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Independent Report on Dominion Energy South Carolina, Inc.'s 2021 Avoided Cost Proceeding

(Docket No. 2021-88-E)

prepared for the Public Service Commission of South Carolina

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List of acronyms

AEO	Annual Energy Outlook
APPA	American Public Power Association
CCEBA	Carolinas Clean Energy Business Association
CCL	South Carolina Coastal Conservation League
CT	Combustion Turbine
DESC	Dominion Energy South Carolina, Inc.
DRR	Difference in Revenue Requirements
EEI	Edison Electric Institute
EIA	US Energy Information Administration
ELCC	Effective Load Carrying Capacity
FERC	Federal Energy Regulatory Commission
FOM	Fixed Operating and Maintenance
IRP	Integrated Resource Plan
LCOE	Levelized Cost of Electricity
LEI	London Economics International LLC
MW	Megawatt
NARUC	National Association of Regulatory Utility Commissioners
NERC	North American Electric Reliability Corporation
NOC	Notice of Commitment
NRECA	National Rural Electric Cooperative Association
NYMEX	New York Mercantile Exchange
ORS	Office of Regulatory Staff
PAF	Performance Adjustment Factor
PFE	Price Forecasting Error
PPA	Power Purchase Agreement
PURPA	Public Utility Regulatory Policies Act of 1978
QF	Qualifying Facility
RFP	Request for Proposals
SACE	Southern Alliance for Clean Energy
SC PSC	Public Service Commission of South Carolina
SEEM	Southeast Energy Exchange Market
SEIA	Solar Energy Industries Association
SRCA	SERC Reliability Corporation/East
SSVM	Solar Site Variability Metric
VIC	Variable Integration Charge

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1 Executive summary

London Economics International LLC ("LEI") was retained by the Public Service Commission of South Carolina ("SC PSC" or "the Commission") to serve as an independent expert in the following avoided cost proceedings:

- Docket No. 2021-88-E – Dominion Energy South Carolina, Inc. ("DESC")'s 2021 Avoided Cost Proceeding Pursuant to South Carolina Code Section 58-41-20(A);
- Docket No. 2021-89-E – Duke Energy Carolinas, LLC's 2021 Avoided Cost Proceeding Pursuant to South Carolina Code Section 58-41-20(A); and
- Docket No. 2021-90-E – Duke Energy Progress, LLC's 2021 Avoided Cost Proceeding Pursuant to South Carolina Code Section 58-41-20(A).

This Independent Report provides LEI's independently derived conclusions following a review of the avoided cost rates, methodology, terms, calculations, and conditions proposed by DESC (or "the Company") in Docket No. 2021-88-E. The report is structured as follows:

Section 2 provides the reader with context regarding LEI's role in the current proceeding. The section begins with a discussion of the scope of work as ordered by the Commission in Order No. 2021-520. LEI then provides an overview of the South Carolina Energy Freedom Act, or Act No. 62, which established the procedural framework that governs this proceeding, and determined the Commission's overarching objectives in approving avoided cost applications. The section also briefly reviews the Public Utility Regulatory Policies Act of 1978, which set out the arrangements by which qualifying facilities ("QFs") transact with electric utilities, and importantly, introduced the notion of avoided cost.

Section 3 summarizes the key filings submitted in Docket No. 2021-88-E, focusing on the filings that were subsequently entered into the hearing record. LEI discusses the notable updates or changes proposed by DESC relative to the 2019 avoided cost proceeding, and summarizes the major issues raised by each of the intervening parties and their expert witnesses. LEI also reviews the status of each issue, differentiating between issues that have been at least partially resolved through the numerous rounds of testimony, and those that remain under dispute. Importantly, the remaining sections of the report focus primarily on these contentious issues, weighing the evidence and arguments presented by each party and then providing LEI's opinion and recommendation.

Section 4 reviews the analysis that LEI conducted to verify the reasonableness of the avoided cost methodology, calculations, and resulting rates proposed by DESC. With regards to the proposed avoided capacity costs, LEI reviewed DESC's calculation methodology and underlying assumptions and assessed the issues relevant to avoided capacity costs that are under contention in the current proceeding. While LEI took a similar approach for reviewing the proposed avoided energy costs, the firm also deployed its proprietary electricity market dispatch model, POOLMod (described in Appendix A), to arrive at its own estimates for avoided energy costs. The goal of this analysis was not to develop an exact replica of the rates put forth by DESC, but rather to

determine whether the proposed rates fall within a reasonable range estimated by LEI using a set of credible assumptions.

Section 5 reviews the Variable Integration Charges ("VICs") that the Company proposes in the current proceeding, which were determined through a study conducted by Guidehouse Inc. and commissioned by DESC ("the Guidehouse VIC Study"). As this aspect of the Company's application has been the subject of substantial dispute, LEI focuses on the main issues raised by intervenors and recommends a path forward. LEI also discusses DESC's proposed Solar Site Variability Metric ("SSVM") mitigation protocol, which outlines the conditions under which solar QFs may be able to reduce their monthly VIC.

Section 6 evaluates the proposed changes to the terms and conditions included in DESC's standard offer, form contract, and commitment to sell form. Specifically, LEI evaluates whether the changes could be deemed as being commercially reasonable as required under Act No. 62.

Section 7 concludes by discussing LEI's observations from its review of the proceeding and summarizes LEI's final opinion consistent with the language of the law. Ultimately, given the contentious nature of this proceeding, LEI recommends that DESC's 2021 avoided cost application be approved by the Commission in part, while incorporating some of the reasonable recommendations presented by the intervening parties. For ease of reference, LEI provides its opinion and recommendations in blue textboxes throughout the report, and consolidates a list of final recommendations at the end of Section 7.

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2 Introduction

2.1 Scope of work

LEI was engaged by the SC PSC on July 29th, 2021,[1] to act as a qualified, independent third-party consultant in Docket No. 2021-88-E – the 2021 avoided cost proceeding of DESC.

As part of this engagement, LEI has been retained to conduct the following tasks:

- observe the hearing that was held between August 18th, 2021 and August 25th, 2021;
- review all submissions filed electronically on the SC PSC's Docket Management System, including all pre-filed testimony and focusing specifically on the evidence entered into the hearing record;
- verify the avoided cost methodology and calculations included in all Parties' testimony; and
- write and file this Independent Report.[2]

Following the submission of this Independent Report with the Commission, LEI understands that the firm will be required to respond to any discovery from parties regarding the report. In addition, LEI may be requested to testify and be cross-examined before the Commission at the hearing currently scheduled for October 11th – 14th and 18th – 19th.

2.2 Overview of Act No. 62

LEI was engaged by the Commission under Section 58-41-20(I) of the South Carolina Code, which authorizes the SC PSC to "*employ … third-party consultants and experts in carrying out its duties under this section, including, but not limited to, evaluating avoided cost rates, methodologies, terms, calculations, and conditions under this section.*"[3]

This section, namely Title 58, Chapter 41: *Renewable Energy Programs*, was added to the South Carolina Code as a result of the South Carolina Energy Freedom Act ("Act No. 62"), which was signed into law on May 16th, 2019. Importantly, Act No. 62 set forth the procedural framework which governs the SC PSC's avoided cost proceedings, requiring the Commission to regularly review and approve (at least once every two years) the avoided cost methodologies, standard offers, form contracts, and commitment to sell forms of electric utilities operating in the state. The legislation defines each of these items as follows:

- **avoided costs:** "*the incremental costs to an electric utility of electric energy or capacity or both which, but for the purchase from the qualifying facility or qualifying facilities, such utility would*

[1] SC PSC. *Statements of Award (Contract No. 4400026692).* July 28, 2021.

[2] SC PSC. *Order No. 2021-520 Setting Third-party's Consultant's Scope of Work and Related Deadlines (Docket Nos. 2021-88-E, 2021-89-E, and 2021-90-E).* July 29, 2021.

[3] South Carolina Legislature. *South Carolina Code, Title 58, Chapter 41: Renewable Energy Programs.* May 16, 2019.

generate itself or purchase from another source."[4] In addition to energy and capacity, ancillary services is also referenced as a component to be considered in each utility's avoided cost methodology;

- **standard offers:** contracts or power purchase agreements ("PPAs") between a utility and a small power producer with a qualifying facility ("QF") up to two megawatts ("MW") in size;
- **form contracts:** contracts or PPAs between a utility and a small power producer with a qualifying facility above 2 MW and up to 80 MW in size; and
- **commitment to sell forms:** a notice that is executed and submitted to a utility by a small power producer wishing to sell the output of its facility to the utility.

The avoided cost rates that are approved by the SC PSC through these proceedings ultimately feed into the standard offer PPA, which is made available to QFs on a fixed-price basis for a contract term of ten years. Section 58-41-20 of the South Carolina Code lays out the provisions of these avoided cost proceedings, which apply only to electric utilities serving more than 100,000 customers – namely DESC, as well as two Duke subsidiaries – Duke Energy Carolinas, LLC and Duke Energy Progress, LLC. In this way, the avoided cost proceedings determine the rates, terms, and conditions under which QFs transact with these utilities in the state.

Under the statutes, the SC PSC is required to initiate an avoided cost proceeding for each of these utilities at least once every two years, to ensure the proposed avoided cost methodologies, standard offers, form contracts, and commitment to sell forms are "*just and reasonable to the ratepayers of the electrical utility, in the public interest, consistent with [the Public Utility Regulatory Policies Act of 1978 ("PURPA")] and the Federal Energy Regulatory Commission's implementing regulations and orders, and nondiscriminatory to small power producers; and shall strive to reduce the risk placed on the using and consuming public.*"[5]

In ensuring the nondiscriminatory treatment of small power producers, the Commission is directed to ensure that:

1. "*rates for the purchase of energy and capacity fully and accurately reflect the electrical utility's avoided costs*";
2. "*power purchase agreements, including terms and conditions, are commercially reasonable and consistent with regulations and orders promulgated by the Federal Energy Regulatory Commission implementing PURPA*"; and
3. "*each electrical utility's avoided cost methodology fairly accounts for costs avoided by the electrical utility or incurred by the electrical utility, including, but not limited to, energy, capacity, and ancillary services provided by or consumed by small power producers including those utilizing energy storage equipment. Avoided cost methodologies approved by the commission may account*

[4] Ibid.

[5] Ibid.

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for differences in costs avoided based on the geographic location and resource type of a small power producer's qualifying small power production facility."[6]

It is with these overarching objectives in mind that LEI has conducted its analysis and review of the current proceeding, including the avoided cost methodology, rates, and contract terms and conditions proposed by DESC.

2.3 Overview of PURPA

As discussed in Section 2.2, one of the key provisions of Act No. 62 requires the Commission to ensure that the proposed avoided cost methodologies, standard offers, form contracts, and commitment to sell forms are "*consistent with PURPA and the Federal Energy Regulatory Commission's implementing regulations and orders.*"[7] As such, before reviewing DESC's current application and discussing LEI's analysis of the evidence in the hearing record, it is important to briefly outline the requirements of PURPA that are relevant to this proceeding.

The Public Utility Regulatory Policies Act of 1978 ("PURPA"), specifically Sections 201 and 210, initially set out the arrangements by which QFs would transact with electric utilities. PURPA introduced the notion of avoided cost – i.e., pricing by reference to what the utility would otherwise pay to build and generate itself or purchase from another source.

As recognized by the Federal Energy Regulatory Commission ("FERC") in Order No. 69 regarding the implementation of PURPA, avoided costs can be broadly categorized into two components, namely energy- and capacity-related costs. Energy-related avoided costs are "*the variable costs associated with the production of electric energy (kilowatt-hours). They represent the cost of fuel, and some operating and maintenance expenses.*"[8] Capacity-related avoided costs are to do with infrastructure costs associated with building power plants, transmission, and distribution systems, or as stated by FERC, "*are the costs associated with providing the capability to deliver energy; they consist primarily of the capital costs of facilities.*"[9]

There are various approaches to evaluate these costs, from considering fixed values assumed for a new power plant, to modeling average or marginal system costs, or other market price-based methodologies. As recognized in the *PURPA Title II Compliance Manual* sponsored by the American Public Power Association ("APPA"), Edison Electric Institute ("EEI"), National Association of Regulatory Utility Commissioners ("NARUC"), and National Rural Electric Cooperative Association ("NRECA"), the following methods "*have generally satisfied FERC requirements and have been in use for many years*": (i) the proxy resource method; (ii) the peaker method; (iii) the revenue requirement differential method; (iv) fuel index rates; and (v) auction

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[6] Ibid.

[7] Ibid.

[8] FERC. *Final Rule Regarding the Implementation of Section 210 of the Public Utility Regulatory Policies Act of 1978 (Order No. 69, Docket No. RM79-55).* February 19, 1980.

[9] Ibid.

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or request for proposals ("RFP") rates.[10] DESC's application seeks to continue using the difference in revenue requirements ("DRR") method to calculate its avoided cost rates – LEI discusses this approach in detail later in Section 4.

It is worth noting that FERC recently revised its regulations implementing Sections 201 and 210 of PURPA through a series of orders in 2020, namely Order No. 872, issued on July 16th, 2020, and Order No. 872-A, issued on November 19th, 2020.[11] These amendments primarily "*granted flexibility to state regulatory authorities in establishing avoided cost rates for [QF] sales inside and outside of the organized electricity markets.*"[12]

[10] Robert E. Burns and Kenneth Rose. *PURPA Title II Compliance Manual.* March 2014.

[11] FERC. *Addressing Arguments Raised on Rehearing and Clarifying Prior Order in Part (Order No. 872-A, Docket Nos. RM19-15-001 and AD16-16-001).* November 19, 2020.

[12] FERC. *FERC Affirms, Clarifies PURPA Final Rule.* November 19, 2020.

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3 Review of the current proceeding

The following section provides a review of the key filings submitted through the SC PSC's Docket Management System as part of DESC's 2021 avoided cost proceeding. LEI focuses mostly on the filings that were subsequently entered into the hearing record.

This overview will serve as background context for LEI's analysis, which includes a review of the proposed avoided cost methodology and estimated rates (discussed in Section 4), the Variable Integration Charge ("VIC") analysis conducted by Guidehouse (discussed in Section 5), as well as the proposed terms and conditions in DESC's standard offer, form contract, and commitment to sell form (discussed in Section 6).

3.1 DESC's application and testimony

Figure 1. Summary of DESC's application

Application element	Changes/updates since the 2019 avoided cost proceeding
Avoided cost methodology	• No change – continues using the difference in revenue requirements methodology
Avoided energy costs	• **PR-1 solar rate:** shifts from 4 pricing periods to a single rate that applies in all hours of delivery • **PR-1 non-solar rate:** modifies the structure of the 4 pricing periods • **Standard Offer solar rate:** shifts from 4 pricing periods that apply for the 10-year term to a single rate that applies in all hours of delivery for 2022-2026, and another rate that applies for the period 2027-2031 • **Standard Offer non-solar rate:** shifts from 4 pricing periods that apply for the 10-year term to 11 pricing periods that differ for 2022-2026 and 2027-2031
Avoided capacity costs	• **PR-1/Standard Offer solar rate:** maintains a single rate that applies in all hours of delivery • **PR-1/Standard Offer non-solar rate:** maintains a single rate that applies for the hours of 6-9am in the months of December through February
Variable Integration Charge ("VIC")	• **PR-1/Standard Offer solar rate:** proposes to shift from the interim VIC of $0.96/MWh (subject to a true up) to $1.80/MWh for Tranche 1 of solar (341-973 MW) and $3.43/MWh for Tranche 2 of solar (≥974 MW) • Proposes a Solar Site Variability Metric ("SSVM") mitigation protocol
Standard Offer/Form PPA	• Eliminates cash collateral as an option for providing Performance Assurance (note this change was later retracted by DESC – see Section 3.5) • Adds environmental provisions • Requires QFs to submit a shortfall report to DESC and the ORS under certain circumstances • Establishes a process by which DESC may issue a system disruption notice to a QF • Modifies insurance requirements • Modifies the Form of Surety Bond
Notice of commitment form	• Requires additional information from QFs with energy storage systems • Modifies the site control certification provision • Proposes an additional termination provision

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DESC submitted its initial avoided cost application to the Commission on April 22nd, 2021, which was later amended in the first amended application filed on June 7th, 2021, and the second amended application filed on June 25th, 2021. These iterations of DESC's application were further supported by the direct and rebuttal testimonies of several Company witnesses (filed on June 29th, 2021, and August 10th, 2021, respectively), including: Allen W. Rooks, Daniel F. Kassis, Eric H. Bell, James W. Neely, John E. Folsom, Jr., Peter B. David, and Thomas E. Hanzlik.[13]

Taken together, DESC's application and supporting testimony outline the proposed updates and changes to its avoided cost methodology, avoided cost rates, VIC, and contracts (i.e., the standard offer, form contract, and commitment to sell form) since those previously approved by the Commission in Docket No. 2019-184-E ("the 2019 avoided cost proceeding"). LEI summarizes the notable updates to each of these elements in Figure 1 above, which are described further in the subsections that follow.

3.1.1 Avoided cost methodology

DESC seeks to continue using the same difference in revenue requirements methodology used and approved in the 2019 avoided cost proceeding to calculate the avoided cost rates proposed in the current proceeding. As discussed previously in Section 2.3, the DRR method is commonly used by utilities throughout the country to determine avoided costs, according to the *PURPA Title II Compliance Manual*. Essentially, the premise of the DRR method as implemented by DESC is that it calculates the two avoided cost components as follows (see Section 4 for further details):

- **avoided energy costs:** calculated as the difference between the base case costs and the change case costs. The base case is "*defined by DESC's existing fleet of generators and the hourly load profile to be served by these generators, including the solar facilities with which DESC has executed a PPA and the solar facilities that have executed a Notice of Commitment ("NOC")*." The change case is identical to the base case, except that it includes "*the addition of a zero-cost purchase transaction modeled after the appropriate energy profile for the resource under consideration*";[14] and
- **avoided capacity costs:** calculated as the difference between the incremental capacity costs in the base case and the change case. The base case is "*the resource plan for meeting DESC's system load reflecting the future capacity resource additions that the generating resource under consideration would be most likely to displace*." Again, the change case is identical to the base case, except that it includes "*the addition of a zero-cost purchase transaction reflecting the size and profile of the resource under consideration*."[15]

[13] Company witness Thomas E. Hanzlik did not submit direct testimony but did file rebuttal testimony on August 10th, 2021.

[14] DESC. *Exhibit No. AWR-4 (Docket No. 2021-88-E)*. June 29, 2021. Page 1 of 3.

