



July 26, 2019

Ms. Kim Jones
Clerks and IT Services Division
North Carolina Utilities Commission
430 North Salisbury Street
Raleigh, NC 27603

Re: Docket No. E-100, Sub 157
2018 Biennial Integrated Resource Plans and Related 2018 REPS Compliance
Plans
**Partial Proposed Order of the North Carolina Sustainable Energy
Association**

Dear Ms. Jones,

In connection with the above-referenced docket, please find enclosed for filing the Partial Proposed Order of the North Carolina Sustainable Energy Association. A Microsoft Word version will also be emailed to briefs@ncuc.net.

Please let me know if you have any questions or if there are any issues with this filing.

Respectfully yours,

/s/ Peter H. Ledford



CERTIFICATE OF SERVICE

I hereby certify that all persons on the docket service list have been served true and accurate copies of the foregoing documents by hand delivery, first class mail deposited in the U.S. mail, postage pre-paid, or by email transmission with the party's consent.

This the 26th day of July, 2019.

/s/ Peter H. Ledford
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STATE OF NORTH CAROLINA
UTILITIES COMMISSION
RALEIGH

DOCKET NO. E-100, SUB 157

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

In the Matter of
2018 Biennial Integrated Resource Plans and) PARTIAL PROPOSED ORDER OF
Related 2018 REPS Compliance Plans) THE NORTH CAROLINA
) SUSTAINABLE ENERGY
) ASSOCIATION¹

HEARD: Commission Hearing Room, Dobbs Building, 430 North Salisbury Street,
Raleigh, North Carolina, on Monday, February 4, 2019, at 7:00 p.m.

BEFORE: Chairman Edward S. Finley, Jr., Presiding²
Commissioner ToNola D. Brown-Bland
Commissioner Jerry C. Dockham³
Commissioner James G. Patterson⁴
Commissioner Lyons Gray
Commissioner Daniel G. Clodfelter
Commissioner Charlotte A. Mitchell

APPEARANCES:

For Duke Energy Carolinas, LLC and Duke Energy Progress, LLC:

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For Virginia Electric and Power Company, d/b/a Dominion Energy North
Carolina:

E. Brett Breitschwerdt
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¹ The Partial Proposed Order of the North Carolina Sustainable Energy Association only addresses the integrated resource plans filed in this proceeding by Duke Energy Carolinas, LLC and Duke Energy Progress, LLC.

² Chairman Finley resigned from the Commission on May 31, 2019.

³ Commissioner Dockham retired from the Commission on June 30, 2019.

⁴ Commissioner Patterson retired from the Commission on June 30, 2019.

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For the Using and Consuming Public on Behalf of the State and its Citizens in this
Matter of Public Interest:

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BY THE COMMISSION: Integrated Resource Planning (IRP) is intended to identify those electric resource options that can be obtained at least cost to the utility and its ratepayers consistent with the provision of adequate, reliable electric service. IRP considers demand-side alternatives, including conservation, efficiency, and load management, as well as supply-side alternatives in the selection of resource options. Commission Rule R8-60 defines an overall framework within which the IRP process

takes place in North Carolina. Analysis of the long-range need for future electric generating capacity pursuant to North Carolina General Statute (G.S.) 62-110.1 is included in the Rule as a part of the IRP process.

G.S. 62-110.1(c) requires the North Carolina Utilities Commission (Commission) to “develop, publicize, and keep current an analysis of the long-range needs” for electricity in this State. The Commission’s analysis should include: (1) its estimate of the probable future growth of the use of electricity; (2) the probable needed generating reserves; (3) the extent, size, mix, and general location of generating plants; and (4) arrangements for pooling power to the extent not regulated by the Federal Energy Regulatory Commission (FERC). Further, G.S. 62-110.1 requires the Commission to consider this analysis in acting upon any petition for the issuance of a certificate for public convenience and necessity for construction of a generating facility. In addition, G.S. 62-110.1 requires the Commission to submit annually to the Governor and to the appropriate committees of the General Assembly a report of its: (1) analysis and plan; (2) progress to date in carrying out such plan; and (3) program for the ensuing year in connection with such plan. G.S. 62-15(d) requires the Public Staff to assist the Commission in making its analysis and plan pursuant to G.S. 62-110.1.

G.S. 62-2(a)(3a) declares it a policy of the State to:

assure that resources necessary to meet future growth through the provision of adequate, reliable utility service include use of the entire spectrum of demand-side options, including but not limited to conservation, load management and efficiency programs, as additional sources of energy supply and/or energy demand reductions. To that end, to require energy planning and fixing of rates in a manner to result in the least cost mix of generation and demand-reduction measures which is achievable, including consideration of appropriate rewards to utilities for efficiency and conservation which decrease utility bills. . . .

Session Law (S.L.) 2007-397 (Senate Bill 3), signed into law on August 20, 2007, amended G.S. 62-2(a) to add subsection (a)(10) that provides that it is the policy of North Carolina “to promote the development of renewable energy and energy efficiency through the implementation of a Renewable Energy and Energy Efficiency Portfolio Standard (REPS)” that will: (1) diversify the resources used to reliably meet the energy needs of North Carolina’s consumers, (2) provide greater energy security through the use of indigenous energy resources available in North Carolina, (3) encourage private investment in renewable energy and energy efficiency, and (4) provide improved air quality and other benefits to the citizens of North Carolina. To that end, Senate Bill 3 further provides that “[e]ach electric power supplier to which G.S. 62-110.1 applies shall include an assessment of demand-side management and energy efficiency in its resource plans submitted to the Commission and shall submit cost-effective demand-side management and energy efficiency options that require incentives to the Commission for approval.”⁵

Senate Bill 3 also defines demand-side management (DSM) as “activities, programs, or initiatives undertaken by an electric power supplier or its customers to shift the timing of electric use from peak to nonpeak demand periods” and defines an energy efficiency (EE) measure as “an equipment, physical or program change implemented after 1 January 2007 that results in less energy being used to perform the same function.”⁶ Energy Efficiency measures do not include DSM.

To meet the requirements of G.S. 62-110.1 and G.S. 62-2(a)(3a), the Commission conducts an annual investigation into the electric utilities’ IRPs. Commission Rule R8-60

⁵ G.S. 62-133.9(c).

⁶ G.S. 62-133.8(a)(2) and (4).

requires that each utility, to the extent that it is responsible for procurement of any or all of its individual power supply resources,⁷ furnish the Commission with a biennial report in even-numbered years that contains the specific information set out in Rule R8-60. In odd-numbered years, each of the electric utilities must file an annual report updating its most recently filed biennial report.

Further, Commission Rule R8-67(b) requires any electric power supplier subject to Rule R8-60 to file a REPS compliance plan as part of each biennial and annual report. In addition, each biennial and annual report should (1) be accompanied by a short-term action plan that discusses those specific actions currently being taken by the utility to implement the activities chosen as appropriate per the applicable biennial and annual reports, and (2) incorporate information concerning the construction of transmission lines pursuant to Commission Rule R8-62(p).

2018 BIENNIAL REPORTS

This Order addresses the 2018 biennial reports (2018 IRPs) filed in Docket No. E-100, Sub 157, by Duke Energy Progress, LLC (DEP) and Duke Energy Carolinas, LLC (DEC) (collectively, Duke).

The following parties have been granted Intervenor status in these proceedings by Commission Order: North Carolina Sustainable Energy Association (NCSEA); Carolina Industrial Group for Fair Utility Rates (CIGFUR); Environmental Defense Fund (EDF); Carolina Utility Customers Association (CUCA); NC WARN, Inc. (NC WARN); North Carolina Clean Energy Business Alliance (NCCEBA); Southern Alliance for Clean

⁷ During the 2013 Session, the General Assembly enacted S.L. 2013-187 (House Bill 223), which exempted the EMCs from the requirements of G.S. 62-110.1(c) and G.S. 62-42, effective July 1, 2013. As a result, EMCs are no longer subject to the requirements of Rule R8-60 and are no longer required to submit IRPs to the Commission for review.

Energy (SACE), Natural Resources Defense Council (NRDC), and Sierra Club (SACE, NRDC, and Sierra Club collectively, SACE et al.); Ecoplexus, Inc.; and Broad River Energy, LLC. The Public Staff's participation as a party in these proceedings is recognized pursuant to G.S 62-15(d). The Office of the Attorney General (AGO) filed a Notice of Intervention in this Docket pursuant to Statute on December 21, 2018.

