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April 29, 2022

**VIA ELECTRONIC FILING**

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

**Re: Duke Energy Carolinas, LLC and Duke Energy Progress, LLC's Response to Commission Order Requesting Answers on 2022 SP Program Petition**
**Docket Nos. E-2, Sub 1297 and E-7, Sub 1268**

Dear Ms. Dunston:

Duke Energy Carolinas, LLC and Duke Energy Progress, LLC (the "Companies") hereby file their Response to Commission Order Requesting Answers on 2022 SP Program Petition in the above-named proceedings.

The Companies have designated portions of certain responses as confidential and trade secret information. Pursuant to N.C. Gen. Stat. § 132-1.2, the Companies respectfully request that the Commission protect this data from public disclosure. The designated portions disclose estimated costs to procure additional energy, as well as the projected cost of new utility-owned generation.. Public disclosure could hinder the Companies from obtaining the most cost-effective energy and capacity necessary to meet the needs of its customers. The Companies will make this information available to other parties pursuant to an appropriate confidentiality agreement.

If you have any questions, please do not hesitate to contact me. Thank you for your attention to this matter.

Sincerely,

Jack E. Jirak

Enclosure

cc: Parties of Record

**Duke Energy Carolinas, LLC and Duke Energy Progress, LLC's Response to Commission Order Requiring Answers on 2022 SP Program Petition**
**Docket No. E-2, Sub 1297; Docket No. E-7 Sub 1268**

***1. Explain why Duke proposes to exclude bids for solar + storage from the 2022 procurement. Provide an explanation for why solar + storage bids are not recommended for utility-owned resources as well as for third-party PPAs.***

**Duke Energy Response:**

In order to develop the 2022 Solar Procurement Program ("2022 SP Program") on the expedited timeline required to align with the 2022 Definitive Interconnection System Impact Study ("DISIS"), Duke Energy Carolinas, LLC ("DEC") and Duke Energy Progress, LLC ("DEP" and together with DEC, the "Companies" or "Duke Energy") and stakeholders agreed that limiting the 2022 SP Program to solar-only proposals is reasonable for the initial 2022 procurement and that future procurements will include the more complex evaluation required to analyze solar plus storage facilities.

This simplification has three main advantages: (i) allowing for a streamlined evaluation process, (ii) enabling a volumetric adjustment rubric, and (iii) providing more time to assess future alternative power purchase agreement ("PPA") structures to account for the dispatchability of storage. By limiting bids to solar-only in this first request for proposal ("RFP"), the Companies can evaluate projects based on the Levelized Cost of Energy ("LCOE") over the life of the PPA or Utility Owned asset. This type of evaluation allows each proposal to bid a single level price and works best when all proposals have substantially the same production profile, so the forecasted benefits to the system are quite similar across all proposals (since they will only produce energy during daylight hours with production peaking at mid-day).

In contrast, if some proposals were to include storage, the production profiles and volume of energy generated could differ significantly across proposals with different storage capacities. In that case, relying on LCOE as the evaluation methodology would not adequately capture the differences in benefits to the system of the different production profiles. In order to include solar plus storage, the Companies would need to utilize a more complex evaluation methodology that would require additional time and resources. Additionally, for solar-only proposals, adjusting the target volume up or down if RFP prices come in higher or lower than the Carbon Plan Solar Reference Cost is fairly straightforward. For solar plus storage, however, adjusting the target volume is more complex because of the possible variety of sizing of storage systems. Last, the existing solar plus storage PPAs use nine seasonal time buckets for price differentiation based on 20-year price forecasts. This PPA creates a storage discharge price incentive that is locked in for the length of the contract even if marginal energy prices change dramatically in the future from the forecasts. Much like the debate on curtailment rights for solar-only PPA structures, the solar plus storage PPA structure requires further discussion and evaluation of ways to establish more dynamic flexibility in the PPAs, and the Companies intend to continue this discussion with stakeholders prior to the next RFP, as discussed in the Petition[1].

