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	)	ATTORNEY GENERAL'S OFFICE
And Related 2018 Compliance	)	REPLY COMMENTS ON DUKE'S
Plans	)	INTEGRATED RESOURCE PLANS

The North Carolina Attorney General's Office ("AGO") respectfully submits these reply comments regarding the 2018 Integrated Resource Plans ("IRPs") for Duke Energy Carolinas and Duke Energy Progress (referenced together as "Duke"). This proceeding investigates utility plans for meeting electric power requirements in North Carolina over the next 15 years using "the least cost mix of generation and demand-reduction measures" that will provide adequate, reliable electric service.[1] Based on reports, comments, and other evidence in the proceeding, the Commission will determine whether the information provided by Duke is sufficient and whether the resource plans are reasonable, and may direct further action based on conclusions drawn in the proceeding.[2]

The AGO, with the assistance of outside experts,[3] reviewed the initial comments submitted by all parties in this docket, as well as Duke's IRP plans, and

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[1] N.C. Gen. Stat. §§ 62-2(a)(3a) (establishing, in quoted text, this policy of the State); 62-110.1(c) (calling for the Commission to "develop, publicize, and keep current" an analysis of long-range electricity needs in North Carolina).

[2] See, e.g., Order Accepting Integrated Resource Plans and Accepting REPS Compliance Plans In the Matter of 2016 Biennial Integrated Resource Plans and Related 2016 REPS Compliance Plans issued 27 June 2017 In Docket No. E-100, Sub 147.

[3] Strategen Consulting, LLC, a California firm, is comprised of a team with technical, regulatory, product and organizational expertise in energy markets. Strategen has decades of experience working closely with governments, utilities, research institutions, technology providers, project developers, and large energy users.

the attached memorandum prepared by Strategen (hereafter "Strategen") sets out a detailed analysis that is incorporated into these comments by reference and summarized below. Based on that review, the AGO respectfully recommends that the Commission direct Duke to revise and supplement the plans by providing further analysis with respect to eight specific points, including the three discussed in the AGO's initial comments and five additional points that were raised in comments of other intervenors:

1. Duke should include a more robust consideration of modern energy efficiency and demand-side management measures that reduce consumption or shift load to off-peak times - including measures that are targeted to winter peaks.

2. Planning should take into account the costs to ratepayers from climate change and other risks associated with natural gas-fired power generation.

3. Duke's modeling should test a wider range of solar plus storage resources.

4. Duke's calculation of solar capacity value should be reevaluated to ensure that solar is not being undervalued as a capacity resource.

5. Duke should conduct a more comprehensive and transparent IRP modeling of its coal fleet.

6. Duke should employ a holistic planning approach in order to ensure that distributed energy resources are appropriately integrated and valued.

7. Duke should include the impacts of its Integrated Voltage Var Control programs in its load forecasts and should use more granular data available from Advanced Metering Infrastructure to refine load forecasts.

8. Duke should provide an analysis of the rate impacts of its portfolios.

DISCUSSION

1. A more robust consideration of demand-side management and energy efficiency measures should be addressed in Duke's plans, and the measures should be modeled as supply-side resource alternatives in order to ensure that a least-cost resource portfolio is selected.

Duke's integrated resource plans give insufficient attention to the potential of using modern energy efficiency measures or encouraging energy management to reduce peak demand. Such measures offer low-cost ways to meet future electric requirements and also benefit North Carolina by reducing the environmental impact of meeting electric power needs in the State. Strategen discusses ways that Duke's resource plans can be improved on this issue (see Attachment at 3-6), drawing from the initial comments of the other parties. To summarize the key points:

- In their initial comments, the AGO, NCSEA, and SACE, Sierra Club, and NRDC all concur that Duke's failure to model energy efficiency measures[4] ("EE") and demand-side management ("DSM")[5] alongside generating resources (i.e., supply-side resources) potentially decreases the amount of cost-effective measures selected, thereby increasing costs for ratepayers.[6] Modeling such demand-side resources alongside supply-side resources is considered a best practice.[7]

