STATE OF NORTH CAROLINA
UTILITIES COMMISSION
RALEIGH

DOCKET NO. E-100, SUB 157

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

In the Matter of 2018 Integrated Resource Plans and Related 2018 REPS Compliance Plans	)	ORDER ACCEPTING SMART GRID TECHNOLOGY PLANS AND REQUIRING ADDITIONAL INFORMATION

BY THE COMMISSION: On October 1, 2018, Dominion Energy North Carolina (DENC), Duke Energy Carolinas, LLC (DEC), and Duke Energy Progress, LLC (DEP) filed their Smart Grid Technology Plans (SGTPs). Collectively, DENC, DEC and DEP are referred to hereinafter as the electric utilities.

After several requests for extensions of time to file comments, which the Commission granted, comments were filed by the parties. On December 17, 2018, the Environmental Defense Fund (EDF) filed comments. The Public Staff, North Carolina Sustainable Energy Association (NCSEA), and NC WARN each filed comments on January 16, 2019. On February 6, 2019, reply comments were filed by DENC, jointly by DEP and DEC (Duke), and by the Attorney General's Office (AGO).

Background

By Orders dated April 11, 2012, and May 6, 2013, in Docket No. E-100, Sub 126, the Commission amended rules requiring electric utilities that file integrated resource plans (IRPs) to include in their IRPs information on how planned "smart grid" deployment would impact the utilities' resource needs. Commission Rule R8-60.1 requires the electric utilities to file SGTPs every two years, with updates in the intervening years. The initial SGTPs were filed by the electric utilities on October 1, 2014. The Commission, in its Order dated November 5, 2015 (2015 Order), approved these 2014 SGTPs. In addition to approving the SGTPs, the Commission ordered: (1) DEC, DEP, and DENC to address in their 2016 SGTPs whether the Commission's Rules require updating to address customer and third-party access to usage data, and (2) DEC to address the issue of Advanced Metering Infrastructure (AMI) opt-outs relative to its current and planned AMI deployments by December 1, 2015.

The Commission stated in the 2015 Order that SGTP proceedings are intended to be informative, and that the Commission does not anticipate using them to order utilities to make specific smart grid investments. Further, the Commission stated that SGTP

proceedings are not a means by which utilities should seek to secure advance prudency reviews of smart grid investments.[1]

By Order dated June 13, 2016, in Docket No. E-100, Sub 126, the Commission amended Rules R8-60(i)(10) and R8-60.1, stating that the amended rules will better focus the SGTP proceedings as an informative effort to assist the Commission and parties in anticipating the potential impact of new technologies on customers.

Rule R8-60.1(c) states that

> For purposes of this Rule, smart grid technologies are as set forth in Rule R8-60(i)(10) and shall also include those that provide real-time, automated, interactive technologies that enable the optimization and/or operation of consumer devices and appliances, including metering of customer usage and providing customers with options to control their energy consumption.

Rule R8-60.1(c) lists the information to be included in each utility's SGTP. In summary, the rule requires a description of the technologies, goals, and objectives of each technology, the status and timeframe for completion of the project, and cost information. In addition, Rule R8-60.1(c)(7) requires additional details about plans and ongoing deployments of AMI.

On March 7, 2018, in Docket No. E-100 Sub 147, the Commission issued its Order Accepting DENC's and DEC's SGTP Updates, Requiring Additional Information from DEP, and Directing DEC and DEP to Convene a Meeting Regarding Access to Customer Usage Data (March 7, 2018 Order), ordering DEP to file within three months a revised AMI cost-benefit analysis, and ordering Duke to convene meetings with NCSEA, the Public Staff, and other interested parties to discuss guidelines for access to customer usage data, and to reflect the results of these stakeholder discussions in its 2018 SGTP reports.

The Commission issued two orders on June 22, 2018, related to the deployment of smart meters and customer data. In its Order Accepting Stipulation, Deciding Contested Issues and Requiring Revenue Reduction in Docket No. E-7, Sub 1146, the Commission required DEC to "collaborate with intervening parties, through the generic and DEC-specific Integrated Resource Planning and Smart Grid Technology Plan docket, toward the goal of resolving some or all of the issues surrounding grid modernization and the most appropriate cost recovery mechanism for such costs." In its Order Approving Manually Read Meter Rider with Modifications and Requesting Meter-Related Information in Docket Nos. E-7, Sub 1115, and E-100, Subs 147 and 153, (June 22, 2018 Orders), the Commission required DEC to include in its SGTP details on its smart meter

[1] It should be noted, however, that N.C.G.S. § 62-42 grants the Commission authority to order an investor-owned utility to make equipment improvements if necessary to assure that customers receive adequate and sufficient electric service.

malfunctions or problems, the number of customers enrolling in its smart meter opt-out rider (Rider MRM), and a verified statement providing its smart meter data privacy procedures.

On October 1, 2018, DENC, DEC, and DEP filed their Smart Grid Technology Plans. The Smart Grid Technology Plan filed by each utility responded to the amended requirements of R8-60.1(c)(1-7), and also addressed the provisions required by the Commission in its 2015 Smart Grid Order.

Summary of Smart Grid Technology Plans

Duke Energy Carolinas

Similar to its 2016 SGTP and 2017 update to its SGTP, DEC continues to outline broad categories of smart grid technologies it plans to implement over the next five years, along with the projects each encompasses. Those categories are:

1) Physical and Cyber Security – to address security risks associated with transmission and distribution assets
2) Self-Optimizing Grid – to allow the grid to quickly respond to problems and self-heal
3) Distribution System Modernization, Automation, and Intelligence – to protect the grid and customers from unsafe voltage and current levels
4) Transmission System Modernization, Automation and Intelligence – to provide quicker response to outage situations and more intelligent analysis of grid assets to determine maintenance and repair needs
5) Communications – to modernize and secure critical communications infrastructure between grid management, data and control systems, and monitoring
6) Energy Storage – to facilitate the integration of storage assets and microgrids
7) AMI – to create a two-way communication platform and provide customers with better access to usage data
8) Customer Programs – to provide customers the tools and data to enable them to make informed choices about their energy consumption

DEC also discussed several projects that had been completed since the 2016 SGTP, including:

1) Large Commercial & Industrial and Special Meter AMI Conversion
2) Yukon Feeder Automation Upgrade
3) IVVC (Integrated Volt-Var Control) Pre-Scale Deployment
4) Distributed Energy Resources Management System
5) Self-Healing Networks
6) Charlotte Automation & Integration Pre-Scale Deployment
7) Small Electronic Sectionalization Device (Fuse Save) Proof of Concept

8) Usage Alerts
9) Pick Your Due Date

DEC also identified several projects under consideration or being piloted, including a broader deployment of the IVVC system, battery storage, and microgrids across the DEC service territory, such as Rankin Hybrid Energy Storage, Marshall Energy Storage, McAlpine Solar DC Coupled Energy Storage, Kilowatt Labs Super Capacitor Evaluation, Tesla PowerPack 2 Energy Storage System, Residential Energy Storage, Pika Energy Storage, and Zero Net Energy Homes.

