

July 1, 2022

***Via Electronic Filing***

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

**Re: Docket No. E-100 Sub 175** – In the Matter of Biennial Determination  
of Avoided Cost Rates for Electric Utility Purchases from Qualifying  
Facilities – 2021

Partial Proposed Order of Southern Alliance for Clean Energy

Dear Ms. Dunston:

In connection with the above-referenced docket, please find enclosed for  
filing the Proposed Order of Southern Alliance for Clean Energy. Pursuant to  
Commission Rule R1-25(c), a Microsoft Word version of the proposed order will  
be emailed to [briefs@ncuc.net](mailto:briefs@ncuc.net).

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

Sincerely,

Nick Jimenez  
Southern Environmental Law Center  
601 West Rosemary St., Ste. 220  
Chapel Hill, NC 27516  
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*Attorney for SACE*

cc: Parties of Record

**CERTIFICATE OF SERVICE**

I hereby certify that all persons on the docket service list have been served true and accurate copies of the foregoing proposed order by electronic mail.

This the 1<sup>st</sup> day of July, 2022.

/s/ Nick Jimenez

Nick Jimenez

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**PARTIAL PROPOSED ORDER  
OF THE SOUTHERN  
ALLIANCE FOR CLEAN  
ENERGY**

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cogenerators and small power producers reflect the cost that the purchasing utility can avoid as a result of obtaining energy and capacity from these sources, rather than generating an equivalent amount of energy itself or purchasing the energy or capacity from other suppliers.

With respect to electric utilities subject to state jurisdiction, FERC delegated the implementation of these rules to state regulatory authorities. State commissions may implement these rules by the issuance of regulations, on a case-by-case basis, or by any other means reasonably designed to give effect to FERC's rules.

The Commission implements Section 210 of PURPA and the related FERC regulations by holding biennial proceedings. The instant proceeding is the most recent biennial avoided cost proceeding. In prior biennial proceedings, the Commission has determined separate utility-specific avoided cost rates to be paid by the electric utilities to the QFs with which they interconnect. The Commission also has reviewed and made determinations regarding other related matters involving the relationship between the electric utilities and such QFs, such as terms and conditions of service, contractual arrangements, and interconnection charges.

This proceeding also follows the mandate of G.S. § 62-156, which was enacted by the General Assembly in 1979. That statute provides that "no later than March 1, 1981, and at least every two years thereafter" the Commission shall determine the rates to be paid by electric utilities for power purchased from small power producers according to certain standards prescribed therein. Such standards generally approximate those prescribed in FERC regulations regarding factors to be considered in the determination of avoided cost rates. House Bill 589 (H589), S.L. 2017-192 made significant revisions to the state implementation of PURPA, while still leaving a number of implementation issues to the Commission for consideration in these biennial proceedings

On August 13, 2021, the Commission issued its Order Establishing Biennial Proceedings, Requiring Data, and Scheduling Hearing. Pursuant to that Order, Duke Energy Carolinas, LLC (DEC), Duke Energy Progress, LLC (DEP) (together, Duke or Duke Energy), Virginia Electric and Power Company, d/b/a Dominion Energy North Carolina (Dominion or DENC), Western Carolina University (WCU), and Appalachian State University, d/b/a New River Power and Light (New River) were made parties to these proceedings.

The following parties filed Petitions to Intervene that were granted by the Commission: North Carolina Sustainable Energy Association (NCSEA), Carolinas Clean Energy Business Association (CCEBA), Southern Alliance for Clean Energy (SACE), Carolina Industrial Group for Fair Utility Rates I (CIGFUR I), Carolina Industrial Group for Fair Utility Rates II (CIGFUR II), and Carolina Industrial Group for Fair Utility Rates III (CIGFUR III) (collectively, CIGFUR), and Appalachian Voices. Participation of the Public Staff was recognized pursuant to N.C. Gen. Stat. § 62-15(d) and Commission Rule R1-19(e).

On November 1, 2021, DENC filed its Initial Statement and Exhibits and confidential avoided cost information. Also on November 1, 2021 Duke Energy filed its Joint Initial Statement and Exhibits and confidential avoided cost information. On November 22, 2021, Duke Energy filed a correction to Exhibit 12 of its initial filing.

On December 16, 2021, WCU and New River filed a Notice of Appearance and Motion for Extension of Time.

On December 20, 2021, the Commission granted the Motion for Extension of Time to WCU and New River, extending the date for parties to file the required statements and exhibits to December 22, 2021.

On December 21, 2021, WCU and New River filed Joint Comments, Proposed Rates and Contracts.

On January 7, 2022, DENC filed corrected versions of its November 1, 2021 filings.

On January 24, 2022, New River filed an Affidavit of Publication of Public Notice to serve as proof of publication and in compliance with the Commission's August 13, 2021 Order.

On January 31, 2022, WCU filed an Affidavit of Publication of Public Notice to serve as proof of publication and in compliance with the Commission's August 13, 2021 Order.

On February 2, 2022, NCSEA, CCBEA, and SACE filed a Joint Motion for Extension of Time to file initial and reply comments.

On February 7, 2022, the Commission granted the Joint Motion for Extension of Time, extending the date for the parties to file initial comments to through and including February 24, 2022 and extended the date for parties to file reply comments to through and including March 28, 2022.

On February 14, 2022, DENC filed an Affidavit of Publication to serve as proof of publication of the Public Notice as required in the Commission's August 13, 2021 Order.

On February 21, 2022, Duke Energy filed an Affidavit of Publication to serve as proof of publication of the Public Notice as required by the Commission's August 13, 2021 Order.

On February 22, the public hearing was held, as scheduled. Duke Energy, DENC, and the Public Staff appeared at the public hearing.

On February 24, 2022, the Public Staff filed confidential and redacted versions of its Initial Comments; CCEBA and NCSEA filed confidential and redacted versions of its Joint Initial Comments; SACE filed confidential and redacted versions of its Initial

Comments; and Appalachian Voices filed its Initial Comments with Exhibit A. Appalachian Voices filed Exhibit B to its Initial Comments on February 25, 2022.

On March 1, 2022, New River filed its Amended Proposed Rates and Contracts in reference to its December 21, 2021 filing.

On March 9, 2022, DENC filed for reference public and confidential versions of all public contracts between VEPCO/DENC and qualifying facilities.

On March 11, 2022, Appalachian Voices filed a Response to New River's Amended Proposed Rates and Contracts filed on March 1, 2022.

On March 24, 2022, Duke Energy filed a Joint Motion for Extension of Time.

On March 25, 2022, the Commission granted the Joint Motion for Extension of Time, extending the date for the parties to file reply comments through April 1, 2022.

On March 31, 2022, SACE filed Reply Comments to the Initial Statement of the Public Staff and to the Joint Initial Comments of CCEBA and NCSEA.

On April 1, 2022, New River filed Reply Comments; DENC filed Reply Comments; CCEBA and NCSEA filed Joint Reply Comments; the Public Staff filed Reply Comments; Duke Energy filed Reply Comments; and NCSEA filed Reply Comments on the Net Excess Energy Credit Rate Revision Proposal (NEEC).

On May 16, 2022, the Commission issued its Order Requiring the Filing of Proposed Orders and Briefs.

On June 17, 2022, Duke Energy, DENC, WCU, New River, the Public Staff, CCEBA, NCSEA, and SACE filed their Proposed Orders and Briefs.

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

### **FINDINGS OF FACT**

1. An F-frame CT is no longer the appropriate avoided peaking resource. Duke Energy should recalculate its avoided costs using an aeroderivative gas turbine, as the most economical highly flexible peaking unit.

2. As a result of pending changes and modernization of the electric system required by Session Law 2021-165, the peaker method of calculating avoided costs likely no longer accurately captures the costs that Duke Energy avoids by purchasing power from QFs and it is appropriate for the Commission to reevaluate the avoided cost methodology in the next biennial avoided cost proceeding.

3. The solar integration services charge (SISC) should be recalculated to correct the three errors identified by Mr. Brendan Kirby.

4. It is appropriate to direct Duke to convene an independent technical review committee (TRC) to review any methodological changes in each SISC study in future biennial avoided cost proceedings.

5. Session Law 2021-165 has established an implicit cost of carbon dioxide emissions.

6. It will be possible to determine a more accurate implicit carbon price once the Carbon Plan is final at the end of this year.

7. It is appropriate to direct Duke and the Public Staff to convene a stakeholder process after the Carbon Plan is final in order to determine the appropriate carbon price, the methodology to derive one from the biennial Carbon Plan, and the methodology to apply it in biennial avoided cost proceedings, beginning in the next proceeding in 2023.

8. Duke's natural gas price forecast methodology is unacceptably likely to lead to inaccurate results due to the volatility of forward market prices, their over-responsiveness to near-term conditions and comparative neglect of longer-term market dynamics as illustrated by the significant inaccuracy of market prices in recent years, and the low volume of trades in later years.