- NCSEA provided an alternative IRP that modeled energy efficiency measures as a supply-side resource, and that approach resulted in energy efficiency

[4] "Energy efficiency measures" refer to utility programs that encourage changes made that result in less energy being used to perform the same function. See G.S. 62-133.8 (a)(4).
[5] "Demand-side management" refers here to programs undertaken to shift the timing of electricity use from peak to nonpeak periods. See G.S. 62-133.8(a)(2). The term is also sometimes used in the Commission's rules to refer to all demand-side resources (as compared to supply-side resources). See NCUC Rule R8-60(f).
[6] Strategen at 3-4; SACE, Sierra Club, and NRDC Initial IRP Comments (hereafter "SACE, et al.) at 12; and NCSEA Initial IRP Comments Attachment (hereafter "NCSEA Att.") 1 at 2.
[7] Strategen at 3.

being added above that modeled by Duke.[8]

- Duke's plans assume that additional savings from energy efficiency and demand-side management programs will not be achieved in future planning years once current measures have been tapped out, but that assumption overlooks advances in technology, including automation and load controls, that will likely "unlock new forms of cost-effective energy efficiency and demand management."[9] Duke's plans also overlook the lasting impact of improved energy efficiency on reduced load growth.[10]

- As the Public Staff points out, very little residential demand-side management is offered to reduce winter peaks.[11] Given increasing winter peaks, energy efficiency and demand-side management programs geared to winter are particularly needed.

    - Strategen refers to advanced demand management programs that have been cost-effective in other jurisdictions. For example, "Bring Your Own Device" ("BYOD") programs offered elsewhere rely on customers to supply a device such as a smart thermostat, and offer promising cost-effective ways to shave winter peaks.[12]

    - One such BYOD program is specifically designed to lower winter peak demand by accessing customer battery storage systems on cold winter nights. Customers are provided incentives that are "based on the amount of energy transferred from the customer's battery to the grid." [13]

      The Public Staff points out that time-of-use schedules have the greatest potential to address winter peak events, and the AGO agrees.[14] Strategen suggests that the Commission take a proactive approach that requires Duke to begin developing time-of-use and critical peak pricing rebates, recognizing that it will take time to refine such programs.[15]

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[8] NCSEA Att. 1 at 2.
[9] Strategen at 4.
[10] Id.
[11] Public Staff Initial IRP Comments (hereafter "Public Staff") at 52.
[12] Strategen at 5.
[13] Id.; see Green Mountain Power, Press Release: Green Mountain Power Offers New "Bring Your Own Device" Program to Cut Energy Peaks (Mar. 21, 2018), greenmountainpower.com/news/gmp-offers-new-bring-device-program-cut-energy-peaks/.
[14] Public Staff at 52-53.
[15] Strategen at 5-6, note 16.

In sum, Duke should be required to revise its models so that energy efficiency and demand-side management programs are evaluated alongside supply-side resources. Further, innovative advances should not be overlooked, and new programs focused on winter energy efficiency and demand-side management programs should be developed.

2. Duke's IRP Plans fail to consider additional costs associated with the reliance on natural gas for new generating resources, including the costs of climate change.

Duke's continued reliance on natural gas plants as the primary route to meet future resource needs is not justified because Duke's plans have not adequately considered the economic and environmental risks of that option. Risks associated with Duke's emphasis on fossil-fueled generation (see Strategen at 6-7), include the following:

- The AGO agrees with Strategen and Public Staff recommendations that Duke should use an analytical tool similar to the Comprehensive Risk Analysis that was employed by Dominion in its initial IRP filing in order "to determine the least cost plan that provides the lowest risk to its customers, while also providing operational and compliance flexibility to each utility."[16]

- Further, as recommended by Strategen, Duke should be required to supply a working copy of the risk analysis / model such that underlying assumptions can be evaluated in detail, or in the alternative, Duke should be directed to run alternative specifications and scenarios as needed.[17]

