under E-100, Sub 148 or E-100, Sub 158 avoided cost rates.

Response:

Deny. While the proposed IVVC in DEC is not a formal EE/DSM program, capacity value is given in year one of implementation regardless of generation need, just like any demand-side management program. In the economic analysis performed in Fall 2018 supporting IVVC in DEC, capacity value was given in the first year of IVCC implementation and therefore not intended to offset DEC capacity needs in the IRP.

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The attached response to North Carolina Public Staff Data Request No. 225-23, was provided to me by the following individual(s): Karen Ann Ralph, Lead Planning & Regulatory Support Specialist, and was provided to North Carolina Public Staff under my supervision.

Camal O. Robinson
Associate General Counsel
Duke Energy Carolinas

North Carolina Public Staff
Data Request No. 225
DEC Docket No. E-7, Sub 1214
Item No. 225-23

Request:

23. On pages 29-32, witness Oliver discusses the momentary outage issue in SOG identified by witness Thomas. Please respond to the following questions.
a. Please clarify the Company's position on momentary outages on a SOG circuit. The Public Staff understands witness Oliver's testimony to be stating that momentary interruptions caused by fault restoration activity on a circuit are present both with and without SOG, and therefore were ignored in this comparative analysis. If the Public Staff's understanding is not accurate, please clarify.
b. The Company assumed 2.7 momentary outages for each sustained outage in its historical dataset, which was then quantified as an avoided momentary outage benefit. Do these 2.7 momentary outages avoided per sustained outage include momentary outages resulting from protective devices attempting to clear faults on the system during a fault, described as "momentary blinks" in witness Oliver's testimony (page 30, line 12)?
i. If not, please describe how the Company calculated the 2.7 figure to specifically exclude these types of momentary outages.
ii. Please explain how customers on a SOG circuit "avoid" a momentary outage from a temporary fault, if they will nonetheless experience a momentary outage during the circuit reconfiguration process?
c. Does the Company disagree with the analysis presented in the LBNL FLISR Document included as Thomas Exhibit 5? If so, please highlight the relevant differences between SOG and FLISR and explain why the LBNL FLISR Document example does not apply to SOG.

Response:

a. The Public Staff's understanding is not accurate. There are no momentary outages caused by fault restoration activity on an SOG circuit.

b.Yes, the 2.7 figure, includes momentary outages resulting from protective devices attempting to clear faults on the system during a fault. Customers on SOG circuits avoid momentary outages from temporary faults via additional protective segmentation devices, which reduce the number of customers exposed to momentary outages (see Oliver Rebuttal page 32, before and after SOG figures).

c.The Company does not disagree with the LBNL FLISR document.

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The attached response to North Carolina Public Staff Data Request No. 225-24, was provided to me by the following individual(s): Karen Ann Ralph, Lead Planning & Regulatory Support Specialist, and was provided to North Carolina Public Staff under my supervision.

Camal O. Robinson
Associate General Counsel
Duke Energy Carolinas

North Carolina Public Staff
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Item No. 225-24
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Request:

24. The following questions refer to the figure at the top of page 31 of witness Oliver's rebuttal testimony.
a. Please confirm that the horizontal axis of each chart represents time (i.e., moving from left to right is progressing forward in time). The remaining questions assume this response is in the affirmative.
b. Please confirm or deny that the duration of the "Fault isolation and circuit reconfiguration" open state in the After SOG graph is longer in duration than the open states that occur immediately after the fault occurs on both graphs (described as "momentary blinks" on page 30, line 12).
c. Would DEC agree with the statement that the "Sustained Outage" on the Before SOG graph is replaced with a new momentary outage (labeled "Fault isolation and circuit reconfiguration") on the After SOG graph? If not, please explain why not.
d. On the After SOG graph, does DEC consider the "momentary blinks" and the "fault isolation and circuit reconfiguration" to be one single momentary outage?