With regard to AMI deployment, DEC indicated that as of August 2018, it has installed 860,562 smart meters in North Carolina and expects to complete its smart meter deployment in 2019. DEC indicated that these smart meters were being used to provide remote meter reading capabilities, remote connections/disconnections, more usage data, tamper-detection, and power quality data.

With respect to the AMI information required by the June 22, 2018 Orders, DEC provided a verified statement regarding its policies on customer data privacy and indicated that it had not observed any incidents related to fire, power outage, interference with other devices, or inaccurate bills due to its deployment of AMI meters. DEC also indicated that as of October 1, 2018, no customer had yet enrolled in Rider MRM.[2]

Duke Energy Progress

DEP's Smart Grid Plan was similar to DEC's in content and format. DEP's list of broad categories and many of the projects identified under each category were the same as those identified for DEC. The few notable differences in the projects listed were mainly associated with DEP's deployment of the Distribution System Demand Response (DSDR) program and other DEP-specific applications.

DEP also identified seven projects that it had completed since its 2016 SGTP, including:

1) Self-Healing Network
2) Yukon Feeder Automation Upgrade
3) Raleigh Urban Underground pilot
4) Mount Sterling Microgrid
5) DSDR

DEP also identified two smart grid technologies that were actively under consideration, including its Western Carolinas Energy Storage Analysis and Deployment Plan, in which DEP committed to working with its customers in the DEP-Western Region

[2] The Public Staff noted that DEC began implementation of Rider MRM on October 1, 2018. As of October 22, 2018, DEC had approximately 7,100 customers that had been bypassed during the AMI deployment.

to provide access to demand-side management (DSM), energy efficiency, or other customer programs, and its efforts to construct at least 15 MW of solar and 5 MW of storage capacity.

Like DEC, DEP included the same discussion regarding its ongoing work with microgrids and energy storage, citing the same projects as DEC did in its SGTP with one addition, the AMSC Mini-D_VAR M-Series Device.

With regard to AMI deployment, DEP indicated that as of August 2018, the Company has installed 194,663 smart meters in North Carolina. DEP's major deployment of AMI began earlier in the spring of 2018. DEP indicated that these smart meters were being used to provide remote meter reading capabilities, more usage data, remote connections/disconnections, and tamper-detection.

Pursuant to the March 7, 2018 Order, DEP filed a revised AMI cost-benefit analysis on June 4, 2018, and discussed the basis for each of the updated inputs used to calculate the updated costs.

Dominion Energy North Carolina

DENC's Smart Grid Plan was framed around Virginia Electric and Power Company's filing in Virginia of its Grid Transformation Plan (GTP).[3] The GTP is the three-year initial phase of a 10-year effort to modernize and strengthen the transmission and distribution grid, as well as to integrate renewable generation and provide more energy information to customers. According to DENC, major components of the GTP include:

1) Smart Meters
2) New Customer Information Platform
3) Improvements to Grid Reliability and Resiliency
4) Physical and Cyber Security Mitigation
5) Promotion of Connection of Renewable Generation
6) Use of Predictive Analytics
7) Telecommunications

DENC stated that the GTP should exert a strong influence on how DENC deploys some or all of these smart grid technologies in North Carolina. However, DENC has not yet made any commitment on deployment in North Carolina. The Virginia State Corporation

[3] See Dominion Energy Virginia's July 24 2018 filing in Docket No. PUR-2018-00100 with the Virginia State Corporation Commission.

http://www.scc.virginia.gov/docketsearch#caseDocs/138777.

This filing was made pursuant to the Grid Transformation and Security Act of 2018 (SB 966, 2018 Virginia Acts of the Assembly Chapter 296, enacted March 9, 2018).

https://lis.virginia.gov/cgi-bin/legp604.exe?181+ful+SB966

Commission (VSCC) in its January 17, 2019 GTP Order (Case No. PUR-2018-00100) concluded:

> In summary, we agree that smart meters and other grid enhancements hold the promise for a true transformation of the grid and for the more efficient consumption of electricity, but spending billions of dollars of customers' money on full deployment is reasonable and prudent only if the expenditure is accompanied by a sound and well-crafted plan to fulfill the promise that smart meter technology and other grid enhancements offer. Our ruling allows Dominion to propose such a plan in the future. We approve herein reasonable spending related to Cyber and Physical Security, including supporting Telecommunications investment, but otherwise do not find the remaining components of the Company's proposed Phase I Plan to be reasonable and prudent based on the record in this proceeding.

GTP Order, at 15.

DENC also listed three pilot projects (NC Solar Study, Solar Partnership, and an Electric Vehicle Pilot) that are currently underway. Two other pilot projects (NC Microgrid Demonstration and the Dynamic Pricing Pilot) have been closed.

With regard to AMI deployment, DENC indicated that as of August 2018, the Company has installed 5,200 smart meters in North Carolina. DENC indicated that these smart meters were being used to provide remote meter reading capabilities, remote connections/disconnections, outage and restoration notifications, and tamper-detection.

COMMENTS AND REPLY COMMENTS

Comments of the Public Staff

The Public Staff stated that the Smart Grid Plans for DEC, DEP, and DENC generally comply with the filing requirements of Commission Rule R8-60.1 and the various orders of the Commission regarding smart grid plans. The Public Staff further stated that since the 2016 Smart Grid Plans, all three electric utilities have initiated major efforts to modernize their transmission and distribution grids. As the Commission indicated in the 2015 Smart Grid Order, the Smart Grid Plans are intended to be informative. The Public Staff opined that while more detailed information may be needed for a specific smart grid project, the overall Smart Grid Plans continue to serve the purpose of providing general information on each Company's smart grid investments. The Public Staff's review was conducted with the same general approach.