9. Duke Energy should recalculate its avoided energy costs using a more accurate natural gas price forecast methodology comprising 18 months of forward market prices, 18 months of blended prices, before switching fully to fundamental forecasts, averaging the Spring 2021 IHS and EIA 2021 Reference Case.

10. QFs are entitled under PURPA to compensation for ancillary services that they provide, as part of the "energy" sold.

11. It is appropriate to require Duke Energy to file within 180 days of this order a report detailing its costs to provide ancillary services, including whether and to what extent Duke compensates its own generators for the provision of reactive power, and the extent to which QFs are currently providing reactive power.

12. It is appropriate to direct Duke and the Public Staff to jointly convene a stakeholder process immediately following submission of Duke's report on its costs to provide ancillary services, lasting no longer than 120 days, to assess the extent to which existing QFs, as well as new solar generators, can provide ancillary services to Duke, and the appropriate compensation structures for those services, resulting in a recommendation whether to establish an ancillary services pilot and the parameters of the pilot.



13. It is not appropriate to decide the appropriate methodology for calculating the avoided cost rate used for the Net Excess Energy Credit (NEEC) for the Net Energy Metering Tariffs (NEM Tariffs) within this docket at this time because the NEEC in Duke's NEM Proposal is not yet adopted and therefore the issue is not yet ripe for consideration until the Commission has ruled on Duke's Joint Application for Approval of Revised Net Energy Metering Tariffs Proposal in Docket Nos. E-7, Sub 1214, E-2, Sub 1219, and E-2, Sub 1076 (NEM Tariffs).

14. It is appropriate to fully vet any future proposed change in the methodology for assigning the value of avoided cost rates that would be specific to rooftop solar customers and to ensure that it properly accounts for the particular benefits of distributed rooftop solar generation.

15. In light of the low current and forecast rooftop solar penetration, any potential minuscule increase in accuracy of the rate calculation resulting from revising the NEEC methodology is outweighed by the increased complexity, administrative burden, and potential for confusion associated with a change in methodology.

16. The current methodology for calculating the NEEC for NEM Tariffs is appropriate at this time.

## **EVIDENCE AND CONCLUSIONS FOR FINDING OF FACT NOS. 1 & 2**

The evidence supporting these Findings of Fact is found in Duke Energy's Initial Statement, the Initial Statement of the Public Staff, the Initial Comments of SACE, the Joint Initial Comments of CCEBA and NCSEA, the Reply Comments of Duke Energy, Reply Comments of the Public Staff, Reply Comments of SACE, and Joint Reply Comments of CCEBA and NCSEA.

### **Summary of the Comments**

In Duke's Initial Statement, it stated that it developed its avoided capacity rates consistent with the direction provided in the Commission's August 13, 2021 Order Establishing Standard Rates and Contract Terms for Qualifying Facilities in Docket No. E-100, Sub 167, including using the peaker method. Duke Initial Statement 14-15. Duke stated that it worked with the Public Staff and Dominion to develop a consensus approach to streamlining the determination of avoided combustion turbine (CT) capacity cost. Duke Initial Statement 17. Duke considered using the cost of brownfield sites but declined because savings are site-specific and instead used a greenfield economies of scale adjustment. Duke Initial Statement 18. The greenfield economies of scale methodology bases the avoided capacity cost on the U.S. Energy Information Administration's (EIA) most current published overnight cost of a CT unit, adjusted by a percentage decrement to reflect the economies of scale associated with a four-unit CT site in the Carolinas. Duke Initial Statement 18. Duke arrived at an overnight CT capital cost of \$619/kW in 2021 dollars for this proceeding. Duke Initial Statement 18. Duke also used EIA data for the fixed operations and maintenance (FOM) component of avoided capacity cost, adjusted



using internal data to reflect the economies associated with a four-unit project. Duke Initial Statement 18-19.

In its Initial Statement, the Public Staff agreed with Duke and Dominion's use of publicly available CT costs and its economy-of-scale adjustments. Public Staff Initial Statement 14-15, 29-30. The Public Staff agreed that a brownfield cost decrement is not appropriate at this time because there is no certainty as to where future CTs may be built. Public Staff Initial Statement 14-15. The Public Staff also found reasonable Duke and Dominion's adjustments to EIA cost data. Public Staff Initial Statement 15. The Public Staff found Duke's capital cost inputs and other assumptions reasonable for the determination of its avoided capacity rates at this time. Public Staff Initial Statement 30-33, 35-37.

The Public Staff supported the use of the peaker method at this time, noting that the Commission has consistently approved the use of the peaker method. Public Staff Initial Comments 24. However, the Public Staff stated that there may come a time when the peaker methodology is not appropriate for use in North Carolina, as a result of increasing deployment of renewable energy resources, and the likelihood that peaking capacity will come from renewable resources and storage. Public Staff Initial Comments 24-25. The Public Staff believes that eventually it may be appropriate to either look to other resources to determine the avoided cost of capacity or to adopt a new methodology that reflects the changing energy landscape. Public Staff Initial Comments 25.

In its Initial Comments, SACE raised concerns about the accuracy and appropriateness of the peaker method for measuring avoided costs in North Carolina in light of recent developments in state law and the ongoing transformation of the electric sector. SACE Initial Comments 3-16. SACE pointed out that Session Law 2021-165 (also known as House Bill 951 or H951) requires the Commission to take "all reasonable steps" and to meet the carbon-reduction mandates in that law and to develop a Carbon Plan to do so, which will require procuring large amounts of additional zero-carbon resources starting immediately. SACE Initial Comments 5-8. SACE pointed out that Duke's 2020 IRPs were filed before the passage of Session Law 2021-165, making them outdated as guides to future procurement. SACE Initial Comments 10-11.

SACE also recommended that in the near term an aeroderivative turbine will be the most economical highly flexible peaking unit—a need that Duke has acknowledged, DEC 2020 IRP at 323; see Reply Comments of Duke Energy Carolinas, LLC and Duke Energy Progress, LLC at 18 (Mar. 5, 2021), Docket No. E-100, Sub 167—and therefore should replace a simple CT as the avoided peaking unit for the purpose of determining avoided cost. SACE Initial Comments 9-13. Doing so would increase overnight cost by 65% and FOM by 133%. SACE Initial Comments 13. SACE recommends that in the near future (but not for this proceeding), if the Commission continues to accept the peaker method, it will be appropriate to use fully (100%) hydrogen-capable turbines or batteries as the avoided peaking unit, citing the evident need for zero-carbon-emitting peaking resources to meet the carbon-reduction mandates in Session Law 2021-165. SACE Initial Comments 13-15.

In their Joint Initial Comments, NCSEA and CCEBA agreed with SACE that an aeroderivative gas turbine is the appropriate avoided capacity resource in the near term and that hydrogen-capable turbines and associated infrastructure upgrade costs should be used to calculate avoided capacity costs in the near future. NCSEA and CCEBA Joint Initial Comments 3. NCSEA and CCEBA also agreed that the Commission and interested stakeholders should re-evaluate the peaker methodology in light of the changes required by Session Law 2021-165. NCSEA and CCEBA Joint Initial Comments 17-18.

In its Reply Comments, Duke Energy reiterated that it developed its proposed methodology for calculating CT cost estimates in consultation with Dominion and the Public Staff, that it used publicly available data, and that it applied a cost decrement to reflect economies of scale. Duke Reply 7-8. Duke disagreed with SACE that an aeroderivative gas turbine is a more appropriate peaking resource at present and that hydrogen-capable turbine and/or battery storage will be more appropriate as a peaking unit in the near future. Duke Reply 8. Duke stated that although an aeroderivative turbine provides greater flexibility attributes than an F-frame CT, the installed cost of an F-frame CT is approximately 60% lower. Duke Reply 9. Duke also disagreed with SACE's characterization of the peaker method, stating that it is intended to produce a reasonable proxy for the marginal capacity and energy costs that a utility avoids by purchasing power from a QF. Duke Reply 9. Duke argued that an F-frame CT accurately represents the utility's avoided costs even if it is not the next planned unit because it is typically the least expensive peaking capacity and always an option within the resource planning process. Duke Reply 9-10. Duke stated that its 2020 IRPs anticipated the need for an F-frame CT but no aeroderivative CTs. Duke Reply 10. Finally, Duke argued that if aeroderivative CTs are required in the future it will be the result of the output from must-take solar generation, i.e. QFs, and solar QFs should be charged the incremental cost.