Response:

a. Confirmed
b. Confirmed
c. DEC would consider this as shortening a sustained outage vs creating a new momentary outage.
d. In this case it would be multiple momentary outages.

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The attached response to North Carolina Public Staff Data Request No. 225-25, was provided to me by the following individual(s): Karen Ann Ralph, Lead Planning & Regulatory Support Specialist, and was provided to North Carolina Public Staff under my supervision.

Camal O. Robinson
Associate General Counsel
Duke Energy Carolinas

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Item No. 225-25
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Request:

25. On page 34 of witness Oliver's testimony, he discusses the SOG CMI saved on Self-Healing Network installations during MED events on 2/6/2020 and 2/7/2020. Please provide a narrative explaining how these benefits were estimated as well as supporting documentation and work papers for the SOG CMI savings of 5 million in DEC and 5.3 million in DEP.

Response:

In DEC there were 7 self-healing events during the time period in question that resulted in customer savings. In DEP there were 17 self-healing events that resulted in customer savings. The spreadsheet named "DEC PS DR 225-25.xlsx" includes the supporting documentation requested.

DEC PS DR
225-25.xlsx

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The attached response to North Carolina Public Staff Data Request No. 225-26, was provided to me by the following individual(s): Karen Ann Ralph, Lead Planning & Regulatory Support Specialist, and was provided to North Carolina Public Staff under my supervision.

Camal O. Robinson
Associate General Counsel
Duke Energy Carolinas

North Carolina Public Staff
Data Request No. 225
DEC Docket No. E-7, Sub 1214
Item No. 225-26

Request:

26. On page 38 of witness Oliver's testimony, he states that the costs of software and communication network replacement costs identified by witness Alvarez should not be included in projected capital costs associated with GIP. Please respond to the following questions.
a. Irrespective of whether these costs should be included in the capital projections in Oliver Exhibit 10, does DEC believe the $1.1 billion in replacement costs identified by Alvarez is a realistic estimate? Why or why not?
b. Assuming that these replacement costs do exist, whether or not they are equal to $1.1 billion, does DEC believe that excluding these replacement costs from the GIP proposal presents the Commission and interveners with an accurate estimate of total costs to ratepayers associated with implementing the GIP? Why or why not?

Response:

Response:
a. No, this estimate is not realistic. Duke Energy's portfolio of communications network assets have a variety of useful lives (NCJC DR 5-3), many of which are beyond the ten years assumed by Witness Alvarez. In Alvarez Exhibit 10 for example, 60 % of the communication network assets are Mission Critical Transport assets (such as Fiber and Microwave) or Towers Shelters assets which typically have useful lives in the twenty to thirty-year range. Duke Energy responsibly operates and maintains its communications network assets such that in some cases, the useful life of a particular asset may exceed what is more typically expected.

b. Yes, replacement cost should be included in a lifecycle estimate of total costs utilizing assumptions that appropriately reflect the asset makeup of the subject analysis. However, as noted in response to question a. above, many of the communication network assets included have useful lives that fall beyond the three-year period of this rate filing and as such, will be included in future rate filings. Existing Duke Energy communication network assets have been maintained in a manner allowing operation well beyond useful life; this exemplifies that these asset classes are proper and prudent investments and serve the ratepayers beyond the depreciated lifespan.
Further, in Witness Thomas' testimony, he states that there are certain factors where a project may be presumptively justified and therefore not require detailed cost-benefit analysis but is essential for modern system operations. Witness Thomas further states that this generally applies to programs under the "Modernize" category, specifically referencing programs such as Duke Energy's Enterprise Communications as being included (Thomas Rebuttal Testimony, February 18, 2020, page 13, lines 4 through 11

including footnote 10).
Therefore, based on the above responses to a. and b., no, the $1.1 billion in replacement costs identified is not a realistic estimate of total costs of the communications network assets.

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The attached response to North Carolina Public Staff Data Request No. 225-27, was provided to me by the following individual(s): Karen Ann Ralph, Lead Planning & Regulatory Support Specialist, and was provided to North Carolina Public Staff under my supervision.