[15] Ibid.

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3.1.2 Avoided energy costs

DESC's proposed avoided energy cost rates estimated using the DRR methodology are outlined in Figure 2 and Figure 3 below.

Figure 2 shows the Company's proposed **PR-1 avoided energy cost rates**, which apply to QFs with facilities less than or equal to 100 kW and are available for a one-year term from May 2021 to April 2022.[16] The PR-1 rate is further differentiated by technology type, with solar QFs receiving a different rate and rate structure from non-solar QFs. Solar QFs under the PR-1 rate receive a single energy rate that applies in all hours of delivery – notably, this is in contrast to the structure approved in the 2019 avoided cost proceeding, which incorporated four energy pricing periods.

Non-solar QFs under the PR-1 rate continue to be subject to four energy pricing periods, which vary by season and time of day. These four pricing periods have been modified slightly from the periods approved in the 2019 avoided cost proceeding. Specifically, DESC seeks to shift: (i) the month of May to the summer period; (ii) the summer 10pm – 10am period to 11pm – 11am; (iii) the middle of the day non-summer hours to off-peak; and (iv) the weekends to on-peak.

Figure 2. DESC's proposed PR-1 avoided energy cost rates ($/MWh)

PR-1 Rate: Solar QFs

	Credit
All hours	28.20

PR-1 Rate: Non-solar QFs

	11am - 11pm	11pm - 11am	5am - 9am, 5pm - 11pm	9am - 5pm, 11pm - 5am
Summer (May-Sep)	33.38	28.30		
Non-summer (Jan-Apr, Oct-Dec)			34.35	28.89

Source: DESC. *Revised Exhibit No. AWR-2 (Docket No. 2021-88-E).* August 10, 2021.

Figure 3 shows the Company's proposed **standard offer avoided energy cost rates**, which apply to QFs with facilities less than or equal to 2 MW and are available for a ten-year term from 2022 to 2031.[17] Similar to the PR-1 rate, the standard offer rate is further differentiated by technology type, with solar QFs receiving a different rate and rate structure from non-solar QFs. Unlike the four energy pricing periods approved in the 2019 avoided cost proceeding, DESC proposes shifting the standard offer solar rate to a single rate that applies in all hours of delivery for the 2022-2026 period, and another rate that applies for the 2027-2031 period.

[16] DESC. *Direct Testimony of James W. Neely, P.E. on behalf of Dominion Energy Services, Inc. (Docket No. 2021-88-E).* June 29, 2021. P. 4.

[17] Ibid.

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Furthermore, DESC proposes shifting from four pricing periods to 11 for the standard offer non-solar rate. The 11 pricing periods are denoted as P*X* in Figure 3 below, and vary by season (winter, shoulder, and summer), time of day, and year (with rates differing for the 2022-2026 and 2027-2031 periods).

Figure 3. DESC's proposed standard offer avoided energy cost rates ($/MWh)

Standard Offer Rate: Solar QFs

	Credit
2022-2026	26.95
2027-2031	29.37

Standard Offer Rate: Non-solar QFs

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11
	Winter (Dec-Feb)				Shoulder (Mar, Apr, Oct, Nov)				Summer (May-Sep)		
	5am - 9am	9am - 5pm	5pm - 11pm	11pm - 5am	5am - 9am	9am - 5pm	5pm - 11pm	11pm - 5am	11am - 5 pm	5pm - 11pm	11pm - 11am
2022-2026	32.45	25.99	31.43	28.01	29.95	25.80	32.24	26.93	28.70	32.60	25.99
2027-2031	36.51	29.23	35.35	31.51	33.69	29.02	36.27	30.28	32.28	36.67	29.23

Source: DESC. *Revised Exhibit No. AWR-6 (Docket No. 2021-88-E).* August 10, 2021.

3.1.3 Avoided capacity costs

DESC's proposed avoided capacity cost rates estimated using the DRR methodology are outlined in Figure 4 below. The proposed rates are the same under both the PR-1 and standard offer rates.

Similar to the avoided energy cost rates, the proposed avoided capacity cost rates are differentiated by technology type, with solar QFs receiving a different rate and rate structure from non-solar QFs. Solar QFs are eligible for a single rate that applies in all hours of delivery, while non-solar QFs are eligible for a higher rate that applies only for the winter months of December through February and the hours of 6am – 9am. Notably, solar QFs receive only 5% of the annual avoided capacity cost value relative to non-solar QFs, as determined by DESC's effective load carrying capacity ("ELCC") methodology – this is lower than the 11.8% ELCC rate used in the 2019 avoided cost proceeding, which the Company states is a reflection of the increase in solar capacity on DESC's system since the previous proceeding.[18]

Figure 4. DESC's proposed avoided capacity cost rates ($/MWh)

Solar QFs

	Credit
All hours	1.40

Non-solar QFs

	Credit
Dec, Jan, Feb (6am - 9am)	217.81

Sources: DESC. *Revised Exhibit Nos. AWR-2 and AWR-6 (Docket No. 2021-88-E).* August 10, 2021.

[18] Ibid. P. 10.

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3.1.4 Variable Integration Charge

Under the PR-1 and standard offer rates, QFs are paid the energy and capacity credits on a monthly basis, which is reduced by the Seller Charge – equal to $4.50/month under the PR-1 rate and $45/month under the standard offer. Solar QFs are subject to an additional charge, the Variable Integration Charge ("VIC"), which at a high-level seeks to recover the additional cost the Company incurs to integrate these solar facilities into DESC's system.[19] While the Commission approved an interim VIC of $0.96/MWh in Order No. 2020-244 in the 2019 avoided cost proceeding, the Company is currently proposing the higher VICs outlined in Figure 5 below.

Specifically, DESC proposes a VIC of $1.80/MWh for Tranche 1 (i.e., solar QFs that are already under contract and are subject to a true-up provision in accordance with Order No. 2020-244) and $3.43/MWh for Tranche 2 (i.e., solar QFs entering into contracts after June 1st, 2021).[20] These updated VICs were determined through a study conducted by Guidehouse Inc. and commissioned by DESC ("the Guidehouse VIC Study"), which is discussed later in Section 5.

Figure 5. DESC's proposed VICs ($/MWh)

	Charge
Solar Tranche 1 (341-973 MW)	1.80
Solar Tranche 2 (≥974 MW)	3.43

Sources: DESC. *Revised Exhibit Nos. AWR-2 and AWR-6 (Docket No. 2021-88-E).* August 10, 2021.

As required under Order No. 2020-244 in the 2019 avoided cost proceeding, the Company has also submitted its Solar Site Variability Metric ("SSVM") mitigation protocol for Commission approval, which outlines the protocols "*that might reduce the VIC … incurred by certain solar projects on the DESC system.*"[21] The mitigation protocol is outlined in a two-page document (Exhibit 9 of the Company's second amended application) and requires the QF to submit a monthly SSVM spreadsheet to DESC in order to determine the level of reduction in its VIC. Essentially, the spreadsheet includes day-ahead energy forecasts and actual generation data for the solar facility (recorded in 5-minute intervals) and calculates the SSVM as follows:

1. "*the change in energy production over applicable daylight hours for each 5-minute period… divided by the actual production levels of the Facility at the beginning of the hour period*";[22]

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[19] As defined by Mr. David in his direct testimony, the VIC "*is the increase in costs to an electric system as a result of the need to carry more Operating Reserves in order to react to unexpected changes in renewable generation.*" (Source: DESC. *Direct Testimony of Peter B. David on behalf of Dominion Energy South Carolina, Inc. (Docket No. 2021-88-E).* June 29, 2021. P. 6)

[20] DESC. *Direct Testimony of Eric H. Bell, P.E. on behalf of Dominion Energy South Carolina, Inc. (Docket No. 2021-88-E).* June 29, 2021. P. 27-28.

[21] DESC. *Amended Application to Approve and Establish Pursuant to S.C. Code Ann. Section 58-41-20(A) the Standard Offer, Avoided Cost Methodologies, Form Contract Power Purchase Agreements, Commitment to Sell Forms, and All Other Appropriate Terms and Conditions (Docket No. 2021-88-E).* June 7, 2021. P. 19.

[22] DESC. *Second Amended Application, Exhibit 9 (Docket No. 2021-88-E).* June 25, 2021. P. 1.

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2. the SSVM is set at zero if the value in step (1) is negative; and
3. the final SSVM for the month is taken as the maximum SSVM recorded for the period.

The final SSVM for the month then determines the reduction in that month's VIC as follows:

- SSVM ≤ 25%: QF pays no VIC for the month;
- 25% < SSVM ≤ 45%: QF pays 50% of the VIC for the month; or
- SSVM > 45%: QF pays the full VIC for the month.

3.1.5 Standard Offer/Form PPA

QFs with facilities less than or equal to 2 MW in size are eligible for the Rate PR – Standard Offer and the associated Standard Offer PPA. QFs with facilities greater than 2 MW and less than or equal to 80 MW are not eligible for the standard offer, but instead are eligible for the Rate PR – Form PPA and the associated Form PPA. Although the rates for each group of QFs differ – standard offer QFs are eligible for the energy and capacity rates discussed in Section 3.1.2 and Section 3.1.3 previously, while QFs under the Form PPA have energy and capacity rates that are determined on a project-specific basis – they are subject to similar contracts.

As noted by Company witness Mr. Folsom in his direct testimony, "*both form contracts contain similar commercial terms and protections for DESC's customers*" and "*the revisions proposed in this docket are substantially the same for both documents*."[23] The revisions proposed by the Company include:

- **cash collateral:** eliminating cash collateral as an option for providing Performance Assurance to primarily align with the practices of DESC's parent company. DESC later withdrew this proposed revision, as discussed later in Section 3.5;
- **environmental provisions:** adding environmental provisions to "*align the Form PPA and Standard Offer with concepts that are commonly found in federal/state statute and relevant case law*";[24]
- **shortfall report:** requiring QFs to submit a report to DESC and the Office of Regulatory Staff if the QF experiences a Shortfall[25] during any contract year, "*detailing the cause of such Shortfall and how it plans to avoid similar Shortfalls going forward*";[26]

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[23] DESC. *Direct Testimony of John E. Folsom, Jr. on behalf of Dominion Energy South Carolina, Inc. (Docket No. 2021-88-E).* June 29, 2021. P. 16, 18.

[24] Ibid. P. 21.

[25] The Standard Offer PPA and Form PPA defines a Shortfall as follows: "*If, starting with the second Contract Year, the Facility fails to deliver [85%] of the Contract Quantity … in any particular Contract Year …, then a shortfall of Net Energy with respect to such Contract Year equal to the difference between the Guaranteed Energy Production and the Net Energy actually delivered (a "Shortfall") shall be deemed to exist*" (P. 18)

[26] DESC. *Direct Testimony of John E. Folsom, Jr. on behalf of Dominion Energy South Carolina, Inc. (Docket No. 2021-88-E).* June 29, 2021. P. 21-22.

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- **system disruption notice:** adding a provision whereby DESC can notify a QF if it creates ""*recurring power quality issues or other issues that disrupt normal operation" of DESC's transmission and distribution system*," and provides QFs eight months to address and remediate such issues;[27]
- **insurance requirements:** modifying the insurance requirements to conform with DESC's parent company. Changes include: (i) requiring delivery of a certificate of insurance within 20 days of DESC's request; (ii) increasing insurance limits (e.g., for General Liability Insurance, increasing the minimum limit from $1 million per occurrence to $2 million, and from $2 million aggregate to $4 million); and (iii) requiring Comprehensive Automobile Liability insurance; and
- **Form of Surety Bond:** modifying the Form of Surety Bond to, again, conform with DESC's parent company.

3.1.6 Notice of commitment to sell form

The notice of commitment to sell ("NOC") form was established under Act No. 62 and provides a non-contractual form that QFs can deliver to DESC to "*[lock]-in avoided cost rates without having to execute a PPA*."[28] As described by the Company, "*[i]n exchange for this ability to lock-in avoided cost rates, the QF must evidence a "substantial commitment" on its part to sell the electric output of its facility to DESC, which will ultimately occur under a subsequent PPA*."[29]

The Company proposes the following revisions to its NOC Form relative to the version approved in the 2019 avoided cost proceeding:

- **energy storage:** requiring QFs to provide technical information related to their energy storage project, such as round-trip efficiency, discharge rating, and whether the energy storage system will operate in accordance with DESC's dispatch signals;
- **site control:** modifying the site control provision to align with FERC Order No. 872 by requiring "*a certification that the QF has at least taken meaningful steps to obtain control of the project site and submitted all applications and filing fees necessary to operate and maintain the project*";[30] and
- **termination:** adding a termination provision that proposes "*[i]f the NOC Form is terminated due to the fault of the QF, DESC will not be obligated to offer that QF within the next two years higher rates than DESC's applicable avoided cost rates as of the submittal date of the NOC Form*," primarily to prevent gaming of the system.[31]

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[27] Ibid. P. 22.

[28] Ibid. P. 7.

[29] Ibid.

[30] Ibid. P. 14-15.

[31] Ibid. P. 15.

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3.2 Position of ORS

The Office of Regulatory Staff ("ORS") is the state agency charged with representing the public interest of South Carolina in cases before the Commission. As defined in Act 258, the public interest means "*the concerns of the using and consuming public with respect to public utility services, regardless of the class of customer, and preservation of continued investment in and maintenance of utility facilities so as to provide reliable and high-quality utility services.*"[32]

As part of the ORS' duties to represent the public interest, the agency has retained Brian Horii, Senior Partner at Energy and Environmental Economics, Inc., as its expert witness for the current avoided cost proceeding. Mr. Horii submitted direct testimony on behalf of ORS on July 27th, 2021, to summarize the results of his review of the Company's avoided cost application (this direct testimony was revised in part and filed electronically on August 23rd, 2021). Mr. Horii also filed surrebuttal testimony with the Commission on August 16th, 2021, responding to the rebuttal testimony of DESC's witnesses Thomas E. Hanzlik, Eric H. Bell, Daniel F. Kassis, and James W. Neely.

It is LEI's understanding that Mr. Horii primarily takes issue with the following aspects of DESC's 2021 avoided cost application:

- **energy pricing periods for non-solar QFs under the PR-1 rate:** argues that "*a more focused peak period*" for the non-solar PR-1 energy rate should be established to "*provide even greater incentives for generators to provide power when it is most valuable to DESC and its retail customers.*"[33] As such, Mr. Horii recommends reducing the Company's proposed summer peak period for the non-solar PR-1 energy rate from 11am – 11pm to 2pm – 11pm.[34] Notably, DESC stated it "*does not oppose*" this change through the rebuttal testimony of Company witness Mr. Bell, as indicated later in Section 3.5;[35]
- **assumed capacity change in the avoided capacity cost calculation:** observes that DESC assumes a capacity change of 100 MW under the change case used in the avoided capacity cost calculation, but then models meeting this change with 66 MW generating units. Mr. Horii argues this "*mismatch in generator sizes biases the avoided capacity cost downward*" and thus recommends modifying the assumed capacity change from 100 MW to 66 MW;[36] and
- **choice of reference year in the avoided capacity cost calculation:** observes that DESC uses 2020 as the reference year in the avoided capacity cost calculation. Mr. Horii recommends using 2022 as the reference year instead, "*because this docket is determining*

[32] ORS. *Fiscal Year 2019-2020 Accountability Report.* March 18, 2021. P. A-3.

[33] ORS. *Revised Direct Testimony and Exhibit of Brian Horii on behalf of the South Carolina Office of Regulatory Staff (Docket No. 2021-88-E).* August 23, 2021. P. 13.

[34] Ibid. P. 13-14.

[35] DESC. *Rebuttal Testimony of Eric H. Bell on behalf of Dominion Energy South Carolina, Inc. (Docket No. 2021-88-E).* August 10, 2021. P. 20.

[36] ORS. *Revised Direct Testimony and Exhibit of Brian Horii on behalf of the South Carolina Office of Regulatory Staff (Docket No. 2021-88-E).* August 23, 2021. P. 21.

avoided capacity values for 2022."[37] Notably, DESC accepted this change through the rebuttal testimony of Company witness Mr. Neely, as indicated later in Section 3.5.

Mr. Horii also provides commentary and recommendations related to the Company's proposed VICs and the associated Guidehouse VIC Study – LEI explores these issues later in Section 5.

3.3 Position of CCEBA

The Carolinas Clean Energy Business Association ("CCEBA") is a non-profit trade association that focuses on "*promoting and advocating public policy positions supportive of solar power generation in North and South Carolina*."[38] The organization represents over 50 members from across the clean energy sector, such as "*developers, manufacturing, engineering, construction, professional and financial services, and non-energy businesses wishing to purchase clean energy*."[39]

Ed Burgess, Senior Director at Strategen Consulting, provided direct testimony and exhibits on behalf of CCEBA on July 27th, 2021. Mr. Burgess also later filed surrebuttal testimony on August 16th, 2021, responding to the rebuttal testimony of DESC's witnesses Eric H. Bell, Peter B. David, Daniel F. Kassis, and Thomas E. Hanzlik.

Mr. Burgess's rounds of testimony focused primarily on a review of the Company's proposed VICs and the associated Guidehouse VIC Study, which LEI explores later in Section 5. However, Mr. Burgess also provided critiques of the Company's proposed mitigation protocol, which is what LEI focuses on here. It is LEI's understanding that Mr. Burgess primarily takes issue with the following aspects of DESC's proposed mitigation protocol:

- **calculation methodology:** Mr. Burgess recommends several modifications to the SSVM calculation, including – (i) "*the SSVM should compare a facility's output to forecasted or expected production, not to the prior hour's production*"; (ii) "*the SSVM should capture hours with the greatest potential for a MW drop in energy production, rather than the greatest percentage drop*"; (iii) "*DESC should use an average, not a maximum, SSVM to evaluate whether a facility can avoid integration charges*"; and (iv) "*the SSVM metric should not necessarily be determined based on a single solar installation*" but should instead be based on "*an individual site's contribution to any fleet-wide drops in solar production*."[40] According to the rebuttal testimony of Company witness Mr. Bell – and as indicated later in Section 3.5 – DESC stated that

[37] Ibid. P. 23.

[38] CCEBA. *Petition to Intervene (Docket No. 2021-88-E).* April 20, 2021. P. 1.

[39] Ibid. For example, members include, but are not limited to: Cypress Creek Renewables, EDF Renewables, First Solar, Google, NextEra Energy Resources, Pine Gate Renewables, and the Solar Energy Industries Association ("SEIA").