As stated in Rule R8-60.1(d)(3), acceptance of a Smart Grid Plan does not constitute approval for the purposes of cost recovery for any specific program in the Plan. Rapidly changing technology and continued amendments to the Smart Grid Plans makes a prudency review for cost recovery purposes inappropriate at this time. Therefore, the Public Staff noted that no prudency review was conducted to justify any of the smart grid

projects that had been completed, were underway, or were under consideration for future deployment. The Public Staff stated that such a review would occur in a future rate case proceeding when the Companies would seek to recover the costs of an individual project. At that time, the Public Staff would review the prudence and reasonableness of each project.

Grid Modernization

The Public Staff noted that DEC and DEP's grid modernization efforts are much further along than those of DENC or its Virginia affiliate. DEC and DEP highlighted their respective grid modernization initiatives in their most recent general rate cases. The Public Staff stated that DEC and DEP continue to work toward modernizing their grids using the same basic model, which includes improvements to grid infrastructure designed to create a self-optimizing grid that is responsive to power fluctuations and outages, resistant to physical and cyber security threats, has increased reliability, better accommodates renewable and other distributed generation resources, and provides customers with greater information and choice about their energy consumption. Duke held stakeholder meetings about DEP and DEC's grid modernization efforts on May 17, 2018, and November 8, 2018, and filed reports on each meeting in Docket Nos. E-2, Sub 1142 and E-7, Sub 1146 on June 26, 2018, and January 9, 2019, respectively.

The Public Staff stated that DENC's grid modernization effort in North Carolina appears to be contingent upon how the VSCC rules on the DENC's GTP. The GTP incorporates many of the same types of grid modernization investments as those of DEC and DEP, such as smart meters, a new customer information platform, improvements to grid reliability and resiliency, physical and cyber security, interconnection of renewable and other distributed generation resources, and telecommunications. However, many of these investments may not be made in North Carolina, unless the VSCC rules affirmatively on the GTP. To the extent that the benefits outweigh the costs, the Public Staff opined that DENC should make prudent investments in grid modernization in North Carolina, and provide its customers with the same level of service that customers of DEC and DEP will receive through their respective grid modernization initiatives.

Smart Meter Deployment

The Public Staff stated that DEC should complete its AMI meter deployment some time in 2019. As required by the Commission, DEC filed additional information regarding its AMI meter deployment. The Public Staff stated that those AMI meters are already providing information about the grid's operation and power quality, as well as allowing customers more access to their data, and that the meters are also allowing DEC to remotely connect and disconnect service. DEC's Rider MRM allows customers to opt-out of having an AMI meter. While DEC has approximately 7,100 customers on an AMI bypass list, DEC is working to transition those bypassed customers to service under Rider MRM, which was initiated October 1, 2018. It will be clearer in DEC's 2019 SGTP update as to how many customers ultimately opt-out and sign up for Rider MRM, and how many receive waiver of the fees related to Rider MRM due to health reasons.

DEP has just initiated its effort to deploy AMI meter technology. Like DEC, AMI meters are also providing information about the grid's operation and power quality, allowing customers more access to their data, and allowing DEP to remotely connect and disconnect service. DEP has pending before the Commission a request for approval of an AMI meter opt-out tariff in Docket No. E-2, Sub 834, that is virtually identical to DEC's Rider MRM.[4]

DENC has approximately 5,200 smart meters in use in North Carolina. DENC indicated to the Public Staff that many of these smart meters have been deployed to support monitoring of the grid where there is a high density of distributed solar generation interconnected to the grid. Those meters are likely to continue in service regardless of the outcome of the GTP in Virginia. DENC has not proposed any smart meter opt-out policy. The Public Staff noted that DENC has committed to working with the Public Staff to develop a smart meter opt-out policy if the Company begins a full AMI deployment in North Carolina.

Customer Data Access

The Public Staff stated that DEC and DEP held discussions with interested parties regarding customer data access issues in May 2018 and July 2018. DENC and the Public Staff were among the participants in those meetings. According to the Public Staff, a vibrant discussion ensued with many of the parties expressing frustration with the slow pace of resolving the issues associated with customer data access. These conversations highlighted the need for a better framework to address these issues, including a rulemaking to establish rules regarding data ownership, access to the data, security and privacy, and costs. DEC's Exhibit 2 provides an accurate summary of the meeting held in July 2018.

All three utilities provide customers with direct access to their energy usage data through web-based account management portals. DEC and DENC also provide data in CSV format for those that have AMI meters. DEP indicated that it will have the same level of access and format when its AMI meter deployment is completed. DENC also provides data in the "Green Button" format for those eligible customers with AMI. The level of access and detail of the data is contingent upon the availability of the AMI meters and customer data and management systems. Each of these components plays a part in educating customers about energy consumption and how to use that data to reduce energy usage. The Public Staff stated that these data access and availability tools provide or will provide customers with reasonable access to their data, and that the availability of some new rate schedules will be contingent on the availability of the AMI meters and customer data and management systems. As AMI meters become more available and customer data management systems are updated, utilities should evaluate rate schedule offerings to provide additional options affecting energy consumption. These tools must work in concert so customers may see the near real-time impact of their energy

[4] On May 2, 2019, the Commission issued an order in Docket No. E-2, Sub 834 granting final approval to DEP's opt-out tariff.

consumption decisions. Customers also need the tools and information to make real-time energy consumption decisions to maximize the benefits of these modernizing technologies. The Public Staff continues to support this ongoing process of modernizing metering, customer information systems, and rate schedules. However, testing must be done to ensure that the tools work as intended, followed by customers being informed of the changes and educated on ways they can use these tools to save energy and money.

With respect to the access of customer data by third parties, the Public Staff stated that each utility provides a mechanism or procedure whereby customers can grant third parties access to their energy data. The format of the data available and the channels used to transfer data from the utilities to third parties vary slightly. Each utility requires written customer consent for the release of data to third parties. However, the level of aggregation of customer data that third parties can use to provide other energy-related services and the degree to which the data is “scrubbed” of any customer-specific information remains a subject of debate.