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Associate General Counsel
Duke Energy Carolinas

North Carolina Public Staff
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Request:

27. On page 48, witness Oliver discusses the Transformer Bank Replacement program. If accounting deferral is not granted for this program, please describe the estimated impact on deployment. This discussion should, at a minimum, address the following:
a. How many fewer transformer banks would be replaced annually compared to the amount estimated in the CBA;
b. The number of transformers currently kept on hand in inventory (not placed in service), the average age of "on hand" inventory, and how the deferral denial will impact this inventory and future purchases of transformers;
c. The estimated reduction in annual spend as a result of the deferral denial;
d. How DEC would determine where the reduced number of transformer replacements would be deployed (i.e., whether DEC would modify its replacement threshold for its Dissolved Gas Analysis test); and
e. The estimated reduction in customer benefits as a result of the reduced program scope, if any.

Response:

a-e. Please see response to Public Staff Data Request 225-1d.

Duke Energy Carolinas
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The attached response to North Carolina Public Staff Data Request No. 225-28, was provided to me by the following individual(s): Karen Ann Ralph, Lead Planning & Regulatory Support Specialist, and was provided to North Carolina Public Staff under my supervision.

Camal O. Robinson
Associate General Counsel
Duke Energy Carolinas

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Item No. 225-28
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Request:

28. On page 49, witness Oliver discusses the Oil Breaker Replacement program. If accounting deferral is not granted for this program, please describe the estimated impact on deployment. This discussion should at a minimum, address the following:
a. How many fewer oil circuit breakers, broken down by transmission and distribution, would be replaced annually compared to the amount estimated in the CBA;
b. The number of gas and vacuum circuit breakers currently kept on hand in inventory (not placed in service), the average age of on hand inventory, and how the deferral denial will impact this inventory and future purchases of gas and vacuum circuit breakers;
c. The estimated reduction in annual spend as a result of the deferral denial;
d. How DEC would determine where the reduced number of vacuum and gas circuit breakers would be deployed (i.e., whether a new replacement threshold based upon inspection and test results would be appropriate); and
e. The estimated reduction in customer benefits as a result of the reduced program scope, if any.

Response:

a-e. Please see response to Public Staff Data Request 225-1d.

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The attached response to North Carolina Public Staff Data Request No. 225-29, was provided to me by the following individual(s): Karen Ann Ralph, Lead Planning & Regulatory Support Specialist, and was provided to North Carolina Public Staff under my supervision.

Camal O. Robinson
Associate General Counsel
Duke Energy Carolinas

North Carolina Public Staff
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Request:

29. On page 58, witness Oliver states that delaying certain programs in the GIP could "hinder the ability of ISOP to deliver its intended benefits." Please respond to the following questions.
a. What benefits of ISOP would be impacted by the delayed rollout of the programs cited?
i. Please provide specific examples of how ISOP benefits would be reduced or hindered as a result of such a delay. This response should address, at a minimum, the five key ISOP elements identified in Duke Energy's January 21, 2020 ISOP Workshop Joint Report (enhanced forecasting, advanced distribution planning, non-traditional solutions, generation-transmission-distribution coordination, and feed-in to IRP) and how they would be impacted by a delay in GIP implementation.
b. Prior to the filing of witness Oliver's Rebuttal testimony, has Duke Energy ever taken the position or informed stakeholders or the Commission that the rollout of ISOP is in any way contingent on the GIP being deployed in the proposed three-year timeline, or being granted accounting deferral?
i. If yes, please provide all communications.
ii. If no, please explain why not.

Response:

a. The ability to deploy non traditional solutions would be impacted. A system with greater ability to support two way power flow and automation is better suited to support non traditional solutions.

b. No. The roll out of ISOP is not contingent upon the GIP being deployed. However, certain benefits of ISOP may be enhanced by the roll out of GIP.