[40] CCEBA. *Direct Testimony of Ed Burgess on behalf of the Carolinas Clean Energy Business Association (Docket No. 2021-88-E)*. July 27, 2021. P. 32-33.

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with regards to item (i) above, it "*could update the SSVM requirement to include a forecasting provision if directed by the Commission*."[41]

However, Mr. Burgess further states that instead of applying the modifications recommended above to the mitigation protocol proposed by DESC in this docket, he "*believe[s] a better approach would be for DESC to use the mitigation protocol Dominion developed for North Carolina as a starting point for South Carolina*," which he attaches as Exhibit B to his direct testimony;[42]

- **need for a separate revenue quality meter:** observes that the proposed mitigation protocol requires QFs to install a separate meter (the revenue quality meter, or integration meter) to determine generation variability. Mr. Burgess argues that while "*a separate meter may be needed for the solar and storage components, … the normal production meter could be used in lieu of one of these*";[43]
- **deadline for data submissions:** observes that the mitigation protocol proposes a two-business day deadline for data submissions at each month end. Mr. Burgess finds this to be "*unduly onerous*" and recommends that QFs should instead "*be allowed five business days after month-end to submit the SSVM spreadsheet to DESC*";[44] and
- **disqualification for non-submission of data:** observes that the mitigation protocol proposes a two-strike disqualification, whereby a QF may be ineligible for future reductions in its VIC if it fails to deliver the SSVM spreadsheet to DESC for two consecutive months. Mr. Burgess also finds this to be "*unduly onerous*" and argues that QFs "*should not be disqualified from using the Protocols for the duration of their PPA based on failure to deliver the SSVM spreadsheet*."[45]

In addition to Mr. Burgess, Steven J. Levitas, Senior Vice President for Regulatory and Government Affairs at Pine Gate Renewables, LLC, provided direct testimony on behalf of CCEBA on July 27th, 2021. Mr. Levitas also later filed surrebuttal testimony on August 16th, 2021, responding to the rebuttal testimony of DESC's witnesses Daniel F. Kassis and John E. Folsom, Jr.

It is LEI's understanding that Mr. Levitas primarily takes issue with the following proposed revisions to the Company's Standard Offer/Form PPA:

- **removal of cash collateral:** Mr. Levitas disagrees with the proposed removal of cash collateral and argues that "*it is common industry practice for utilities to accept cash as PPA*

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[41] DESC. *Rebuttal Testimony of Eric H. Bell on behalf of Dominion Energy South Carolina, Inc. (Docket No. 2021-88-E)*. August 10, 2021. P. 13.

[42] CCEBA. *Direct Testimony of Ed Burgess on behalf of the Carolinas Clean Energy Business Association (Docket No. 2021-88-E)*. July 27, 2021. P. 33.

[43] Ibid. P. 34.

[44] Ibid.

[45] Ibid.

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performance assurance."[46] Through the rebuttal testimony of Mr. Folsom, DESC stated it "*is comfortable leaving cash collateral as an express option for Performance Assurance in the Form PPA and Standard Offer*" – as indicated later in Section 3.5;[47]

- **modified insurance requirements:** argues that the "*proposed insurance changes are unjustified and are unreasonable in two primary respects: (1) new timing for certificate of insurance delivery, and (2) revised coverage amounts.*"[48] Recommends that DESC's proposed timing change be rejected, that current insurance coverage levels be maintained, and that "*the new automobile minimum coverage should be limited to [$1 million]*."[49] Mr. Levitas later withdrew his objection to the new timing for certificate of insurance delivery when he testified before the Commission on August 24th, 2021;
- **modified surety bond requirement:** Mr. Levitas argues that "*DESC has modified the surety bond requirement in a manner that will make it virtually impossible for QFs to utilize the surety bond option for Performance Insurance.*"[50] Recommends that DESC's proposed modifications be rejected, in particular the provisions related to timing for payment and the waiver of surety defenses;[51] and
- **ancillary services:** observes that "*DESC's PPA requires the QF to convey ancillary services, including reactive power, to DESC*" at no additional cost.[52] Mr. Levitas recommends that "*[a]t a minimum, the Commission should require DESC to remove the language in the PPA purporting to give DESC ancillary services for free.*"[53]

LEI understands that Mr. Levitas takes further issue with the following proposed revisions to the Company's NOC Form:

- **modified site control requirement:** argues "*[b]ecause readiness to commence construction is not germane to formation of a LEO, the changes proposed in item 4(iii) referencing construction should not be adopted*";[54]

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[46] CCEBA. *Direct Testimony of Steven J. Levitas on behalf of the Carolinas Clean Energy Business Association (Docket No. 2021-88-E).* July 27, 2021. P. 9.

[47] DESC. *Rebuttal Testimony of John E. Folsom, Jr. on behalf of Dominion Energy South Carolina, Inc. (Docket No. 2021-88-E).* June 29, 2021. P. 3-4.

[48] CCEBA. *Direct Testimony of Steven J. Levitas on behalf of the Carolinas Clean Energy Business Association (Docket No. 2021-88-E).* July 27, 2021. P. 9.

[49] Ibid. P. 10-11.

[50] Ibid. P. 8.

[51] Ibid. P. 11-12.

[52] Ibid. P. 8.

[53] CCEBA. *Surrebuttal Testimony of Steven J. Levitas on behalf of the Carolinas Clean Energy Business Association (Docket No. 2021-88-E).* August 16, 2021. P. 12.

[54] CCEBA. *Direct Testimony of Steven J. Levitas on behalf of the Carolinas Clean Energy Business Association (Docket No. 2021-88-E).* July 27, 2021. P. 16.

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- **permitting and approvals requirement:** argues "*[b]ecause LEOs are formed early in the life of a project … the project sponsor will likely lack the information needed to meaningfully apply for granular approvals.*"[55] As such, Mr. Levitas recommends that the proposed changes be rejected; and
- **termination provision:** observes that the "*NOC terminates if the Seller has not executed a PPA within 90 days of the NOC's submittal, regardless of whether a PPA has been tendered by the utility.*"[56] As such, Mr. Levitas recommends revising language in item 8(ii) of the NOC Form to read "*the later of (i) within 90 business days after the Submittal Date, or (ii) within 60 business days after receipt of an executable PPA from Company.*"[57] Notably, through the rebuttal testimony of Mr. Folsom, DESC stated it "*is willing to compromise and views Witness Levitas's proposed language … as a reasonable solution*" – as indicated later in Section 3.5.[58]

3.4 Position of CCL and SACE

The South Carolina Coastal Conservation League ("CCL") and Southern Alliance for Clean Energy ("SACE") are non-profit organizations that respectively seek to "*protect the natural environment of the South Carolina coastal plain and to enhance the quality of life in its communities by working with individuals, businesses, and government to ensure balanced solutions*" and "*promote responsible and equitable energy choices to ensure clean, safe and healthy communities throughout the Southeast.*"[59]

Kenneth Sercy, an independent electric sector consultant, provided direct testimony and exhibits on behalf of CCL and SACE on July 27th, 2021. Mr. Sercy also later filed surrebuttal testimony on August 16th, 2021, responding to the rebuttal testimony of DESC's witnesses James W. Neely, Eric H. Bell, and Daniel F. Kassis (this surrebuttal testimony was later corrected in part and filed electronically on August 23rd, 2021).

It is LEI's understanding that Mr. Sercy primarily takes issue with the following aspects of DESC's 2021 avoided cost application:

- **natural gas price forecast used in the avoided energy cost modeling:** observes the Company proposes utilizing New York Mercantile Exchange ("NYMEX") natural gas futures prices for 2021-2023 and escalating these prices by 3.959% thereafter, with the escalation rate based on the US Energy Information Administration ("EIA")'s Annual Energy Outlook ("AEO") reference case gas price forecast. Mr. Sercy argues that this produces a forecast that is "*unreasonably low*" and instead recommends the use of a blended forecast which uses: (i) the NYMEX futures price in 2021; (ii) the midpoint

[55] Ibid. P. 17.

[56] Ibid. P. 17.

[57] Ibid. P. 18.

[58] DESC. *Rebuttal Testimony of John E. Folsom, Jr. on behalf of Dominion Energy South Carolina, Inc. (Docket No. 2021-88-E).* June 29, 2021. P. 10.

[59] CCL and SACE. *Petition to Intervene (Docket No. 2021-88-E).* May 28, 2021. P. 1.

between the NYMEX price and the EIA AEO price in 2022; and (iii) EIA AEO prices directly in 2023 and beyond;[60]

- **methodology for determining the energy pricing periods for non-solar QF rates:** argues that "*DESC's method of grouping hours and months together into pricing periods appears to have been highly subjective.*"[61] Mr. Sercy recommends that DESC should instead use a "*data-driven approach*" that involves calculating descriptive statistics such as ranges and standard deviations "*for the price values that make up the candidate pricing periods,*" with the ultimate goal of achieving smaller ranges and standard deviations within a given pricing period;[62]
- **solar QF eligibility for "technology-neutral" energy rates:** argues that paying solar QFs a flat energy rate "*regardless of where solar QFs are located or how their systems are designed*" does not align with certain provisions of Act No. 62.[63] Mr. Sercy recommends that instead, "*standalone solar QFs be granted eligibility for the technology-neutral energy rates,*" which LEI understands refers to DESC's proposed non-solar energy rates;[64]
- **application of a performance adjustment factor ("PAF"):** argues that a lack of inclusion of a PAF in the Company's avoided capacity cost calculation violates Act No. 62 and PURPA's nondiscriminatory standard. Mr. Sercy recommends that DESC should instead apply the same 1.05 PAF approved in the Duke 2019 avoided cost proceeding;[65]
- **capital cost assumptions used in the avoided capacity cost calculation:** observes that DESC assumes a $991/kW (2020 dollars) capital cost for aeroderivative combustion turbines ("aero-CTs") in its avoided capacity cost calculation, along with a $8.14/kW-year fixed O&M cost. Mr. Sercy finds these assumptions to be "*unreasonably low*" and recommends the use of EIA assumptions instead – $1,139/kW (capital cost) and $15.79/kW-year (fixed O&M) after adjusting for inflation and locational factors;[66]
- **ELCC calculation methodology for solar QF avoided capacity rates:** Mr. Sercy states his concern "*about both the lack of rigor of DESC's ELCC calculation and a failure to incorporate current best practices in ELCC study design,*" and notes that "*much of the substance of the analysis is effectively not reviewable, because it is represented in a software program that is not accessible without a license and detailed knowledge of the SAS product.*"[67] Given these concerns,

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[60] CCL and SACE. *Direct Testimony of Kenneth Sercy on behalf of the Southern Alliance for Clean Energy and the South Carolina Coastal Conservation League (Docket No. 2021-88-E).* July 27, 2021. P. 7-8.

[61] CCL and SACE. *Corrected Surrebuttal Testimony of Kenneth Sercy on behalf of the Southern Alliance for Clean Energy and the South Carolina Coastal Conservation League (Docket No. 2021-88-E).* July 27, 2021. P. 10.

[62] Ibid. P. 10-11.

[63] CCL and SACE. *Direct Testimony of Kenneth Sercy on behalf of the Southern Alliance for Clean Energy and the South Carolina Coastal Conservation League (Docket No. 2021-88-E).* July 27, 2021. P. 13.

[64] Ibid. P. 17.

[65] Ibid. P. 18-19.

[66] Ibid. P. 20.

[67] Ibid. P. 23.

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Mr. Sercy recommends that DESC be required to "*[i]nclude in future avoided cost applications the detailed methodology and intermediate outputs of the DESC's ELCC calculation in a format that may be reviewed by intervenors*" and that DESC be further required to "*use large datasets and rigorous ELCC methodologies using modern analytical techniques*";[68]

- **seasonal allocation for non-solar QF avoided capacity rates:** argues that because "*DESC has experienced more summer peaks in the last decade than winter peaks, assigning all capacity value to winter hours is questionable*."[69] Mr. Sercy instead recommends that the Company apply a 52% winter/48% summer allocation, with pricing periods of 6am – 9am (winter) and 2pm – 8pm (summer);[70]
- **solar QF eligibility for "technology-neutral" capacity rates:** similar to his criticism of DESC's separate energy rates for solar and non-solar QFs, Mr. Sercy also recommends that standalone solar QFs be deemed eligible for non-solar QF (i.e., technology-neutral) capacity rates, subject to several modifications;[71] and
- **avoided cost application transparency:** argues that DESC's application and testimony lacked transparency in that its "*initial amended applications, along with its direct testimony, omitted discussion of several underlying inputs, assumptions, and methodologies the Company used to develop its proposal*."[72] As such, Mr. Sercy in his direct testimony lists several pieces of information that DESC should be required to include in its next avoided cost application.[73]

3.5 Summary of positions and contested areas

Many aspects of DESC's application and testimony remain under dispute and will be the focus of LEI's analysis in the remaining sections of this report. However, a selection of issues raised by intervenors have been at least partially resolved according to the rebuttal testimonies of several Company witnesses. The table in Figure 6 on the following pages tracks the status of these issues, with resolved/partially resolved issues highlighted in green and contested issues highlighted in red; the issues are grouped by application element for ease of reference – i.e., avoided energy costs, avoided capacity costs, SSVM mitigation protocol, Standard Offer/Form PPA, and NOC Form. As noted earlier, issues raised related to the Guidehouse VIC Study and resulting proposed VICs are discussed later in Section 5. The table also includes cross-references for the specific report sections where LEI discusses and opines on each disputed issue (see the "Status" column of the table).

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[68] CCL and SACE. *Corrected Surrebuttal Testimony of Kenneth Sercy on behalf of the Southern Alliance for Clean Energy and the South Carolina Coastal Conservation League (Docket No. 2021-88-E).* July 27, 2021. P. 25.

[69] CCL and SACE. *Direct Testimony of Kenneth Sercy on behalf of the Southern Alliance for Clean Energy and the South Carolina Coastal Conservation League (Docket No. 2021-88-E).* July 27, 2021. P. 28.

[70] Ibid. P. 28-30.

[71] Ibid. P. 32.

[72] Ibid. P. 33.

[73] Ibid. P. 34-35.

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Figure 6. Status of contested areas in the 2021 avoided cost proceeding

Issue	DESC's initial position	Intervenor position(s)	Status
Avoided energy costs			
Natural gas price forecast	Utilizes NYMEX natural gas futures for 2021-2023 and escalates by 3.959% thereafter	Mr. Sercy (CCL/SACE) recommends use of a blended gas price forecast	Remains under dispute – see Section 4.3.3.1
Standard Offer non-solar pricing periods	Proposes 11 energy pricing periods	• Mr. Horii (ORS) agrees with the proposed pricing periods • Mr. Sercy (CCL/SACE) recommends a data-driven approach to redesign the pricing periods	Remains under dispute – see Section 4.3.3.2
Solar-specific energy rates	Proposes different energy rates and rate structures for solar QFs and non-solar QFs	• Mr. Horii (ORS) agrees with use of flat solar energy rates • Mr. Sercy (CCL/SACE) recommends standalone solar QFs be granted eligibility for non-solar energy rates	Remains under dispute – see Section 4.3.3.3
PR-1 non-solar pricing periods	Modifies structure of the 4 energy pricing periods	Mr. Horii (ORS) recommends reducing summer peak period from 11am – 11pm to 2pm – 11pm	Partially resolved – DESC does not oppose Mr. Horii's suggested change (*Bell rebuttal*)
Avoided capacity costs			
Capacity change assumption	Assumes a capacity change of 100 MW but models meeting this change with 66 MW generating units	Mr. Horii (ORS) recommends modifying the assumed capacity change from 100 MW to 66 MW	Remains under dispute – see Section 4.2.2.1
Capital cost assumptions	Assumes $991/kW (2020 dollars) capital cost and $8.14/kW-year fixed O&M cost for aero-CTs	Mr. Sercy (CCL/SACE) recommends using EIA assumptions – $1,139/kW (capital cost) and $15.79/kW-year (fixed O&M)	Remains under dispute – see Section 4.2.2.2
PAF	Does not propose application of a PAF	Mr. Sercy (CCL/SACE) recommends a PAF of 1.05	Remains under dispute – see Section 4.2.2.3
Solar-specific capacity rates	Proposes different capacity rates and rate structures for solar QFs and non-solar QFs	Mr. Sercy (CCL/SACE) recommends standalone solar QFs be granted eligibility for non-solar capacity rates	Remains under dispute – see Section 4.2.2.4
ELCC calculation	Proposes use of a 5% ELCC rate	Mr. Sercy (CCL/SACE) recommends DESC be required to use large datasets and rigorous ELCC methodologies in future calculations	Remains under dispute – see Section 4.2.2.4
Seasonal allocation	Allocates capacity payments for non-solar to a 3-hour winter period (6am-9am, Dec-Feb)	Mr. Sercy (CCL/SACE) recommends a 52% winter/48% summer allocation, with pricing periods of 6am – 9am (winter) and 2pm – 8pm (summer)	Remains under dispute – see Section 4.2.2.4
Reference year	Uses 2020 as the reference year	Mr. Horii (ORS) recommends using 2022 as the reference year	Resolved – DESC accepts Mr. Horii's change (*Neely rebuttal*)

Issue	DESC's initial position	Intervenor position(s)	Status
SSVM mitigation protocol			
Calculation methodology	See Section 3.1.4 for a summary of the proposed SSVM calculation	Mr. Burgess (CCEBA) recommends 4 modifications to the SSVM calculation, as discussed in Section 3.3, or using the protocol developed by Dominion for North Carolina with some modifications	Remains under dispute, although DESC stated it could update the SSVM calculation to include a forecasting provision if directed by the SC PSC (*Bell rebuttal*) – see Section 5.6.1
Revenue quality meter	Requires a separate meter to determine generation variability	Mr. Burgess (CCEBA) recommends use of the normal production meter	Not addressed in DESC rebuttal testimony – see Section 5.6.2
Deadline for submissions	Proposes a two-day deadline for data submissions	Mr. Burgess (CCEBA) recommends extending the deadline to 5 days	Not addressed in DESC rebuttal testimony – see Section 5.6.2
Two-strike provision	Proposes a two-strike disqualification for non-submission of data	Mr. Burgess (CCEBA) recommends this provision be removed	Not addressed in DESC rebuttal testimony – see Section 5.6.2
Standard Offer/Form PPA			
Cash collateral	Eliminates cash collateral as an option for providing Performance Assurance	Mr. Levitas (CCEBA) recommends this removal be rejected	Partially resolved – DESC has stated it is comfortable leaving cash collateral as an option (*Folsom rebuttal*)
Insurance requirements	Requires delivery of a certificate of insurance within 20 days of DESC's request; increases insurance limits; requires Comprehensive Automobile Liability insurance	Mr. Levitas (CCEBA) recommends the current insurance coverage levels should be maintained, and the automobile minimum coverage should be limited to $1 million	Remains under dispute – see Section 6.2.1
Form of Surety Bond	Modifies the form to conform with DESC's parent company	Mr. Levitas (CCEBA) recommends the proposed modifications be rejected and the current form maintained	Remains under dispute – see Section 6.2.2
NOC Form			
Site control	Revises language related to site control and securing permits and approvals	Mr. Levitas (CCEBA) recommends the proposed modifications be rejected	Remains under dispute – see Section 6.3
Termination	Terminates the NOC if the QF has not executed a PPA within 90 days of submitting the form	Mr. Levitas (CCEBA) recommends revised language	Resolved – DESC accepts Mr. Levitas's proposed language (*Folsom rebuttal*)

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4 Review of DESC's proposed avoided cost methodology

4.1 Overview and framework for analysis

As discussed previously, DESC uses the DRR methodology to arrive at its proposed avoided costs for non-solar and solar QFs, which have different PR-1 and Standard Offer rates. The avoided costs assessed in this section relate to separate avoided energy and avoided capacity cost components. Together, these two components can be viewed as representing the fixed costs and variable costs, respectively, that may be avoided through purchases from the relevant QFs.