PROCEDURAL HISTORY

On September 5, 2018, Duke Energy Progress and Duke Energy Carolinas filed annual IRPs and 2018 REPS Compliance Plans.

On September 27, 2018, the Commission issued an Order Scheduling a Public Hearing to be held on February 4, 2019 at 7:00 p.m. in Raleigh for the purpose of taking non-expert public witness testimony with respect to the filed IRP reports and REPS Compliance Plans.

On November 8, 2018, NC WARN filed a Motion for Evidentiary Hearing. On November 15, 2018, DEC and DEP filed a Response in opposition of that motion. On November 27, 2018, Virginia Electric and Power Company, d/b/a Dominion Energy North Carolina (DENC) also filed a Response in opposition of that motion.

On December 14, 2018, NC WARN filed initial comments regarding DEC and DEP's IRPs.

On December 17, 2018, the Commission issued an Order Requiring Interim CPRE Program Reports Allowing Interim Implementation of the CPRE Program Plans, and Establishing Schedule for Filing of Comments in this Docket and in Docket Nos. E-2, Sub 1159 and E-7, Sub 1156. The Order established November 5, 2018, as the date on which DEC and DEP were to file Interim Reports regarding the status and results of the

Tranche 1 CPRE RFP solicitation.

The December 17, 2018 Order also set January 31, 2019, as the date for all parties and the Public Staff to file initial comments on the CPRE Program Plans filed on September 1, 2018, in this Docket. Reply comments addressing other parties' initial comments were due March 29, 2019.

On March 7, 2019, the Public Staff, NCSEA, the Attorney General's Office, and SACE et al. filed initial comments regarding DEC and DEP's IRPs. On March 12, 2019, the Public Staff filed a correction to their initial comments.

On May 20, 2019, Duke, the Attorney General's Office, and NC WARN filed reply comments.

On June 12, 2019, the Commission issued an Order Requiring Filing of Proposed Orders.

On July 10, 2019, the Public Staff and DENC filed a joint Motion for Extension of Time to File Proposed Orders.

On July 12, 2019, the Commission issued an Order Granting Extension of Time for Proposed Orders.

On July 23, 2019, the Commission issued an Order Scheduling Technical Conference and Requiring Responses to Commission Questions.

On July 26, 2019, the parties filed proposed orders.

PUBLIC HEARING

Pursuant to G.S. 62-110.1(c), the Commission held a public hearing in Raleigh on Monday, February 4, 2019, at 7:00 p.m., where 49 public witnesses spoke. In summary, the testimonies of the public witnesses focused on the need to encourage energy

efficiency and clean renewable resources, such as solar and wind. A few of the witnesses commented on the value of integrating batteries, and other storage technologies, with the utilities' distributed resources. In addition, the witnesses encouraged the Commission to promote an economy and energy future focused on renewables and distributed energy systems. For example, one witness testified that Xcel Energy has pledged to get to 100% renewable energy by 2050, while Duke Energy projects to have 8% renewable energy by 2033. Other witnesses contended that coal and gas perpetuate climate issues because of greenhouse gas emissions, and further, that the utilities should stop investing in hydraulic fracked gas infrastructure, including the Atlantic Coast Pipeline.

Based on the entire record in this proceeding, the Commission now makes the following:

FINDINGS OF FACT

1. Duke has not provided sufficient evidence to demonstrate that the DEC and DEP IRPs represent the least-cost mix of future energy resources, Duke has failed to adequately account for the ability of solar generation and solar plus storage to cost-effectively meet resource needs, and further examination at an evidentiary hearing is necessary.
2. The DEC and DEP IRPs undervalue the contributions of solar generation and further examination at an evidentiary hearing is necessary.
3. There is insufficient evidence for the Commission to determine an appropriate reserve margin for use in DEC and DEP IRPs and further examination at an evidentiary hearing is necessary.
4. It is appropriate to examine at an evidentiary hearing whether DEC and

DEP IRPs over-rely on new natural gas energy generation.

5. It is appropriate to open a rulemaking docket regarding integrated distribution planning.

6. It is appropriate to examine Duke's treatment of expiring power purchase agreements with solar qualifying facilities at an evidentiary hearing.

7. It is appropriate to examine at an evidentiary hearing the proper valuation of energy storage in DEC and DEP's territories, and the appropriate level of energy storage deployment in DEC and DEP's IRPs.

EVIDENCE AND CONCLUSIONS FOR FINDING OF FACT NO. 1

The evidence for this finding is found in DEC and DEP's IRPs, SACE et al.'s Initial Comments, NCSEA's Initial Comments, the Synapse Study, the IPM Report, and Duke's Reply Comments.

DISCUSSION AND CONCLUSIONS

The IRP process is intended to identify those electric resource options that can be obtained at least cost to the utility and its ratepayers consistent with the provision of adequate, reliable electric service. In this proceeding, intervenors have presented multiple different detailed reports that call into question whether DEC and DEP's IRPs constitute a least cost generation mix. See, NCSEA Initial Comments, Attachment 1 (Synapse Study) and SACE et al. Initial Comments, Attachment 1 (IPM Report). In summary, the Synapse Study models a scenario in which new solar plus storage generation is constructed instead of new natural gas generation, which would result in reductions in residential average annual electricity expenditures of 2.5 to 5.5 percent compared to DEC and DEP's IRPs. Synapse Study, pp. 1, 14-15. Similarly, the IPM Report shows that the

substitution of new natural gas generation for existing coal generation and significant expansion of solar plus storage generation would result in savings of \$5.5 billion for North Carolina's ratepayers over the 15-year planning horizon. IPM Report, pp. 5, 9.

Duke attempts to impugn the credibility of the Synapse Study and the IPM Report by claiming that NCSEA and SACE et al. are biased in favor of clean energy. Duke Reply Comments, pp. 32-42. However, the Commission notes that Duke itself is biased in favor of providing positive financial outcomes for its shareholders. Duke's bias does not undermine its credibility; similarly, any perceived bias of NCSEA and SACE et al. does not undermine the credibility of those organizations nor the credibility of the Synapse Study and the IPM Report.

Duke has failed to provide evidence to substantiate its claim that the Synapse Study and IPM Report are not credible. While Duke claims that "The Synapse Report would not conform to the regulated utilities' requirement to provide *reliable* electric utility service at least cost over the planning period and should be dismissed[,]" it fails to explain how the plan proposed in the Synapse Study would compromise reliability. Duke Reply Comments, p. 32 (emphasis in original). Instead, Duke alleges, without providing supportive evidence, that "Must-run requirements are in place to maintain stability on the transmission system by providing voltage support or other services." *Id.*, p. 33.

The Commission finds that the Synapse Study and the IPM Report are credible, and that Duke has failed to demonstrate that the DEC and DEP's IRPs constitute least cost plans, as required by G.S. 62-110.1(c) and R8-60. Accordingly, it is appropriate to further examine the inputs and modeling used to create the Synapse Study and the IPM Report at an evidentiary hearing so that they may inform future Duke IRPs.

Imports from Neighboring Utilities and Competitive Markets

The Synapse Study's "Clean Energy Scenario" utilizes imports from neighboring utilities to create a least cost generation mix. Synapse Study, p. 5. Duke argues that this is inappropriate because the Synapse Study does not investigate the costs associated with obtaining firm transmission between neighboring utilities and the Duke service territory. Duke Reply Comments, p. 35.

Rule R8-60(d) requires that "As part of its integrated resource planning process, each utility shall assess on an on-going basis the potential benefits of soliciting proposals from wholesale power suppliers and power marketers to supply it with needed capacity." The Synapse Study assessed the benefits of obtaining capacity from wholesale power suppliers, which is reasonable under Rule 8-60(d). Duke does not dispute the Synapse Study's analysis that purchasing power from neighboring utilities, or wholesale power providers, would be less costly than self-building generation. Instead, Duke argues that the Synapse Study failed to consider the costs of firm transmission. Duke Reply Comments, p. 35. However, Duke provides no evidence that the costs of such firm transmission are greater than the savings associated with purchasing power from neighboring utilities or wholesale power providers. Moreover, the burden is on Duke to full consider the potential benefits of imports and to demonstrate that greater reliance on imports is not a viable option.