In its Reply Comments, SACE agreed with the Public Staff that the peaker method may soon be inappropriate for North Carolina. SACE Reply 5. SACE stated that the peaker method does not mandate the use of a simple CT as the avoided peaking unit, which instead is the lowest-cost capacity option available to the utility. SACE Reply 5-6. SACE agreed with CCEBA and NCSEA's suggestion that the Commission and interested stakeholders reevaluate the method. SACE Reply 9.

In their Joint Reply Comments, NCSEA and CCEBA joined SACE and the Public Staff in encouraging the Commission to carefully study the role of the peaker method in the Carbon Plan and future Avoided Cost proceedings, and the use of an aeroderivative gas turbine as the appropriate avoided peaking resource in this proceeding. NCSEA and CCEBA Joint Reply 8-9.

## **Discussion and Conclusions**

The Commission determines that an F-frame CT does not represent the most appropriate avoided peaking resource for the purpose of calculating avoided costs in this proceeding. Although Duke's 2020 IRPs anticipate constructing new F-frame CTs those IRPs were filed—and drafted—before Session Law 2021-165 became law. The Carbon

Plan currently being developed in compliance with that law will stand in place of Duke Energy's IRP in 2022, Order Requiring Filing of Carbon Plan and Establishing Procedural Deadlines, Docket No. E-100, Sub 179 (N.C.U.C. Nov. 19, 2021), and the certificate of public convenience and necessity (CPCN) for a future peaking resource will need to be consistent with the Carbon Plan. In a carbon-constrained world, it is no longer true that a simple CT is always an option for additional peaking capacity as needed. As a more efficient resource that Duke Energy acknowledges has advantages for integrating higher penetrations of variable zero-carbon resources, an aeroderivative gas turbine presents advantages that the Commission would consider carefully in a hypothetical CPCN proceeding for a new peaking resource. For similar reasons, an F-frame CT is an inappropriate proxy for the marginal capacity and energy costs that a utility avoids by purchasing power from a QF, whereas an aeroderivative gas turbine is more accurate for this proceeding. Session Law 2021-165 will require expanding carbon-free resources, which tend to have higher up-front capital costs and much lower marginal operating costs than conventional thermal generation. Because, as discussed below, the Commission anticipates adopting a new methodology in the next avoided cost proceeding it need not address the potential appropriateness of full-hydrogen turbines or batteries as avoided peaking resources in future proceedings. Accordingly, the Commission will direct Duke Energy to recalculate its avoided costs using an aeroderivative gas turbine as the avoided resource.

The Commission determines that for a carbon-constrained and modernizing electric system, the peaker method is becoming increasingly disconnected from the actual costs avoided by Duke Energy through purchases from QFs. Accordingly, the Commission will reconsider the most appropriate methodology in the next biennial avoided cost proceeding. In advance of that proceeding the Commission will direct Duke to convene a stakeholder process and potentially will hold a technical conference depending on the outcome of the stakeholder process.

### **EVIDENCE AND CONCLUSIONS FOR FINDING OF FACT NOS. 3 & 4**

The evidence supporting these Findings of Fact is found in Duke Energy's Initial Statement, the Initial Statement of the Public Staff, the Initial Comments of SACE, the Joint Initial Comments of CCEBA and NCSEA, the Reply Comments of Duke Energy, and Joint Reply Comments of CCEBA and NCSEA.

### **Summary of the Comments**

In its Initial Statement, Duke Energy reviewed the history of the solar integration service charge (SISC), beginning with the Commission's decision in the 2016 proceeding that it would be appropriate for Duke to propose schedules specific to QFs that provide intermittent, non-dispatchable power, if its data demonstrated marked differences in the value of the energy and capacity that they provided. Duke Initial Statement 31. Duke commissioned Astrapé Consulting to prepare a solar integration cost study, which in the 2018 avoided cost proceeding supported a SISC of \$1.10/MWh for DEC and \$2.39/MWh for DEP. Duke Initial Statement 32. In its April 15, 2020 Order Establishing Standard

Rates and Contract Terms For Qualifying Facilities, issued in Docket No. E-100, Sub 158 (2018 Sub 158 Order), the Commission directed the Companies to undertake an independent technical review of the 2018 Astrapé Study to inform future biennial avoided cost proceedings. Duke Initial Statement 33. The TRC produced a report that Duke filed along with a new 2021 Astrapé Report. Duke Initial Statement 33. Based on the 2021 Astrapé Report, Duke proposed a SISC of \$1.05 per MWh for DEC and \$2.26 per MWh for DEP. Duke Initial Statement 34.

In its Initial Statement, the Public Staff discussed the history of the TRC and stated that the recommendations in its report were incorporated into the 2021 Astrapé Report. Public Staff Initial Statement 21. The Public Staff highlighted several significant changes to the SISC methodology resulting from the TRC report: the SISC was calculated to reflect that the Joint Dispatch Agreement (JDA) allows DEC and DEP to share load following reserves at least cost in the event of intra-hour net load variations; rather than applying the Loss of Load Expectation (LOLE) flexibility standard the 2021 Astrapé Report focuses on returning the system to pre-solar levels of reliability; load-following reserves were added only when most likely needed (in hours of high solar volatility) rather than at all hours of the day. Public Staff Initial Statement 21-23. In addition, the impact of the proposed Southeastern Energy Exchange Market (SEEM) was not included. Public Staff Initial Statement 23-24.

The Public Staff found that Duke satisfied the requirements of the 2018 Sub 158 Order during the TRC process recommended accepting the TRC report and approving the proposed SISCs. Public Staff Initial Statement 45. However, the Public Staff requested that Duke confirm in reply comments that the SISC avoidance criteria referenced in the proposed Schedule PP tariffs reflect the use of the approved SISC avoidance methodology, and that Duke consider including the full SISC avoidance requirements in its Schedule PP tariffs. Public Staff Initial Statement 45-46. Finally, it requested that the Commission direct Duke to file a report on QFs that attempt to avoid the SISC, and include an analysis of actual solar volatility reductions of QFs that avoid the SISC in Duke's service territories in future avoided cost filings, and direct Duke to specifically address QFs seeking SISC avoidance in direct testimony filed in future fuel rider proceedings, providing the specific facilities and amount of SISC credits issued, supporting workpapers, and reports on any audits performed on QFs seeking to avoid the SISC. Public Staff Initial Statement 46.

In its Initial Comments, SACE stated that it believed that the TRC process had been productive, pointing out that the TRC discussed and incorporated several concerns raised by SACE. SACE Initial Comments 23. SACE recommended building on the success of this approach and requiring third-party independent technical review, informed by stakeholder input, of Duke's analyses in the avoided cost and other proceedings in the future. SACE Initial Comments 23. SACE stated that the 2021 Astrapé Study nonetheless contained three errors, detailed in an attached report prepared by Brendan Kirby. SACE Initial Comments 23. First, the 2021 Astrapé Study assumed that solar load-following reserves are required during multiple hours during which there is no solar generation. SACE Initial Comments 23. Second, the "combined case" designed to approximate the

functioning of the JDA failed to account for the reduction in the amount of solar load-following reserves that are required under actual JDA operations, which allow “netting” the DEC and DEP systems’ dispatch needs to meet real-time balancing requirements. SACE Initial Comments 24. Third, the 2021 Astrapé Study applied a five-minute “flexibility violation” metric that is more stringent than the 30-minute balancing required by North American Electric Reliability Corporation (NERC) reliability standards. SACE Initial Comments 24. SACE recommended the Commission require Duke to revise the 2021 Astrapé Study accordingly. SACE Initial Comments 25.

In their Joint Initial Comments, CCEBA and NCSEA objected to the SISC on the grounds that under Session Law 2021-165 and the resulting Carbon Plan variable clean-energy resources must be the norm, not the exception, and Duke must plan and operate its system to optimally integrate very large quantities of interconnected clean energy resources. CCEBA and NCSEA Joint Initial Comments 3. CCEBA and NCSEA also agreed that the SISC is flawed in the ways identified by SACE. CCEBA and NCSEA Joint Initial Comments 4.

In its Reply Comments, Duke Energy stated that it did not object to the Public Staff’s recommendation that it consider the effect of the SEEM on calculation of SISC in any avoided cost filings that occur six months or more after SEEM operations commence. Duke Reply 37-38. Duke then challenged the flaws identified by SACE consultant Kirby. Duke Reply 38-43. First, Duke argued that the 2021 Astrapé Study properly accounted for solar load-following reserves, on the grounds that the TRC found Astrapé’s approach reasonable. Duke Reply 39-40. Duke further argued that the SISC favors solar because it allows an increase in excursions across the solar production hours by eliminating excursions in periods where reserves are already low a few hours before and after the solar production hours, speculating that if the methodology were changed as SACE proposed then it is likely that excursions would occur in those pre- and post-solar output periods, requiring more reserves across the solar production hours. Duke Reply 40. Second, Duke argued that SACE’s critique of the “combined case”—that it failed to account for “netting” across DEC and DEP systems—relied on an oversimplification of the JDA arrangement, which allows economic exchanges to reduce the costs of additional load following requirements, but does not affect each Balancing Authority’s (BA) mandate to continue to plan for and maintain its own operating reserves. Duke Reply 41. Third, Duke argued that the five-minute “flexibility violation” metric is not unnecessarily stringent because that contention was not adopted by the TRC, which found that the five-minute flexibility violation likely results in a lower SISC relative to using a longer flexibility violation, such as 10 minutes, because the addition of solar resources increases the share of longer flexibility violations. Duke Reply 42. Duke pointed out that the TRC found that “adjusting modeling assumptions to reduce the level of reliability to exactly the amount needed to avoid NERC standards implies eliminating any potential reliability cushion that has historically been provided to customers and giving all the benefit of eliminating that cushion entirely to solar resources.” Duke Reply 42-43.