Due to the slow pace of stakeholder process mentioned above, the Public Staff opined that the questions involving data access and availability suggest a need for a rulemaking procedure to create rules that would provide customers or a third party with customer permission appropriate access to customer data, while protecting customers and their personal and energy consumption data. As part of the rulemaking proceeding in Docket No. E-100, Sub 153, related to metering and billing technology, the Public Staff has been analyzing how current Commission rules related to metering, billing, and customer data could be updated to address some of the issues discussed above, including the development of rules that establish a definition of "customer data," who should have access to that data, how access should be granted, customer data protections, liability for parties who breach the confidentiality of data, and who pays for the access. With the deployment of smart meters and a new customer information and billing platform, a greater emphasis on customer data regulation is necessary to ensure that customers understand and have confidence in their energy data and the bill developed from that data, how their data is used and made available to third parties, and who will be responsible for the integrity and security of that data. With the deployment of AMI meters nearly complete in DEC’s territory and in progress in DEP’s territory, this issue should be addressed immediately. Accordingly, the Public Staff believes that the current proceeding in Docket No. E-100, Sub 153, would be an appropriate forum for addressing customers’ rights to new customer usage data that is captured by new technologies and for creating rules for third-party access to customer’s data.

The Public Staff stated that DEC and DEP have undertaken significant steps toward modernizing their transmission and distribution grids. These steps are a beginning of grid modernization that will continue for the next few years. If the VSCC approves the GTP in Virginia, DENC will likely soon begin making similar investments to modernize its grids in both Virginia and North Carolina. In addition, the deployment of smart meter technologies and new customer information systems effort will likely result in a significant increase in the costs of utility service.

Comments of NC WARN

NC WARN stated that Duke's SGTP provides grid technology strategies which include the Power/Forward Carolinas (Power/Forward) grid improvement project, and that much of Duke's Power/Forward grid improvement project is included in their SGTP while a few programs from their Power/Forward project are excluded.

According to NC WARN, the strategic plan(s) in Duke's 2018 IRPs ignore the most cost-effective and environmentally sound solutions to grid reliability in favor of routine infrastructure additions apparently selected to maximize shareholder returns. NC WARN noted that Duke proposes to add only 230 MW of battery storage, even though solar with battery storage is already more cost effective than gas-fired peaker turbine capacity in some parts of the country, and storage prices continue to decline at a rapid pace.

NC WARN stated that Duke asserts that Power/Forward is necessary to support a green energy future, yet Duke proposes no strategy to accelerate green energy adoption, and forecasts that its generation from renewables will reach only 8% by 2033.

NC WARN opined that Duke actually proposes to slow the rate of new utility-scale solar capacity over the next 15 years to about one-quarter the rate of solar additions over the last four years. Duke is also impeding the ability of new non-utility solar projects to include battery storage. Independent solar developers contend that Duke is attempting to extend its monopoly to new projects that would combine battery storage with solar power, and that onerous conditions imposed by the utility make it impossible for the developers to offer economically competitive bids for projects that combine storage and solar.

Moreover, NC WARN stated that Duke Energy Corporation as a whole is well-positioned to benefit financially while evolving from a utility dominated by fossil-fuel expansion to one that joins the market transition to renewables with storage. Implementing battery storage at the point where power is used will increase reliability for all North Carolina communities, by eliminating dependence on wires. It is a more economical and effective solution than Duke's proposal to: (1) build redundant backup transmission lines to meet vulnerable communities' reliability needs, (2) address transmission congestion caused by solar farms being built in remote parts of the state by building more transmission lines or increasing the capacity of existing line, and (3) place some distribution lines underground.

According to NC WARN, in a context where a massive increase in customer-owned solar and storage is the most likely future, a build-out of new conventional infrastructure that is under-utilized, or not used at all, will lead to major stranded costs. In the meantime, the green distributed energy resources that are built would be inefficiently utilized.

Comments of the North Carolina Sustainable Energy Association

Data Access

NCSEA applauds Duke's recognition that customer access to energy usage data is an important part of the future of energy efficiency in North Carolina. However, Duke's proposals fall short of describing and implementing a progressive and modern program which will allow customers to fully utilize the potential of access to their energy usage data.

NCSEA stated that Duke does not show that they will implement the most up-to-date data access protocol for their recently installed customer smart meters within Rule R8-60.1's five-year planning horizon. While NCSEA acknowledges that Duke "facilitated several meetings with NCSEA, Public Staff and other interested parties to discuss guidelines regarding third-party access to customer usage data[,]" NCSEA believes that Duke's summary does not adequately describe the nuance of those meetings. Namely, NCSEA (and other stakeholders) advocated for the Green Button Connect data access protocol (GBC), which is the current industry standard data access protocol.

In the most recent DEC and DEP rate cases (Docket Nos. E-2, Sub 1142 and E-7, Sub 1146), NCSEA witness Michael Murray provided analysis as to why the GBC standard is the current prevailing standard for smart meter data access technology being adopted by investor-owned utilities and is superior to its predecessor offering, the Green Button Download My Data (DMD) standard.

According to NCSEA, in Duke's SGTPs Duke does not make explicitly clear whether their data access system upgrade will follow the GBC or the more-limited DMD standard. However, Duke acknowledges in discovery responses that Duke has recently begun the process to "develop and implement" DMD and is only now studying the effects of GBC. Further, Duke does not state with certainty that either program will be implemented, but acknowledges that DMD, if implemented, will not be rolled out until "late 2019" and indicates that GBC is still in an investigation and analysis phase.

As set forth in the Duke SGTPs, Duke is only planning on utilizing a data access protocol with "functionality similar to the Green Button Download My Data" and that has "functionality consistent with" GBC. These vague statements indicate that Duke does not intend to utilize DMD or GBC, but rather Duke's "version" of one of those two programs. However, DMD and GBC were the programs discussed during the stakeholder meetings and also in previous filings to the Commission (including NCSEA witness Murray). While NCSEA would not categorically object to a program rolled out by Duke, particularly one that is practically identical to the GBC standard, NCSEA does believe that the stakeholders and Commission should know (1) what, if any, differences there are between Duke's programs and the DMD/GBC standards and, (2) if there are no differences, then why did Duke utilize its own program(s) rather than DMD/GBC?

NCSEA encourages the Commission to direct Duke to implement the GBC protocol for its data access program.