As for utility-owned assets, Duke Energy could add storage to the facilities at a future date if the investment is justified. Duke Energy also has the benefit of economically operating the utility-owned solar plus storage in response to short term marginal energy costs as they occur over time without any contractual limitations.

***2. Describe how the Carbon Plan Solar Reference Cost will be determined.***

**<u>Duke Energy Response</u>:**

The Carbon Plan Solar Reference Cost to be included in Carbon Plan[2] is determined by taking the 55% / 45% weighted average of the levelized utility-owned solar on a $/MWh basis and an estimated 25-year third-party PPA on a $/MWh basis for solar installed in 2026. The capital and fixed operating and maintenance (FOM) cost of the solar facility is based on the same assumption of costs for a solar facility with a COD in 2026 that are used in the Carbon Plan. Additionally, the Carbon Plan Solar Reference cost includes estimates for solar transmission upgrade costs that will likely be required to incorporate this solar on the DEP and DEC systems.

The levelized cost of utility-owned solar is calculated based on applying financing assumptions (i.e. after-tax weighted average cost of capital) for a 30-year asset. Additionally, a 10% investment tax credit ("ITC") was assumed for solar with an in-service date of 2026, and based on the Companies' tax positions, the ITC was assumed to be monetized in 2031 when it was normalized over the remaining life of the asset. The MWh of the facility are based on an approximate 28% capacity factor with a 0.5% annual degradation rate which are the assumptions used for a single-axis tracking facility with bifacial solar panels that was the design used in the Carbon Plan based on stakeholder feedback.

The 25-year third-party PPA was determined by using the same revenue requirements model that was used to calculate the utility cost of service solar levelized cost, but the inputs were adjusted based on financing assumptions for a third-party developer. The financing assumptions used are sourced from the LCOE calculations in the 2021 National Renewable Energy Lab Annual Technology Baseline report. Similar to the utility-owned solar, a 10% ITC was applied for third-party PPAs, however, the ITC was assumed to be fully monetized in 2026 through a tax equity structure.

[1] DEC DEP Petition for Authorization of 2022 Solar Procurement Program, Docket Nos. E-2, Sub 1297 and E-7, Sub 1268 (filed Mar. 14, 2022).
[2] All inputs and assumptions remain preliminary and subject to change until the Carbon Plan is filed on May 16, 2022.

The following table summarizes the inputs used to calculate the levelized costs of utility-owned and third-party PPA solar, as well as the resulting preliminary LCOE for Utility-Owned and Third-Party PPA Solar.

**BEGIN CONFIDENTIAL**

| | Utility Owned | Third-Party PPA |
|---|---|---|
| Nominal After-tax WACC | [redacted] | [redacted] |
| Normalize ITC? (Y/N) | [redacted] | [redacted] |
| Year ITC Monetized | [redacted] | [redacted] |
| Asset Life / PPA Term (Years) | [redacted] | [redacted] |
| Transmission System Upgrade Costs, $/w | [redacted] | [redacted] |
| Approximate LCOE, $/MWh | [redacted] | [redacted] |

**END CONFIDENTIAL**

Based on the above calculations, the preliminary Carbon Plan Solar Reference cost is $57.86/MWh. In an effort to address the Asset Life and PPA term differences between Utility-Owned and Third-Party PPA solar, the Companies assumed the same salvage cost was incurred for both ownership types in year 30 at a rate of 11% of the direct cost of the installed solar asset.