In their Joint Reply Comments, CCEBA and NCSEA supported SACE’s critique provided by Mr. Kirby, agreed with the Public Staff’s support for adjustments to the



methodology but argued that those adjustments might only amplify the remaining errors, and joined SACE in requesting the Commission direct Duke to correct the errors identified by Mr. Kirby. CCEBA and NCSEA Joint Reply Comments 11-12.

## Discussion and Conclusions

The Commission determines that the 2021 Astrapé Report represents a significant improvement over the 2018 Astrapé Report and that the improvement is in large part a result of the independent review provided by the TRC as well as the valuable contributions to the TRC process made by stakeholders such as SACE and its consultant Mr. Kirby.

The Commission determines that the SISC contains three flaws, as identified by Mr. Kirby. First, the 2021 Astrapé Study assumed that solar load-following reserves are required during multiple hours during which there is no solar generation. Duke's speculation that requiring reserves during these pre- and post-solar output periods in fact reduces the SISC by reducing the likelihood of excursions during those periods is insufficient justification for requiring reserves intended to address the variability of solar output during periods when there is no solar output and therefore no solar variability, which is the justification for the SISC.

Second, the "combined case," designed to approximate the functioning of the JDA, failed to account for the reduction in the amount of solar load-following reserves that are required under actual JDA operations, which allow "netting" the DEC and DEP systems' dispatch needs to meet real-time balancing requirements. Duke is correct that the JDA does not affect each BA's mandate to continue to plan for and maintain its own operating reserves, and that it allows economic exchanges to reduce the costs of additional load following requirements. But this does not mean that the JDA prohibits "netting" across BAs; the two BAs have been owned and operated by the same corporate entity for more than a decade and the JDA does not prevent each BA from reasonably relying on the other as part of its plan for and maintenance of operating reserves, nor does it prevent dispatching units across the combined fleet in an efficient manner.

Third, the five-minute "flexibility violation" metric is unnecessarily stringent in light of NERC's 30-minute requirement. The Commission acknowledges the TRC's conclusion that reducing the level of reliability to exactly the amount needed to avoid NERC standards and eliminating any "reliability cushion" between actual operations and NERC minimum standards would transfer the "benefit" of eliminating that cushion to solar resources. However, SACE did not recommend meeting the minimum NERC standards, but for something between the 5-minute metric and NERC's 30-minute requirement. Furthermore, the TRC did not address whether customers in fact benefit from the added stringency of the 5-minute metric, which customers ultimately pay for in rates that compensate Duke for the added infrastructure and other costs necessary to achieve it. Neither customers nor the owners of solar QFs should pay for the infrastructure necessary to limit flexibility violations more than customers will reasonably benefit from.

The Commission will direct Duke to correct the methodological errors discussed above and recalculate its SISC accordingly. In addition, because of the valuable contributions of the TRC and the consensus among the parties concerning the same, the Commission will direct Duke to convene an independent TRC to review any methodological changes in each SISC study in future biennial avoided cost proceedings. The improvements resulting from the TRC's review of the 2018 Astrapé Study, as well as the flaws in the 2021 Astrapé Study identified by Mr. Kirby show that this additional review is warranted. The SISC methodology is not yet static but will evolve as technology and the electric system change and future TRC review will ensure that the SISC methodology is accurate.

## **EVIDENCE AND CONCLUSIONS FOR FINDING OF FACT NOS. 5-7**

The evidence supporting these Findings of Fact is found in the Initial Statement of the Public Staff, the Initial Comments of SACE, the Joint Initial Comments of CCEBA and NCSEA, the Reply Comments of Duke Energy, Reply Comments of SACE, and Joint Reply Comments of CCEBA and NCSEA.

### **Summary of the Comments**

In its Initial Statement, the Public Staff reviewed the history of the consideration of a cost of carbon in avoided cost proceedings, beginning with the Commission's development of the "known and verifiable" standard in its December 31, 2014 Order Setting Avoided Cost Parameters, Docket No. E-100, Sub 140. Public Staff Initial Statement 6-7. The Public Staff also reviewed the requirements of Session Law 2021-165. The Public Staff pointed out that H951 imposes a limit on total CO2 emissions (mass cap) and although it does not impose a direct price on CO2 emissions, a mass cap and a price on CO2 are directly related to one another: setting a mass cap in a capacity expansion model will yield a model result with an implied price on carbon, which is indicative of the cost per ton of carbon abatement. Public Staff Initial Statement 8. The Public Staff determined it is not appropriate to require Duke to include carbon prices, or use an IRP Portfolio that includes carbon pricing, in setting avoided energy rates in this proceeding because some factors that affect the price are not yet determined. Public Staff Initial Statement 8-9. The Public Staff will determine in the Carbon Plan docket the appropriate avoidable cost of carbon, if any, that should be included in the calculation of avoided energy rates. Public Staff Initial Statement 9.

The Public Staff stated that the implied cost of carbon resulting from H951 cannot be accurately determined until a Carbon Plan is approved and recommended approving Duke's avoided energy rates using Portfolio A without a carbon price at this time, but that once a Carbon Plan is approved directing Duke, in its next avoided cost filing, to use the approved Carbon Plan as the expansion portfolio and include the Commission-approved avoidable cost of carbon in its calculation of avoided energy and capacity rates, if appropriate. Public Staff Initial Statement 9. The Public Staff further stated that although QFs do not convey environmental attributes, carbon-free QF power still displaces utility-owned carbon-emitting generation and could require compensation for its contribution



towards Duke's statutory mandate to reduce carbon emissions. Public Staff Initial Statement 9-10.

In its Initial Comments, SACE argued that Session Law 2021-165 creates an implicit carbon price that should be included in Duke's avoided energy costs because the carbon-reduction mandate in the law must guide Duke's procurement beginning immediately and the Carbon Plan developed in order to carry out the carbon-reduction mandate will take the place of Duke's 2022 IRP. SACE Initial Comments 33. Like the Public Staff, SACE pointed out that the mass cap in Session Law 2021-165 implies a carbon price. SACE Initial Comments 34. SACE, however, argued that the Commission need not wait for a final Carbon Plan before adopting a carbon price in avoided energy costs, recommending using a proxy. SACE Initial Comments 34. SACE reasoned that the carbon price implied by Session Law 2021-165 is "known and verifiable" precisely because Session Law 2021-165 has become law, and the Commission has authority under Session Law 2021-165 to establish this carbon price regardless. SACE Initial Comments 34-36. SACE argued that not applying a carbon price is untenable because it ignores the effect of Session Law 2021-165. SACE Initial Comments 35-36.

In their Joint Initial Comments, CCEBA and NCSEA pointed out that the Carbon Plan under Session Law 2021-165 will materially change the mix of resources that will be built or procured over the avoided cost planning horizon. CCEBA and NCSEA Joint Initial Comments 2. CCEBA and NCSEA agreed with SACE that Duke's avoided costs for non-carbon resources should be based on the cost of such resources assumed in the Carbon Plan. CCEBA and NCSEA Joint Initial Comments 4.

In its Reply Comments, Duke Energy agreed with the Public Staff that Session Law 2021-165 establishes a carbon mass cap, and that the implied cost of carbon resulting from the law cannot be accurately determined—or "known and verifiable"—until a Carbon Plan is approved, because there is no certainty regarding the resources to be developed or any future implied cost of carbon to be included in the approved Carbon Plan. Duke Reply 17-20. Duke agreed with the Public Staff that once a Carbon Plan is approved and the avoidable cost of carbon, if any, is determined within those proceedings, that the Commission could direct the Companies to use the approved Carbon Plan as the expansion portfolio in its next avoided cost filing, and further agreed that the future base portfolio selected from the Carbon Plan should be used to calculate avoided cost rates in the next biennial avoided cost proceeding. Duke Reply 20-21. Duke further recommended that the Commission consider whether renewable energy credits and environmental attributes should be credited to customers if customers are paying QFs for avoided carbon benefits of generation. Duke Reply 21.