Grid Modernization

NCSEA noted that over the past year, the idea of what it means to update and modify the grid has been oft-debated in front of the Commission. Duke introduced the "Power/Forward" proposal in the DEP rate case (Docket No. E-2, Sub 1142). The Commission directed Duke to convene a stakeholder meeting (per a stipulation agreed to between the Public Staff and DEP) on the Power/Forward Proposal in its final order in Docket No. E-2, Sub 1142, and, at those meetings, to describe a comprehensive proposal for Duke's planned "upgrades" to the grid. As evidenced in the stipulation agreed to by NCSEA in Docket No. E-7, Sub 1146, NCSEA was not and is not fundamentally opposed to some of the proposed modernization proposals for the grid in North Carolina. Namely, NCSEA supports advancements in voltage control, hosting capacity analysis and stakeholder input related thereto, electric vehicle investment and infrastructure, and energy storage. In fact, NCSEA would posit that each of these investments are currently prudent. Despite this, NCSEA was disappointed to see the lack of such programs and advancements being included in the Duke SGTPs.

NCSEA requested that the Commission require Duke to clarify the status of its Power/Forward proposal and how it plans to tie such a plan to its SGTPs.

Integrated System Operations Planning

NCSEA has previously recommended that the utilities implement integrated distribution planning. NCSEA stated that to Duke's credit it has proposed to implement Integrated System Operations Planning (ISOP). However, details are lacking, and the stakeholder feedback is absent. NCSEA requests the Commission to direct Duke to hold stakeholder meetings on a quarterly basis about ISOP or any iteration of integrated distribution planning. To that end, NCSEA requests that the Commission require Duke to file updates on the status of ISOP implementation, including summaries of stakeholder meetings, on an annual basis, with an opportunity for parties to comment on related matters as the Commission sees fit.

Demand Side Demand Response – Conservation Voltage Reduction

In its SGTP, DEP proposes to conduct a cost/benefit analysis for converting DEP's Demand Side Demand Response (DSDR) program from the current peak shaving operational strategy to a Conservation Voltage Reduction (CVR) operational strategy. NCSEA stated that it supports a DSDR/CVR evaluation as described in the SGTP and urges DEP to complete that evaluation as soon as possible so DEP and its stakeholders can determine whether the overall load reduction benefits from a CVR operational mode outweigh any reduction to the DSDR program's maximum peak shaving capabilities.

While NCSEA supports CVR as a demand-side management (DSM) measure, NCSEA stated that it remains concerned about the impact on DER, especially given that Duke was unwilling to provide its expected impact on DER in its data request responses. In response to data requests on this issue, Duke did not specifically state how Duke's plan to utilize CVR in its DSDR program will impact new PV projects seeking to interconnect to the grid.[5] However, NCSEA objects to any program which Duke will attempt to implement which will limit renewable generation, be adverse to the goals of House Bill 589 and N.C. Gen. Stat. § 62-2(a)(10), or otherwise slow the interconnection queue. NCSEA supports this program, but not if it adversely impacts renewable generation being interconnected to the grid.

Comments of the Environmental Defense Fund

Smart Grid Technology Strategy and Goals

Environmental Defense Fund (EDF) stated that it encourages the utilities to explore smart grid technology options as part of an integrated distribution planning approach that is responsive to the unique characteristics and needs of North Carolina's electricity system and that builds on the foundation laid by the state's energy policies and goals, notably HB 589 and the Governor's Executive Order 80. It is with this objective in mind that we make the following recommendations.

Consistent with R8-60.1(c)(1), which requires that utilities include a "summary of the utility's strategy for evaluation and developing smart grid technologies," EDF recommended that Duke outline a strategy including clear and measurable goals to help the Commission and stakeholders evaluate how the utility has identified and prioritized proposed smart grid technology investments.

According to EDF, expanding on the "four benefit areas," that are listed in Duke's strategy sections (i.e., improved reliability, grid hardening, cyber security, expanded integration of solar and distributed technologies, and better customer control and choice (pp. 2-3)), we recommend Duke set clear overarching goals to guide the strategy.

A strategy with measurable goals, will enable stakeholders to evaluate how the utility is planning to leverage and prioritize grid investments and whether it is making progress. We further ask that Duke Energy offer more background on how the proposed investments align with grid upgrades considered in parallel regulatory tracks such as IRPs and rate cases, and crucially, with larger public policy objectives, namely Executive Order 80.

[5] Duke Energy Carolinas, LLC and Duke Energy Progress, LLC's Response to NCSEA Data Request No. 2-11.

DER Integration

EDF proposed that as DERs become more integral to distribution planning, that the utility develop a DER integration strategy based on some of the leading practices developed in other jurisdictions. While the IRP offers some insight into the expected growth of DERs and the SGTP outlines several technologies to support the integration of DERs, it remains unclear what the utility's systematic efforts are to integrate DERs in the long-term. Particularly in light of HB 589, and the ambitious clean energy goals set forth in Executive Order 80, EDF encourages the utility to develop a strategy or roadmap for DER integration to ensure the grid is ready for the anticipated impacts. Such a strategy should also include a plan for how the utility intends to leverage customer-driven DERs including energy conservation, load shifting, demand response, and price responsive strategies.

AMI and Data Access

EDF emphasized the crucial role utilities can play to help unlock customer benefits associated with AMI. One way by which the utility can make progress on providing customers "with the intelligence needed to make smart energy choices to conserve and lower monthly bills" is to enable customers to easily share their energy usage data with authorized third-parties in a secure manner. To this end, EDF stated that it recommends the adoption of the industry standard Green Button Connect My Data (GBC).

EDF and NCSEA have raised concerns in prior proceedings regarding Duke Energy's failure to provide adequate access to customer energy usage data. EDF noted that Duke held two stakeholder meetings to discuss implementing GBC. At the end of the second meeting, EDF recommended that Duke prepare a cost/benefit study for implementing GBC, and convene another stakeholder meeting to review the cost/benefit study. Duke later informed EDF that it had adopted a different solution for data access and that it would not prepare a cost/benefit study for implementing GBC. EDF opined that Duke has failed to comply with the Commission's directive to explore data access issues in collaboration with stakeholders by unilaterally adopting a different solution and failing to complete a cost/benefit analysis for GBC.

EDF requested that the Commission schedule a hearing in this docket to address Duke's failure to collaborate with stakeholders to address data access issues.