As many areas of DESC's proposal are still being contested, LEI's approach in conducting its review of the Company's avoided cost methodology and structuring this section was as follows. First, LEI reviewed and summarized the approach taken by DESC to arrive at its proposed avoided costs for capacity and energy. Next, LEI assessed issues relevant to avoided costs that are under contention, laying out arguments being made by different parties from direct, rebuttal, and surrebuttal testimonies; in doing this LEI attempted to use direct quotes and limit paraphrasing to maintain the essence of the arguments being made by relevant parties. Finally, for each of the issues covered in this section, LEI provided its own opinion.

For avoided capacity costs, as discussed later in this section, LEI generally agrees with issues raised by intervenors Mr. Horii and Mr. Sercy. Specifically, LEI agrees: (i) with Mr. Horii that DESC should match the capacity change being assessed and the generating unit size; (ii) with Mr. Sercy that capital and fixed operating and maintenance costs may need to be adjusted upwards; and (iii) with Mr. Sercy that capacity costs should incorporate a performance adjustment factor. The combined impact of these changes would raise DESC's proposed avoided capacity rates from $58.81/kW-year to $81.99/kW-year, a 39.4% increase.[74]

For avoided energy costs, LEI also conducted its own analysis to arrive at estimates for avoided energy costs, deploying its proprietary electricity market dispatch model, known as POOLMod.[75] Because modeling is subject to significant uncertainty, and is the product of the assumptions used, LEI did not seek to replicate DESC's proposed numbers exactly or critique individual assumptions, but rather to determine whether values arrived at by DESC fall within a "zone of reasonableness" (discussed in the textbox on the following page) compared to values arrived at independently by LEI. Based on this approach, LEI's analysis indicates the avoided energy costs proposed by DESC fall within the zone of reasonableness developed for LEI's analysis. One important difference, however, is that LEI disagrees with the inclusion of separate rates for solar QFs (on both the energy and capacity side), viewing a technology-neutral approach regardless of resource type as more appropriate.

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[74] For reference, this value is higher than comparable avoided capacity rates being proposed by the two Duke subsidiaries, largely because DESC uses an aeroderivative CT as the reference technology, while Duke uses a frame peaker (which is cheaper on a $/kW basis).

[75] LEI used an 11-year forecast horizon, announced generation entry and exit dates, relevant fuel forecasts, prevailing regulations, and dynamic constraints consistent with modeled resources to develop a base case; then, a proportionate amount of no-cost generation was added in each year to determine the avoided energy costs.

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Price forecasting error analysis and establishing a zone of reasonableness

The US Energy Information Administration ("EIA") releases annual estimates of various energy market indicators through its Annual Energy Outlook ("AEO") publication, such as projections for fuel prices (e.g., natural gas, coal), average retail electricity prices, and energy consumption. Once every two years, the EIA also issues its AEO Retrospective Review, which compares projections from previous editions of the AEO to actuals, thus "*[informing] discussions about the underlying models*" and "*[illustrating] the uncertainty inherent in long-term projections*."

The EIA's data on price forecasting error ("PFE") from the AEO Retrospective Review provides useful insights into the variations that can be expected between projections and actual outcomes, which are driven in large part by underlying modeling assumptions. In LEI's opinion, this can be informative in thinking about what may constitute an appropriate zone of reasonableness.

LEI sampled data from 27 editions of the AEO, comparing forecasts for retail electricity prices against actuals from issues dating back as far as 1994 and as recent as 2020. LEI calculated the PFE (taken as the absolute percentage difference between projected and actual values) and averaged the error depending on the forecast horizon. As demonstrated in the table below, the PFE tends to increase the farther out the forecast extends – for example, projections looking one year out tend to demonstrate a margin of error of 4% on average, while ten-year projections demonstrate a higher margin of error of 14% on average. These PFEs serve as the basis for LEI's determination of a zone of reasonableness of +/- ~10% around LEI calculations.

Number of years forward	1	2	3	4	5	6	7	8	9	10	Average
PFE (%) in absolute terms	4%	7%	8%	10%	11%	12%	13%	14%	14%	14%	**11%**

Source: EIA. *AEO Retrospective Review – Table 15b: Average electricity prices (nominal $).* December 29, 2020.

4.2 Avoided capacity costs

4.2.1 Overview of methodology used by DESC to calculate avoided capacity costs

As described in Mr. Neely's direct testimony filed with the Commission on June 29th, 2021, DESC uses the DRR methodology to calculate its avoided capacity costs. According to Mr. Neely, the DRR approach "*follows directly from PURPA's definition of avoided costs in that it involves calculating the revenue requirements between a base case and a change case*."[76] Under the base case, "*the Company calculates the incremental capital investment related revenue required to support its resource plan, either*

[76] DESC. *Direct Testimony of James W. Neely, P.E. on behalf of Dominion Energy Services, Inc. (Docket No. 2021-88-E).* June 29, 2021. P. 6.

the [integrated resource plan ("IRP")] or another resource plan if more appropriate."[77] Under the change case, *"the Company analyzes the estimated impact that a purchase from a 100 MW facility would have on the resource plan,"*[78] which results through changes in capacity requirements, with costs being dependent on assumptions around capital costs and fixed operating and maintenance ("FOM") expenses of an aeroderivative combustion turbine ("aero-CT").

Differences between the base case and change case revenue requirements as a result of the capacity change are established in nominal annual dollar terms. With the series of nominal annual cost differences established, DESC then converts this series into annualized present value terms, by first calculating the present value of the series, and then calculating the annualized (or levelized) value that can be used as the reference for avoided capacity costs. As this annualized value is still in dollar terms, DESC then divides the dollar value by the size of the capacity change being assessed (100 MW) to establish avoided capacity costs in $/kW-year terms. Using this approach, the annual avoided capacity cost being proposed by DESC is $58.81/kW-year.

This annual avoided capacity value of $58.81/kW-year is used as the basis for determining rates for both non-solar QFs and solar QFs, although different processes are used to arrive at separate volumetric ($/kWh) rates for non-solar QFs and solar QFs. Avoided capacity rates for PR-1 and Standard Offer do not differ.

For non-solar QFs, rates are established using the annual avoided capacity value of $58.81/kW-year and the time periods where DESC perceives a capacity need. According to DESC, avoided capacity rates will be paid during the months of December, January, and February, between the hours of 6am and 9am. Using this approach, non-solar QFs would be paid for energy generated during a 270-hour period annually, resulting in avoided capacity rates for non-solar QFs of $0.21781/kWh (i.e., $58.81/kW-year divided by 270 hours).

For solar QFs, rates are established using the annual avoided capacity value of $58.81/kW-year, and the Effective Load Carrying Capacity ("ELCC") rate. According to Mr. Neely, incremental solar QFs relevant to this assessment have a 5% ELCC rate.[79] Multiplying the annual avoided capacity value of $58.81/kW-year by the ELCC provides the annual avoided capacity value used for solar QFs of $2.9405/kW-year. Capacity values are paid out for all hours of generation, with the volumetric rate based on a solar capacity factor of 23.9%. Using this approach, the volumetric rate for solar QFs is $0.00140/kWh; this value is arrived at by dividing the annual avoided capacity value used for solar QFs by the number of hours in a year (8,760) multiplied by a solar capacity factor of 23.9%.

[77] Ibid. P. 7.

[78] Ibid. P. 7.

[79] DESC. *Exhibit No. JWN-1 (Docket No. 2021-88-E).* June 29, 2021.

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4.2.2 Overview of outstanding issues raised by intervenors

Upon review of the issues raised by intervenors, the subsections below discuss aspects from DESC's application and testimony relevant to the avoided capacity costs and resulting rates that remain under dispute.

4.2.2.1 Mismatch between capacity change and generating unit size

One main issue with the approach being used by DESC relates to the mismatch between capacity changes being assessed. As described by Mr. Neely, the change case assesses the estimated impact that a 100 MW facility would have on the resource plan.[80] Accordingly, 100 MW of avoided capacity is analyzed in the change case, and 100 MW is also used to convert the annual avoided capacity values from dollar terms to $/kW-year terms (i.e., dividing the resulting avoided capacity values in dollar terms by 100 MW).

However, as discussed by Mr. Horii in his direct testimony, this 100 MW capacity change is modeled as being met with 66 MW generators, which leads to a "*mismatch in generator sizes and biases the avoided capacity cost downward*."[81] To reconcile this, Mr. Horii recommends matching the size of the capacity change and the generator – by either scaling down the capacity change to 66 MW or scaling up the generator size to 100 MW. According to Mr. Horii, in the 2019 avoided cost proceeding, "*the Commission adopted the recommendation from ORS to set the Change Case capacity change at the same size as the new modeled new generation.*"[82]

In his rebuttal testimony, Mr. Neely disagreed with Mr. Horii, stating that the use of a 100 MW capacity change is (i) consistent with the Company's capacity change used in the calculation of avoided energy costs; (ii) more reflective of the MW change that the Company could expect it "*would be required to purchase from QFs over the next two years*";[83] and (iii) that "*PURPA specifically provides that a utility may use a capacity change of up to 100 MW to calculate avoided costs*."[84]

In his surrebuttal, Mr. Horii responded that he did not find Mr. Neely's reasons (listed above) compelling. Specifically, Mr. Horii stated that: (i) maintaining consistency between the MW being changed when calculating avoided energy and capacity costs is not necessary, as they are based on completely independent models; (ii) Mr. Neely's point that a 100 MW capacity change is more reflective of the MW change that the Company could expect to purchase from QFs over the next two years is not a compelling justification; and (iii) that PURPA allows **up to** 100 MW to be used to calculate avoided costs, and does not mandate that 100 MW must be used. Mr. Horii also

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[80] DESC. *Direct Testimony of James W. Neely, P.E. on behalf of Dominion Energy Services, Inc. (Docket No. 2021-88-E).* June 29, 2021. P. 7.

[81] ORS. *Revised Direct Testimony and Exhibit of Brian Horii on behalf of the South Carolina Office of Regulatory Staff (Docket No. 2021-88-E).* August 23, 2021. P. 21.

[82] Ibid. P. 22.

[83] DESC. *Rebuttal Testimony of James W. Neely, P.E. on behalf of Dominion Energy Services, Inc. (Docket No. 2021-88-E).* August 10, 2021. P. 3.

[84] Ibid. P. 3.

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reiterated that it is "*important to recall that this Commission required the Company to use the assumed size of a new generating unit in its analysis of avoided capacity costs in Commission Order No. 2019-847.*"[85]

While not mentioned in Mr. Horii's surrebuttal, LEI believes it is worth noting again that although Mr. Horii's direct testimony recommended a 66 MW capacity change be used to ensure consistency with DESC's modeled capacity of the CT generators, he also provided an alternative whereby DESC could maintain the capacity change at 100 MW and assume a CT plant with a hypothetical 100 MW of capacity. Under this alternative approach, Mr. Neely's stated areas of disagreement in his rebuttal testimony would be alleviated.

LEI's opinion on matching capacity changes being assessed

LEI agrees with Mr. Horii. Mr. Neely's rebuttal rational does not address the main issue with this approach. On the one hand, the Company is **modeling the impact of a 100 MW capacity change**, while on the other hand this need is being met by 66 MW generators. Because of this, **capacity increments of 66 MW are being used to determine the avoided capacity values** in dollar terms. Once these avoided capacity values in dollar terms are established, and their net present value is determined and levelized, this **dollar value is then divided by 100 MW** to convert it to $/kW-year terms, which establishes the avoided capacity costs used to determine the avoided capacity rates. Therefore, the current approach used by DESC underestimates the value of capacity, and the size of the capacity change and the size of the generator should be set equal to one another to correct this mismatch.

Correcting this mismatch by either adjusting the size of the capacity change down to 66 MW, or the size of the generator up to 100 MW, would **increase avoided capacity rates for non-solar QFs and solar QFs by 16.7%**.

4.2.2.2 Cost assumptions for aero-CTs

A second issue, as raised by Mr. Sercy in his direct testimony, relates to the capital cost and FOM cost input assumptions used by DESC in its calculation of the avoided capacity costs. These assumptions are a key driver of the resulting avoided capacity rates, and according to Mr. Sercy are "*unreasonably low*" and "*compromises the goal of fully and accurately reflecting DESC's avoided costs.*"[86] As an alternative, Mr. Sercy recommends using data contained in the EIA's AEO, which provides an assessment of costs to develop and install various generating technologies including aero-CTs. As stated by Mr. Sercy, "*in Order No. 2020-832 in DESC's IRP proceeding, the Commission rejected DESC's proposed assumption for combustion turbine capital costs in favor of using a respected public industry data source, in that case the National Renewable Energy Lab's Annual*

[85] ORS. *Surrebuttal Testimony of Brian Horii on behalf of the South Carolina Office of Regulatory Staff (Docket No. 2021-88-E).* August 16, 2021. P. 5.

[86] CCL and SACE. *Direct Testimony of Kenneth Sercy on behalf of the Southern Alliance for Clean Energy and the South Carolina Coastal Conservation League (Docket No. 2021-88-E).* July 27, 2021. P. 18.

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Technology Baseline."[87] Since the Annual Technology Baseline does not include cost assumptions for aero-CTs, Mr. Sercy recommends using the EIA as "*a similar and highly credible public reference source*."[88]

In response to this, Mr. Neely's rebuttal testimony stated that the "*aero-CT costs used came from the interactions with turbine vendors and accurately reflect the costs that DESC would have to pay for the turbine being modeled*."[89] Mr. Neely further stated that "*to use a generic cost is not appropriate when actual cost data is available*," and that "*modeling costs that are higher actual costs would penalize the utility's customers and not accurately reflect the utility's avoided cost*."[90] DESC provided additional context on this topic in response to a DR submitted by LEI, including that: the cost assumptions reflect price discovery information from the Dominion Energy Construction Projects team's regular discussions with vendors "*concerning pricing, availability, technology advances, and additional specifications*" for multiple technologies including aero-CTs; that DESC issued an RFP in addition to this information concerning its peaking generation replacement plan which helped inform aero-CT cost assumptions, with the RFP receiving multiple responses for different aero-CT installations; and that an associated Excel file from DESC contained detailed build-ups to the relevant cost components.[91]

In his surrebuttal, Mr. Sercy reiterated that "*respected public data sources are a reliable and more transparent information source than non-public vendor statements*" and that "*this Commission has rejected cost assumptions based on vendor information in favor of credible public datasets supplying generic technology costs*."[92]

For reference, Figure 7 below shows the specific capital cost and FOM input assumptions used by DESC and compares them against information contained in the EIA's 2021 AEO. These values differ slightly from those shown by Mr. Sercy in his direct testimony, which instead referenced data from a previous issue, namely the EIA's 2020 AEO. Values are shown in 2020 dollar terms, with capital cost assumptions from the EIA reflecting the SERC Reliability Corporation/East ("SRCA") subregion (consisting of South Carolina and most of North Carolina). As FOM costs provided by EIA are generic, LEI applied the same regional adjustment factor to arrive at implied SRCA subregional FOM costs. As shown in the figure, cost assumptions from the EIA's 2021 AEO are slightly higher for capital costs, by around 8%, while FOM costs are around 84% higher.

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[87] Ibid. P. 20-21.

[88] Ibid. P. 21.

[89] DESC. *Rebuttal Testimony of James W. Neely, P.E. on behalf of Dominion Energy Services, Inc. (Docket No. 2021-88-E).* August 10, 2021. P. 16.

[90] P. 16-17.

[91] DESC response to LEI DR in Docket No. 2021-88-E. September 14, 2021.

[92] CCL and SACE. *Corrected Surrebuttal Testimony of Kenneth Sercy on behalf of the Southern Alliance for Clean Energy and the South Carolina Coastal Conservation League (Docket No. 2021-88-E).* August 23, 2021. P. 16.

For reference, Figure 8 shows the illustrative impacts on avoided capacity costs from changes to each of these two cost inputs, along with the total impact from making changes to both. In total, adjusting both cost inputs would increase DESC's proposed avoided capacity rates by 13.9%.

Figure 7. Comparison of DESC assumptions versus EIA's 2021 AEO for aero-CT

Item	DESC assumptions	EIA's 2021 AEO	% difference (EIA vs. DESC)
Capital costs (2020 $/kW)	$991	$1,071	8.1%
FOM (2020 $/kW-year)	$8.14	$15.01	84.4%

Sources: LEI analysis based on: CCL and SACE. *Corrected Surrebuttal Testimony of Kenneth Sercy on behalf of the Southern Alliance for Clean Energy and the South Carolina Coastal Conservation League (Docket No. 2021-88-E).* August 23, 2021. P. 20; EIA. *Cost and Performance Characteristics of New Generating Technologies, Annual Energy Outlook 2021*. February 2021.