In attempting to rebut the Synapse Study, Duke calls into question the adequacy of its transmission system. Rule R8-60(i)(5) requires that, in an IRP, "The utility shall also include a discussion of the adequacy of its transmission system (161 kV and above)." Despite questioning the adequacy of its transmission system to accommodate

the recommendations of the Synapse Study, Duke has failed to discuss the adequacy of its transmission system in its IRPs as is required by Rule R8-60(i)(5).

Duke has argued that insufficient transmission capacity and the carbon emissions goals contained in Executive Order 80 prevent it from importing electricity from neighboring utilities. Duke Reply Comments, p. 35. However, Duke has provided no substantive evidence to support these claims. The Commission does not believe that these are sufficient barriers to prohibit further examining imports from neighboring utilities or participating in a competitive market.

The Commission notes its determination that DENC's participation in the PJM competitive market has been shown to lower electricity rates. In 2016, the Commission found that DENC and its customers both benefited from participating in PJM:

The evidence presented in this case demonstrates that DENC's integration into PJM has benefited its customers, and that those benefits can be expected to continue even if the Commission relieves the Company from compliance with most of the PJM Order conditions.

Order Approving Rate Increase and Cost Deferrals and Revising PJM Regulatory Conditions, p. 144, Docket No. E-22, Sub 532 (December 22, 2016).

Based on the foregoing, the Commission concludes that, with regard to electricity imports from neighboring utilities, Duke's IRPs fail to comply with the requirements of Rule R8-60(d) and Rule R8-60(i)(5). The Commission finds credible evidence in the Synapse Study that imports from neighboring utilities are a part of a least-cost generation mix. As such, and given the Commission's determination that participation in PJM has led to decreased costs for DENC's ratepayers, the Commission directs Duke to include in its next IRP, in the form of an alternative IRP scenario, an investigation of the costs and benefits for ratepayers of Duke participating in the PJM competitive market.

Coal Retirement

The Duke IRPs foretell an energy future for North Carolina that is inconsistent with current trends shaping the energy industry. NCSEA Initial Comments, p. 5. The Synapse Study demonstrates that adopting more clean energy at a faster rate is more economical than Duke’s proposed gradual phase-out of fossil fuels and use of “must run” designations for coal power plants, which results in higher electricity rates for consumers. Synapse Study, p. 1. SACE et al. argue that Duke should evaluate accelerated retirement of coal plants, and that the IRP is the right vehicle for studying the economics of Duke’s coal units. SACE et al. Initial Comments, pp. 5-6. NCSEA’s initial comments generally agree with SACE et al., and specify that for economic, health and environmental reasons, Duke should significantly decrease its use of coal power generation. NCSEA Initial Comments, p. 1.

In its initial comments, SACE et al. argue that Duke performed a flawed economic analysis of its coal fleet. SACE et al. Initial Comments, pp. 5-6. Duke’s methods in evaluating the appropriate retirement of its coal plants are an important reason why the energy portfolios proposed in DEC’s and DEP’s respective IRPs do not represent the economically efficient outcome for Duke or its customers. *Id.* As SACE et al. point out, “The Companies have not performed a full economic comparison of existing and new resources” because their current method “hard-wire[s] the projected lifespans of their existing coal units[.]” *Id.*

Finally, as NCSEA points out, there are tangible health and quality of life benefits associated with cleaner air, fewer sick days, fewer doctor’s visits, and fewer air quality alerts due to decreased reliance on coal generation. Synapse Study p. 12. The Synapse

Study's Clean Energy Scenario demonstrates there are significant health benefits cost savings for North Carolinians because it uses less coal than the Duke IRP Scenario. By 2033, North Carolina residents could see up to \$354 million in avoided health impacts due to a decrease in hospital room visits and lost work days. NCSEA Initial Comments, p. 8.

Based on these findings, the Commission believes intervenors present credible evidence that Duke does not accurately economically model the utilization and retirement of coal plants. The Commission believes an evidentiary hearing should be held to investigate Duke's future plans for its coal power plants.

Conclusion

The Commission concludes that Duke has failed to demonstrate that the DEC and DEP's IRPs constitute least cost plans, as required by G.S. 62-110.1(c) and R8-60. The Commission further concludes that the evidence shows that imports from neighboring utilities are a part of a least-cost generation mix and that DENC's participation in the PJM competitive market has led to financial benefits for its ratepayers. As such, the Commission concludes that it is appropriate for Duke to include in its next IRP an examination of the costs and benefits to ratepayers of its participation in PJM. The Commission also concludes that the DEC and DEP IRPs do not accurately model the economics of coal power generation. The Commission further concludes that it is appropriate to further examine the inputs and modeling used to create the Synapse Study and the IPM Report at an evidentiary hearing so that they may inform future Duke IRPs.

EVIDENCE AND CONCLUSIONS FOR FINDING OF FACT NO. 2

The evidence for this finding is found in DEC and DEP's IRPs, NCSEA's initial

comments, the initial comments of SACE et al., the Public Staff's initial comments, and Duke's reply comments.

DISCUSSION AND CONCLUSIONS

As discussed in the Evidence and Conclusions of Findings for Fact 1, Duke has not demonstrated that DEC and DEP's IRPs recommend the least cost future mix of energy resources. Duke's undervaluing of solar is an important contributor to its failure to meet the least-cost energy portfolio as required by G.S. 62-110.1(c) and R8-60. The Commission finds that Duke's IRPs undervalue solar resources in two important areas: (1) in estimating the capacity that solar provides to the Duke grid in planning for peak load; and (2) in planning for new energy generation.

The Commission finds that DEC and DEP's IRPs undervalue solar resources in planning for peak load. The Commission agrees with SACE et al. that "Duke undervalues the capacity that solar provides to the DEC and DEP systems[.]" SACE et al. Initial Comments, p. 8. Similarly, the Public Staff expresses concern that Duke's method for valuing the capacity contribution of solar resources adversely affects its ability to plan to meet peak load:

By discounting the solar contribution based on its output during High Risk Hours, yet planning future resource additions to meet the Peak Load Hour, the actual contribution of solar resources during the Peak Load Hour is ignored.

Public Staff Initial Comments, p. 85. The Public Staff recommends Duke uses a coincident peak methodology for calculating the capacity value of solar. Specifically, they recommend "that the aggregate solar generation at coincident peak for both winter and summer be used to determine the capacity value of solar[.]" Id., p. 69. The Public Staff believes a coincident peak methodology is "appropriate for use in IRP

proceedings[,]” Id., p. 88, and refer to the statistical analysis offered by SACE et al. in the 2017 IRP proceeding as a possible starting point for “a more robust statistical analysis of the correlation of solar generation to system load during peak periods and any recommended changes to DEC and DEP’s current approach.” Id., p. 19. The Commission believes the Public Staff’s suggestions have merit, and that it is worth examining whether Duke should use a coincident peak methodology, as described in the Public Staff’s initial comments, for calculating capacity value of solar in its IRPs, rather than the methods used in the IRPs submitted in October 2018.

The Commission also finds that Duke undervalues solar in planning for new energy generation. SACE et al. states that Duke’s “projections do not reflect the recent trends in accelerated solar installations in the Carolinas nor the continuing and steep cost declines for solar.” SACE et al. Initial Comments, p. 8. SACE et al. also point out that the Astrapé report, which Duke relied upon in its IRP filings, included severely flawed data and methodology. Id., pp. 9-10. In response, Duke expresses concern that rapidly expanding solar will have adverse impacts on its business model. The Commission finds that Duke’s concerns about solar expansion in North Carolina are inaccurately accounted for and are significantly overstated. The Public Staff is sympathetic to some of Duke’s concerns, but believes that Duke is double-counting any risk associated with solar:

There is some concern that [load uncertainty and unit outages] are having the effect of both pushing down the solar capacity value, as well as pushing up the required minimum reserve margin. The proper response to these factors is *either* an increased reserve margin *or* a decreased solar capacity value – by implementing both of these changes, the Public Staff is concerned that the need for future resource additions may be overstated.

Public Staff Initial Comments, p. 89 (emphasis in original). The Public Staff strongly rebukes of Duke’s current method of valuing of solar generation. The Commission finds,

however, that the Public Staff's shared concerns about the cost of solar to Duke are also overstated. Energy storage mitigates costs associated with introducing large quantities of solar into the grid. Energy storage is the subject of Finding of Fact No. 7, and the topic is elaborated on further in that section.