Full Implementation of IVVC

EDF stated that DEC completed a pre-scale deployment of Integrated Voltage/Volt-Ampere Reactive Control (IVVC) technology in 2016. DEC filed a cost/benefit study for full deployment of IVVC with its present SGTP. The cost/benefit study shows that fully deploying IVVC would produce a net present value of approximately $8 million and would significantly reduce DEC's greenhouse gas emissions. DEC's current SGTP does not, however, state whether DEC plans to deploy this technology.

EDF recommended that DEC state in its reply comments whether it plans to deploy this technology and provide a timetable.

According to EDF, DENC's SGTP does not discuss its plans for deploying IVVC, even though it completed a case study in 2012 and despite having an affiliate that has installed this technology for several other utilities that is producing energy reductions of up to 4%. EDF recommended that DENC provide its plans for deploying IVVC in its North Carolina service territory, and state whether it will be able to achieve the 4% energy reductions that it has obtained for the utilities for which it has installed this technology in other states.

Improving IVVC Results

DEC's SGTP states that its IVVC pre-scale deployment obtained 2% in voltage reductions and 1.4% in energy reductions. DEC is studying the following improvements:

> . . . possible installation of End of Line Medium Voltage Sensors, and two-way communications implementation into these substation and distribution line devices. New Distribution Line Voltage Regulator and Capacitor additions are also possible.

EDF stated that it applauds Duke for attempting to improve its IVVC performance. While anticipated benefits associated with IVVC deployment are significant, we observe that the 1.4% in energy reductions is much lower than other utilities have reported.

EDF recommended that the Commission should require Duke and Dominion to develop a feasibility study and action plan for maximizing the energy savings and demand reduction from their IVVC deployments. After determining the additional reductions that are achievable, the utilities should update their cost/benefit studies to reflect how much additional IVVC would become cost-effective using 4% energy reductions.

Pilot Projects – Grid-Integrated Water Heaters (GIWH)

EDF noted that utilities are continuing to press for new rate designs for residential customers that include demand charges, and a GIWH program would also allow a customer to mitigate demand charges. Only a few utilities have pilot GIWH programs, but this is an area that will become increasingly important as the share of generation from renewable resources increases. A GIWH program could provide energy storage service for the utility that is more cost-effective than conventional battery storage.

EDF recommended that the utilities work collaboratively with stakeholders to develop pilot GIWH programs so that customers can maximize the available benefits from the utilities' grid modernization investments.

Pilot Projects – Medium- and Heavy-Duty Electric Vehicles

EDF stated that there is clearly an effort underway to convert some portion of the medium-and-heavy duty truck and bus market to electric vehicles. Utilities need to be prepared for the grid impacts. In conjunction with Executive Order 80, which not only sets ambitious goals for zero-emission vehicle (ZEV) deployment but also for clean-energy focused DER utilization, EDF recommended that the utilities develop pilot programs to begin to study these grid impacts, such as the energy use characteristics and rate design to ensure that the potential benefits (e.g., emissions reductions, improved reliability, infrastructure deferral, etc.) associated with electric heavy duty vehicles (EHDVs) are maximized. According to EDF, a thorough inquiry of efficient EHDV integration would also include an examination of opportunities that exist to provide storage service and ancillary services back to the grid. Duke has introduced proposals in South Carolina for pilot school bus and municipal transit programs and it should consider introducing similar programs in North Carolina, including options for school and municipal bus systems to finance their EV bus purchases through on-bill financing.

Metrics

Metrics provide the information necessary to course-correct certain aspects of the design and implementation associated with these new technologies and enable customers, policy makers, and other stakeholders to have greater confidence in investment plans. EDF recommended that the Commission require the utilities to include metrics in their SGTP filings to measure the performance of these new technologies. EDF further recommended that the utilities work collaboratively with stakeholders to develop a set of performance metrics to include in future SGTP filings.

Reply Comments of DEC & DEP (Duke)

Reply to Public Staff Comments:

On the issue of customer usage data access, the Public Staff summarized the stakeholder meetings jointly hosted by DEC and DEP and recommended that the Commission utilize Docket No. E-100, Sub 153 to address rulemaking related to customer and third-party access to customer usage data. On February 4, 2019, the Commission issued its Order Requiring Information, Requesting Comments, and Initiating Rulemaking, in Docket No. E-100 Sub 161 for the purpose of initiating a rulemaking regarding electric customer billing data. Duke stated that DEC and DEP will participate in this new docket and rulemaking, and that Duke agrees with the Public Staff and Commission that this is an appropriate process to resolve outstanding data access issues.

Reply to NC WARN Comments:

NC WARN's SGTP comments appear to recite several unfounded policy and IRP positions, and it is unclear to Duke what relevance NC WARN's comments have to the SGTPs filed by DEC and DEP, much less what arguments NC WARN is making to the Commission regarding the compliance of Duke's 2018 SGTPs with Commission Rule R8-60.1. Accordingly, to the extent that the Commission interprets NC WARN's comments to oppose acceptance of Duke's 2018 SGTPs, DEC and DEP respectfully requested that NC WARN's request be denied.

Reply to NCSEA Comments:

Data Access

Duke stated that DEC and DEP are committed to providing their North Carolina and South Carolina customers' data access functionality similar to the access provided under Green Button: Download in 2019. This approach will provide data access consistent with the standards as defined by the Green Button Alliance. The technology approach in determining how to provide this capability is in the process of being finalized. By providing customers with the data access functionality consistent with the Green Button: Download capability, customers will have the ability to share data with third parties as they deem appropriate once the functionality is deployed. With regard to Green Button Connect and further data access issues, the Companies believe these issues will be addressed and resolved by the Commission in Docket No. E-100, Sub 161.

Integrated System Operations Planning (ISOP)

Duke stated that it would show that ISOP, which is a planning process rather than a technology, as discussed in the IRP, is covered in the Grid Improvement Plan, and that it has been, and will continue to be, part of Duke's ongoing stakeholder workshops. Further, DEC noted that it has laid out the conceptual goals and timelines for ISOP development as part of the settlement agreement developed with NCSEA and filed in the DEC rate case, in Docket No. E-7, Sub 1146, and has been working on it as a baseline for stakeholder feedback.