Figure 8. Illustrative impact of using EIA data as inputs in DESC's avoided capacity cost model

Impact of using cost inputs from:		Avoided capacity costs ($/kW-year)	Non-solar QF avoided capacity cost	Solar QF avoided capacity cost	% difference (from DESC proposed)
Capital costs	FOM				
DESC	**DESC**	$58.81	$0.21781	$0.00140	0.0%
EIA 2021 AEO	**DESC**	$63.13	$0.23380	$0.00151	7.3%
DESC	**EIA 2021 AEO**	$62.66	$0.23209	$0.00150	6.6%
EIA 2021 AEO	**EIA 2021 AEO**	$66.98	$0.24806	$0.00160	13.9%

Source: LEI analysis based on adjustments to DESC's "*Capacity Cost Base v Change -AEROCT_10_66MW.xlsx*" file.

LEI's opinion on cost assumptions for aero-CTs

Based on a review of the information submitted by DESC, it appears the capital cost and FOM assumptions being applied for avoided cost calculations represent those associated with a 131 MW generator addition (i.e., two 66 MW turbines), rather than a 66 MW generator addition (one 66 MW turbine), for which DESC also has cost data. When assessing the data submitted by DESC for a 66 MW generator addition against EIA data for an aero-CT (which represents 105 MW of capacity), costs for the 66 MW generator are higher and would therefore result in higher avoided capacity rates (by around 20%, as compared to using EIA data where avoided capacity rates were higher by 13.9%). This highlights the importance of scale in establishing lower costs for new-build generation and indicates that the EIA estimates for aero-CTs fall within the range of DESC's inputs when considering generating capacity.

In LEI's view, as the **EIA's cost assumptions** for an aero-CT addition are closest to the 100 MW being assessed, they **serve as the best source for avoided capacity cost calculations**.

4.2.2.3 Inclusion of a performance adjustment factor

The third issue, as raised by Mr. Sercy in his direct testimony, centers around upward adjustments to the avoided capacity costs to account for resource unavailability. Specifically, Mr. Sercy's issue is that utility-owned resources receive compensation for periods of unplanned (or

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forced) outages, while under the current construct, avoided capacity payments do not compensate QFs during similar periods of outages. As stated by Mr. Sercy, "*in order to treat QFs on a fair and equal footing with utility-owned resources, QFs should be compensated in such a way that allows for a level of unavailability that is reasonably comparable to the level of unavailability of utility-owned resources*."[93] Accordingly, the application of a performance adjustment factor ("PAF"), which can be based on a utility's own generator forced outage rate, "*within the avoided capacity rate calculations would accomplish this goal*."[94] With this in mind, Mr. Sercy recommended that DESC use a 1.05 PAF in its avoided capacity cost calculations, based on the PAF approved by the Commission in Duke's 2019 avoided cost proceeding, where the Commission found that "*the performance adjustment factor capacity payment multiplier proposed by Duke is reasonable and supports Act 62's objective of placing QF generators and utility generators on equal footing in terms of reasonable allowance for unplanned outages*."[95]

In his rebuttal testimony, Mr. Neely replied that the current approach taken be DESC, where QFs would "*only be compensated at the full avoided capacity rate if they generate during all avoided capacity payment hours*" is appropriate, and that "*any other way of paying for capacity would cause DESC's customers to pay for something they did not receive,*" which would "*be in direct conflict with the requirements of Act No. 62*."[96] Mr. Neely further stated that "*construction costs and fixed O&M is sufficient to estimate system capacity value*" and that a "*PAF that artificially inflates capacity values is not needed or appropriate*."[97]

In his surrebuttal, Mr. Sercy reiterated his recommendation, stating that Mr. Neely did not "*address the fact that utility-owned generating units are fully compensated for capacity provisions to the system even if they do not generate during all hours of greatest capacity need,*" and that the inclusion of a "*PAF in calculating avoided capacity costs puts QFs on equal footing with those utility-owned resources, as required by Act 62, by making a minor adjustment to avoided capacity costs that allows a comparable level of unavailability on the part of the QF, while still receiving full capacity payment, just as DESC's assets receive*."[98]

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[93] CCL and SACE. *Direct Testimony of Kenneth Sercy on behalf of the Southern Alliance for Clean Energy and the South Carolina Coastal Conservation League (Docket No. 2021-88-E).* July 27, 2021. P. 18-19.

[94] Ibid. P. 19.

[95] Commission Order No. 2019-881(A) at 30, Docket Nos. 2019-185-E, 2019-186-E (Jan. 2, 2020).

[96] DESC. *Rebuttal Testimony of James W. Neely, P.E. on behalf of Dominion Energy Services, Inc. (Docket No. 2021-88-E).* August 10, 2021. P. 14-15.

[97] Ibid. P. 16.

[98] CCL and SACE. *Corrected Surrebuttal Testimony of Kenneth Sercy on behalf of the Southern Alliance for Clean Energy and the South Carolina Coastal Conservation League (Docket No. 2021-88-E).* August 23, 2021. P. 15-16.

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LEI's opinion on the application of a PAF

LEI agrees with Mr. Sercy's point and recommendation that a PAF be included in calculating avoided capacity costs, and that doing so would put QFs on a more equal footing with utility-owned resources, as DESC's resources are compensated for periods of unavailability relevant to this PAF issue, while under the proposed structure QFs would not be compensated. The PAF should not be viewed as an artificial inflation, but an adjustment that leads to a more accurate depiction of the costs for capacity under an understanding that a level of outages consistent with a generic CT is expected.

In subsequent proceedings, LEI recommends DESC use a PAF developed from availability factors of its own fleet. Without such information, LEI would agree with Mr. Sercy's recommendation that a PAF of 1.05 be used, based on the PAF included in Duke's 2019 avoided cost proceeding, which is consistent with the outage rates for peaking plants. Applying this PAF as an upward adjustment to capital and FOM costs would increase DESC's proposed avoided capacity rates by 5%.

4.2.2.4 Technology neutrality and seasonal allocations

This section discusses other issues raised by Mr. Sercy in his direct testimony related to technology neutrality and seasonal allocation, which LEI views as relatable issues and has therefore combined. Specifically, on the technology neutrality front, LEI's understanding of Mr. Sercy's overarching point is that "*solar QFs should be deemed eligible for the technology-neutral [non-solar QF] capacity rate*"[99] (although he may not be recommending an elimination of the solar QF rate specifically). On the issue of seasonal allocation, which relates specifically to non-solar QF avoided capacity cost allocation, Mr. Sercy claims that DESC's proposed rates "*also suffer from serious flaws*" by only allocating capacity values between a 6 a.m. to 9 a.m. window over three winter months (December, January, and February).[100] On this issue, Mr. Sercy noted that given "*DESC has experienced more summer peaks in the last decade than winter peaks, assigning all 3 capacity value to winter hours is questionable.*"[101] As an alternative, Mr. Sercy recommended based on his own analysis to instead use a 52% winter/48% summer allocation, with the winter period covering January and February from 6:00 a.m. to 9:00 a.m., and the summer period covering June to August from 2:00 p.m. to 8:00 p.m.[102]

In response to the seasonal allocation issue, Mr. Neely in his rebuttal testimony noted his issues with Mr. Sercy's analysis to establish the alternative allocations, including that Mr. Sercy "*failed to factor into his assumptions the difference in reserve margin requirements between summer and winter on the DESC system*"; accounting for this plus summer solar capacity would mean "*all of the need*

[99] CCL and SACE. *Direct Testimony of Kenneth Sercy on behalf of the Southern Alliance for Clean Energy and the South Carolina Coastal Conservation League* (Docket No. 2021-88-E). July 27, 2021. P. 32.

[100] Ibid. P. 27.

[101] Ibid. P. 28.

[102] Ibid. P. 29 - 30.

for additional capacity is driven by winter demand" and that "*additional summer capacity does not avoid any future capacity costs*", justifying an allocation structure for capacity credits "*that can help meet winter peaks*."[103]

In his surrebuttal, Mr. Sercy reiterated his concerns with DESC's approach and data used to substantiate its 100% winter allocation, including that DESC's data showed the appropriateness of the 6:00 a.m. to 9:00 a.m. window for capacity allocation in the winter season, but that it did not provide information on how capacity should be allocated seasonally (i.e., winter versus summer). Mr. Sercy noted that "*despite the seasonal reserve margin differences and the level of existing solar on DESC's system, DESC's own calculations – which account for both the differing summer and winter reserve margins and the existing solar on the system – show that the DESC system has both a summer and a winter capacity need at the same time*" and that "*DESC's 100% winter season capacity allocation is at odds with the load patterns on its system*" as it "*has experienced more summer peaks than winter peaks in recent years*."[104]

LEI's opinion on technology neutrality and seasonal allocation of avoided capacity rates

On the issue of technology neutrality, **LEI recommends the use of a single avoided capacity rate**, as a resource's capability to deliver capacity when required should determine its payment regardless of technology type. Technology neutrality avoids having different avoided costs for the same hour, provides clear price signals, and assures values are assigned appropriately when considering costs avoided from a utility's perspective. As LEI is recommending a technology-neutral avoided capacity rates (i.e., no solar-specific capacity rates), LEI does not view the ELCC issue as relevant, because resources only receive the rate if they generate in the specified periods.

On the issue of seasonal allocation, LEI reviewed available DESC models and excel files relevant to the avoided capacity calculation. Upon this review it appears that, as DESC notes, winter reserve margin requirements are driving differentiation in the avoided cost change case.

(continued…)

[103] DESC. *Rebuttal Testimony of James W. Neely, P.E. on behalf of Dominion Energy Services, Inc.* (Docket No. 2021-88-E). August 10, 2021. P. 25.

[104] CCL and SACE. *Corrected Surrebuttal Testimony of Kenneth Sercy on behalf of the Southern Alliance for Clean Energy and the South Carolina Coastal Conservation League* (Docket No. 2021-88-E). July 27, 2021. P. 19.

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Outside of this, as historical data shared by DESC that LEI reviewed lacked information on peak demand or reserve margin trends for months other than December to February, LEI could not substantiate the importance of summer capacity value. As DESC notes, peak demand is only one factor in determining capacity needs, with other factors such as supply (notably, higher capacity from solar in summer months), as well as reserve margin requirements also being important considerations. Nevertheless, as it is possible DESC's capacity allocation window may be overly narrow seasonally, LEI would recommend that going forward DESC assess the value of summer capacity, and provide more clarity and data substantiation on why it believes summer capacity has little to no value should it reach that conclusion.

4.2.2.5 Overall impact of proposed changes on avoided capacity rates

The overall impact of the changes discussed in Sections 4.2.2.1 to 4.2.2.3 on avoided capacity rates in $/kW-year terms is summarized in Figure 9 below. The impact of each change is shown individually, followed by the total impact of all three changes combined.

Figure 9. Summary of impact from proposed changes on avoided capacity rates ($/kW-year)

Impact of change to:	Capacity cost ($/kW-year)	% impact
No change - avoided capacity cost proposed by DESC	$ 58.81	
Matching capacity change and generating unit size	$ 68.61	16.7%
Using EIA-based cost assumptions for aero-CT	$ 66.98	13.9%
Inclusion of a 1.05 PAF	$ 61.75	5.0%
Impact of all three changes	**$ 81.99**	**39.4%**

Source: LEI analysis based on making adjustments to DESC's "*Capacity Cost Base v Change -AEROCT_10_66MW.xlsx*" file.

4.3 Avoided energy costs

4.3.1 Overview of methodology used by DESC for avoided energy costs

As with avoided capacity costs, DESC uses the DRR methodology to calculate avoided energy costs. Production cost simulation modeling is deployed to estimate these costs. At a high level, production cost modeling can be described as a simulation of energy prices ($/MWh) on an hourly basis, based on generating resource commitment under modeled supply and demand conditions; hourly energy prices are set by the "marginal" clearing unit, or the highest-priced generating resource that is dispatched. DESC uses the PLEXOS simulation model to perform production cost modeling for two cases over the forecast horizon.

For the two cases, DESC first establishes a base case that uses "*DESC's existing and future fleet of generators and the hourly load profile to be served by these generators, as well as the solar facilities with which DESC has executed a power purchase agreement*"; the change case "*is the same as the base case except that a zero-cost purchase transaction modeled after the appropriate 100 MW energy profile is*

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assumed."[105] The difference between the change case versus base case production costs in the PLEXOS outputs provides the avoided energy cost, by converting the resulting difference to $/MWh terms (dividing the savings by the output of the 100 MW unit). These values are in nominal dollar terms over the timeframes being assessed.

For the forecast horizon, two time periods are assessed. The **short-term period** (May 2021 to April 2022) is used to establish avoided energy costs for PR-1 rates. To establish avoided energy costs for Standard Offer rates, a **long-term period** (2022 to 2031) is used, which is broken down into two five-year groupings (2022 to 2026 and 2027 to 2031).

The approach to modeling for solar and non-solar QFs is similar, with one important distinction related to the assumed energy profiles. For **non-solar QFs**, the 100 MW change is assumed to provide a 100% load factor (or, as described by Mr. Neely, the "*change case for non-solar QFs is derived from the base case by subtracting a 100 MW round-the-clock power purchase profile*").[106] **For solar QFs**, the 100 MW change is assumed to provide an output based on a solar profile, with an average load factor of around 23% (or, as described by Mr. Neely, the "*the change case for solar QFs is calculated by subtracting from the base case a 100 MW power purchase modeled after a solar profile*").[107]

The PLEXOS-based simulation provides the nominal avoided energy cost estimates (in $/MWh) for both solar and non-solar QFs over the short-term period and the long-term period. For non-solar QFs, the resulting nominal annual avoided energy cost estimates are then divided into time-of-production periods, which provide differentiation within years depending on the hour of day and season. In contrast, for solar QFs, a single avoided energy estimate is used (i.e., the same rate regardless of hour or season).

After division of the nominal avoided energy cost estimates into their relevant time-of-production periods, a series of adjustments are made that provide the avoided energy costs used for PR-1 and Standard Offer rates for solar and non-solar QFs. As mentioned previously, Standard Offer rates (long-term) are divided into two five-year groupings (2022 to 2026 and 2027 to 2031), and the nominal avoided energy costs for each of these two grouping are levelized (by establishing the present value of the nominal avoided energy costs and annuitizing this value) for both solar and non-solar QFs. Because PR-1 rates (short-term) only cover a one-year period, no levelization is required. Finally, these PR-1 and Standard Offer rates are adjusted to account for working capital, gross receipts taxes, generation taxes, and line losses (with line losses differing for PR-1 and Standard Offer rates as PR-1 rates are calculated at the distribution level). Making these final adjustments provides the avoided energy rates proposed by DESC. The full lists of avoided energy cost rates are shown previously in Figure 2 (for PR-1 solar and non-solar QFs) and Figure 3 (for Standard Offer solar and non-solar QFs).

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[105] DESC. *Direct Testimony of James W. Neely, P.E. on behalf of Dominion Energy Services, Inc. (Docket No. 2021-88-E).* June 29, 2021. P. 6.

[106] Ibid. P. 8.

[107] Ibid. P. 8.

A summary table listing these key differences between establishing PR-1 and Standard Offer rates is provided in Figure 10 below.

Figure 10. Summary of key differences in approach to establishing different energy rates

Rate	QF	Change case reflects	Time period being assessed	Time-of-production periods
PR-1	**Non-solar**	100 MW at 100% load factor	May 2021 - April 2022	4 time of production periods
Standard Offer	**Non-solar**		2022 - 2031, divided into 5-year rate periods (2022-2026 and 2027-2031)	11 time of production periods
PR-1	**Solar**	100 MW using solar profile (~23% load factor)	May 2021 - April 2022	One rate without differentiation
Standard Offer	**Solar**		2022 - 2031, divided into 5-year rate periods (2022-2026 and 2027-2031)	

4.3.2 Summary of results from LEI's avoided energy cost analysis

LEI conducted an independent avoided energy cost analysis using its proprietary simulation model POOLMod, which is presented in Appendix A (Section 8). Consistent with the production cost modeling forecasting horizons assessed by DESC, LEI forecasted both a short-term period (May 2021 to April 2022) and a long-term period (2022 to 2031) under two cases, a "base case" and an "alternative case," which simply adds hypothetical no-cost generation to the base case. LEI's base case is based on outlooks for demand and supply conditions (notably announced generation entry and exit dates), fuel costs, prevailing regulations, and a set of dynamic constraints. A summary comparison of key assumptions used by LEI and DESC is provided in Figure 11 below. One notable difference in LEI's approach is that, because LEI's market topology for the region that encompasses DESC's service territory includes other entities, the size of the hypothetical unit in the "alternative case" was increased proportionally to account for modeling these additional entities.

Overall, LEI results were around 6% lower than results from DESC's PLEXOS modeling for PR-1 non-solar, around 3% higher than results from DESC's PLEXOS modeling for Standard Offer non-solar for the first 5-year period (2022-2026), and around 5% lower than results from DESC's PLEXOS modeling for Standard Offer non-solar for the second 5-year period (2027-2031). Based on this, LEI views results from its modeling as demonstrating that DESC's proposals fall within an acceptable zone of reasonableness. As LEI does not agree with having separate energy rates for solar resources (discussed later in Section 4.3.3.3), it has not performed similar detailed analysis for solar QF rates.

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Figure 11. Summary of key assumptions used by LEI and DESC

Assumption	DESC	LEI
Gas prices	Henry Hub gas prices commencing ~$2.9/MMBtu in 2021, increasing to ~$3.5/MMBtu in 2031, growing at a compound annual growth rate ("CAGR") of ~2%	Transco Zone 5 gas prices commencing ~$3.1/MMBtu in 2021, increasing to ~$4.4/MMBtu in 2031, growing at a CAGR of ~3.6%
Load growth	Peak demand grows at a CAGR of 0.4% over 2021-2031 timeframe, energy consumption grows at CAGR of 0.3%	Peak demand and energy consumption grows at CAGRs of 0.5% over 2021-2031 timeframe
Supply	Winter capacity of ~5.9 GW. Additions of ~1.4 GW between 2022 and 2031, mostly gas CC and CT. Retirements of ~2.1 GW, mostly coal	Nameplate capacity of ~53 GW (includes but not limited to DESC territory). Additions of ~16.3 GW between 2022 and 2031, mostly CT, solar, and storage. Retirements of ~10.3 GW, mostly coal

Notes: Gas prices and load growth assumptions are based on information from DESC DR responses; supply assumptions are from DESC's 2020 Modified IRP for Resource Plan 8.

Sources: LEI analysis based on Sercy and Neely filings, and DESC's 2020 Modified IRP.