Conclusion

The Commission finds that Duke's IRPs undervalue solar in planning for peak load, and in planning for new energy generation. The Commission believes it is in the general public's best interest for Duke's IRPs to accurately value solar energy. Therefore, the Commission will hold an evidentiary hearing to determine the most accurate way for Duke to value solar and the appropriate role for solar generation in the IRPs.

EVIDENCE AND CONCLUSIONS FOR FINDING OF FACT NO. 3

The evidence for this finding is found in DEC and DEP's IRPs, NCSEA's initial comments, the initial comments of SACE et al., the Public Staff's initial comments, and Duke's reply comments.

DISCUSSION AND CONCLUSIONS

In its reply comments, Duke discusses the importance of maintaining an adequate reserve margin, stating that "the Companies carry a reserve margin to be able to meet unexpected demand due to extreme temperatures, economic load forecast uncertainty, and unexpected outages of its operating units." Duke Reply Comments, p. 36. As Duke's comment illustrates, DEC, DEP, and ratepayers rely on the Commission to select an appropriate reserve margin for Duke territories. If the Commission selects too low a margin, customers may not receive reliable electricity during periods of unexpected demand. Likewise, if the Commission selects too high a margin, ratepayers will be

burdened with maintaining a larger infrastructure system than is required to meet their energy needs, and this will result in unnecessarily high electricity rates. Duke and some of the intervenors argue that Duke should maintain a 15% reserve margin, a 16% reserve margin, or a 17% reserve margin. See, NCSEA Initial Comments, p. 8; Public Staff Initial Comments, p. 44; Duke Reply Comments, p. 53.

Three different organizations submitted comments in the current proceeding suggesting different reserve margins. NCSEA recommended a 15% reserve margin as the economically optimum solution. NCSEA Initial Comments, p. 8. Duke cited a 2016 report commissioned by Astrapé Consulting that concluded a 17% reserve margin was the correct number for its territories. Duke Reply Comments, p. 53. The Public Staff argued in favor of the Astrapé report from the 2016 Duke IRP proceedings and concluded that a 16% reserve margin was the appropriate number. Public Staff Initial Comments, p. 44.

15% Reserve Margin:

NCSEA commissioned the Synapse Study in order to perform “a rigorous, scenario-based analysis to evaluate an alternative clean energy future compared to the more traditional portfolio of fossil-fueled resource additions included in Duke Energy Carolinas and Duke Energy Progress’s (collectively Duke Energy) IRPs”. Synapse Study, p. 1. The study found that the energy portfolio in Duke’s 2018 IRPs is not the least cost mix of energy resources, and that the Synapse Study’s Clean Energy Scenario was a more economical energy portfolio for the state. *Id.* As part of its least-cost analysis, Synapse evaluated the reserve margin that would achieve its Clean Energy Scenario.

The Clean Energy Scenario maintains the required 15 percent reserve margin and EnCompass projects no loss-of-load hours and sees zero hours

with unserved energy, proving that the retirement of fossil fuels and build-out of renewables leads to no new system reliability issues.

NCSEA Initial Comments, p. 8. As indicated above, according to Synapse's analysis, a 15% reserve margin achieves both aspects of an adequate reserve margin as defined by Duke: it is high enough to ensure reliable energy for Duke customers without burdening ratepayers.

Duke argues Synapse's 15% reserve margin is too low because it performs an oversimplified analysis of peak load:

One does not simply use the Companies' weather normalized peak demand forecast, along with an hourly load shape from the EnCompass National Database as Synapse did, and claim no reliability concerns when the model converges without unserved energy hours.

Duke Reply Comments, p. 36. The Synapse Study claims a 15% reserve margin will meet the energy demands of Duke's customers and result in zero hours with unserved energy.

NCSEA Initial Comments, p. 8. The Commission finds that fact that the Synapse Study utilizes the NERC-accepted reserve margin does not undermine its credibility.

16% and 17% Reserve Margin:

Before the 2016 IRPs, the Commission had historically approved a 16% reserve margin for Duke territories. In 2016, Duke contracted Astrapé Consulting to perform a study for the purpose of presenting during the 2016 IRP proceedings. Duke's analysis of the study indicated that that a 17% reserve margin is necessary for Duke territory. While Duke has used the Astrapé study to argue for a 17% reserve margin, the Public Staff maintains that the methods used in the Astrapé study are imperfect and therefore its conclusions do not justify changing the reserve margin from 16%.

In their 2018 IRP initial comments, the Public Staff concisely summarizes the

concerns they have with the Astrapé Study:

In this report, the Public Staff raised several concerns with the Astrapé study, including the use of forced outage rates, load regression during extreme events, economic load growth error, load multiplier values, and joint utility operations, among others. Based upon the results of alternate scenarios that the Company processed through the Astrapé model, the Public Staff recommended a 16% reserve margin. Duke contended that a holistic view of the study's reasonableness is more appropriate than focusing on specific individual factors that could potentially result in a lower reserve margin, and that there exist other more aggressive assumptions in the model that may require additional analysis in future reserve margin studies.

Public Staff Initial Comments, p. 44.

The Public Staff recommends “[t]hat DEC and DEP maintain their proposed reserve margins as filed, and continue to present a 16% reserve margin sensitivity analysis in future IRPs”. Public Staff Initial Comments, p. 98. The Commission agreed with the Public Staff's position in 2016 and ordered Duke to “present a sensitivity analysis in their 2018 IRPs that illustrates the impact of a 16% winter reserve margin, including the specific risk impact (LOLE) of using a 16% minimum reserve margin versus a 17% minimum reserve margin.” Duke Reply Comments, p. 43.

Duke believes its 2018 IRPs meet this requirement, and stand by their 17% reserve margin number. Duke Reply Comments, p. 43. Duke expressed concern with any reserve margin less than 17%. They argued that a 16% reserve margin does not allow for enough of a margin of error in its peak demand forecast:

as demonstrated in the Companies' 2018 IRPs, assuming perfect knowledge of its 50/50 weather normal forecast, the Public Staff's recommended 16% reserve margin is only 0.28% greater than the reserve margin needed with perfect forecasting knowledge.

Id., p. 45. Duke also expressed concern that the Public Staff's load forecast error assumptions mean that its load forecast does not represent the median load forecast.

The Companies are not comfortable with the over forecast bias that is assumed in the Public Staff's load forecast error assumptions, which reflect a probability of over forecasting load approximately 48% of the time and under forecasting load approximately 17% of the time.

Instead, the Companies believe that because the load forecast represents a 50/50 forecast, the load forecast uncertainty should reflect possible loads that are equally likely to fall either above or below the forecast. That is, 50% of the time load growth is expected to be higher than projected, and 50% of the time it is expected to be lower than projected.

Id., p. 44. The Public Staff maintains that its load forecasts are based on sound statistical methods:

The Public Staff continues to believe that use of its recommended LFE assumptions put forth in the Joint Report, namely that (i) a 2-year LFE is appropriate, given that IRPs are required to be filed every two years, and (ii) the effects of cold weather outages should be removed, should have been used in the resource adequacy study.

Public Staff Initial Comments, p. 46. Duke also expressed concern that a reserve margin lower than 17% would result in a high number of load shifts.

The Companies believe it is prudent to maintain a minimum 17% winter reserve margin to provide adequate reliability and satisfy the target of less than 1 firm load shed event every 10 years. The Companies recommend use of a 17% winter reserve margin until such time as a new study is completed.

Duke Reply Comments, p. 53. The Public Staff demonstrates that, according to the data presented in Duke's 2018 IRPs, a 16% reserve margin comes close to meeting Duke's 10-year criteria and has a marginal effect on future resource additions. Specifically, DEC's IRP shows that a 16% reserve margin would not affect future resource additions and would result in one load shed event per 8.6 years. Similarly, DEP's IRP shows that a 16% reserve margin would "reduce its short-term market purchases and defer a portion of the CT blocks in 2029 and 2032 by two years each, to 2031 and 2034, respectively" and result in one load shift event every 7.7 years. Public Staff Initial Comments, p. 45.

Duke and the Public Staff disagree over the assumptions put into the Astrapé study, the statistical interpretations of Duke's data and the development of their respective load forecast models, and ultimately what is an acceptable shifting of future resource additions frequency of load shed events for Duke and its customers. These disagreements all stem from the lack of information on what is an appropriate reserve margin for Duke territory.