Reply to EDF Comments:

Data Access

Duke stated that it will be implementing data access functionality in 2019 for its North Carolina and South Carolina customers similar to the access provided by Green Button: Download functionality. This functionality will provide the data in a format consistent with the standards as laid out by the Green Button Alliance. EDF also incorrectly states that the Companies informed EDF that they "would not prepare a

cost/benefit study for implementing" Green Button Connect, but the Companies have, in fact, agreed to do so. The Companies are working to complete a cost/benefit analysis for additional data access functionality provided under other Green Button protocols and will provide it to participating stakeholders. The Companies believe the topic of data access will be addressed and resolved by the Commission in Docket No. E-100, Sub 161.

IVVC

In response to EDF's recommendation that DEC state whether it plans to deploy IVVC and provide a timetable, DEC stated that it is actively considering deployment of IVVC as part of its Grid Improvement Plan in both North Carolina and South Carolina, as recently reflected in the South Carolina rate case filings and as discussed and provided in documentation during the November 2018 North Carolina Grid Improvement workshop. In addition, DEC stated that it is currently seeking approval from South Carolina regulators for IVVC deployment as described in the rate cases and, although DEC anticipates at least one more workshop in North Carolina, no negative feedback regarding IVVC has been received to date.

EDF noted that the 1.4% in energy reductions assumed in DEC's cost/benefit analysis is much lower than what other utilities have reported. EDF requested more detail on the IVVC cost/benefit analysis study be offered so that stakeholders can better understand and evaluate the assumptions the utility made to calculate the environmental, customer and operational benefits associated with IVVC. In response, Duke stated that it provided details regarding IVVC to the Public Staff in response to a data request in this proceeding, and that it does not object to providing the requested detail and assumptions to EDF around the IVVC cost/benefit analyses, and will do so.

Reply Comments of DENC

Grid Modernization

In response to the Public Staff, DENC stated that it continues to develop its smart grid efforts on a system basis taking into consideration recent developments in their Virginia operating jurisdiction as discussed in the 2018 SGT Plan.

On January 17, 2019, the VSCC issued an order on the Company's Virginia Grid Transformation Plan (VGTP Order). In summary, the VGTP Order finds that "smart meters and other grid enhancements hold the promise for a true transformation of the grid and for the more efficient consumption of electricity." However, the VSCC also found that the Company must submit a more specific plan before the VSCC would approve most Virginia Grid Transformation Plan components as reasonable and prudent. The Company is still analyzing the implications of the VGTP Order.

Specific to North Carolina, DENC stated that it supports the Public Staff's recommendation to pursue prudent investments in grid modernization on behalf of North

Carolina customers. In the near term, this requires a focused evaluation of the VGTP Order as the most cost-effective deployment of smart grid technologies continues to be on a system basis. The Company specifically commits to update the Commission in its 2019 SGT Plan Update filing regarding any new developments related to re-filing its Virginia Grid Transformation Plan as well as the implication for North Carolina as the Company continues to develop its system wide smart grid strategy for both North Carolina and Virginia.

Rate Schedules Enabled by AMI

The Public Staff commented that as AMI meters become more available and customer data systems are updated, "utilities should evaluate rate schedule offerings to provide additional options affecting energy consumption." DENC stated that, as the Public Staff recognizes, the value of various rate schedule offerings in highly dependent on AMI being installed as well as utility investments in web-based platforms to interpret the data received from AMI. DENC agrees with the Public Staff, and commits to providing a more fulsome description of DENC's plans to deploy AMI in its 2019 Update filing and future smart grid plan filings.

Customer Data Access

In general, DENC stated that it is willing to investigate options to make usage data more accessible to customers. Today, the Company offers the Green Button Download My Data option to its customers, which provides customers a way to securely download their usage data. Appendix A to DENC's SGT Plan demonstrates that DENC already has appropriate procedures and customer protections in place to provide customers and third parties access to this usage data.

The Public Staff recommended that customer data access tools should work in concert to allow customers to see the "near real-time impact of their energy consumption decisions." DENC stated that it currently provides substantial historical customer usage information with retail customer bills for each current billing period and additional information for up to the customer's prior 12 billing periods. As DENC continues to develop its strategy for future AMI deployment in North Carolina, customers do currently have a means to receive historical usage data that is reflective of current metering capabilities and, where applicable, includes more granular interval data.

The Public Staff recommended a rulemaking to "create rules that would provide customers or a third party with customer permission appropriate access to customer data, while protecting customers and their personal and energy consumption data." DENC stated that it already has procedures in place to allow for such access, and that its 2018 SGT Plan explains that customers may authorize the release of their usage information to a third party by mailing a written release to the Company authorizing release of their usage information to a third party, or customers may obtain their own usage information (such as through Green Button Download My Data) and provide it themselves to a third party by any mode they deem appropriate.

DENC noted that on February 4, 2019, the Commission issued an order establishing a new rulemaking docket (E-100, Sub 161) to address customer data issues (including usage data). DENC stated that it intends to fully participate in this new proceeding to address third party access to customer data while ensuring customer usage data is appropriately protected.

Reply Comments of AGO

The AGO stated two areas of concern: (1) Duke has not provided sufficient information about customer benefits to support the cost of the smart meters proposed n Duke's plans; and (2) the Commission has recognized, a rulemaking is needed to address access to customer data by customers, third parties, and Duke.

AMI Meters and Customer Information Systems

The AGO stated that Duke's smart grid technology plans do not inform the Commission about the details of proposed new tariff offerings and improved customer-facing data, even though Duke relies on these alleged benefits to justify costly investments in AMI meters and customer information systems.

The AGO opined that Duke should not be able to charge ratepayers for AMI meter costs unless the costs of those meters are offset by programs that demonstrably offer greater benefit to those rate paying consumers. To date, Duke has not detailed the programs that required AMI meters at all, and Duke has not explained why AMI meters needed to be purchased and put in place, using up a significant portion of their total life, years before any Duke program was available to use those AMI meters. Therefore, the AGO would find Duke's AMI spending not reasonable unless Duke supports that spending with a detailed and convincing cost-benefit analysis.

In addition, the AGO agreed with the Commission's requirement in the 2018 DEC rate case that Duke accelerate its rate design plan and provide consumers with vital information about the potential energy and cost savings that can be achieved by making changes in their energy usage. The AGO also agreed with the Commission's decision to schedule a hearing in that docket to review DEC's progress in complying with its June 22, 2018 Commission DEC Rate Case Order regarding AMI meters. Likewise, the AGO recommended due consideration be given in this docket, when determining the sufficiency of information about customer benefits that will be associated with smart meters under Duke's plans, to both the Commission's Order in the 2018 DEC rate case, as well as to the needs of the using and consuming public and those of the State and its citizens in this matter that affects the public interest as expressed in these comments.