***3. Is "administratively determined avoided cost" analogous to the avoided cost method established by the Commission pursuant to N.C. Gen. Stat. § 62-156, with rates derived by using Duke Energy's most recent data and assumptions?***

**Duke Energy Response:**

Yes. N.C. Gen. Stat. § 62-156 grants the Commission authority to "determine standard contract avoided cost rates." Standard offer rates approved by the Commission pursuant to N.C. Gen. Stat. § 62-156 are therefore "administratively determined" as they are set based upon an avoided cost forecasting methodology approved by the Commission, as opposed to being set, for example, by a competitive price or through a competitive solicitation determined through a Commission-approved competitive procurement program. 18 C.F.R. 292.304(b)(7)-(8). For example, the Federal Energy Regulatory Commission ("FERC"), in Order Nos. 872 and 872-A, recently referenced "administratively set" and "administratively-determined" avoided cost rates and forecasts of utility avoided costs over time to distinguish between avoided cost established via fixed long-term forecasts versus through more competitive avoided cost rate setting mechanisms. *See, e.g., Qualifying Facility Rates & Requirements Implementation Issues Under the Pub. Util. Regul. Pol'ys Act of 1978*, Order No. 872 172 FERC ¶ 61,041 at ¶¶ 31, 126 and 424 (2020) (discussing, for example, as-available avoided cost rates and locational market prices as compared to administratively-determined avoided cost rates); Order No. 872-A 173 FERC ¶ 61,158 at ¶ 196 (2020) (discussing avoided cost rates set pursuant to competitive solicitations as opposed to administratively-determined avoided cost rates).

Notably, FERC's PURPA regulations contemplate that avoided cost rates can be set by negotiation between utilities and qualifying facilities ("QFs"), 18 C.F.R. 292.301(b)(1) ("Nothing in this subpart . . . [l]imits the authority of any electric utility or any qualifying facility to agree to a rate for any purchase, or terms or conditions relating to any purchase, which differ from the rate or terms or conditions which would otherwise be required by this subpart"), and also now expressly provide that states can implement PURPA's mandatory purchase obligation through pricing established in a competitive solicitation. *See* 18 C.F.R. 292.301(b)(8); (d)(iii).

As identified in the Companies' Petition, the 2022 SP Program provides QF sellers an alternative to North Carolina's and South Carolina's standardized "must-take" avoided cost rate framework that allows QFs to sell power at competitively determined avoided cost rates designed to take into account the Companies' operational needs and to deliver environmental attributes of solar generation to customers. The FERC has recognized that "a state may also have alternative programs [under its authority to implement PURPA] that QFs and electric utilities may agree to participate in…." *Winding Creek Solar LLC*, 151 FERC ¶ 61,103 at P 6, *Order Denying Reconsideration,* 153 FERC ¶ 61,027 (2015).

***4. How will the Carbon Plan Solar Reference Cost compare to the "administratively determined avoided cost"?***

**Duke Energy Response:**

Please refer to the Companies response to Questions 3 and 6. The Carbon Plan Solar Reference Cost is the assumed long-term lifecycle cost of a portfolio of controllable solar resources that is used in the Carbon Plan modeling framework to select a resource portfolio that achieves the Companies' carbon reduction goals. These resources convey energy value, capacity value and renewable and environmental attributes and are sourced competitively.

The "administratively determined avoided cost" on the other hand is a methodology that was established for valuing the energy and capacity of "must-take" non-controllable QF resources that do not convey environmental attributes to customers. In North Carolina, the capacity value is currently based upon a gas peaker cost.

For the avoidance of doubt, Duke Energy is not suggesting that the Carbon Plan Solar Reference Cost is the utility's avoided cost; instead, the reference cost reflects the assumed generic solar resource cost utilized in the Carbon Plan. The Carbon Plan Solar Reference Cost is dependent on the assumed solar technology and system upgrade costs in the Carbon Plan. The table below compares the Utility Owned and Third Party PPAs with and without transmission upgrade costs from the Carbon Plan to an estimated "administratively determined avoided cost" based on the following assumptions:

- Sub 175 rate assumptions
- March 2022 NC avoided costs (i.e. March 2022 fuel prices) escalated by 2.5% after 2041
- SISC netted from rates (i.e. rates reduced by SISC)
- 2026 start date
- Same solar bifacial profiles used for calculating the Utility Owned LCOE and Third Party PPA
- Peaker methodology derived avoided cost developed by weighting 25 Year rate at 45% and 30-Year rate at 55%