- The Commission should broaden its approach to environmental factors in light of the policy goals announced in Executive Order 80 for addressing climate change, reducing GHG emissions by 40% below 2005 levels by 2025 and encouraging greater use of clean energy resources.[18]

- Conventional natural gas-fired plants are built to last for decades, and the

[16] Public Staff at 73; Strategen at 6.
[17] Strategen at 6-7.
[18] See Environmental Defense Fund Initial IRP Comments at 1; AGO Initial IRP Comments (hereafter "AGO") at 8; Strategen at 7.

investment may become stranded or the costs may become uneconomic due to new emission standards or due to technological change, such as the current changes being brought about by renewables paired with storage.[19]

- This concern was identified by the Indiana Utility Regulatory Commission when it rejected an 850 MW natural gas plant proposal and directed Vectren to evaluate alternatives to the large, centralized generation approach given the potential that the plant could become a stranded asset as the cost of renewable energy declines.[20]

- Renewable and storage technologies are becoming better alternatives for providing many grid services and are also a better economic choice than Duke's current coal plants, according to the initial comments of NCSEA and SACE, Sierra Club, and NRDC.[21]

In sum, Duke's IRP plans do not adequately consider the costs and risks associated with the reliance on natural gas for new generating resources.

3. A robust and flexible analysis of solar plus storage needs to be modeled.

The AGO's initial comments concluded that Duke's modeling fails to address solar-plus-storage resources adequately as options to meet peak hours of demand.[22] This issue is key to the development of reasonable resource plans because, as NCSEA points out, battery storage technologies provide flexibility that enables a far larger part of Duke's energy and capacity requirements to be satisfied at lower economic and environmental costs.[23] Given the current broad array of storage technologies with different sizes, configurations, and operating

[19] Strategen at 7; NCSEA Att. 1 at 36; SACE, et al. at 2.
[20] Final Order in Cause No. 45052 *In the Matter of Verified Petition of Southern Indiana Gas and Electric Co. d/b/a Vectren*, issued 24 April 2019; see Gavin Bade, "Indiana regulators reject Vectren gas plant over stranded asset concerns," Utility Dive (Apr. 25, 2019), www.utilitydive.com/news/indiana-regulators-reject-vectren-gas-plant-over-stranded-asset-concerns/553456/.
[21] Strategen at 7; NCSEA Att. 1 at 36; SACE, et al. at 12.
[22] AGO at 3-7; see also Strategen at 7-9; NCSEA Initial IRP Comments (hereafter "NCSEA") at 5; SACE, et al. at 10.
[23] NCSEA at 5; see Strategen at 7.

characteristics, modeling should include an array of the alternatives consistent with industry best practice. The Public Staff comments point out that Duke was directed in the 2016 IRP Order to provide a more complete and thorough assessment of battery storage technologies and value in its IRPs in this proceeding.[24] Duke's assessment is insufficient.

Battery storage offers several advantages that are not sufficiently evaluated in Duke's plans:

- Storage is a valuable tool to address peak demand.[25]
- Strategen points out that storage has a modular design and can be added in small increments that fit growth, avoiding the "lumpy" additions required when traditional power plants sized at 200 MW or more are added.[26] Larger traditional power plants often add more capacity than is needed, at least until load growth catches up to the installed capacity, whereas storage can be added relatively quickly as needed or avoided altogether if load growth does not materialize.[27]
- Storage enhances the resilience of the grid during catastrophic events like hurricanes.[28]
    - The importance of creating a resilient electric grid that integrates clean energy resources is discussed in Executive Order No. 80, the North Carolina policy addressing climate change.[29]
    - Strategen notes that the effectiveness of storage was demonstrated during Hurricane Irma, when two large battery storage projects in the Dominican Republic helped stabilize grid frequency and alleviate fluctuations caused when 40% of the generation fleet had suffered an