Data Access

The AGO stated that Duke's control over customer data and how the data will be used by Duke, third parties, and customers, are matters that affect the public interest, and Commission oversight is needed. It noted that on February 4, 2019, the Commission, in response to the Public Staff's recommendations regarding the issue of customer data, entered an Order "for the purpose of initiating a rulemaking regarding Electric Customer

Billing Data." The AGO agreed with the Commission's rulemaking requirement, provided that the rulemaking process sufficiently addresses Duke's control over customer data and how the data will be used by Duke, third parties, and customers.

DISCUSSION AND DECISIONS

The Commission finds the SGTPs filed by DEC, DEP, and DENC to be informative and in compliance with the requirements of Commission Rule R8-60.1. Issues specific to the electric utilities' SGTPs in this docket are addressed below.

Data Access

The Commission recognizes that Docket No. E-100, Sub 161 was opened to address Commission Rules Related to Electric Customer Billing Data and concludes that data access issues, including Green Button Connect, should be appropriately addressed in that proceeding.

Integrated Volt-Var Control (IVVC)

EDF requested more detail on the IVVC cost/benefit analysis study to help stakeholders better understand and evaluate the assumptions the utility made to calculate the environmental, customer, and operational benefits associated with IVVC. Duke indicated in its reply comments that details regarding IVVC were provided to the Public Staff in response to a data request in this proceeding. Based on Duke's comments, it did not object to providing the requested detail and assumptions to EDF around the IVVC cost/benefit analyses. The Commission finds it appropriate for Duke to file this information in the current docket within 60 days of this Order.

Grid Integrated Water Heaters

The Commission is interested in additional discussion and analyses of "Grid Integrated Water Heaters." The Commission concludes that each of the utilities should include discussion of this technology in the next SGTP Updates. This discussion, at a minimum, should include direct comparisons to existing battery storage technologies.

Smart Grid Technology Performance Metrics

The Commission is not persuaded that it should require the utilities to include additional metrics in their SGTP fillings to measure the performance of new smart grid technologies. The Commission is of the opinion that the information required by Rule R8-60.1(c)(4) is sufficient to inform the Commission and parties prior to the utilities' requests for cost recovery. In particular, the Commission recognizes the requirement in the Rule R8-60.1(c)(4) for "goals and objectives" of each technology deployed to be discussed in the SGTP.

For pilot projects, the Commission finds the information required by Commission Rule R8-60.1(c)(5) relative to results sufficient to inform future decisions on these projects.

Grid Modernization

Grid Modernization (including Duke's Power/Forward Carolinas) was the subject of much comment in this docket. The Commission recognizes the intersection of programs that fit the definition of "Smart Grid Technologies" as defined in Commission Rule R8-60.1(c) and a broader definition of grid modernization programs. Duke stated in its SGTPs that "The Company has determined that smart-thinking, self-optimizing grid technologies, as well as certain transmission improvements, physical and cyber security upgrades, and the advanced monitoring and communication capabilities required to enable a smart grid, meet the criteria for the SGTP and will be outlined within the Plans each year as applicable." Duke's SGTPs at 4. The Commission accepts Duke's position as appropriate for future SGTP filings.

The Commission recognizes the comments of the Public Staff that:

> DEC and DEP's grid modernization efforts are much further along than those of DENC or its Virginia affiliate. DEC and DEP highlighted their respective grid modernization initiatives in their most recent general rate cases. DEC and DEP continue to work toward modernizing their grids using the same basic model, which includes improvements to grid infrastructure designed to create a self-optimizing grid that is responsive to power fluctuations and outages, resistant to physical and cyber security threats, has increased reliability, better accommodates renewable and other distributed generation resources, and provides customers with greater information and choice about their energy consumption. (See Page 16 of Public Staff's Comments)

DENC committed to addressing the status of its Virginia Grid Transformation Plan in its 2019 SGT Plan Update. The Commission finds this to be a reasonable approach.

In the settlement agreement approved by the Commission on February 23, 2018, in Docket No. E-2, Sub 1142 in the DEP rate case, DEP agreed to "host a technical workshop during the second quarter of 2018 regarding its NC Power/Forward grid investments to explain the need for and ongoing benefits of grid investments, and to hear feedback from stakeholders in attendance." The workshop was held on May 17, 2018. Acting as a neutral facilitator, a team from Rocky Mountain Institute (RMI) convened 65 participants for a day-long workshop that included content presentations, structured feedback sessions, and facilitated small group breakout sessions. On June 26, 2018, the final report for the workshop was filed in Docket Nos. E-2, Sub 1142 and E-7, Sub 1146. Duke hosted a second workshop on November 8, 2018 with a final report filed on January 9, 2019.

The Commission encourages the utilities to continue to effectively address grid modernization programs and projects in their SGTPs responsive to Commission Rule R8-60.1(c). The Commission concludes that the stakeholder discussions have played an important role in advancing a better understanding of grid modernization. The Commission finds that the grid modernization information presented in the SGTPs is adequate at this time. NCSEA requested that the Commission require Duke to clarify the status of its Power/Forward proposal and how it plans to tie such a plan to its SGTPs. The Commission determines there is no need to require that information from Duke at this time.

CONCLUSION

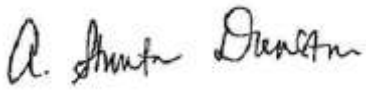
Based on the foregoing and the record in this proceeding, the Commission hereby accepts the SGTPs filed by the utilities as complete and in compliance with the requirements set out in Commission Rule R8-60.1. The Commission orders that Duke file in the current docket the details of IVVC, discussed on page 21, within 60 days of the date of this Order. The Commission orders that each of the utilities shall include discussion of "Grid Integrated Water Heater" technology in their next SGTP Updates. In addition, the Commission orders that DEC, DEP, and DENC shall update their responses to the questions posed in the Commission's August 23, 2013 Order and include those responses in future SGTP filings.

IT IS, THEREFORE, SO ORDERED.

ISSUED BY ORDER OF THE COMMISSION.

This the 22nd day of July, 2019.

NORTH CAROLINA UTILITIES COMMISSION



A. Shonta Dunston, Deputy Clerk