**[BEGIN CONFIDENTIAL]**

| $/MWh | Peaker Methodology Derived Avoided Cost | Preliminary Carbon Plan Solar Reference Cost w/ Transmission | Preliminary Carbon Plan Solar Reference Cost w/o Transmission |
|---|---|---|---|
| [redacted] | | | |

**[END CONFIDENTIAL]**

***5. How does the Carbon Plan Solar Reference Cost compare to or comply with the least cost mandate contained in S.L. 2021-165?***

**Duke Energy Response:**

The Carbon Plan Solar Reference Cost is an input to the 2022 Carbon Plan. More specifically, the Carbon Plan Solar Reference Cost is the forecasted cost of the targeted solar quantity including transmission network upgrades delivered in 2026 based upon a 55%/45% utility-owned/contracted PPA portfolio split of resources.

Duke Energy has utilized least cost planning techniques by forecasting the future costs of different generation and resource technologies and then selecting the combination of resources that best meets the requirements of HB 951 at the lowest overall cost to customers on a net present value basis. The Solar Reference Cost itself neither complies nor conflicts with the least cost mandate — it is simply an input to the modeling work for a larger resource planning exercise that complies with least cost planning.

***6. Does the proposed 2022 solar procurement potentially allow for PURPA qualifying facilities to be compensated at a rate that is in excess of the rates calculated using the avoided cost method established by the Commission pursuant to N.C.G.S. § 62-156? If so, why should the Commission permit PURPA qualifying facilities to be compensated in excess of avoided cost rates?***

**Duke Energy Response:**

The proposed 2022 SP Program does potentially allow for *controllable* PURPA QFs *including* their renewable attributes to be compensated at a rate that is in excess of the rates calculated using the avoided cost method established by the Commission pursuant to N.C. Gen. Stat. § 62-156. The avoided cost methodology was established to assign an economic value for generic QF resources (including solar QFs) at which the customer would be indifferent (to paying for the solar or paying for the utility's generation). These must-take contracts do not include controllability or environmental attributes, and the "avoided cost" is essentially an opportunity cost of what the power would have otherwise cost for the utility to generate or purchase it from another source.

As explained above in the Companies' response to Question 3, the 2022 Solar Procurement Program is an alternative PURPA program that allows solar QFs to competitively bid to sell their output to DEC and DEP under a controllable PPA for a significantly longer 25 year contract term as compared to avoided cost rates established using the peaker methodology approved by the Commission. The 2022 Solar Procurement Program is voluntary and also requires the selling solar QF to contractually obligate itself to provide the utility enhanced curtailment rights and to transfer the renewable and environmental attributes associated with QF generation to the utility and customers.

In describing the PURPA framework, FERC has explained that "as long as a state provides QFs the opportunity to enter into long-term legally enforceable obligations at avoided-cost rates, a state may also have alternative programs that ... limit how many QFs, or the total capacity of QFs, that may participate in the [alternative] program." *See Winding Creek Solar LLC*, 151 FERC ¶ 61,103 at P 6, *Order Denying Reconsideration*, 153 FERC ¶ 61,027 (2015) (quoting *Otter Creek Solar LLC,* 143 FERC ¶ 61,282 at ¶ 4 (2013) (stating that "[n]othing in FERC's regulations limits the authority of either an electric utility or a QF to agree to rates for any purchases or terms or conditions which would otherwise be required by [FERC's] regulations"), *Order Denying Reconsideration* 146 FERC ¶ 61192(2014)). The Carbon Plan-informed volume of solar resources to be procured through the 2022 SP Program is limited to the solar resources needed and determined by the Commission to contribute to a least cost portfolio of resources designed to reliably achieve HB 951's $CO_2$ emissions reduction targets. Purchasing solar QFs output under this alternative program is consistent with PURPA and the rates to be paid by the Companies' customers are representative of and do not exceed the Companies' avoided cost of controllable solar energy resources.