[24] Public Staff at 18-19.
[25] SACE, et al. at 10; Strategen at 7.
[26] See Strategen at 8-9.
[27] Id.
[28] Strategen at 8.
[29] Executive Order No. 80 "North Carolina's Commitment to Address Climate Change and Transition to a Clean Energy Economy" (Oct. 29, 2018). files.nc.gov/governor/documents/files/EO80-%20NC%27s%20Commitment%20to%20Address%20Climate%20Change%20%26%20Transition%20to%20a%20Clean%20Energy%20Economy.pdf. E.O. 80 was announced after Duke filed its plans.

outage.[30]

- Further, inverter-based resources (like batteries)[31] have been shown in recent studies to actually respond faster and more accurately than traditional generators in the face of a disturbance.[32]

In its initial comments, NCSEA provides an IRP model that incorporates more flexible pairings of solar plus storage resources into Duke's IRP plans and demonstrates how doing so can greatly impact results.[33] Strategen points to two advantages to NCSEA's approach: 1) NCSEA's model selects sizes and ratios of solar plus storage that fit a system need (rather than pre-selecting more limited options)[34] and 2) the model uses publicly-available cost estimates that are considered to be industry standards from the National Renewable Energy Laboratory and Lazard.[35] By comparison, Duke's model "hard-coded," i.e., forced the selection by the model of one (and only one) option for solar-plus-storage.[36] The impact on the cost estimates is **[begin confidential]**: [redacted]

[30] Strategen at 8; see Fluence Energy, Case Study: Energy Storage Provides Grid Resilience During Severe Storm Conditions (2018) cdn2.hubspot.net/hubfs/2810531/Collateral/AES%20Collateral/Fluence%20Case%20Study%20-%20Storm%20Resilience.pdf.

[31] Wind, solar PV, and battery resources are called inverter-based resources because they are interfaced with the grid through power electronics to stabilize and control the resources; inverters synchronize flows and offer other improvements in performance of the grid. North American Electric Reliability Corporation ("NERC"), Reliability Guideline BPS-Connected Inverter-Based Resource Performance (Sept. 2018) at viii, www.nerc.com/comm/OC_Reliability_Guidelines_DL/Inverter-Based_Resource_Performance_Guideline.pdf.

[32] Strategen at 8.

[33] NCSEA at 17; Strategen at 8-9; compare Duke Energy Carolinas, North Carolina Integrated Resource Plan 2018 (hereafter "DEC") at 184 and Duke Energy Progress, North Carolina Integrated Resource Plan 2018 (hereafter "DEP") at 180-81.

[34] NCSEA Att.1 at 17; Strategen at 8.

[35] NCSEA Att. 1 at 3; Strategen at 9.

[36] DEC at 184; Strategen at 8-9.

[end confidential] is the investment cost Duke associated with energy storage,[37] while the investment cost range in Lazard goes as low as $1,200/kW.[38]

In sum, Duke's solar-plus-storage modeling is not flexible enough to provide an effective evaluation and an alternative modeling approach should be required. Absent a more robust evaluation of solar plus storage, it is not reasonable to rely on Duke's IRP modeling as justification to add natural gas generators to meet peak load rather than solar plus storage.

4. Duke's calculation of solar capacity value should be reevaluated to ensure that solar is not being undervalued as a capacity resource.

In their initial comments, the Public Staff, SACE, Sierra Club, and NRDC expressed concerns about Duke's representation of the capacity value of solar.[39] The AGO shares these concerns. To the extent that solar capacity is undervalued, Duke's plans may include more generation than necessary, thus leading to increased costs to Duke's customers."[40]

Strategen details multiple concerns about Duke's capacity value calculation that could result in an unreasonable bias against solar resources.[41] Taking into account these concerns, the AGO recommends that Duke be required to reevaluate the calculation of solar capacity value to ensure that solar is not being

[37] [redacted].

[38] Strategen at 9. See Lazard's Levelized Cost of Energy Analysis – Version 4.0 (Nov. 2018), www.lazard.com/media/450774/lazards-levelized-cost-of-storage-version-40-vfinal.pdf.

[39] Strategen at 7; SACE, et al. at 8; Public Staff at 82-89.

[40] Strategen at 10.