LEI's opinion of DESC's approach to calculating avoided energy costs

Based on a review of DESC's approach to calculating avoided energy costs and rates**, LEI believes the methodology and resulting avoided energy costs for non-solar QFs are reasonable.** In general, LEI agrees with the use of production cost modeling, and allocation of avoided costs based on value according to expected periods of peak hours and seasons. While assumptions used in the modeling differ between DESC and LEI, and LEI's modeling consists of a region that includes but is not limited to DESC's service territory, LEI believes the results arrived at by DESC for avoided energy are within an acceptable zone of reasonableness as compared to LEI's results. LEI **disagrees with the use of separate rates for solar QFs, viewing a technology-neutral approach for all resources as more appropriate**.

4.3.3 Overview of outstanding issues raised by intervenors

Upon review of the issues raised by intervenors, the subsections below discuss aspects from DESC's application and testimony relevant to the avoided energy costs and resulting rates that remain under dispute.

4.3.3.1 Natural gas price forecast

One issue, raised by Mr. Sercy in his direct testimony, relates to the approach taken by DESC to arrive at its natural gas price assumptions, a key input in production cost modeling. Mr. Sercy argues DESC's approach leads to "*unreasonably low*" natural gas price assumptions and

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contributes to "*an underestimation*" of costs avoided by QFs. According to Mr. Sercy, DESC "*used a methodology for forecasting natural gas prices that this Commission recently rejected in Order No. 2020-832*."[108] Specifically, the issue according to Mr. Sercy is that DESC uses three years of natural gas futures prices from NYMEX, after which prices are escalated by 3.959% "*based on EIA AEO reference case gas price forecast*," instead of using the EIA AEO's 2021 gas price outlook directly, which the Commission ruled that DESC must do in Order No. 2020-832 (from Docket No. 2019-226-E – i.e., DESC's 2020 IRP proceeding).[109] As an alternative, Mr. Sercy recommended using: NYMEX futures for 2021; the midpoint between NYMEX and the EIA AEO's Reference Case outlook for 2022; and the EIA AEO's Reference Case outlook exclusively for 2023 to 2031. According to Mr. Sercy, this blended approach "*achieves an appropriate balance between short-term futures market indicators and long-term gas supply and demand dynamics*" and "*is also consistent with previous Commission orders*."[110]

In his rebuttal testimony, Mr. Neely replied that DESC "*used the best available and most appropriate information and projections in calculating its avoided costs*," and that Mr. Sercy's recommended approach would not "*lead to more accurate gas price forecasts for this proceeding*."[111] Specifically, in Mr. Neely's view, "*it is necessary to derive the most accurate projection that can be ascertained at the time the costs are calculated*," and that "*although using EIA's AEO forecast of gas prices may be appropriate for scenario analysis such as that developed in the IRP, use of those forecasts is not appropriate or required in this proceeding because a prudent and reliable avoided costs calculation requires a more accurate forecast than that provided by the any of the three that EIA calculates once a year*."[112] Additionally, Mr. Neely notes that as the EIA's AEO contains numerous gas price outlooks, it "*does not provide a single forecast and instead provides a broad and wide range of how prices might develop depending on the development of numerous factors*."[113] Overall, Mr. Neely stated that the forecast used by DESC compares "*very favorably*" to the EIA AEO outlooks, "*demonstrating that it is a prudent and reasonable forecast within the very wide parameters identified by the EIA*," and that the "*gas forecast used by DESC better represents the expected gas prices at the time of the avoided cost calculation because it is created based on current factors, whereas the EIA AEO projections are determined once a year and market characteristics may have changed between the time those projections were made and the calculation of DESC's avoided costs*."[114]

In reply, Mr. Sercy reiterated in his surrebuttal that "*DESC will not experience different natural gas prices in the context of avoided costs than it will in the context of integrated resource planning, … and the same Commission-approved methodology should be used consistently across these dockets*" and that his

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[108] CCL and SACE. *Direct Testimony of Kenneth Sercy on behalf of the Southern Alliance for Clean Energy and the South Carolina Coastal Conservation League (Docket No. 2021-88-E).* July 27, 2021. P. 7.

[109] Ibid. P. 7-8.

[110] Ibid. P. 8.

[111] DESC. *Rebuttal Testimony of James W. Neely, P.E. on behalf of Dominion Energy Services, Inc. (Docket No. 2021-88-E).* August 10, 2021. P. 4-5.

[112] Ibid. P. 5.

[113] Ibid. P. 5.

[114] Ibid. P. 6.

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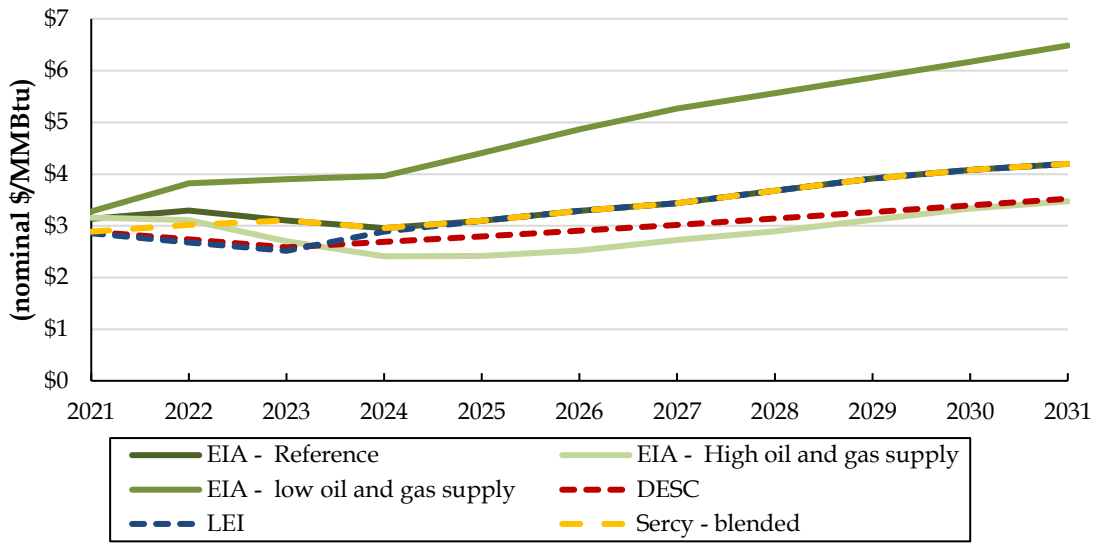
recommended blended approach "*is more reliable as a means of calculating avoided energy costs when compared with DESC's methodology*."[115] Further, Mr. Sercy stated that "*while the AEO as a whole does provide a broad and wide range of how prices might develop, the reference case is a reasonable price benchmark to use for avoided cost calculations,*" and that for "*several reasons, the EIA AEO reference case is an appropriate natural gas forecast to use directly for avoided cost calculations, as part of the blended approach that I recommend, and not only for the escalation rate*."[116] Reasons listed by Mr. Sercy include: (i) that "*the EIA AEO reference case accounts for persistent supply and demand factors that actually drive long-term prices, resulting in a more reliable forecast for avoided cost purposes*," while DESC's approach effectively carries short-term price effects through the entirety of the forecast, producing an unreliable forecast; (ii) that his recommend blended approach "*more appropriately balances short-term futures market indicators and long-term gas supply and demand dynamics*"; and (iii) that "*major long-term market supply and demand shifts are unlikely to occur in short timeframes, and any incremental changes that do occur will be captured when avoided cost calculations are reset biannually as required by Act 62.*"[117]

Figure 12. Gas price outlooks over 2021 – 2031 timeframe (nominal $/MMBtu)



Note: LEI and Sercy lines converge to 'EIA – Reference' in 2024 and 2023 respectively.

Sources: LEI analysis; DESC's "*DESC 2021 AC Gas prices*" excel file; EIA 2021 AEO data.

For reference, the various gas prices being discussed over the 2021 to 2031 timeframe are provided in Figure 12 below. Gas prices being used by DESC are shown in the red dotted line, while the blended gas prices recommended by Mr. Sercy are shown in the orange dotted line. Also included in the green lines are the EIA AEO reference case outlook from 2021, along with the AEO's highest

[115] CCL and SACE. *Corrected Surrebuttal Testimony of Kenneth Sercy on behalf of the Southern Alliance for Clean Energy and the South Carolina Coastal Conservation League (Docket No. 2021-88-E).* August 23, 2021. P. 2.

[116] Ibid. P. 3.

[117] Ibid. P. 3-4.

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and lower gas price cases (which represent low and high oil and gas supply cases, respectively). Finally, for additional context, also included in the blue dotted line are the gas prices LEI used in its avoided energy modeling.

LEI's opinion on DESC's approach to establishing its gas price outlook

In the short term, LEI agrees with DESC that natural gas price futures represent the best estimate for costs at any one time, and that relying on natural gas futures for a three-year forward period is appropriate and sufficiently liquid. Beyond three years, with reduced liquidity, alternative approaches are required. The approach LEI takes for establishing a longer-term gas price outlook aligns with the approach recommended by Mr. Sercy, in that the EIA AEO's 2021 Reference Case outlook was used, rather than an application of Reference Case outlook growth rates on gas price futures data.

However, different approaches and outlooks can be equally defensible, and the approach taken by DESC (i.e., using the EIA AEO's Reference Case growth rates, rather than the dollar values themselves) is in line with approaches taken by LEI in the past to establish longer-term gas price outlooks when it felt AEO Reference Case numbers were inconsistent with market conditions. While it is possible to defend either position, given that DESC's gas price outlook falls within the range of the various cases provided in the EIA's 2021 AEO, **LEI views the price outlook used be DESC as within a reasonable range of potential outcomes**.

4.3.3.2 Standard Offer non-solar energy pricing periods

A second issue raised by Mr. Sercy in his direct testimony relates to the approach used by DESC to establish the 11 distinct pricing periods for its proposed Standard Offer energy rates for non-solar QFs. According to Mr. Sercy, "*it is not possible to determine whether DESC's pricing periods align with DESC's system costs based on DESC's filings*" as, in his opinion, "*DESC did not provide adequate support for its pricing periods in its application and testimony to allow for independent review and verification of the underlying assumptions, data, and results*."[118] Mr. Sercy reiterated his concerns in his surrebuttal testimony, stating that "*neither witness [Neely nor Bell] provided any substantive justification for the criteria DESC used to group hours and months into pricing periods,*" and that "*DESC's method of grouping hours and months together into pricing periods appears to have been highly subjective*." [119] In his surrebuttal, Mr. Sercy elaborated on his recommendations for a "*data-driven approach to grouping hours and months into pricing periods*" which he recommended DESC should use.[120]

[118] CCL and SACE. *Direct Testimony of Kenneth Sercy on behalf of the Southern Alliance for Clean Energy and the South Carolina Coastal Conservation League (Docket No. 2021-88-E).* July 27, 2021. P. 10.

[119] CCL and SACE. *Corrected Surrebuttal Testimony of Kenneth Sercy on behalf of the Southern Alliance for Clean Energy and the South Carolina Coastal Conservation League (Docket No. 2021-88-E).* August 23, 2021. P. 5, 10.

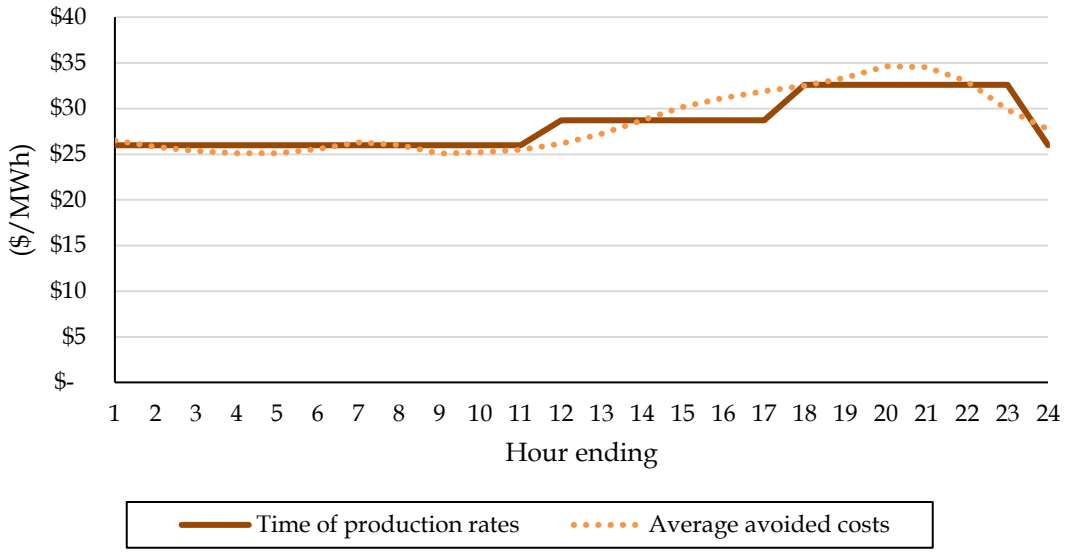
[120] Ibid. P. 10-11.

In reply to Mr. Sercy's direct testimony, Mr. Neely stated that "*DESC's discovery responses provided sufficient information to evaluate its avoided cost calculations,*" which included "*ten years of hourly loads; ten years of monthly gas prices; ten years of hourly generation for all modeled generators for all modeled seeds; ten years of hourly marginal costs for all modeled seeds, ten years of annual avoided costs; and the 8,760-hour solar profile that was used.*"[121] According to Mr. Neely, the data that was provided "*was sufficient to determine the appropriateness of the Company's conclusions.*"

On the issue of pricing periods for Standard Offer non-solar QFs, Mr. Horii in his direct testimony did not recommend any changes to DESC's 11 pricing periods, stating that "*the TOU [time-of-use] periods for the Standard Offer rate for non-solar are reasonable, and the higher granularity will help incentivize generators to export energy in hours of highest value to DESC.*"[122]

For reference, the figures below provide visual depictions of DESC's proposed Standard Offer rates for non-solar QFs over the 2022-2026 timeframe for the 11 pricing periods, with figures separated by Summer (Figure 13), Winter (Figure 14), and Shoulder (Figure 15) seasons, and plotted by hour. Rates for the 2027-2031 timeframe are not shown, but exhibit the same trend. For additional context, also included in the figures are average avoided hourly energy cost profiles over the relevant seasons, for the 2022 to 2026 timeframe.

Figure 13. DESC's proposed Summer non-solar QF rates (2022-2026) and average avoided hourly energy cost profiles (2022-26) ($/MWh)



[121] DESC. *Rebuttal Testimony of James W. Neely, P.E. on behalf of Dominion Energy Services, Inc. (Docket No. 2021-88-E).* August 10, 2021. P. 10.

[122] Ibid.

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Figure 14. DESC's proposed Winter non-solar QF rates (2022-2026) and average avoided hourly energy cost profiles (2022-26) ($/MWh)

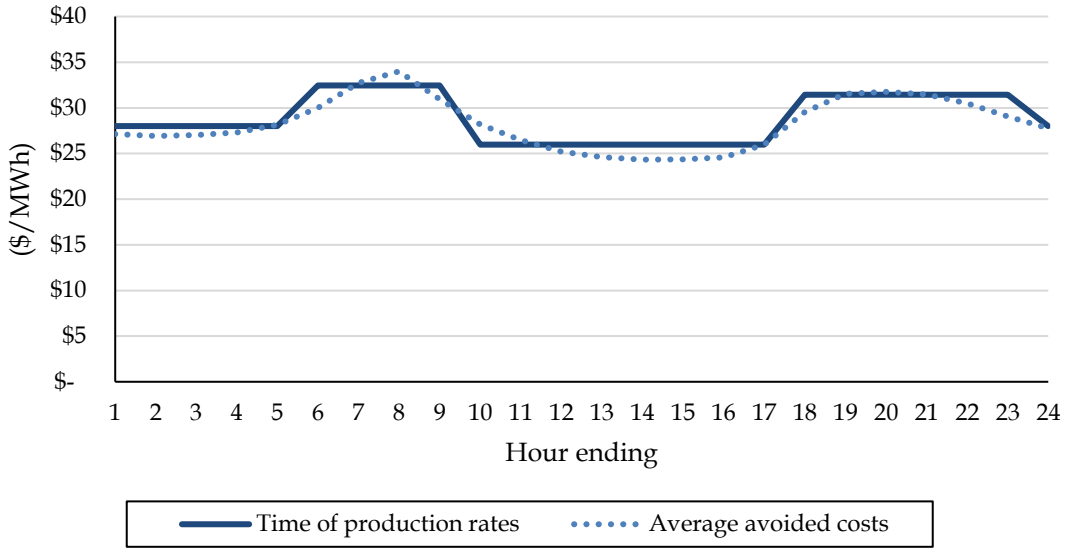
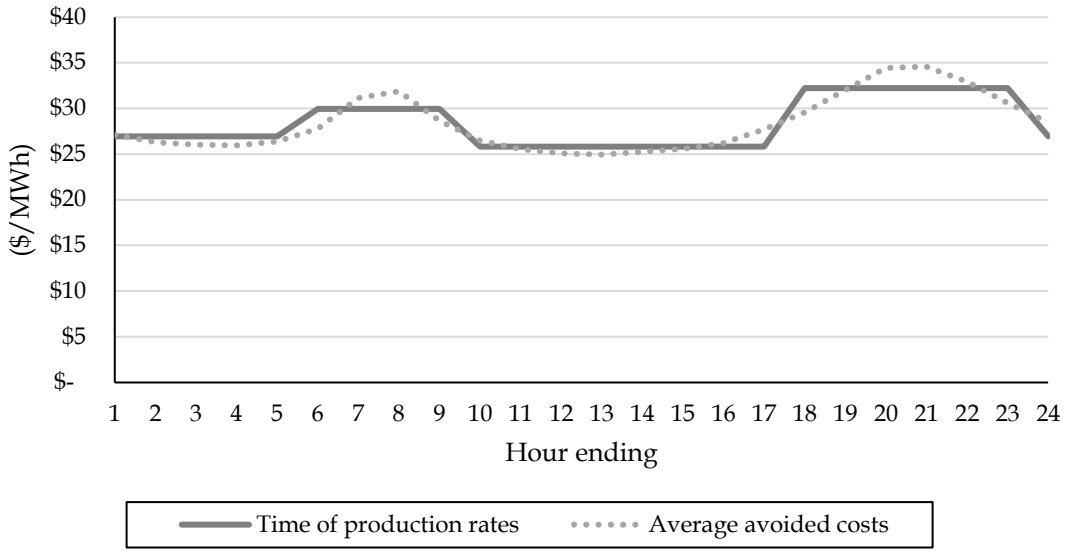


Figure 15. DESC's proposed Shoulder non-solar QF rates (2022-2026) and average avoided hourly energy cost profiles (2022-26) ($/MWh)



Sources: DESC. *Direct Testimony of James W. Neely, P.E. on behalf of Dominion Energy Services, Inc. (Docket No. 2021-88-E).* June 29, 2021. P. 12.' DESC's "2021 Avoided Cost Hourly Profile" excel file.