***7. How will the services of the proposed Independent Evaluator compare to those of the Independent Administrator of the Competitive Procurement of Renewable Energy Program pursuant to N.C.G.S. § 62-110.8? What will be the main differences?***

**Duke Energy Response:**

Duke Energy is committed to a transparent and fair bid evaluation and selection process. The bid evaluation and selection process will be designed to procure the best available Utility Ownership assets and Controllable PPA resources to meet the needs of the Carbon Plan and to comply with the ownership requirements of HB 951 at the lowest cost for customers.

In pursuit of those goals, many of the services that will be provided by the 2022 Solar Procurement Independent Evaluator ("2022 SP IE") are the same as those of the Competitive Procurement for Renewable Energy Program Independent Administrator ("CPRE IA"). For example, the 2022 SP IE and the CPRE IA are the communications interface between Duke Energy and market participants, and each receives the bid information directly from the market participants. Both independently evaluate and rank projects based upon the relevant evaluation criteria. Both file independent reports with the Commission regarding the transparency and fairness of the selection process and how the winning bids were selected.

There is also one notable difference between the two. While the 2022 SP IE does its own evaluation of projects and will provide Duke Energy with its independent analysis, Duke Energy is ultimately responsible for selecting the winning bids. In contrast, the CPRE IA selects the winning bids in that program.

The Companies have proposed the 2022 SP IE approach with review and input from market participants, the Public Staff, and other stakeholders and no party objects to the use of the 2022 SP IE for this procurement.

***8. Will ratepayers be responsible for any Independent Evaluator's fees that exceed program fees collected from solar procurement bidders? Describe cost containment measures to be implemented with regard to the Independent Evaluator's fees.***

**Duke Energy Response:**

Yes. However, like CPRE, the 2022 SP Program RFP is designed to primarily recover the 2022 SP IE's costs from market participants that bid into the RFP. Duke Energy is working with Charles River Associates (the 2022 SP IE) to accurately forecast its service fees to arrive at reasonable bidder fees (paid by each bidder at the time it submits a bid) and winners fees (paid by each winning bid) that will offset those costs as much as possible.

***9. What solutions have the stakeholders discussed to mitigate the concerns described in Paragraph No. 13 of the Public Staff's initial comments, particularly in light of the rate disparity between DEC and DEP raised in footnote 5?***

**Duke Energy Response:**

Rate disparity between DEC and DEP was not a significant topic of discussion in the 2022 SP Program stakeholder process. However, Duke Energy recognizes that this is an important issue that should be further considered as part of the Carbon Plan proceeding. For the 2022 Solar Procurement, the Companies have not designated specific allocations of solar procurements by utility in order to procure the lowest cost solar resources for customers regardless of location.

The most immediate mitigant against increasing the rate disparity is to limit the size of the 2022 SP to a reasonable level so that Duke Energy and stakeholders can work together on Carbon Plan-informed solutions that can be incorporated into future procurements. This approach will enable Duke Energy to take important steps to meeting the goals of HB951 without jeopardizing affordability for customers.

***10. Explain further how the "Volume Adjustment Mechanism" described in Paragraph No. 9 of the Public Staff's initial comments will "provide some ratepayer protection and offer some assurance that the 2022 Solar RFP adheres to the Carbon Plan's least cost pathway." What other cost-containment measures have been considered?***

**Duke Energy Response:**

The slide below (#9 from Stakeholder Meeting 2 on Feb 7, 2022) illustrates some of the cost-containment measures that were considered in the Stakeholder meetings. Option 1 was to postpone the RFP until the Carbon Plan was approved and essentially wait to align it with the 2023 DISIS cluster, thus allowing for less time to add solar to the system by the 70% interim target and making it harder to comply with HB 951.