[41] See Strategen at 10-11.

undervalued as a capacity resource, and Duke should respond to the detailed concerns outlined by the parties.

For future resource plans, Strategen observes that an analytical framework similar to the one used by Duke (called the Effective Load Carrying or "ELLC" framework) can be a sound approach, but the underlying assumptions are important to evaluate and more information is needed. Therefore, Strategen supports using the coincident peak method suggested by the Public Staff to value solar capacity for purposes of this 2018 IRP proceeding, as it provides an acceptable method that would be consistent with past practices in North Carolina.[42] The AGO agrees. Using the coincident peak method, the Public Staff found that the capacity attributable to solar resources is higher than it is using Duke's calculation, and, based on that higher solar capacity, the projected need for traditional resources declines by 138 MW for DEC and 168 MW for DEP.[43]

5. Duke should conduct a more comprehensive and transparent IRP modeling of its coal fleet.

Comments made by NESEA, and SACE, Sierra Club, and NRDC raise an important question about Duke's continued operation of coal plants: are the plans to continue operating some or all plants the least cost alternative, or are coal plants being operated inefficiently and uneconomically while other energy resources provide better, cheaper options?[44] Intervenors challenge Duke's assumptions in the modeling used to select least cost alternatives, and in particular, they question the validity of using "hard codes" to force selection of coal units rather than allowing

[42] Public Staff at 82-88; Strategen at 11.
[43] Public Staff at 84-85.
[44] NCSEA Att. 1 at 2; SACE, et al. at 5; Strategen at 12-13.

the models to determine the least cost outcome.[45] They indicate that significant costs to ratepayers may be associated with plans to continue operation of inefficient coal plants when it would be more economical to retire them.[46]

These parties note that Duke plans to operate numerous coal units at low capacity factors over the planning period. Coal plants are not designed to operate infrequently and at low capacity factors, and intermittent operation of the plants may lead to higher costs than if the coal plants are simply retired.[47] Yet, Duke's analysis appears to perform only a limited evaluation of retirement as an option that considers natural gas plants as replacements, but does not assess the potential of other alternatives such as by using solar plus storage. Recent studies performed in Oregon, Indiana, and other states indicate that substantial savings can be achieved through planned retirements.[48]

Due to the significance of the costs (and potential cost avoidance) related to coal operations and retirement decisions, Strategen recommends that the Commission direct Duke to study and report the costs of operating versus retiring coal plants on a station basis and a per unit basis in addition to evaluating them in modeling for least cost alternatives. The AGO supports that recommendation.

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[45] Id.
[46] NCSEA at 7.
[47] SACE, et al. Initial IRP Comments Attachment (hereafter "SACE, et al. Att.") 2 at 6; Strategen at 12.
[48] For Oregon, see Iulia Gheorghiu, "PacifiCorp shows 60% of its coal units are uneconomic," Utility Dive (Dec. 5, 2018), www.utilitydive.com/news/pacificorp-shows-60-of-its-coal-units-are-uneconomic/543566/. For Indiana, see Darrell Proctor, "Indiana Utility Will Close Coal Units, Transition to Renewables," Power (Nov. 5, 2018), www.powermag.com/indiana-utility-will-close-coal-units-transition-to-renewables/.

6. Duke should use a comprehensive planning approach that integrates and recognizes the value of distributed energy resources.

Commission Rules require that public utilities provide a comprehensive analysis of all resource options (supply- and demand-side) that may be used to satisfy projected electric load and demand requirements.[49] Duke's plans are insufficient in that they do not use a holistic approach to evaluate the improvements and investments that will be needed to modernize Duke's distribution and transmission grid to enable better use of energy resources such as storage or demand-side measures. (See Strategen's discussion of this point in the Attachment at 13-14.)

As NCSEA pointed out in its initial comments, this gap in Duke's plans is in tension with Duke's position that billions of dollars should be invested for grid modernization.[50] Duke's plans should indicate how economically-planned grid investments will be coordinated with demand-side resources to reduce peak costs, to integrate solar and storage, and generally, how load and voltage will be managed more efficiently.[51] Additionally, the plans should identify corresponding efficiencies that can be achieved by reducing major investments in supply-side resources.