In its Reply Comments, SACE agreed with the Public Staff that Session Law 2021-165 establishes a carbon mass cap that is directly related to a price on carbon dioxide emissions. SACE Reply 3. SACE disagreed that the Commission should wait until after the Carbon Plan is approved to begin applying a cost of carbon in the avoided cost proceeding, on the grounds that the "known and verifiable" standard is already met, the Commission cannot wait for every input to be certain before apply a cost of carbon when

state law has made clear that the cost will not be zero, and many other longstanding inputs into avoided cost calculations, such as load forecasts or fuel prices, rely on future assumptions that are not perfectly certain. SACE Reply 3-4.

In their Joint Reply Comments, CCEBA and NCSEA agreed with the Public Staff and SACE that the carbon reduction mandates of H951 should be incorporated into the calculation of avoided cost rates. CCEBA and NCSEA Joint Reply Comments 4. CCEBA and NCSEA agreed with SACE that Duke will be required to take action to achieve the 70% reduction long before 2030, and argued that Duke's modeling should incorporate the incremental implied carbon price as such changes are made between 2022 and 2030. CCEBA and NCSEA Joint Reply Comments 4. CCEBA and NCSEA did not object to the Public Staff's proposal to further evaluate the appropriate application of the Carbon Plan in the calculation of avoided cost rates after the Carbon Plan has been approved, but recommended addressing the issue prior to the 2023 biennial avoided cost proceeding in this proceeding, a separate proceeding, or in some other way the Commission deems appropriate.

## **Discussion and Conclusions**

The Commission determines that by establishing a mass cap on carbon dioxide emissions Session Law 2021-165 has established an "implied" cost of carbon dioxide emissions, represented by the carbon price sufficient in modeling to transform the electric system to meet the law's carbon-reduction mandates in 2030 and 2050. Although every input into this price is not yet known, it is nonetheless sufficiently "known and verifiable" for inclusion in avoided cost calculations as soon as feasible. The Commission finds that to ignore the cost would be equivalent to deeming the cost to be zero, which would conflict with the clear legislative mandate recently issued by the General Assembly in Session Law 2021-165. However, the Commission recognizes that it will be possible to determine a more accurate carbon price once the Carbon Plan is final at the end of this year. The Commission also recognizes apparent consensus among many of the parties that it would be appropriate to calculate the carbon price in the Carbon Plan proceeding and apply it in the next avoided cost proceeding. Reconciling the legislative mandate and the desirability of improved accuracy in the carbon price, the Commission will direct Duke and the Public Staff to convene a stakeholder process immediately after the Carbon Plan is final in order to determine the appropriate carbon price, the methodology to derive one from the biennial Carbon Plan, and the methodology to apply it in biennial avoided cost proceedings, beginning in the next proceeding in 2023. The carbon price will not confer environmental attributes associated with QF generation.

## **EVIDENCE AND CONCLUSIONS FOR FINDING OF FACT NOS. 8-9**

The evidence supporting these Findings of Fact is found in the Initial Statement of Duke Energy, the Initial Statement of the Public Staff, the Initial Comments of SACE, the Joint Initial Comments of CCEBA and NCSEA, the Reply Comments of the Public Staff, the Reply Comments of SACE, and the Reply Comments of Duke Energy.

## Summary of the Comments

In its Initial Statement, Duke Energy stated that it calculated its avoided energy costs using forward market price data for eight years (2022-2029) before transitioning to fundamental forecast data starting in year nine (2030-2031). Duke Initial Statement 25-26. Duke stated that this approach is consistent with the Commission's orders in the 2018 and 2020 biennial avoided cost proceedings. Duke Initial Statement 26.

In its Initial Statement, the Public Staff stated that it believed that Duke's projection of its annual energy prices is reasonable for the short-term variable energy rate. Public Staff Initial Statement 41.

In its Initial Comments, SACE reviewed the history of the contested issue of natural gas price forecast methodology and argued that it is appropriate to revise this methodology for two reasons. SACE Initial Comments 16-19. The first was the passage of Session Law 2021-165. SACE pointed out that in its proposed Carbon Plan Duke planned to use five years of forward market prices followed by three years of blended prices followed by market fundamental forecasts. SACE Initial Comments 19. SACE also cited the South Carolina Public Service Commission's recent conclusion that the ten-year-forward-contract methodology used in Duke's prior IRPs is flawed and results in generation mixes which do not represent the most reasonable and prudent means of meeting Duke's energy and capacity needs because it commits Duke to large-scale buildouts of natural gas generation assets, at the expense of renewables and storage, endangering Duke's internal commitment to net-zero generation by 2035. SACE Initial Comments 20. The South Carolina Commission directed Duke to use natural gas pricing forecasts that rely on market prices for eighteen months before transitioning over eighteen months to the average of at least two fundamentals-based forecasts. SACE Initial Comments 20. For market fundamental forecasts, SACE recommends averaging the Spring 2021 IHS and EIA 2021 Reference Case because Duke has relied on IHS, a private forecast, and adding EIA's public forecast would further transparency. SACE Initial Comments 21. The second reason SACE advocated revising Duke's proposed natural gas price forecast methodology was the inaccuracy of forward market prices in recent times. SACE Initial Comments 21. SACE pointed out that forward market prices have been highly inaccurate even as little as one year out whereas fundamental forecasts have been more accurate. SACE Initial Comments 21-22. SACE recommended adopting the basic methodology applied by Dominion, using 18 months of forward market prices, 18 months of blended prices, before switching fully to fundamental forecasts, averaging the Spring 2021 IHS and EIA 2021 Reference Case. SACE Initial Comments 22-23.

In their Joint Initial Comments, CCEBA and NCSEA agreed with SACE that Duke's natural gas commodity price forecast methodology should be revised. CCEBA and NCSEA Joint Initial Comments 4. CCEBA and NCSEA stated that numerous stakeholders had opposed Duke's previous natural gas price forecast methodology and that the Public Staff had previously taken the position that it is appropriate for Duke to use no more than five years of forward market data before transitioning to a fundamental forecast. CCEBA and NCSEA Joint Initial Comments 18-19. CCEBA and NCSEA stated that NCSEA had

previously recommended that Duke use forward market prices for two years, with a transition in the next three years to the average of a set of recent fundamentals forecasts. CCEBA and NCSEA Joint Initial Comments 19. CCEBA and NCSEA stated that SACE previously pointed out that long-term forward pricing is inappropriate because future markets are highly responsive to short term and temporary trends, making them poor indicators of long-term market trends, and that the lack of trading volume for NYMEX gas futures more than two to three years ahead prohibits prices from being robust forecasters of gas prices. CCEBA and NCSEA Joint Initial Comments 19. CCEBA and NCSEA also reviewed their arguments, led by Mr. Kevin Lucas, in the 2020 Duke IRP proceeding, focusing on the volatility inherent in forward market prices, and that the South Carolina Commission adopted Mr. Lucas' approach, as discussed above. CCEBA and NCSEA Joint Initial Comments 20-22. CCEBA and NCSEA recommended the Commission require Duke to use eighteen months of forward market prices before transitioning to a blended fundamentals forecast, using at least two reputable sources, for the remainder of the planning period. CCEBA and NCSEA Joint Initial Comments 22.

In its Reply Comments, Duke Energy defended its reliance on forward market prices as approved in the 2020, 2018, and 2016 avoided cost proceedings and the 2020 IRP proceeding. Duke Reply 14. Duke argued that CCEBA and NCSEA's and SACE's arguments were substantially similar to ones made in past avoided cost proceedings, where they were not adopted. Duke Reply 15-16. Duke stated that it might support a different position on natural gas commodity price forecasting methodologies in future proceedings. Duke Reply 16. Duke stated that it had committed to using, for the Carbon Plan, five years of forward market natural gas forecasts followed by three years of blending, before transitioning to fundamental forecasts; and to using the average of fundamental forecasts developed by EIA, EVA, IHS, and Wood MacKenzie to calculate market fundamental pricing. Duke Reply 16.

In its Reply Comments, the Public Staff described substantial debate over the proper natural gas price forecast methodology. Public Staff Reply 2-3. The Public Staff reviewed the methodology Duke has used in past IRP proceedings and stated that it supports the updated approach Duke proposed for the Carbon Plan. Public Staff Reply 3. The Public Staff did not recommend requiring Duke to recalculate its avoided energy rates in this proceeding with the new proposed methodology because the methodology Duke used technically complies with past Commission orders and is in alignment with the natural gas forecasting methodology in the 2020 IRP Supplemental Portfolio B. Public Staff Reply 4. The Public Staff further stated that it believes that the methodology should be consistent between avoided cost and IRP proceedings, and Duke had not yet filed its proposed Carbon Plan using the updated methodology. Public Staff Reply 4.