Option 2 examined a preset cost cap for the solar, but there was no statutory requirement for a cost cap and no clear consensus in determining what an appropriate preset cost cap would be. In addition, stakeholders agreed a cost cap could lead to a failed RFP with few or no bids submitted, which would also make complying with HB 951 more difficult.

Option 3 looked to use the modeling work from the Carbon Plan, which uses least-cost planning principles, to set a target volume for a 2022 Solar Procurement and adjust that target volume 20% up or down if bid prices came in lower or higher than what the model assumed (the reference cost).

## Options to Limit Solar Costs

| Option 1: Wait – No '22 RFP | Option 2: Preset Cost Cap | Option 3: Carbon Plan-informed Volume |
| --- | --- | --- |
| • Defer any decisions on launching an RFP until there is a complete and approved Carbon Plan 12/31/2022.<br>• This would mean projects would be studied in the 2023 DISIS cluster.<br>• Once Carbon Plan is approved, Duke will target the approved volume per Option 3. | • March '22 filing would ask NCUC for a "preliminary determination of 2022 solar need" and to approve a set cost cap and a target MW.<br>• PPA cost cap would be based on already-established methodologies and practices (i.e., generic peaker method proxy avoided cost).<br>• Designed to mitigate against excessive cost given that a Carbon Plan is not yet approved.<br>• Cost cap for utility-owned solar would also be established.<br>• Enables use of 2022 DISIS cluster to bring on solar as quickly as possible. | • March '22 filing would ask NCUC for a "preliminary determination of 2022 solar need" to be based upon the May '22 Carbon Plan filing resulting in a modeled economic solar need and resource-specific avoided cost.<br>• If RFP bid prices are materially higher than modeled assumptions, the MW quantity is **reduced** as much as 20% from target.<br>• If RFP bid prices are materially lower, the MW quantity would be **increased** as much as 20% from target.<br>• The filings would request NCUC order by 11/1/22 to determine how many projects are invited to Step 2/Phase 2.* |

* Procedural path in SC still under discussion

| 9

The Volume Adjustment Mechanism will provide some customer cost protection by adjusting the volume down as much as 20% (but no lower than 700 MW) from the Commission approved Target in the event that the cost of the selected RFP portfolio of solar projects (both Utility-Owned and contracted via PPA) plus upgrades exceeds 110% of the Carbon Plan Solar Reference Cost approved by the Commission. This provides some protection against a scenario in which the market cost of solar significantly exceeds the assumptions in the approved Carbon plan by lowering the volume and therefore limiting the cost.

***11. What workarounds or alternatives are available to the issue described in Paragraph No. 15 of the Public Staff's initial comments – that the Commission may have difficulty enforcing a limited termination right in the event that transmission upgrade costs increase above a specified threshold relative to the DISIS upgrade costs without impacting projects both participating in the 2022 Solar RFP and those not participating in the 2022 Solar RFP?***

**Duke Energy Response:**

Duke Energy has proposed including a limited termination right in its PPAs should the cost of network upgrades associated with that project increase substantially from Phase 2 of the Interconnection study process up the point where an Interconnection Agreement is offered for execution.

This right would enable Duke Energy to cancel the PPA if upgrades become prohibitively expensive either because other projects who share the allocated network upgrades drop out or as the cost estimates are refined over the course of the interconnection study process. Because this limited right to terminate is part of the PPA, it would be exercised by Duke Energy, not by the Commission as suggested in the Public Staff's comments.

The Public Staff is correct in that if Duke Energy exercises that termination right, other projects who share the cost of the network upgrade with the project whose contract is terminated may be at risk themselves as more of the cost of the upgrade will be reallocated to them (if the upgrade is still needed). Therefore, Duke Energy's exercising of this termination right, while helpful in containing the cost of customers, could potentially result in solar volumes that are below the 700 MW minimum and cause a shifting of Upgrade costs to other Interconnection Customers not participating in the 2022 SP Program. Thus, Duke Energy will need to carefully consider all the potential ramifications before it exercises that right in consultation with the IE and Public Staff.