Conclusion

The arguments presented by NCSEA, the Public Staff and Duke demonstrate uncertainty regarding whether the Commission should require DEC and DEP to use a 15% reserve margin, a 16% reserve margin, and a 17% reserve margin, respectively. The dialogue between the three organizations on the topic of reserve margins demonstrates that the Commission does not have enough information to determine which reserve margin is most economical for Duke and its customers while ensuring reliable electric service. For these reasons, the Commission finds that an evidentiary hearing is necessary to determine an appropriate reserve margin for Duke territories.

EVIDENCE AND CONCLUSIONS FOR FINDING OF FACT NO. 4

The evidence for this finding is found in DEC and DEP's IRPs, SACE et al.'s Initial Comments, the IPM Report, NCSEA's Initial Comments, the Synapse Study, the Public Staff's Initial Comments, and Duke's Reply Comments.

DISCUSSION AND CONCLUSIONS

DEC and DEP's IRPs call for a significant increase in natural gas-produced energy. Over the fifteen-year planning horizon between 2018 and 2033, natural gas makes up 77% and 54% of new resources added to the grid for DEP and DEC,

respectively. DEC IRP, p. 10, DEP IRP, p. 9. By 2033, DEP's capacity mix will be 51% natural gas and DEC's capacity mix will be 32% natural gas. DEC IRP, p. 10, DEP IRP, p. 9. While intervenors in this docket express their encouragement that Duke is moving away from coal, they present evidence that DEC and DEP are not moving to renewable energy fast enough.

In its reply comments, Duke addresses some of the arguments against its natural gas projections. They maintain that there is an economic incentive to invest in natural gas, that ten-year natural gas prices are stable enough to make a fuel forecast, and that other market participants are also purchasing large amounts of natural gas. Duke argues that "Contrary to the [Attorney General's Office's] suggestion, the Companies already consider the impacts and future costs from natural gas price volatility in their filed IRPs." Duke Reply Comments, p. 16. Duke points out that the Attorney General's Office did not predict that natural gas prices would drop to their present-day value.

It should be noted the AG's Office does not mention the risk of falling gas prices that has contributed to the current projection of a \$2.5B customer overpayment for solar QF generation that was based on natural gas price forecasts significantly above the current market prices for natural gas.

Id. While the Commission recognizes that Duke has financial obligations to its employees and shareholders, it finds that there are credible arguments against each of Duke's points.

It is true that the Attorney General's Office did not predict that natural gas prices would fall to their current low. However, it is misleading to suggest that this inaccurate projection is an indication that the Attorney General's Office, or any intervenor in this docket, is not qualified to speak on the subject of natural gas price forecasting. In fact, in the 1990s and 2000s, Duke did not project that natural gas prices would fall to their

current level, either. Outside forces such as the widespread proliferation of hydraulic fracturing are largely responsible for today's low natural gas prices. These outside forces are difficult to predict and difficult to model. It is true that outside forces may confound any attempt by participants on this docket to predict what the natural gas market might look like in 2033. However, a more thorough natural gas market forecast is better for planning purposes than a less thorough forecast, and several intervenors have credible evidence that their projections are more thorough than Duke's projections.

Intervenors raise several concerns with Duke's aggressive proposed investment in natural gas. SACE et al. argue that "Duke's 2018 IRPs rely excessively on new gas generating capacity." SACE et al. Initial Comments, p. 13. SACE et al. state that overinvesting in natural gas creates risk for Duke, its shareholders, and its customers, pointing out that "Gas generation is subject to numerous uncertainties, such as fuel cost volatility, potential supply disruptions, and carbon regulation." Id.

The Public Staff makes several arguments in favor of SACE et al.'s position. In their initial comments, they call into question Duke's natural gas forecasting methodology. Public Staff Initial Comments, pp. 19, 71. As mentioned above, Duke maintains that a natural gas forecast using ten years of forward market is appropriate for planning purposes. Duke Reply Comments, p. 16. The Public Staff argues that because they feel that a five-year forward market forecast is most appropriate in the biennial avoided cost proceeding and because the Commission has noted the close relationship between the avoided cost and IRP proceedings, using a ten-year forecast in DEC and DEP's respective IRPs has significant implications. Public Staff Initial Comments, p. 71. The Public Staff concludes that maintaining internal consistency justifies requiring Duke

to use a five-year forward market forecast in their IRPs, stating that:

[T]he Public Staff recommends that the Commission require DEC and DEP to revise the natural gas fuel price forecast used in developing their generation expansion plans to use no more than five years of forward market data before appropriately transitioning to their fundamental forecast.

Id. The Commission agrees with the Public Staff, and will require that Duke use a natural gas fuel price forecast that includes no more than five years of forward market data in its 2019 IRP and all future IRPs.

The Public Staff also raises concern that Duke is disproportionately investing in natural gas because it has not accurately valued other alternatives to coal.

In addition, the Utilities should continue to develop methods of quantifying the benefits of fuel diversity and consider natural gas electric generation facilities that can also operate on an alternate fuel.

Public Staff Initial Comments, p. 19. The Public Staff is concerned that the reason why DEP projects that over three-fourths of its new energy generation and why DEC projects that over half of its new energy generation, respectively, will come from natural gas is because Duke is inadequately analyzing the economic value of natural gas.

The Commission finds there is other credible evidence against Duke's proposed investment in natural gas. The Synapse Study and the IPM Report are two independent third-party studies that evaluate the economically efficient energy portfolio for Duke's territories. As discussed in the Findings of Fact No. 1, these two studies are critical of Duke's energy portfolio. In summary, the Synapse Study models a scenario in which new solar plus storage generation is constructed instead of new natural gas generation, which would result in reductions in residential average annual electricity expenditures of 2.5 to 5.5 percent compared to Duke's IRP. Synapse Study, pp. 1, 14-15. Similarly, the IPM

Report shows that the substitution of new natural gas generation for existing coal generation and significant expansion of solar plus storage generation would result in savings of \$5.5 billion for North Carolina's ratepayers over the 15-year planning horizon. IPM Report, pp. 5, 9. The findings of these two reports suggest that Duke's IRPs do not represent the least-cost energy portfolio for their respective territories, and therefore would violate G.S. 62-110.1(c) and R8-60. As has been mentioned earlier in this Order, the Commission believes that the findings of the Synapse Study and the IPM Report are credible.

NCSEA and SACE et al. argue there are ways to meet Duke's projected 2033 energy demands without substantial increases in natural gas, while also significantly lowering energy bills for ratepayers. They present two ways that work in combination to meet this projected demand: (1) investment in renewable energy instead of fossil fuels, and (2) energy efficiency (EE) programs. It is NCSEA's position that,

With a heavy reliance on natural gas and other traditional generating resources, the plans fail to account for cost-effective clean energy alternatives to the increasingly uneconomic operations of Duke's existing coal plants.

NCSEA Initial Comments, p. 5. NCSEA argues that the Synapse Study details a realistic clean energy future that provides both the energy and capacity to meet the needs of Duke's customers, while effectively meeting future reliability requirements as traditional generating resources are retired. *Id.*, pp. 5-6.

Regardless of what energy future the Commission selects for Duke, SACE et al. believe there are opportunities for DEC and DEP to meet part of their energy demand through growth in EE programs, rather than investment in new natural gas generation.

As more energy efficiency programs and renewable energy resources and

battery storage are added to the Companies' resource mix, the need for additional gas-fired capacity . . . is diminished or delayed.

SACE et al. Initial Comments, p. 13. SACE et al. are also critical of Duke's incorporation of EE into its current energy portfolio, and into its planning process. SACE et al. feel Duke is artificially limiting the amount of demand side management in its territories by being too selective in what EE programs it adopts for its customers. Id., p. 12. They are also concerned that Duke is not fully capturing demand-side management in its capacity expansion model, and therefore is unable to easily compare EEs and supply-side resources. Id.

The Public Staff shares some of SACE et al. and NCSEA's concerns with how EE is incorporated into Duke's IRPs. In particular, the Public Staff raised concerns about inconsistencies with Duke's EE accounting: "The assumption that EE measures will be replaced with other or new measures differs from the assumptions Duke uses regarding NUG contract renewals[.]" Public Staff Initial Comments, p. 54.