In its Reply Comments, SACE agreed with CCEBA and NCSEA's recommended approach to updating the natural gas price forecast methodology, which it stated was compatible with the approach SACE recommended. SACE Reply 9-10.

## Discussion and Conclusions

The Commission determines that Duke Energy should recalculate its avoided energy costs using a more accurate natural gas price forecast methodology comprising eighteen months of forward market prices, followed by eighteen months of blended prices, before switching fully to fundamental forecasts, averaging the Spring 2021 IHS and EIA 2021 Reference Case. The Commission finds that the methodology that Duke used is unacceptably likely to lead to inaccurate results due to the volatility of forward market prices, their over-responsiveness to near-term conditions and comparative neglect of longer-term market dynamics as illustrated by the significant inaccuracy of market prices in recent years, and the low volume of trades in later years. The Commission also finds persuasive the South Carolina Commission's recent decision to adopt a nearly identical methodology. The Commission desires to keep the methodology consistent between the avoided cost and IRP – or Carbon Plan – proceedings, but the methodology that Duke chose for its last IRP need not control in this proceeding; each of the proceedings presents an equal opportunity to correct the methodology. Accordingly, after correcting the methodology here the Commission will require this updated methodology in the final Carbon Plan.

### EVIDENCE AND CONCLUSIONS FOR FINDING OF FACT NOS. 10-12

The evidence supporting these Findings of Fact is found in the Initial Statement of Duke Energy, the Initial Statement of the Public Staff, the Initial Comments of SACE, the Joint Initial Comments of CCEBA and NCSEA, the Reply Comments of the Public Staff, the Reply Comments of SACE, the Reply Comments of CCEBA and NCSEA, the Reply Comments of Duke Energy, and the Reply Comments of Dominion.

### Summary of the Comments

In its Initial Statement, Duke Energy reviewed the potential for QFs to provide ancillary services, pursuant to the Commission's order in the 2020 proceeding, and concluded a QF selling "must take" energy under PURPA cannot provide incremental positive ancillary services value under current system operations. Duke Initial Statement 34. Duke further stated that QFs are already fully compensated for their capacity and energy output under the peaker method such that no additional compensation is appropriate under PURPA. Duke Initial Statement 34. Duke reviewed the definition of "ancillary services" and stated that system operators must have control over assets in order for the assets to provide ancillary services. Duke Initial Statement 35. Duke stated that the costs required to enable its system to make use of ancillary services provided by third parties would outweigh the benefits. Duke Initial Statement 35-36. Duke argued that PURPA's must-take framework is incompatible with compensating QFs for ancillary services because providing ancillary services would require the QF to produce less than its maximum energy and capacity. Duke also stated that in its experience QFs increase the need for ancillary services and argued that QFs must first eliminate the demand for ancillary services that they cause before they could be compensated for providing them. Duke Initial Statement 36. Finally, Duke argued that under FERC precedent the value of



positive ancillary services provided by a QF as part of the capacity and energy delivered to the utility, if any, is already incorporated into the calculation of the utility's full avoided cost rates. Duke Initial Statement 37.

In its Initial Statement, the Public Staff stated its conclusion that while PURPA's mandatory purchase obligation does not extend to ancillary services, it also does not prohibit the procurement of ancillary services from QFs. Public Staff Initial Statement 17-18. The Public Staff stated that it believed that as Duke procures additional renewable generation to comply with its Carbon Plan, some ancillary services may be provided at least cost from inverter-based resources (IBRs) such as solar PV, both with and without energy storage. Public Staff Initial Statement 18. Stakeholder discussions revealed three specific ancillary services that are best suited to come from IBRs: spinning reserve, frequency regulation, and Volt-VAR support. Public Staff Initial Statement 18. The Public Staff stated that a significant challenge in obtaining ancillary services from QFs is that ancillary services often require generators to produce less energy and capacity, resulting in a trade-off between compensation for energy and capacity and compensation for ancillary services, and speculated that unless QFs could provide all three simultaneously few would choose to provide ancillary services. Public Staff Initial Statement 18-19. However, the Public Staff pointed out that without knowing Duke's ancillary service costs, it is difficult to determine the degree to which procuring ancillary services from QFs could provide savings to ratepayers. Public Staff Initial Statement 19. The Public Staff concluded that it is not appropriate at this time to compensate QFs for ancillary services beyond avoiding the SISC decrement, but solicited feedback from Duke, DENC, and other intervenors on the potential benefits of initiating a proceeding to investigate this matter and potentially establish a pilot program to procure a small amount of ancillary services from IBRs, either through the establishment of a limited competitive solicitation from QFs, or a pilot program at one of Duke's or DENC's utility-owned solar sites. Public Staff Initial Statement 19.

In its Initial Comments, SACE stated that it believed that CCEBA and NCSEA would demonstrate in this proceeding that some QFs already provide ancillary services and could provide additional ancillary services with relatively low-cost modifications. SACE Initial Comments 25. SACE argued that QFs are entitled to compensation for providing ancillary services. SACE Initial Comments 25-31. FERC in Order No. 69 determined that QF compensation should equal the full avoided cost, and further explained that the purchase of "electric energy" under PURPA Section 210(a)(2) includes both energy and capacity and was intended to refer to "all of the costs associated with the provision of electric service." SACE Initial Comments 26 (quoting 45 Fed. Reg. 12214). SACE added that the Commission has declined to "agree that FERC's regulations prohibit the approval of any rate or charge other than those offered for energy and capacity." SACE Initial Comments 26 (quoting Sub 158 Order at 90 n.4). SACE also pointed out that a QF operating in an organized market—but lacking nondiscriminatory market access and therefore eligible to sell under PURPA's purchase obligation—is entitled to compensation at the avoided cost rate for the energy and capacity that it provides and may choose to be compensated for providing ancillary services by self-supplying and avoiding the charge for optional ancillary services under the transmission

provider's Open Access Transmission Tariff (OATT), and also could provide ancillary services to other customers as a third-party provider. SACE Initial Comments 26 n.74. Finally, SACE argued that the Commission indicated that QFs are entitled to compensation for ancillary services when it repeatedly referred to the benefits as well as costs of solar integration when it approved the SISC as a decrement to avoided cost rates for solar. SACE Initial Comments 27. SACE indicated that Duke appeared to agree in some of its statements concerning the SISC. SACE Initial Comments 27-28.

SACE disagreed with Duke's reasons for opposing compensation for ancillary services. SACE argued that FERC Order No. 69 in fact requires compensation for ancillary services as a type of "energy" as that term is understood in the context of PURPA, and that because capacity also is included in the sale of "energy" under PURPA, Duke's interpretation would remove compensation for capacity as well, contrary to longstanding PURPA precedent. SACE Initial Comments 28-29. SACE argued that whether Duke's system needs additional ancillary services is separate from the legal question whether QFs should be compensated under PURPA for the ancillary services that they provide, at the cost that they allow Duke to avoid. SACE Initial Comments 29-30. SACE also argued that Duke's lack of control over QFs does not preclude compensation for ancillary services that they do provide, nor future controllability. SACE Initial Comments 30. SACE argued that the potential trade-off QFs face between providing ancillary services and providing energy and capacity could be solved by contract. SACE Initial Comments 30. Finally, SACE pointed out that the cost of any increase in ancillary services required by QFs is already captured by the SISC. SACE Initial Comments 30-31. SACE recommended that the Commission begin establishing compensation for ancillary services by either requiring Duke to commission an independent and stakeholder-informed study of the potential for QFs to provide ancillary services and the appropriate compensation, or by establishing a pilot program for ancillary services, subject to clear guidelines and transparency requirements. SACE Initial Comments 31.

In their Joint Initial Comments, CCEBA and NCSEA disagreed with Duke's conclusions concerning ancillary services. CCEBA and NCSEA Joint Initial Comments 5. CCEBA and NCSEA stated that Duke's characterization of operational control of QFs is incomplete, and the changes required to facilitate the provision of ancillary services from QFs are easily attainable, explaining that existing QFs might have automatic generation control (AGC) capability or could be equipped relatively cheaply. CCEBA and NCSEA Joint Initial Comments 6. CCEBA and NCSEA stated that QFs already provide certain ancillary services to Duke without compensation, in the form of reactive power, under Duke's Interconnection Agreement. CCEBA and NCSEA Joint Initial Comments 7-9. CCEBA and NCSEA requested that the Commission order further evaluation of the extent to which QFs are currently providing reactive power without compensation and whether and to what extent Duke compensates its own generators for the provision of reactive power. CCEBA and NCSEA Joint Initial Comments 9. CCEBA and NCSEA stated that QF operations and PPAs could be modified to incentivize the provision of ancillary services in a variety of ways, or compensation could be determined by the Commission. CCEBA and NCSEA Joint Initial Comments 9-11. CCEBA and NCSEA stated that the



peaker method does not include the provision of, and compensation for, ancillary services, citing the Commission's Order Setting Avoided Cost Input Parameters, Docket No. E-100, Sub 140 (December 31, 2014) (Sub 140 Phase 1 Order). CCEBA and NCSEA Joint Initial Comments 11-13. Finally, CCEBA and NCSEA stated that Duke failed to consider the ability of new solar and solar + storage facilities to provide additional ancillary services, as documented in First Solar, Inc.'s comments in the competitive procurement of renewable energy (CPRE) program proposing a "dispatchable PPA," among multiple other places. CCEBA and NCSEA Joint Initial Comments 13-16. CCEBA and NCSEA recommended initiating a stakeholder process to further evaluate QF ancillary services issues. CCEBA and NCSEA Joint Initial Comments 16-17.