Planning and modeling for the future grid – including the integration of distributed resources into distribution and transmission systems – are important pieces of developing integrated resource plans.[52] Indeed, Strategen notes that

[49] NCUC Rule R8-60(c).
[50] NCSEA at 2-3.
[51] Strategen at 13.
[52] Strategen at 14.

some forecasts indicate that distributed resources will almost double by 2023,[53] and North Carolina has witnessed tremendous growth in solar installations and projects.[54] These forecasts need to be considered when formulating integrated resource plans.

Duke should be required to use a comprehensive planning approach that integrates and values distributed energy resources. To that end, NCSEA has requested "that the Commission open a rulemaking docket for stakeholders to develop a framework and adequate requirements for Integrated Distribution Planning," and Strategen supports that proposal.[55] The AGO recommends that the Commission review and take a proactive role in the planning of integrated distribution planning, either by opening a rulemaking for that purpose or by other appropriate procedures.

7. Duke should include the impacts of its Integrated Voltage Var Control programs in its load forecasts and should use more granular data available from Advanced Metering Infrastructure to refine load forecasts.

In initial comments, the Public Staff found that Duke had failed to incorporate Integrated Voltage Var Control ("IVVC") programs in its IRP and recommended that Duke include the impacts of such programs in its load forecasts in its "future years of capacity planning."[56] (See Strategen's discussion of this point in the Attachment at 14-15.) Strategen explains that Integrated Voltage Var Control

[53] Id.; see Jeff St. John, "Distributed Energy Poised for 'Explosive Growth' on the US Grid," GTM (June 21, 2018), www.greentechmedia.com/articles/read/distributed-energy-poised-for-explosive-growth-on-the-us-grid.
[54] DEC at 22; DEP at 22; U.S. Energy Information Administration, North Carolina State Energy Profile Quick Facts (updated Sept. 20, 2018), www.eia.gov/state/print.php?sid=NC.
[55] NCSEA at 16; Strategen at 14.
[56] Public Staff at 55.

manages voltage levels and reactive power as electricity flows from transmission lines to end users to achieve improved efficiencies in grid operations by reducing system losses, reducing peaks in demand, reducing energy consumption or by a combination of the three.[57] The AGO supports the Public Staff's recommendation to include the impacts of Integrated Voltage Var Control in load forecasts.

Furthermore, Duke should evaluate new technologies that may enhance the savings. NCSEA advised that, when Duke has previously predicted the impacts of Integrated Voltage Var Control programs for optimizing the management of voltage levels and reactive power, Duke found that they would enable a 2% energy savings and a 1.4% reduction in peak demand.[58] Strategen notes that Duke's prior estimate of the effectiveness is "likely understated."[59] Although such programs created between 1-2% energy and demand reductions in the past, the "technologies available today can create energy savings above 3% and peak demand reductions of approximately 5%, or three times greater than Duke's estimate," while smart inverters may be able to further enhance the program's effectiveness.[60]

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[57] Strategen at 14-15; see Jared Green, Jeff Roark, and Jim Park, "Determining the impacts of volt/VAR optimization: a tale of two approaches" (Aug. 8, 2015), www.elp.com/articles/powergrid_international/print/volume-20/issue-8/features/determining-the-impacts-of-volt-var-optimization-a-tale-of-two-approaches.html.

[58] NCSEA at 13.

[59] Strategen at 15.