The Public Staff is concerned that Duke is assuming that retired or "rolled-off" EE measures and savings will be replaced with equivalent or more efficient EE measures for the purposes of its IRPs, but not for the purposes of NUG contract renewals. They raise the point that this inconsistency may eventually significantly affect the evolution of their energy portfolio. Public Staff Initial Comments, p. 54.

Conclusion

The Commission feels that NCSEA, SACE et al., the Public Staff, and others present credible evidence that Duke's IRPs plan for an overinvestment in natural gas and an underinvestment in energy efficiency measures. Given that Duke's IRPs project a substantial and disproportionate level of investment in natural gas to meet its 2033

projected energy demand, the Commission believes it is important to examine whether this investment is in the best interest of the Company's ratepayers. Therefore, the Commission calls for an evidentiary hearing to determine the appropriate level of natural gas and energy efficiency measures in Duke's IRPs.

EVIDENCE AND CONCLUSIONS FOR FINDING OF FACT NO. 5

The evidence for this finding is found in the DEC and DEP IRPs, NCSEA's Initial Comments, EDF's Initial Comments, the AGO's Reply Comments, Duke's Reply Comments, and the Commission's July 23, 2019 Order in this Docket.

DISCUSSION AND CONCLUSIONS

DEC and DEP's IRPs state that Duke is recognizing that the traditional methods of utility resource planning must be enhanced to keep pace with changes occurring in the industry. DEC IRP, p. 31, DEP IRP, p. 31. In particular, Duke states that the planning tools that have been used in the past are limited in their ability to value some aspects of newer technologies such as renewables and distributed generation sources. DEC IRP, p. 31, DEP IRP, p. 31. While the Duke IRPs describe some of initial steps DEC and DEP included 150 megawatts (MW) and 140 MW of nameplate battery storage placeholders, respectively, in their IRPs, and the Public Staff encouraged DEC and DEP to continue to enhance their modeling capabilities as described in the have taken to include estimates of real-time system impacts of these new technologies in the long-term planning models, they conclude that these shifting trends in technologies and planning practices will have to be further addressed in future IRPs through their Integrated System and Operations Planning (ISOP) effort. DEC IRP, p. 32, DEP IRP, p. 32.

According to DEC and DEP's IRPs, ISOP:

- [E]nvisions the creation of a broader process by which all energy resources are evaluated fully and fairly valued on functional capability, irrespective of the resource location on the grid.
- [S]trives to identify the appropriate tools and examine the performance of different asset portfolios across a variety of potential futures.
- ISOP has completed evaluations of the current planning practices and has identified future enhancements to be addressed in a systematic, disciplined manner to realize this future vision.
- One key goal of ISOP is for the planning models to reasonably mimic the future operational realities to allow DEP [and DEC] to serve its customers with newer technologies.

DEC IRP, p. 32, DEP IRP, p. 32. Further, the Duke IRPs explain that,

ISOP has a number of other workstreams addressing the identified future enhancements to the modeling tools, the need for granularity in location and time, as well as, the approach for stacking functional benefits across the system. These future enhancements in planning are expected to be addressed over the next several years, as soon as the modeling tools, processes and data development will allow.

DEC IRP, p. 32, DEP IRP, p. 32.

In initial comments, both EDF and NCSEA expressed interest in the ISOP concept as described in the Duke IRPs but noted the lack of detail. EDF Initial Comments, p. 5, NCSEA Initial Comments, pp. 19-20. EDF likened ISOP to Distribution System Planning (DSP) which NCSEA referred to as Integrated Distribution Planning (IDP). *Id.*, p. 19; EDF Initial Comments, p. 5. Both EDF and NCSEA describe the potential benefits of establishing an DSP/IDP process for DEC and DEP which include identifying cost savings opportunities for ratepayers that may not be identified in traditional resource planning approaches, improved accounting and compensation for the benefits of distributed energy resources (DERs), and enhancing utilities' relationships with their customers as interest in and deployment of DERs continue to grow. EDF Initial Comments, pp. 5-6, NCSEA Initial Comments, pp. 17-18. The Public Staff also

recognized the benefits an ISOP/DSP/IDP process could bring to quantifying energy storage benefits and costs in a way that would, “obviate the need to force storage into the IRP modeling.” Public Staff Initial Comments, pp. 76-77.

Both EDF and NCSEA request that the Commission initiate a rulemaking proceeding or separate docket to better define and establish rules for an ISOP/DSP/IDP process for utilities that are required to submit IRPs in North Carolina. EDF and NCSEA note that the lack of detail provided in the Duke IRPs about the ISOP process doesn’t provide any certainty that customers will receive the full benefits of ISOP/DSP/IDP as described by EDF and NCSEA and state that the requested rulemaking would reduce or eliminate this uncertainty. EDF Initial Comments, pp. 5-6; NCSEA Initial Comments, pp. 20-21. NCSEA was particularly concerned that the ISOP description included in the Duke IRPs made no mention of providing consumers and developers with a hosting capacity analysis that could, “help provide a constructive path forward on some of the more contentious issues related to DERs that have come before the Commission in recent years.” NCSEA Initial Comments, p. 17. NCSEA further notes that,

[I]t is vital that the Commission initiate a directly related IDP Rulemaking Proceeding as soon as possible to assure Duke customers, stakeholders, and regulators that ISOP does not become a vehicle for the utility to justify routine/business as usual investments in the grid as “grid modernization” or in the worst case, justify excess investment.

Id., p. 20. In Reply Comments, the AGO and its outside expert, Strategen, echoed EDF’s and NCSEA’s request and stated that,

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. 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.

AGO Reply Comments, p. 13.

In Reply Comments, DEC and DEP stated,

The Companies do not oppose a rulemaking, but recommend that the Commission allow interested parties to participate in a pre-rulemaking stakeholder process to facilitate common understanding of ISOP and IDP issues, and attempt to reach consensus on as many areas as possible to make the formal rulemaking process more collaborative and efficient. The Companies have discussed this stakeholder proposal informally with the Public Staff, and believe that such a process could be beneficial to the Commission and interested stakeholders.

DEC and DEP Reply Comments, p. 42.

In its July 23, 2019 *Order Scheduling Technical Conference and Requiring Responses to Commission Questions* in this Docket, the Commission stated that it recognizes that some of the most promising emerging resource solutions such as energy storage and leading-edge intelligent grid controls, are still in the early stages and will require enhanced capabilities, such as those promoted through ISOP. The Commission concluded that it would be helpful for the Commission to receive additional information from Duke about ISOP and requested that Duke respond to the Commission Questions attached as Appendix A in the Order. The Commission requested that Duke file responses to the Commission Questions on or before Wednesday, August 21, 2019 and scheduled a Technical Conference on Wednesday, August 28, 2019, at 10:00 a.m., for the purpose of obtaining additional information from Duke and the Public Staff. The Commission also invited all parties, stakeholders, and other interested persons to attend the Technical Conference but did not request other parties to provide witnesses or testimony at the conference since the Technical Conference is being held for informational purposes only.

Conclusion

The Commission is persuaded by the arguments by NCSEA, EDF, and the AGO that the ISOP process introduced in the 2018 DEC and DEP IRPs and the IDP concept is important enough to the future of integrated resource planning in North Carolina that it warrants establishing new rules to define and govern the process. However, the Commission also agrees with DEC and DEP that a stakeholder process to facilitate common understanding of ISOP and IDP issues will likely lead to areas of consensus and reduce the number of issues in dispute during a rulemaking process. Therefore, following the August 28th Technical Conference, the Commission will open a rulemaking docket regarding Integrated Distribution Planning and direct the Public Staff to convene a stakeholder process and to report on areas of consensus and disagreement before the Commission requests proposed rules and comments.

EVIDENCE AND CONCLUSIONS FOR FINDING OF FACT NO. 6

The evidence for this finding is found in NCSEA's initial comments, the Public Staff's initial comments, and Duke's reply comments.

DISCUSSION AND CONCLUSIONS

As summarized by the Public Staff,

The assumptions made regarding qualified facility (QF) capacity; the treatment of QF contracts that expire within the planning period, planned utility uprates, energy efficiency programs, load assumptions, generation unit retirement assumptions, and avoidable and unavoidable planned generation units, all directly impact the first year of capacity need, which is used to calculate avoided capacity payments in the Avoided Cost proceeding.