In its Reply Comments, Duke Energy maintained its opposition to compensating QFs for ancillary services. Duke Reply 21-22. Duke argued that avoided cost rates already fully compensate QFs for ancillary services because the "energy" purchased includes the entire output of the QF, including capacity, energy and ancillary services. Duke Reply 24-25. Duke argued that its avoided cost rates are designed to compensate QFs for the full avoided cost of energy and capacity (including ancillary services, if any) delivered because the peaker method is generally accepted for calculating avoided cost and it inherently captures the operational value of the avoided CT unit including ancillary services. Duke Reply 25-27. Duke argued that the SISC decrement does not imply compensation for ancillary services as benefits associated with integrating solar QFs because a QF must forego energy or capacity to provide ancillary services, but may not be paid above the avoided cost rate, which is based on energy and capacity only. Duke Reply 27. Duke also argued that because a QF is not paid for capacity when capacity is not needed neither should it be paid for ancillary services if the system does not need them. Duke Reply 27-28. Duke again stated that QFs under must-take contracts have not been expected to limit their energy sold in order to provide ancillary services and imposing that requirement would infringe PURPA, and that providing ancillary services would require producing less energy, entailing less compensation. Duke Reply 28-29. Duke cited the apparent lack of precedent in other jurisdictions for compensating QFs for ancillary services. Duke Reply 29-30. Finally, it argued that QFs do not already provide ancillary services as argued by CCEBA and NCSEA because providing voltage support is an operational obligation of a generator independent of PURPA. Duke Reply 30-31. Duke opposed an ancillary services pilot on the grounds that its analysis indicated that the cost to allow third parties to provide ancillary services outweighed the benefits and Carbon Plan-derived procurement would be a better vehicle for any additional ancillary services procurement from third parties. Duke Reply 31-33.

In its Reply Comments, Dominion argued that PURPA does not require utilities to purchase ancillary services or provide QFs access to ancillary services markets. Dominion Reply 23-24. Dominion argued its customers should not pay for ancillary services because they are already provided by PJM, including spinning reserves, frequency control, reactive power. Dominion Reply 24-27. Dominion argued that it is not appropriate at this time to devote the time and resources of a separate proceeding to investigate utility compensation of QFs for ancillary services, or to establish a pilot program at a DENC-owned solar generation facility. Dominion Reply 28.

In its Reply Comments, the Public Staff stated that it appreciated the arguments made by SACE, and CCEBA and NCSEA, in support of a pilot program to evaluate whether these services can be procured from IBRs at a lower cost than Duke's own resources. Public Staff Reply 4. The Public Staff concluded that the issue has expanded beyond avoided cost and recommended that the Commission open a separate docket to solicit comments specifically related to this pilot or, more broadly, to the utilization of IBRs to provide ancillary services. Public Staff Reply 5. It recommended potentially focusing on potential revisions to future competitive procurements triggered by need identified within the Carbon Plan. Public Staff Reply 5. The Public Staff expressed interest in the "dispatchable PPA" idea but noted a difference between PURPA must-take contracts and CPRE or Carbon Plan-derived contracts, which required dispatchability. Public Staff Reply 6. The Public Staff urged Duke to work collaboratively with stakeholders to propose an alternative PPA, potentially based upon fixed capacity payments that would allow for full dispatchability and the provision of ancillary services from IBRs, in future RFPs for Carbon Plan resources, potentially to be based on the First Solar proposal. Public Staff Reply 6-7.

In its Reply Comments, SACE agreed with the Public Staff that it is difficult to determine the potential cost savings from QF provision of ancillary services without knowing Duke's costs to provide them and stated it would support investigation into Duke's costs to provide services and ongoing transparent production of the results. SACE Reply 4-5. SACE stated however that opacity about Duke's costs was not reason to deny QFs compensation for ancillary services under PURPA. SACE Reply 5. SACE supported the Public Staff's suggestion to establish a pilot program. SACE Reply 5.

In their Reply Comments, CCEBA and NCSEA agreed with both the Public Staff and SACE that it is appropriate for the Commission to evaluate the extent to which solar facilities can provide ancillary services and the appropriate compensation for the provision of such services. CCEBA and NCSEA Reply Comments 7. CCEBA and NCSEA recommended the Commission to establish a stakeholder process to evaluate the issue in early 2023 following the approval of the Carbon Plan with the intent that such stakeholder process could inform the utilities' 2023 avoided cost filings. CCEBA and NCSEA Reply Comments 7. CCEBA and NCSEA also supported a pilot program as recommended by the Public Staff and SACE but that it be in addition to, and not in lieu of, a stakeholder process and/or study to establish a mechanism for the provision of and compensation for ancillary services from solar generators. CCEBA and NCSEA Reply Comments 7.

## **Discussion and Conclusions**

The Commission finds persuasive the arguments advanced by SACE and NCSEA/CCEBA and determines that QFs are entitled under PURPA to compensation for ancillary services that they provide, as part of the "energy" sold.

The evidence indicates that QFs might be providing some ancillary services uncompensated at this time and that QFs likely could provide additional ancillary services,

as a technical matter, with limited upgrades. However, the Commission has insufficient information to determine quantitatively the extent and type of ancillary services provided, or of which QFs could be capable, or the upgrades necessary at QFs and at other parts of the electric system. The Commission also has insufficient information concerning the extent of QF interest in providing ancillary services, which it recognizes will depend primarily on the compensation available. The Commission recognizes that QFs likely will need to evaluate a trade-off between providing—and being compensated for—energy or capacity and providing and being compensated for ancillary services. QFs will be compensated only for services that they provide; however, given that QFs are entitled to compensation for ancillary services if they provide them it will be their prerogative whether to do so, presumably depending on the economics of their various options. Finally, the Commission has insufficient information concerning the current cost that Duke incurs to provide ancillary services.

For the foregoing reasons, the Commission will require Duke Energy to file within 180 days of this order a report detailing its costs to provide ancillary services, including whether and to what extent Duke compensates its own generators for the provision of reactive power, and the extent to which QFs are currently providing reactive power. The Commission will direct Duke and the Public Staff to jointly convene a stakeholder process following submission of that report, lasting no longer than 120 days, to assess the extent to which existing QFs, as well as new solar generators, can provide ancillary services to Duke, and the appropriate compensation structures for those services. The stakeholder process should also result in a recommendation whether to establish an ancillary services pilot and the parameters of the pilot.

## **EVIDENCE AND CONCLUSIONS FOR FINDING OF FACT NOS. 13-16**

The evidence supporting these Findings of Fact is found in the Initial Comments of the Public Staff, the Reply Comments of Duke Energy, the Reply Comments of SACE, the Reply Comments on NEEC Proposal of NCSEA and CCEBA, the Reply Comments of the Public Staff, and the Reply Comments of Duke.

### **Summary of the Comments**

The Public Staff first raised the issue of avoided costs in net metering in its Initial Statement, calling into question the methodology for calculating the Net Excess Energy Credit (NEEC) for the Net Energy Metering Tariffs (NEM Tariffs) proceeding. Public Staff Initial Statement 3. Although the Commission requested comments from interested parties in Docket No. E-100, Sub 180 where Duke filed a Joint Application for Approval of Revised NEM Tariffs, the Public Staff stated that it raised the issue over NEEC in this docket because the calculation of the annualized rate is typically performed within the biennial avoided cost proceeding. Public Staff Initial Statement 3. The Public Staff advocated for deciding the appropriate methodology for calculating the avoided cost rate used for the NEEC within this docket and proposed an alternative methodology. Public Staff Initial Statement 3, 5. Its proposal recommended that the Commission direct Duke to make a supplemental filing providing a recalculated annualized NEEC rate that is: i)

weighted to a solar profile; ii) differentiated by season; and iii) based on the 5-year avoided cost rates. Public Staff Initial Statement 5.