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LEI's opinion of DESC's approach to establishing pricing periods for Standard Offer rates

LEI does not take issue with the approach deployed by DESC, and in consideration of information it reviewed believes it was data-driven. Additionally, a review of the PLEXOS hourly price outputs by season (summaries shown in Figure 13 to Figure 15) indicates the production periods selected by DESC are a fair fit for the hourly average price outputs. Based on this, **LEI believes DESC's pricing periods for Standard Offer rates are sufficient for purposes of this proceeding**.

4.3.3.3 Solar-specific energy rates

A third issue raised by Mr. Sercy in his direct testimony relates to the inclusion of a separate rate for solar QFs. As described previously, DESC's proposed approach would provide solar QFs with a single annual price in a given year, as opposed to non-solar QFs where rates vary within a given year by time of production period. As a starting point, Mr. Sercy described the non-solar QF rate as "*essentially a technology-neutral rate design whereby any type of QF can generate energy and be paid based on the value of the energy to the system at that time*" and noted that "*price signals under the technology-neutral energy rate would incentivize project developers for standalone solar QFs to design and site projects in a way that maximizes system value.*"[123]

In response to Mr. Bell's direct testimony, where Mr. Bell stated that the non-solar QF time of production schedule "*is not appropriate for use with solar-only generation… because... solar generation is limited in dispatchability and flexibility, and subject to intermittency and time-of-day restrictions,*"[124] Mr. Sercy noted that "*other elements of DESC's proposal and South Carolina's PURPA implementation already account for the production patterns of standalone solar, and make DESC's technology-neutral approach well-suited to standalone solar.*"[125] These other elements include DESC's proposed VIC, "*which if approved would account for any material intermittency and operating reserves cost impacts deemed legitimate by the Commission.*" Mr. Sercy listed additional arguments to conclude "*there are no real issues specific to standalone solar PV that necessitate a solar-specific rate*" and recommended "*standalone solar QFs be granted eligibility for the technology-neutral [non-solar QF] energy rates.*"[126]

In reply, Mr. Neely stated in his rebuttal testimony that Mr. Sercy's "*assertions regarding a single technology-neutral rate are unfounded and do not constitute a more reasonable alternative than the solar and non-solar rates developed by the Company*" and that "*the methodology employed by the Company yields a prudent and reasonable calculation of solar avoided costs because it aligns well with the operating characteristics and technological nature of the solar generators actually connected to the Company's system*

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[123] CCL and SACE. *Direct Testimony of Kenneth Sercy on behalf of the Southern Alliance for Clean Energy and the South Carolina Coastal Conservation League (Docket No. 2021-88-E).* July 27, 2021. P. 13 – 14.

[124] DESC. *Direct Testimony of Eric H. Bell on behalf of Dominion Energy South Carolina, Inc. (Docket No. 2021-88-E).* June 29, 2021. P. 34.

[125] CCL and SACE. *Direct Testimony of Kenneth Sercy on behalf of the Southern Alliance for Clean Energy and the South Carolina Coastal Conservation League (Docket No. 2021-88-E).* July 27, 2021. P. 15.

[126] Ibid.

as well as those being proposed for connection in the future."[127] Mr. Neely further stated that because "*system dispatch requirements for including solar QFs are more costly than those for non-solar QFs… the avoided cost for solar QFs must be less than that of a non-solar QF, which can typically generate around the clock and does not require the constant ramping of other resources as is needed with solar QFs*."[128]

In his surrebuttal, Mr. Sercy reiterated that solar QFs would "*be **more** accurately compensated under the time-of-use approach of the technology neutral rate,*" and that "*a rate that compensates QFs based on the specific hours they generate is better able to capture the different production profiles of individual solar QFs, compared to a rate that is based on a single production profile*" as "*energy production among solar QFs may vary due to geographic location and technology choice*."[129] Mr. Sercy also reiterated that DESC's proposed VIC was "*intended to capture the impacts of solar variability, which if approved could readily be applied to any solar QFs under the technology neutral energy rates*."[130] Overall, Mr. Sercy reiterated his recommendation for "*standalone solar QFs to be eligible for the Standard Offer technology neutral [non-solar QF] energy rate*."[131]

On this issue, Mr. Horii in his direct testimony agreed with DESC's position that a single energy credit for solar QFs was appropriate. According to Mr. Horii, although hourly price differentiation would provide "*the most precise price signals,*" because prices for non-solar QFs use a time-of-use structure, this means that "*TOU prices could over or under compensate customers*."[132] As part of his argument, Mr. Horii described an assessment he conducted to compare annual energy credits a solar generator could receive using hourly avoided energy cost credits versus four time-of-use periods, with results indicating average energy credits "*by the four current TOU periods would overcompensate solar generators by 7%*."[133] Mr. Horii concludes that DESC's proposed use of a single solar-specific rate "*solves the TOU overcompensation because it specifically estimates the annual value of solar generation through the DRR process, and divides that value by the annual solar output,*" which "*eliminates the averaging problem inherent in the TOU credits,*" and makes the proposed single rate approach for solar "*preferrable to an alternative such as the four (4) TOU credits.*"[134]

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[127] DESC. *Rebuttal Testimony of James W. Neely, P.E. on behalf of Dominion Energy Services, Inc. (Docket No. 2021-88-E).* August 10, 2021. P. 11, 14.

[128] Ibid.

[129] CCL and SACE. *Corrected Surrebuttal Testimony of Kenneth Sercy on behalf of the Southern Alliance for Clean Energy and the South Carolina Coastal Conservation League (Docket No. 2021-88-E).* August 23, 2021. P. 12.

[130] Ibid. P. 13.

[131] Ibid. P. 24.

[132] ORS. *Revised Direct Testimony and Exhibit of Brian Horii on behalf of the South Carolina Office of Regulatory Staff (Docket No. 2021-88-E).* August 23, 2021. P. 14.

[133] Ibid. P. 15.

[134] Ibid.

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LEI's opinion on the inclusion of solar-specific energy rates

As with capacity, **LEI recommends the use of a single technology-neutral energy rate schedule**. Avoided cost pricing calculations should be based on utility costs, rather than the nature of the technology receiving the rate. Furthermore, whether or not a QF is flexible is not a factor in determining the utility's avoided costs in a particular hour. Costs of integration are already addressed through the VIC. Providing all resources with the same set of price signals provides more effective price signals as developers design their projects.

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5 Review of DESC's proposed VIC and mitigation protocol

The Guidehouse VIC Study and resulting proposed VICs form an integral part of DESC's 2021 avoided cost application and has been the subject of substantial dispute among the parties, in particular between DESC and CCEBA. The following section provides an overview of the analysis and methodology which Guidehouse used to determine the proposed VICs and discusses the main issues raised by intervenors. LEI also discusses DESC's proposed SSVM mitigation protocol, which outlines the conditions under which solar QFs could be able to reduce their monthly VIC.

5.1 Overview of the Guidehouse VIC Study and resulting VICs

The Guidehouse VIC Study, published in June 2021, is discussed at length in the direct testimony of DESC witness Peter B. David, an Associate Director at Guidehouse, and is included as an attachment to his testimony (Exhibit PBD-2). As described by Mr. David, "*Guidehouse conducted the Study in order to estimate the impacts that solar installations will have on DESC's system operations and determine the resulting incremental costs both for projects that are already under contract and have a variable integration charge clause in their [PPAs] as well as potential future projects that are not already under contract*."[135] Importantly, the Study quantifies the "variable integration cost" associated with integrating these solar facilities into DESC's system, which Mr. David defines as "*the increase in costs to an electric system as a result of the need to carry more Operating Reserves*[136] *in order to react to unexpected changes in renewable generation*."[137]

At a high-level, the VIC analysis involves conducting production cost modeling simulating four scenarios:

1. **Baseline (0-340 MW):** includes the 340 MW of solar QFs currently on DESC's system that have executed a PPA without a VIC clause;
2. **Tranche 1 (341-973 MW):** includes the Baseline solar resources plus the 663 MW of solar QFs currently on DESC's system that have executed a PPA with a VIC clause that is subject to a true up provision, as per Order No. 2020-244;
3. **Tranche 2 (974 – 1,073 MW):** includes all of the Tranche 1 solar resources plus a generic 100 MW of solar that is "*not currently under contract or actively in development*";[138] and

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[135] DESC. *Direct Testimony of Peter B. David on behalf of Dominion Energy South Carolina, Inc. (Docket No. 2021-88-E).* June 29, 2021. P. 6.

[136] As defined by Mr. David in his direct testimony, Operating Reserves "*means the capability of the electric system to quickly increase generation in the event of mismatch between scheduled and actual generation or load caused by unexpected drops in generation or increases in load. Available Operating Reserves are calculated in terms of how much additional generation is available in a given period of time. For the purposes of the Study, Operating Reserves refers to the reserves needed to comply with the North American Electric Reliability Corporation's ("NERC's") 15-minute contingency reserve requirement.*" (Source: DESC. *Direct Testimony of Peter B. David on behalf of Dominion Energy South Carolina, Inc. (Docket No. 2021-88-E).* June 29, 2021. P. 5)

[137] DESC. *Direct Testimony of Peter B. David on behalf of Dominion Energy South Carolina, Inc. (Docket No. 2021-88-E).* June 29, 2021. P. 6.

[138] Ibid. P. 7.

4. **Tranche 3 (1,074 – 1,373 MW):** includes all of the Tranche 2 solar resources plus a generic 300 MW of solar.

While the Study ultimately determined the levelized costs associated with maintaining additional operating reserves for each tranche of solar deployment indicated above, DESC proposes to implement the VICs calculated for Tranche 1 and Tranche 2 only (see Figure 16). Specifically, DESC proposes the VICs be implemented as follows:

- **Tranche 1 VIC of $1.80/MWh (341-973 MW):** "*[t]his Tranche 1 VIC should be applied going forward to these existing contracts and, pursuant to Commission Order No. 2020-244, should be considered for a "true-up" against the interim VIC,*" where the interim VIC is currently set at $0.96/MWh;[139] and
- **Tranche 2 VIC of $3.43/MWh (≥974 MW):** the Tranche 2 VIC "*will apply to the proposed PR-1 Solar rates and to additional solar only contracts under the PR-Standard Offer and PR-Form PPA.*"[140]

Figure 16. DESC's proposed VICs ($/MWh)

	Charge
Solar Tranche 1 (341-973 MW)	1.80
Solar Tranche 2 (≥974 MW)	3.43

Sources: DESC. *Revised Exhibit Nos. AWR-2 and AWR-6 (Docket No. 2021-88-E).* August 10, 2021.

5.2 Intervenor positions on the VIC analysis

As noted previously, the VIC analysis conducted by Guidehouse was the subject of substantial dispute, with CCEBA witness Mr. Burgess in particular raising many points of disagreement. LEI summarizes the major issues identified by Mr. Burgess and other intervenors below, and then discusses the recommended VICs presented by each involved party. The major points of contention can be grouped as follows:

- **analytical approach – modeled versus historical:** Mr. Burgess argues that the VIC should be calculated based on actual historical integration costs rather than on estimates from simulation modeling. Specifically, because "*about 863 MW, or nearly all (~90%) of the Tranche 1 facilities, have already come online,*" Mr. Burgess contends that "*DESC should have been able to track the corresponding increase in Operating Reserves and corresponding integration costs over this time period.*"[141] Mr. Burgess argues that these actual costs should form the

[139] DESC. *Direct Testimony of Eric H. Bell on behalf of Dominion Energy South Carolina, Inc. (Docket No. 2021-88-E).* June 29, 2021. P. 27.

[140] Ibid. P. 28.

[141] CCEBA. *Direct Testimony of Ed Burgess on behalf of the Carolinas Clean Energy Business Association (Docket No. 2021-88-E).* July 27, 2021. P. 8, 9.

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basis of the VIC, instead of the Guidehouse VIC analysis, which he states "*is only a hypothetical projection of the potential integration costs that DESC might incur*."[142]

In response, DESC witness Mr. Bell states in his rebuttal testimony that "*the actual costs to which [Mr. Burgess] refers are already embedded in fuel and operating costs and, thus, in the fuel recovery charge*" and are "*due to many interdependent and related, but not easily distinguishable, factors and constraints*."[143, 144] Instead, Mr. Bell posits that "*the Commission [should] continue to rely on production cost modeling and simulations to assess the VIC*" as he argues this approach is "*the most reasonable method to ascertain the cost impact of intermittent resources and the impact to customer bills*";[145]

- **operating reserve requirements:** Mr. Burgess argues that "*in the VIC analysis, DESC inexplicably assumes that incremental reserves equal to 60% of solar generation are needed to avoid a reserve shortfall*" and recommends "*correcting this factor to 40%*" to align with DESC's current operating practice.[146] ORS witness Mr. Horii also finds that "*Guidehouse has not justified their forecast of incremental operating reserves needed to accommodate solar forecast uncertainty*."[147]

  In response, DESC witness Mr. Bell recognizes that "*[w]hile it is true that Guidehouse identified additional operating reserves higher than DESC has historically used, the study establishes that additional reserves are needed due to the intermittent nature of solar energy generation and the increasing levels of solar penetration into the DESC system*";[148]

- **1-hour versus 4-hour ahead solar forecasts:** the Guidehouse VIC Study compares the difference between 4-hour ahead scheduled solar generation and actual generation in order to estimate the marginal need for operating reserves. Guidehouse on behalf of DESC witness Mr. David notes that while "*[i]deally, the Study would rely on the difference between 1-hour ahead advance schedules and actual operations to estimate the marginal need for Operating Reserves created by solar resources*" the Study "*mitigates the potential for overstating the necessary adjustment to the Operating Reserve requirement by eliminating the 10% of intervals with the highest observed increase in Operating Reserve requirements in each month*."[149]

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[142] Ibid. P. 7.

[143] DESC. *Rebuttal Testimony of Eric H. Bell on behalf of Dominion Energy South Carolina, Inc. (Docket No. 2021-88-E).* August 10, 2021. P. 4.

[144] While LEI believes it would be possible to develop estimates of historical variable integration costs, LEI understands it would require a degree of effort.

[145] Ibid. P. 4-5.

[146] CCEBA. *Direct Testimony of Ed Burgess on behalf of the Carolinas Clean Energy Business Association (Docket No. 2021-88-E).* July 27, 2021. P. 19.

[147] ORS. *Revised Direct Testimony and Exhibit of Brian Horii on behalf on the South Carolina Office of Regulatory Staff (Docket No. 2021-88-E).* August 23, 2021. P. 8.

[148] DESC. *Rebuttal Testimony of Eric H. Bell on behalf of Dominion Energy South Carolina, Inc. (Docket No. 2021-88-E).* August 10, 2021. P. 3.

[149] DESC. *Direct Testimony of Peter B. David on behalf of Dominion Energy South Carolina, Inc. (Docket No. 2021-88-E).* June 29, 2021. P. 9-10.

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Mr. Burgess disagrees with the use of a 4-hour ahead solar forecast and posits that "*there is substantial evidence that a 1-hour forecast would significantly reduce the level of solar forecast error relative to a 4-hour forecast*."[150] ORS witness Mr. Horii echoes this sentiment, recognizing that "*[s]olar forecast uncertainty is the primary driver of the Company's need for increased operating reserves*" and stating "*[t]he ability of the Company to increase its forecast accuracy depends on the specific forecasting method used, and a 2015 study suggests that solar forecast errors could be reduced by about half if 1-hour ahead schedules are used*";[151]

- **hourly weighting of integration costs:** Mr. Burgess argues that "*the modeled integration costs should be weighted based on the hourly solar generation profile*" to "*ensure that incremental costs are not excessively inflated during times of expected low solar production*."[152]

  In response, Mr. David in his rebuttal testimony notes that "*while I considered the merits of weighting by solar production, in the final analysis I ultimately concluded an unweighted average better reflected the costs to the system*";[153]

- **allocation of integration costs:** Mr. Burgess argues that "*DESC unfairly assigned 100% of the costs associated with the 340 MW of Baseline facilities to the 633 MW of Tranche 1 facilities*" which "*violates the principle of cost causation*."[154] Mr. Burgess recommends that instead, "*the VIC calculation for the 973 MW scenario should initially assume that integration costs are spread equally across all solar facilities*."[155]

  In response, Mr. David in his rebuttal testimony disputes this observation, stating "*[a]ll of the incremental increases in minimum operating reserve requirements incorporated in this study, and thus all of the incremental increases in system costs, are attributable to the Tranche 1 solar capacity*";[156] and

- **modeling of Fairfield pumped hydro:** Mr. Burgess contends that "*DESC made the arbitrary decision to restrict the operations of the Fairfield pumped hydro facility by defining specific hours in which it could pump or generate*" which he argues "*undoubtedly inflates the instances of shortfalls in the baseline scenario*."[157]

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[150] CCEBA. *Direct Testimony of Ed Burgess on behalf of the Carolinas Clean Energy Business Association (Docket No. 2021-88-E).* July 27, 2021. P. 25.

[151] ORS. *Revised Direct Testimony and Exhibit of Brian Horii on behalf on the South Carolina Office of Regulatory Staff (Docket No. 2021-88-E).* August 23, 2021. P. 8-9.

[152] CCEBA. *Direct Testimony of Ed Burgess on behalf of the Carolinas Clean Energy Business Association (Docket No. 2021-88-E).* July 27, 2021. P. 21-22.

[153] DESC. *Rebuttal Testimony of Peter B. David on behalf of Dominion Energy South Carolina, Inc. (Docket No. 2021-88-E).* August 10, 2021. P. 18.

[154] CCEBA. *Direct Testimony of Ed Burgess on behalf of the Carolinas Clean Energy Business Association (Docket No. 2021-88-E).* July 27, 2021. P. 23.

[155] Ibid.

[156] DESC. *Rebuttal Testimony of Peter B. David on behalf of Dominion Energy South Carolina, Inc. (Docket No. 2021-88-E).* August 10, 2021. P. 22.

[157] CCEBA. *Direct Testimony of Ed Burgess on behalf of the Carolinas Clean Energy Business Association (Docket No. 2021-88-E).* July 27, 2021. P. 20.