[60] Id.; see Larry Conrad, "Integrated Volt Var Control (IVVC) Issues for the Future," Energy & Power Society (Jul. 26, 2010), grouper.ieee.org/groups/td/dist/da/doc/Larry%20Conrad%20-%20IVVC%20Presentation%20IEEE_pptx.pdf; see Varentec, Press Release: Varentec deploys Grid Edge Control to meet aggressive energy savings goals in Denver across 472 circuits for Excel Energy (May 18, 2018), http://varentec.com/varentec-deploys-grid-edge-control-meet-aggressive-energy-savings-goals-denver-across-472-circuits-xcel-energy/; see Fei Ding, Adarsh Nagarajan, Sudipta Chakraborty, and Murali Baggu, National

In addition, the Public Staff also comments that the data Duke uses to evaluate peak demand is not granular enough. (See Strategen's discussion of this point in the Attachment at 15.) The AGO agrees that smart meter data should be used to inform load forecasts to better understand the trends in both winter and summer peaks.[61]

In sum, the AGO recommends that the Commission conduct a robust review of any future projections of the impacts of Duke's Integrated Voltage Var Control program in order to assure that Duke selects the most beneficial solution and to see that the load forecasts include the impact. Additionally, load forecasts should be performed in a way that takes advantage of the granular data available from smart meters.

8. Duke should provide an analysis of the ratepayer impacts of its portfolios.

Multiple intervenors discussed the issue of ratepayer bill impacts in their initial comments. As Strategen notes, the costs that will be borne by customers should be a central consideration of long-term resource planning.[62] NCSEA and SACE, Sierra Club, and NRDC conducted independent ratepayer bill impact analyses. The results of their analyses indicate that Duke's resource plans may lead to costs that are well above the least cost approach.[63]

Renewable Energy Laboratory (NREL), Photovoltaic Impact Assessment of Smart Inverter Volt-VAR Control on Distribution System Conservation Voltage Reduction and Power Quality, NREL/TP-5D00-67296 (Dec. 2016), www.nrel.gov/docs/fy17osti/67296.pdf.

[61] Public Staff at 80-81; Strategen at 16.

[62] Strategen at 16.

[63] NCSEA Att. 1 at 1; SACE, et al. at 5; Strategen at 16.

The Public Staff agreed that the issue of ratepayer impact should be monitored, and recommended "that in future IRPs, DEC and DEP provide an analysis of the residential annual rate impacts of each of its portfolios similar to that presented in [Dominion's] 2016 and 2018 IRPs."[64] Not only Dominion, but utilities in other states include this analysis, as it is a key factor in determining the reasonableness of a resource portfolio.[65]

The AGO agrees with the Public Staff's recommendation. Further, the AGO recommends that ratepayer bill impacts include a general analysis (not only applied to residential ratepayers) and that the analysis include a breakout of the portions of bills that are fuel-related, since ratepayers bear greater price risks associated with changes in the cost of fuel.

CONCLUSION

For the reasons discussed in these comments, the AGO respectfully recommends that the Commission direct Duke to submit revised Plans that:

1. Include a more robust consideration of demand-side management and energy efficiency measures, model them as supply-side alternatives, and develop measures that target winter peaks;
2. More thoroughly assess the costs to ratepayers of economic and environmental risks, including climate change, associated with reliance on natural gas for new generating resources;
3. Provide a more robust evaluation of storage-plus-renewables, including but not limited to modeling that explores a wide array of solar-plus-

[64] Public Staff at 73.
[65] Strategen at 16.

storage configurations;

4. Reevaluate the calculation of solar capacity value to ensure that solar is not being undervalued as a capacity resource; and rely on the Public Staff's capacity value calculation for this proceeding;
5. Provide a more comprehensive and transparent IRP modeling of Duke's coal fleet;
6. Use a comprehensive planning approach that integrates and recognizes the value of distributed energy resources;
7. Include the impacts of its Integrated Voltage Var Control programs in the load forecasts, with a robust review to ensure that it is not understated; and
8. Provide an analysis of the ratepayer impacts of the portfolios, including a breakout of the portions of bills that are fuel-related.

Respectfully submitted this the 20th day of May, 2019.

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CERTIFICATE OF SERVICE

The undersigned certifies that she has served a copy of the foregoing ATTORNEY GENERAL'S OFFICE REPLY COMMENTS ON DUKE'S INTEGRATED RESOURCE PLANS upon the parties of record in this proceeding by email or by depositing a copy of the same in the United States Mail, postage prepaid, this the 20th day of May, 2019.

/s/
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