The Public Staff proposed this change to the calculation methodology for three reasons. Public Staff Initial Statement 3. First, it argued that the rate should be weighted to a solar profile rather than a constant profile because most of the net metered facilities are solar and the weight assigned to each rate is proportional to the number of hours that rate occurs during a given year, making a solar profile more appropriate. Public Staff Initial Statement 4. Second, it stated that a seasonal calculation of NEEC rates for summer and non-summer seasons is more appropriate to reflect the difference in value associated with net metering exports and to align with the season in the time of use (TOU) rates schedules applicable to all NEM customers taking service under the proposed NEM Tariffs. *Id.* Third, the Public Staff recommended replacing Duke's proposed two-year variable rate to set the NEEC with a five-year rate in future avoided cost filings. Public Staff Initial Statement 4-5.

In its Reply Comments, Duke agreed with the Public Staff that the NEEC calculation methodology for the NEM Tariffs should be decided within this avoided cost docket. Duke Reply 49. Duke disagreed with the Public Staff's proposal to use a seasonal rather than annualized rate, stating that its analysis showed the change would have a negligible impact on the NEEC avoided cost credit and that it shared the concerns of other parties to the Memorandum of Understanding (MOU) filed in the NEM Tariffs docket about adding further complexity to the proposed tariffs. *Id.* Duke stated it would agree to calculate seasonal rates within avoided cost proceedings for analytical purposes and would consider switching if the differentiation between summer and non-summer seasons becomes sufficiently impactful to outweigh the added complexity concerns. Duke Reply 49-50. Regarding the other proposed changes, Duke agreed to support annualized NEEC rates based on a 5-year term, including both energy and capacity credits where applicable, and weighted using a typical rooftop solar production profile. Duke Reply 50. Duke also stated that it might recommend switching to a typical NEM export profile in the future when more information becomes available. Duke Reply 50.

In its Reply Comments, SACE argued that the Public Staff's proposed recommendations to change the calculation methodology are unnecessary and ill-advised at this time. SACE Reply 2. SACE pointed out that any potential increase in rate accuracy resulting from the proposed changes would not make a meaningful difference to non-rooftop solar customers. SACE Reply 2. The percentage of overall generation in the Duke territories currently met by rooftop solar generation--or even expected to be met by rooftop solar generation by 2035—is very low and therefore any improvement in accuracy would not outweigh the added administrative difficulty, while the proposed changes would complicate compensation for generation from rooftop solar. SACE Reply 2. SACE recommended that before considering any change in the methodology for assigning the value of avoided cost rates that would be specific to rooftop solar customers the Commission should fully vet any proposed change to ensure that it properly accounts for the particular benefits of distributed rooftop solar generation. SACE Reply 2-3.

In a Reply Comment specifically about the NEEC Rate Revision Proposal, NCSEA opposed the changes suggested by the Public Staff. NCSEA Reply on NEEC Proposal 2. NCSEA argued the issue is not ripe because the NEEC in Duke's NEM Proposal is not yet adopted. NCSEA Reply on NEEC Proposal 2. NCSEA contended that the question over the NEEC is not properly before the Commission in this current proceeding as the Commission's decision on Duke's submitted NEM Proposal has not yet been made. NCSEA Reply on NEEC Proposal 2. NCSEA stated the Public Staff's Revised NEEC Proposal would be moot if the Commission were to deny Duke's proposal. NCSEA Reply on NEEC Proposal 2. NCSEA agreed that further investigation might be needed in the future if the Commission were to approve Duke's NEM Proposal. NCSEA Reply on NEEC Proposal 2. In the alternative, NCSEA argued that if the Commission approves Duke's NEM Proposal and determines that the NEEC rate needs to be altered, then NCSEA would agree with the Public Staff that a longer-term rate is more appropriate but would disagree that five years is the most accurate term. NCSEA Reply on NEEC Proposal 4. NCSEA argued that a ten-year term, at least, is more appropriate given that manufacture warranties for various solar equipment typically range from 10-25 years and those using net metered systems have a strong financial motivation to operate longer than ten years to realize enough electricity bill savings to offset their initial investment. NCSEA Reply on NEEC Proposal 4-5. NCSEA also stated that the aforementioned MOU, which they are a party to, already gives Duke the flexibility to propose a solar energy profile and different monthly rates when appropriate. NCSEA Reply on NEEC Proposal 2. NCSEA requested that the Commission instruct interested parties to work together on future rate terms to improve the accuracy of compensation to solar customers should Duke request that the annualized rate be altered. NCSEA Reply on NEEC Proposal 2. NCSEA stated that the terms currently set in Duke's NEM Proposal and the MOU are prudent at this time but agreed with the Public Staff that further work should be done in the future to appropriately compensate and incentivize residential solar-plus-storage systems within this new net metering paradigm. NCSEA Reply on NEEC Proposal 5-6.

In its Reply Comments, the Public Staff stated that it is in continuing discussions with Duke over the NEEC proposal and requested the opportunity to file supplemental reply comments to update the Commission if necessary. Public Staff Reply 8-9.

## **Discussion and Conclusions**

The Commission finds the arguments of SACE and NCSEA persuasive regarding the questions concerning the NEEC. Currently, the issue is not ripe and the methodology for calculating the rate is still appropriate. The Commission declines the NEEC Revised Proposal and recommendations for action made by the Public Staff at this time.

The Commission disagrees with the Public Staff and Duke that this issue should be decided within this current avoided cost proceeding docket. It is not prudent to approve changes to the calculation of NEEC given Duke's pending NEM Tariffs proceeding proposal and the larger potential impacts of the forthcoming Carbon Plan. The issue is not yet ripe for consideration until the Commission has ruled on Duke's Joint Application for Approval of Revised Net Energy Metering Tariffs Proposal in Docket Nos. E-7, Sub



1214, E-2, Sub 1219, and E-2, Sub 1076 (NEM Tariffs). Before considering any change in the methodology for assigning the value of avoided cost rates that would be specific to rooftop solar customers, the Commission will fully vet any proposed change to ensure that it properly accounts for the particular benefits of distributed rooftop solar generation.

In the interim, the Commission finds that the current methodology for calculating the NEEC for NEM Tariffs is appropriate at this time. Because rooftop solar represents only a very small portion of generation receiving the NEEC, the avoided cost payments that the owners of rooftop solar would receive for this small percentage of generation are inconsequential in the context of Duke's overall revenue requirement. The concerns over increasing administrative difficulty brought forth by Duke, SACE, and NCSEA are valid and outweigh the potential minuscule increase in accuracy of the rate calculation. The Commission sees that current methodology and terms between parties are sufficient in the current moment to address issues over weighted profile selection and other questions that may arise in rate calculation. The Commission declines the recommendation by the Public Staff for Duke to make a supplemental filing with the Public Staff's proposed changes to the methodology.

IT IS, THEREFORE, ORDERED as follows:

1. That Duke Energy shall recalculate its avoided cost rates using an aeroderivative gas turbine as the avoided resource;
2. That Duke shall convene a stakeholder process to develop a consensus recommendation on replacing the peaker method, to provide a recommendation to the Commission in advance of the 2023 biennial avoided cost proceeding;
3. That Duke shall recalculate the SISC after correcting the issues identified in the Kirby SISC Report;
4. That Duke shall convene an independent technical review committee to review any methodological changes in each SISC study in future biennial avoided cost proceedings;
5. That Duke and the Public Staff shall convene a stakeholder process to develop a consensus approach to determining the avoided cost of carbon, which Duke shall include in its next initial biennial avoided cost filing;
6. That Duke shall recalculate its natural gas price forecast using 18 months of forward market prices, followed by 18 months of blended prices, before switching fully to fundamental forecasts, and for those, averaging the Spring 2021 IHS and EIA 2021 Reference Case forecasts;
7. That Duke Energy shall file within 180 days of this order a report detailing its costs to provide ancillary services, including whether and to what extent Duke

compensates its own generators for the provision of reactive power, and the extent to which QFs are currently providing reactive power;

8. That Duke and the Public Staff shall jointly convene a stakeholder process following submission of Duke's report on its costs to provide ancillary services, lasting no longer than 120 days, to assess the extent to which existing QFs, as well as new solar generators, can provide ancillary services to Duke, and the appropriate compensation structures for those services, resulting in a recommendation whether to establish an ancillary services pilot and the parameters of the pilot;

9. That it is not necessary to consider an avoided cost rate for the NEEC rate under the NEM Tariffs in this proceeding and the Commission will fully vet any future proposed change in the methodology for assigning the value of avoided cost rates that would be specific to rooftop solar customers and to ensure that it properly accounts for the particular benefits of distributed rooftop solar generation.

ISSUED BY ORDER OF THE COMMISSION.

This the \_\_\_\_ day of \_\_\_\_, 2022.

NORTH CAROLINA UTILITIES COMMISSION

A. Shonta Dunston, Deputy Clerk