Public Staff Initial Comments, p. 90 (internal citations omitted). However, as filed, the Duke IRPs do not make clear how each of these factors influence the first year of

capacity need for both DEC and DEP. In its initial comments, NCSEA takes issue with Duke's assumption that expiring PPAs with solar QFs will be renewed or replaced in kind, without creating a capacity need for the utility. NCSEA Initial Comments, p. 25. NCSEA argues that, because Duke assumes that PPAs will be renewed, it artificially negates a capacity need. However, since the IRP does not show a capacity need, pursuant to the provisions of G.S. 62-156(b)(3), a solar QF that is renewing a PPA would receive a reduced or no capacity payment. NCSEA further takes issue with the fact that the expiration of a PPA with a solar QF is treated differently in Duke's IRP process than the expiration of all other PPAs.

In response to NCSEA's arguments, Duke states that:

The Companies' IRPs actually assume that, upon expiration of any third-party wholesale purchase contract (both QF and non-QF), the Companies recognize a reduction in capacity by the amount of the capacity provided in the expiring wholesale purchase contract in the year following contract expiration.

Duke Reply Comments, p. 29. While wholesale purchase contracts with both QFs and non-QFs may be treated the same, it does not appear that Duke's planning process treats PPAs with solar generation resources the same as with non-solar generation resources.

Duke asserts that:

DEC and DEP have consistently assumed across multiple planning cycles that all wholesale purchase contract capacity is removed in the year after a wholesale contract expires and that QFs are not presumptively assumed to establish a new Power Purchase Agreement ("PPA") to deliver capacity and energy to the Companies over a new fixed term in the future.

Id., pp. 27-28. However, this is contradicted by Duke's own statement that:

Solar capacity, however, will continue to grow in the future, increasing the Companies' planned solar capacity. As such, the capacity of existing solar QFs will either be procured by the renewal of existing contracts or replaced with other solar PPAs.

Id., p. 27. Duke further notes that solar QFs are treated differently than all other generation resources, noting that Attachment 2 to NCSEA’s Initial Comments “refers specifically to solar QFs, as existing QFs of any other technology are assumed to retire at the end of the contract term.” Id.

Duke argues that “The IRP is agnostic as to which choice is made but rather focuses on an expected level of solar penetration.” Duke Reply Comments, p. 28. While it is true that the IRP is agnostic as to whether a capacity need is served by a new solar QF or a solar QF that is renewing its PPA, the IRP is not agnostic to the fact that there is a capacity need that is created when a PPA with a solar QF expires. In fact, Duke recognizes that “the expiration of each PPA has the potential to impact the timing of the Companies’ first capacity need, particularly when viewed in aggregate with other contract expirations or retirements.” Id., p. 29. Furthermore, Avoided Cost is not agnostic to this capacity need; in fact, pursuant to G.S. 62-156(b)(3), the calculation of the Avoided Cost is entirely dependent on this capacity need.

In an attempt to remedy this issue, the Public Staff proposes “that the Utilities, in their IRP Update to be filed in 2019 and in all future IRPs and updates, include a new Utility Statement of Need section.” Public Staff Initial Comments, p. 90. This Statement of Need would address, at a minimum, the following issues:

- The year in which the Utility would fall below its planning reserve margin without commitment(s) to procure additional resources;
- Whether QF contracts expiring within the Avoided Cost term are renewed, replaced in kind, or excluded;
- Whether Utility uprates are solely installed for additional capacity and if they could be considered avoidable;
- Whether new EE measures are included in the determination of capacity need;
- The quantity of MW needed in the first year, and a discussion of whether avoided capacity payments will be made to QF contracts

- executed in excess of that capacity;
- The year in which the Utility’s first avoidable capacity need becomes unavoidable; and
- Whether it is appropriate to create a separate “Avoided Cost Portfolio” in the IRP’s portfolio analysis section, which might present a more objective determination of capacity need that could ensure QFs providing capacity are not treated as captive.

Id., p. 91. In its reply comments, Duke agreed “with the Public Staff’s recommendation and will include a Statement of Need section to more clearly identify the undesignated capacity needs for each utility in DEC’s and DEP’s 2019 IRP Updates and in future biennial IRP filings.” Duke Reply Comments, p. 26.

Conclusion

The Commission concludes that Duke should include a Statement of Need in all future biennial IRPs and IRP updates. This alone, however, is insufficient to address the concerns raised by NCSEA and shared by the Commission. Duke provided contradictory information as to whether the expiration of solar QF PPAs does⁸ or does not⁹ create a capacity need.

The Commission believes that, upon expiration of a PPA regardless of the generation facility or resource, a resource need is created, and that this resource need could be met through the renewal of the PPA. The non-utility generator whose PPA is expiring should have an opportunity to meet this resource need. For QFs, this raises questions regarding capacity payments that require examination in the biennial avoided cost proceedings. However, in the instant proceeding, the Commission must determine how to provide non-utility generators with the opportunity to meet a resource need that is created when a PPA expires. Therefore, the Commission determines that it is appropriate

⁸ See, Duke Reply Comments, pp. 28-29.

⁹ See, Duke Reply Comments, p. 27. See also, NCSEA Initial Comments, Attachment 2.

to include in its evidentiary hearing an examination of Duke's treatment of expiring solar QF PPAs and how to provide non-utility generators with an opportunity to meet a resource need that is created when a PPA expires.

The Commission agrees with the Public Staff's recommendation that Duke include in all future biennial IRPs and update filings a Statement of Need, and the Commission directs Duke to include the Statement of Need as set forth above. However, the Commission continues to be concerned that Duke treats the expiration of PPAs with solar generators differently than the expiration of PPAs with non-solar generators. Accordingly, the Commission believes it is appropriate to address this at an evidentiary hearing.

EVIDENCE AND CONCLUSIONS FOR FINDING OF FACT NO. 7

The evidence for this finding is found in Duke's IRPs, the initial comments of the Public Staff, SACE et al., and the Attorney General, and Duke's reply comments.

DISCUSSION AND CONCLUSIONS

Based on the evidence submitted in this proceeding, it is clear that energy storage, and particularly batteries, will play an important role in North Carolina's transition from fossil fuel generation to renewable energy, as well as in issues involving reliability, resiliency, and security. Duke acknowledges that energy storage merits further study than it received in DEC and DEP's 2018 IRPs.

The Companies acknowledge that inclusion of additional storage and solar plus storage resources in the IRPs may be warranted, as suggested by the AG's Office; however, Duke Energy is committed to studying the true value of energy storage on the DEP and DEC systems before arbitrarily assigning value in the IRPs.

Duke Reply Comments, pp. 20-21. While Duke's comments are encouraging, they fall

short in two areas. First, the Commission believes that Duke's IRPs should accurately project DEC and DEP's respective plans for battery storage. An IRP is required by G.S. 62-110.1(c) and Rule R8-60 to reflect a utility's long-term plans. If, after examining the comments in this proceeding, Duke believes it will invest more in energy storage than its currently submitted IRPs spell out, then it is appropriate for the Duke to amend its 2018 IRP to reflect this change. The purpose of Intervenor's filing comments and participating in the IRP process is to have a dialogue between stakeholders. If Duke believes its long-term plans will change as a result of this dialogue, it is the Commission's position that the utility should amend its IRP or make clear how it plans to address these changes in future IRPs.

The Commission also finds it concerning that Duke states it is "committed to studying the true value of energy storage[.]" While on the surface this is an encouraging sentiment, this is precisely what the energy storage study required by House Bill 589, Session Law 2017-192 (HB589) was designed to do. This causes the Commission to question how Duke participated in the HB589 energy storage study.

As the Public Staff outlines in its comments, there are several shortcomings in the way that Duke modeled energy storage in its 2018 IRPs. Both DEC and DEP include modest increases in lithium battery "placeholder" storage. Public Staff Initial Comments, p. 73. Duke refers to lithium battery storage in its IRPs as "placeholder" because according to its analysis, lithium batteries are the only batteries that are technologically and economically feasible. For this reason, Duke's System Optimizer and Prosym models used to evaluate its energy portfolios only include lithium batteries. The Commission believes this is an unnecessary limitation of Duke's IRP. While it is difficult to anticipate

what type of battery technology will develop in the next fifteen years, by assuming the status quo, Duke is likely to underestimate the feasibility of battery storage in its IRPs.

In addition, rather than attempting to model energy storage's economic benefits as it does with traditional generation technologies, Duke forces these models to accept energy storage. In addition, "energy storage provides a range of benefits, such as transmission investment deferral and ancillary services, which are difficult, if not nearly impossible, to quantify over the long-term period of the capacity expansion model."

Public Staff Initial Comments, p. 74 (internal citations omitted). The Public Staff writes:

The Utilities should provide in future IRPs or IRP updates a more complete and thorough assessment of battery storage technologies including the 'full value'. If the standard technical and economic analyses of generation resources somehow preclude the complete and thorough assessment of battery storage technologies, then a separate discussion of this point should be included in the IRPs.

Id., p. 19.

As noted by the Public Staff, Duke acknowledges that it did not consider all benefits of batteries in the 2018 IRPs. Public Staff Initial Comments, p. 56. See also, DEC IRP, p. 179 and DEP IRP, p. 175. Duke describes the process it went to model energy storage benefits as,

[T]he Companies acknowledged the potential benefits of storage, included steep cost declines for battery storage technologies, evaluated a sensitivity of replacing a future CT with battery technology, and went as far as to include upwards of 300 MWs of battery storage as capacity assets in the DEC and DEP IRPs...

Duke Reply Comments, pp. 21-22. While it is clear Duke did attempt to quantify some of the benefits of energy storage, the Commission has reason to believe Duke's models are currently missing some key benefits of energy storage technologies. For example, the Public Staff finds Duke's Prosym's model does not fully capture the benefits of energy

storage.

This analysis captures the benefits of bulk energy time shifting, but does not quantify additional energy storage benefits as defined in the recently published *Energy Storage Options for North Carolina* study[.]

Public Staff Initial Comments, p. 75.

While the Public Staff asserts that DEC and DEP's IRPs do not fully account for the benefits of energy storage, the Public Staff suggests the IRPs show energy storage's potential to reduce costs for customers. The Public Staff believes Duke's IRPs suggest energy storage may provide ancillary benefits to combustion turbines (CTs) in an energy future with high levels of renewables.

In a high renewable scenario, it is possible that the Utilities may begin to favor CTs for their flexibility, in which case energy storage represents a valuable tool to reduce ratepayer costs.

Public Staff Initial Comments, p. 67 (internal citations omitted). Duke's Portfolio 6 and Portfolio 7 contain high levels of renewables, and are CT-centric. The difference between Portfolio 6 and Portfolio 7 is that a 460 MW CT in Portfolio 6 is replaced with four-hour lithium-ion based energy storage in Portfolio 7. *Id.* On average over all energy scenarios, Portfolio 7 results in lower rates for customers than does Portfolio 6. *Id.*

The Commission finds the comments and suggestions made by the Public Staff to be credible. The Commission also finds that Duke does not explain why it was unable to meet a higher level of model sophistication, and why it did not incorporate the energy storage modelling techniques of the HB589 energy study into its modelling process. As a result of the concerns raised by the Public Staff in this section, and in particular because it appears that Duke did not incorporate all of the pertinent findings of the HB589 energy storage study into its IRPs, the Commission finds that energy storage is not being fully

valued in Duke's IRPs. The Commission finds that the Public Staff's concerns with Duke's System Optimizer and Prosym models are credible, and calls into question whether DEC and DEP's IRPs constitute least cost plans, as required by G.S. 62-110.1(c) and Rule R8-60.

It is important for Duke's IRPs to include a complete economic analysis of energy storage because energy storage is a crucial underpin of Duke territory's least-cost energy portfolio. SACE et al. argue that "The Companies should fairly evaluate solar-plus-storage resources" because, among other things, they help address winter peaking concerns. SACE et al. Initial Comments, p. 10. Without solar plus storage, Duke will be forced to maintain an excess reserve margin; this additional reserve margin would presumably consist of additional fossil-fuel based capacity. These fossil-fuel plants usually are run at a fraction of their full capacity but must be maintained at cost to ratepayers for the purpose of meeting spikes in demand in early winter mornings. Solar generation has the potential to replace many of these peaking plants, if solar is combined with energy storage. By itself, as Duke points out, solar generation is an inadequate method of supplying vast sums of power during winter peaks. Duke Reply Comments, p. 41. Solar plus storage is more valuable to customers than solar by itself because it can more readily contribute to meeting winter peak demands. Synapse Study, p. 8. Given the realities of electricity demand in North Carolina, customers are not indifferent between solar by itself and solar plus storage.

The Commission does not find Duke's arguments about customers being indifferent between solar and solar plus storage to be valid, and it also calls into question Duke's understanding of the value of energy storage. Duke indicates it cannot make an

accurate assessment of energy storage used in conjunction with solar generation as of its 2018 IRP filing:

Because North Carolina’s peak conditions occur in both summer afternoon and winter mornings and afternoon, and can be at least several hours in duration, there may be limitations to the capacity value of batteries, particularly batteries charged solely from solar resources.

Duke Reply Comments, p. 22. The Commission finds this statement by Duke to be problematic for multiple reasons. First, Duke states that solar is unlikely to be a valid alternative to coal fired power plants in planning for peak load, when there is credible evidence that this assessment is inaccurate. Synapse Study, p. 1. Second, Duke claims there “may be limitations” to the value of energy storage, “particularly” batteries charged from solar generation. The Commission questions the accuracy of this claim, given that Duke did not incorporate the results of the HB589 energy storage study, which included a more rigorous modelling of energy storage than did Duke’s IRPs. The Commission expects Duke to make a more concerted effort to more accurately model energy storage in its IRPs to reduce the planning uncertainty stemming from an incomplete understanding of the value of energy storage. This uncertainty is not in the interest of Duke, its shareholders, or its ratepayers.

Conclusion

The Commission believes it is important for energy storage to be accurately valued in Duke’s IRPs, and that energy storage has the potential to play an important role in North Carolina’s energy future. It finds the arguments by the Public Staff to be credible and calls into question whether Duke’s IRPs accurately value energy storage. Therefore, the Commission finds an evidentiary hearing is necessary to determine the proper valuation of energy storage in DEC and DEP’s territories, and the appropriate

level of energy storage deployment in Duke's IRPs.

IT IS, THEREFORE, ORDERED as follows:

1. NC WARN's Motion for Evidentiary Hearing is granted. The Commission will contemporaneously issue a scheduling order for the evidentiary hearing, which will investigate the following topics:

- Whether the inputs and modeling used to create the Synapse Study and the IPM Report may be used to inform future Duke IRPs;
- Whether Duke's IRPs forecast an appropriate level of new natural gas generation;
- Whether Duke's IRPs forecast an appropriate level of energy efficiency measures;
- Whether Duke's IRPs forecast the most economical utilization and retirement schedule for coal generation;
- Whether it is in the best interest of ratepayers for Duke to participate in the PJM wholesale energy market;
- Whether Duke should use adopt the Public Staff's recommendation that it utilize a coincident peak methodology for calculating the capacity value of solar in its IRPs;
- Whether Duke's IRPs accurately reflect the role of solar in its generation mix, including the value solar provides during peak periods;
- Whether Duke's IRPs reflect an appropriate reserve margin;
- Whether Duke's IRPs properly create a capacity need when the PPA

of a solar QF expires;

- How to provide non-utility generators with an opportunity to meet a resource need that is created when a PPA expires;
- Whether Duke's IRPs properly value energy storage;
- Whether it is necessary for the Commission to open an independent docket to comprehensively examine issues related to energy storage; and
- Whether it is necessary for the Commission to amend Rule R8-60 to better reflect the needs of North Carolina.

2. The Commission shall, after the August 28th technical conference, open a rulemaking docket to investigate rules governing to integrated distribution planning.

3. Duke shall include in its 2019 IRP and in all future IRPs a Statement of Need section that meets the specifics outlined by the Public Staff in its Initial Comments.

4. Duke shall include in its 2019 IRPs a thorough examination of the economic costs and benefits to its ratepayers of joining PJM.

6. DEC and DEP shall use in its 2019 IRP and all in future IRPs a natural gas fuel price forecast that includes no more than five years of forward market data.

ISSUED BY ORDER OF THE COMMISSION.

This the ___ day of _____, 2019.

NORTH CAROLINA UTILITIES COMMISSION

Janice Fulmore, Deputy Clerk

Chairman Edward S. Finley, Jr., Commissioner Jerry C. Dockham, and Commissioner James G. Patterson did not participate in this decision.