Mr. David disputes this claim in his rebuttal testimony, noting it "*fundamentally misrepresents both how this study was conducted and how a production cost model such as PROMOD works*."[158]

At the conclusion of multiple rounds of testimony, the VICs recommended by each party are as follows:

- **CCEBA:** with regards to proposed VIC values, Mr. Burgess argues that "*[g]iven the lack of incremental operating reserve needs beyond historical levels, a VIC charge of $0/MWh is appropriate*" but offers that "*[i]f the Commission feels compelled to adopt a non-zero VIC in this proceeding, the Commission should consider values of $0.28/MWh or less for Tranche 1 and $0.71/MWh or less for Tranche 2 (and above), which correct for some of the deficiencies in DESC's VIC analysis*."[159]

  In his surrebuttal testimony, Mr. Burgess recommends that the Commission should either: (i) fix the VIC at a level consistent with his proposed VIC values indicated above; or (ii) "*eliminate the VIC until the Commission adopts a new avoided cost rate in the future. Under this latter approach, any future VIC should only apply prospectively to PPAs executed after that new rate is approved*";[160]

- **ORS:** Mr. Horii argues that because "*the Commission has already determined that the VIC should be informed by the Commission study referenced in Order No. 2020-244, it would be premature to adopt new VIC values at this time.*"[161] As such, Mr. Horii recommends that DESC's proposed VICs should not be adopted at this time, and that instead the VIC should "*remain at $0.96/MWh and remain subject to a future true up as contemplated in Order No. 2020-244*";[162] and

- **DESC:** while DESC proposes the VICs shown in Figure 16 as determined by the Guidehouse VIC Study, the Company "*understands there is a separate integration-study docket ongoing before the Commission and is therefore willing to accept Witness Horii's proposal that the VIC remain at $0.96/MWh on an interim basis, so long as the VIC remains subject to a future true up*."[163]

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[158] DESC. *Rebuttal Testimony of Peter B. David on behalf of Dominion Energy South Carolina, Inc. (Docket No. 2021-88-E).* August 10, 2021. P. 14.

[159] Ibid.

[160] CCEBA. *Surrebuttal Testimony of Ed Burgess on behalf of the Carolinas Clean Energy Business Association (Docket No. 2021-88-E).* August 16, 2021. P. 8.

[161] ORS. *Revised Direct Testimony and Exhibit of Brian Horii on behalf on the South Carolina Office of Regulatory Staff (Docket No. 2021-88-E).* August 23, 2021. P. 10.

[162] Ibid. P. 9.

[163] DESC. *Rebuttal Testimony of Daniel F. Kassis, P.E. on behalf of Dominion Energy South Carolina, Inc. (Docket No. 2021-88-E).* August 10, 2021. P. 7.

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5.3 LEI's views on the appropriate level of the VIC

From the summary of intervenor positions included above, it is clear the parties disagree on most, if not all, of the issues raised regarding the Guidehouse VIC Study. LEI believes that the extent of contrary evidence introduced regarding the VIC analysis supports the need for a truly independent study.[164] Such a study should be conducted through a collaborative (as opposed to adversarial) process, where the inputs, assumptions, and methodological approach can be the subject of stakeholder consultation and feedback.

As LEI understands it, Act No. 62 set forth Section 58-37-60 of the South Carolina Code, which establishes the process and framework under which such an independent study should be conducted – the statute reads in part:

> *(A) The commission and the Office of Regulatory Staff are authorized to initiate an independent study to evaluate the integration of renewable energy and emerging energy technologies into the electric grid for the public interest.* ***An integration study conducted pursuant to this section shall evaluate what is required for electrical utilities to integrate increased levels of renewable energy and emerging energy technologies*** *while maintaining economic, reliable, and safe operation of the electricity grid in a manner consistent with the public interest.* ***Studies shall be based on the balancing areas of each electrical utility.*** *The commission shall provide an opportunity for interested parties to provide input on the appropriate scope of the study and also to provide comments on a draft report before it is finalized. All data and information relied on by the independent consultant in preparation of the draft study shall be made available to interested parties, subject to appropriate confidentiality protections, during the public comment period. The results of the independent study shall be reported to the General Assembly.*[165] [emphasis added]

LEI also understands that the Commission opened Docket No. 2020-219-A – *Utility Integration Studies of Dominion Energy South Carolina, Incorporated (Pursuant to Commission Directive Order No. 2020-583* – on September 3rd, 2020, in furtherance of this legislation. Apart from written comments provided by interested parties on September 28th, 2020, and an initial virtual forum held on October 6th, 2020, there has been limited movement in this docket.[166] LEI believes this is an appropriate avenue through which to conduct an updated VIC study that involves stakeholders from the outset of the analysis. LEI recommends that the Commission or ORS begin the process to conduct such a study as soon as practicable.

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[164] While LEI is capable of performing an independent VIC calculation given the appropriate data, LEI believes that a robust study requires stakeholder involvement in developing the assumptions, and a timeframe that is longer than that provided for LEI's report.

[165] South Carolina Legislature. *South Carolina Code, Title 58, Chapter 37: Energy Supply and Efficiency.*

[166] SC PSC. *Docket No 2020-219-A.* September 3, 2020.

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In the meantime, LEI concurs with the recommendation proposed by Mr. Horii and which DESC has noted it is "*willing to accept*."[167] This recommendation would maintain the interim VIC at the current level of $0.96/MWh, subject to the same true up provision set forth in Order No. 2020-244, until the results of an independent study are finalized.

Various witnesses have presented timelines for producing a study; LEI is generally in agreement with the timeline presented by Mr. Horii – during his testimony on August 25th, 2021, Mr. Horii stated in response to Commission questions that "*if you're bringing in a new consultant to do the work, you're probably looking more like, I would guess, six months to do that. And with the necessity of having stakeholder involvement, review, probably alternate cases run, etc., and … the time to bring on a new consultant, you're probably looking more realistically at, I would say, like nine months to a year to actually get a new VIC study done.*"[168] LEI feels a minimum of six months is likely necessary for both performing the runs and ensuring a robust stakeholder process. Given the recommendation for a true up (or down),[169] and that it is a small percentage of annual fuel costs,[170] LEI does not believe that customers will be harmed by this timeframe. Likewise, for those projects with existing contracts referencing the VIC true up, waiting an additional six to nine months does not increase uncertainty for those projects, as this uncertainty already exists. The biggest impact is on those considering developing a project in South Carolina; however, having a clear timeline for when a VIC will be determined will help developers in scheduling investment decisions.

LEI understands that continuing uncertainty creates challenges for stakeholders, and that the use of the word "fixed" in the law (specifically Section 58-41-20(F)(1)) makes continuing the interim VIC subject to true up potentially problematic from a legal perspective. Developers need to ask themselves whether having a VIC that is fixed but potentially higher than warranted is better than waiting for the results of a comprehensive independent study, especially if establishing a fixed VIC now for a ten-year period reduces pressure to perform the independent study.

LEI believes that the terms of reference for such a study should include:

- examination of the impact of DESC's proposed peaking turbine modernization program;
- the potential (if any) for additional demand response resources;
- the way in which the proposed Southeast Energy Exchange Market ("SEEM") could be designed to minimize VIC;

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[167] DESC. *Rebuttal Testimony of Daniel F. Kassis, P.E. on behalf of Dominion Energy South Carolina, Inc. (Docket No. 2021-88-E).* August 10, 2021. P. 7.

[168] Southern Reporting, Inc. *Transcript of Testimony and Proceedings, Volume 6 (Docket No. 2021-88-E, Hearing # 11947).* August 25, 2021. P. 96-97.

[169] LEI does not agree with the assertion that "*there is a long and detailed record that establishes a higher permanent value*" (Kassis rebuttal page 7); instead, the record establishes that the need for and amount of the VIC are disputed. There are reasonable questions regarding the level of the VIC which can only be resolved through an independent study.

[170] DESC. *Rebuttal Testimony of Eric H. Bell, P.E. on behalf of Dominion Energy South Carolina, Inc. (Docket No. 2021-88-E).* August 10, 2021. P. 5.

- the role of battery storage; and
- the extent to which investment in modifications to existing must-run units to further increase flexibility would provide benefits to ratepayers.

LEI's opinion of DESC's proposed VICs

Ultimately, LEI believes that the best approach is to continue with the VIC at the current interim level of $0.96/MWh subject to true up or down based on the results of a comprehensive independent study.

However, if the Commission believes that it must set a fixed VIC as part of this proceeding, LEI concurs with Mr. Horii that DESC's proposed VIC for Tranche 1 of $1.80/MWh may be a reasonable value for all newly contracted resources over the next two years and existing contracts with a true up provision, for the following reasons:

- it was calculated based on the amount of solar already on DESC's system;
- it is consistent with the levels established in the Duke 2019 avoided cost proceeding; and
- it is within the range of what LEI has observed through a survey of solar integration charges and ancillary services costs across regions – specifically, while LEI has observed that ancillary services costs in organized markets tend to be lower (and are not charged to intermittent resources but to customers), the proposed Tranche 1 VIC of $1.80/MWh is generally in line with the values presented in other solar integration studies conducted for utilities in the Southeast.

LEI recommends that if the Commission feels it must establish a fixed rate, it should also assure that a thorough, independent VIC study with appropriate stakeholder involvement be performed prior to the next avoided cost review.

Sources: Tennessee Valley Authority. *2019 Integrated Resource Plan: Volume I – Final Resource Plan (Appendix D: Modeling Framework Enhancements).* Pages D-7 to D-10; California ISO. *2020 Annual Report on Market Issues and Performance.* August 2021; ISO-NE Internal Market Monitor. *Annual Markets Report.* 2016-2020; Potomac Economics. *State of the Market Report for The ERCOT Electricity Markets. Independent Market Monitor for ERCOT.* 2017-2020; Potomac Economics. *State of the Market Report for The MISO Electricity Markets. Independent Market Monitor for the Midcontinent ISO.* 2017-2020; Southwest Power Pool. *Annual State of the Market Report.* 2016-2020.

5.4 Mitigation protocol

The SVVM mitigation protocol proposed by DESC sets forth the calculation methodology and additional provisions through which solar QFs may reduce their VIC on a monthly basis – the calculation methodology is more fully described in Section 3.1.4. CCEBA witness Mr. Burgess raises several issues related to the mitigation protocol, which LEI discusses in the subsections below.

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5.4.1 Calculation methodology

Mr. Burgess in his direct testimony identifies four issues with regards to the SSVM calculation – these are:

1. **use of forecast production data:** Mr. Burgess recommends "*the SSVM should compare a facility's output to forecasted or expected production, not to the prior hour's production*" as "*[i]ncremental operating reserves are only needed to respond to unexpected changes in supply, not expected changes*";[171]
2. **capturing production drops on a MW-basis:** Mr. Burgess recommends "*the SSVM should capture hours with the greatest potential for a MW drop in energy production, rather than the greatest percentage drop*" because "*the percentage-based approach overly weights morning and evenings hours when solar production is relatively low*";[172]
3. **averaging SSVM across the month:** Mr. Burgess recommends "*DESC should use an average, not a maximum, SSVM to evaluate whether a facility can avoid integration charges*" as he argues that "*[a] facility with very low volatility and occasional deviations may not impact DESC's integration costs as much as a facility with frequent deviations from its forecasted output that are still less than the maximum*";[173] and
4. **capturing contribution to system-wide solar production:** Mr. Burgess argues that "*the SSVM metric should not necessarily be determined based on a single solar installation*" and instead that "*the relevant metric should be an individual site's contribution to any fleet-wide drops in solar production*."[174]

Despite proposing these modifications, Mr. Burgess then goes on to note that "*rather than rely upon this relatively flawed framework, I believe a better approach would be for DESC to use the mitigation protocol Dominion developed for North Carolina as a starting point for South Carolina*," to which Mr. Burgess recommends further modifications.[175]

DESC witness Mr. Bell in his rebuttal testimony responds to item (1) above, stating that "*DESC could update the SSVM requirement to include a forecasting provision if directed by the Commission*" by "*modify[ing] the SSVM spreadsheet to compare each five-minute period to a forecast instead of the one hour "look back.""*[176] Related to item (4) above, Mr. Bell notes that "*[i]f the facilities are under contract with DESC by the same owner and the owner provides the aggregated generation meter data and aggregated forecast data in one properly completed SSVM spreadsheet each month, DESC could evaluation all facilities*

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[171] CCEBA. *Direct Testimony of Ed Burgess on behalf of the Carolinas Clean Energy Business Association (Docket No. 2021-88-E).* July 27, 2021. P. 32.

[172] Ibid.

[173] Ibid. P. 33.

[174] Ibid.

[175] Ibid.

[176] DESC. *Rebuttal Testimony of Eric H. Bell, P.E. on behalf of Dominion Energy South Carolina, Inc. (Docket No. 2021-88-E).* August 10, 2021. P. 13.

covered in the spreadsheet as a whole for VIC mitigation."[177] In response to the other items raised by Mr. Burgess, Mr. Bell argues these are already implicitly addressed in the proposed protocols, because according to Mr. Bell "*[b]y providing for 100% VIC mitigation in the SSVM spreadsheet with drops in output up to 25% (mitigating existing drops down to 25%, instead of zero or near zero), DESC has already provided a level of tolerance for these events*."[178]

LEI's opinion of DESC's proposed mitigation protocol: calculation methodology

LEI agrees with DESC's proposed mitigation protocol and SSVM calculation, so long as the modifications which Mr. Bell noted in his rebuttal testimony are incorporated. These modifications include calculating solar QF production variability relative to forecast rather than actual, as well as allowing solar owners to aggregate production data from across the QFs that they own. LEI believes comparing to forecast is a reasonable approach, and the established tranches allow a degree of latitude in terms of facility operations.

5.4.2 Other issues

Other issues raised by Mr. Burgess are concerned with several practical implementation issues associated with the mitigation protocol as currently proposed by DESC. Mr. Burgess notes:

> *DESC calls for QFs to install a separate meter for the purpose of calculating the hourly variability. While I agree that a separate meter may be needed for the solar and storage components, I believe the normal production meter could be used in lieu of one of these. Second, the proposed two-day deadline for data submissions appears to be unduly onerous. Sellers should be allowed five business days after month-end to submit the SSVM spreadsheet to DESC. Finally, the two-strikes disqualification for non-submission of data is also unduly onerous. Sellers should not be disqualified from using the Protocols for the duration of their PPA based on failure to deliver the SSVM spreadsheet.*[179]

[177] Ibid. P. 16.

[178] Ibid. P. 14.

[179] CCEBA. *Direct Testimony of Ed Burgess on behalf of the Carolinas Clean Energy Business Association (Docket No. 2021-88-E)*. July 27, 2021. P. 34.

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LEI's opinion of DESC's proposed mitigation protocol: other issues

Revenue quality meter requirement

DESC's proposed SSVM mitigation protocol requires QFs to install a revenue quality meter (the integration meter) "*capable of recording 5-minute energy production data for the Facility's AC production*." **LEI recommends that to the extent the production meter recording QF generation as required under the Standard Offer/Form PPA** (i.e., the "Buyer's Meter(s)" as defined in the PPA) **can provide the necessary data, this meter should be used for the SSVM calculation.** However, if a separate meter is indeed needed, LEI does not find this provision to be particularly onerous. In the general context of developing a solar project, LEI believes the cost of a production meter is far from a material issue.

Deadline for submissions

LEI disagrees with Mr. Burgess's argument that requiring QFs to submit the SSVM spreadsheet to DESC within two business days of month end is "*unduly onerous*". LEI does not view a two-business day timeframe as being particularly onerous, especially given that the protocol requires QFs to enter the 5-minute production data from the integration meter and day-ahead energy forecast data for the prior month into a predetermined spreadsheet template. As such, **LEI recommends that Mr. Burgess's recommendation to extend the deadline to five business days be rejected.**

Two-strike provision

LEI agrees with Mr. Burgess's view that the two-strike disqualification provision is potentially onerous, as it prevents a QF from being able to use the mitigation protocol for the remainder of its PPA term in the event that it fails to provide the SSVM spreadsheet to DESC for two consecutive months. While LEI recognizes that non-submission of data is a serious issue, the SSVM protocol as proposed would charge a QF the full VIC in any months where it fails to timely submit the SSVM spreadsheet anyway. As such, **LEI does not view this additional disqualification provision as necessary and recommends that the Commission reject this element of DESC's proposed mitigation protocol.** If DESC is particularly concerned with non-submission of data from QFs, the Company may wish to consider proposing a reasonable fine or penalty structure to demonstrate the seriousness of the issue.

LEI further notes that the proposed two-strike disqualification provision could potentially harm customers, in the sense that any QFs that are disqualified from eligibility for the mitigation protocol, and hence are not able to reduce their monthly VIC, would no longer be incentivized to avoid unexpected variations in output.

Sources: DESC. *Second Amended Application, Exhibit 9 (Docket No. 2021-88-E).* June 25, 2021; CCEBA. *Direct Testimony of Ed Burgess on behalf of the Carolinas Clean Energy Business Association (Docket No. 2021-88-E).* July 27, 2021.

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6 Evaluation of the terms and conditions in DESC's proposed standard offer, form contract, and commitment to sell form

6.1 Overview and framework for analysis

As dictated by Act No. 62, and discussed previously in Section 2.2, the Commission is required to ensure the nondiscriminatory treatment of small power producers. This includes, among other directives, ensuring that "*power purchase agreements, including terms and conditions, are commercially reasonable and consistent with regulations and orders promulgated by the Federal Energy Regulatory Commission implementing PURPA*."[180]

Although the term "commercially reasonable" is not explicitly defined in Section 58-41-20 of the South Carolina Code, LEI generally takes this to mean that the agreements, and terms and conditions proposed by DESC should be "*fair, done in good faith, and correspond to commonly accepted commercial practices.*"[181] This understanding aligns with several publicly available PPAs that LEI reviewed, which in some instances included the definition quoted below. LEI presents this definition as merely an example of the types of considerations that could be used to determine the extent of commercial reasonableness.

> *"Commercially Reasonable" or "Commercially Reasonable Efforts" means, with respect to any action required to be made, attempted or taken by a Party …, the level of effort in light of the facts known to such Party at the time a decision is made that: (a) can reasonably be expected to accomplish the desired action at a reasonable cost; (b) is consistent with Prudent Utility Practice; and (c) takes into consideration the amount of advance notice required to take such action, the duration and type of action and the competitive environment in which such action occurs.*[182]

LEI reviews DESC's proposed Standard Offer/Form PPA and NOC Form in turn in the following subsections, keeping the Commission's aforementioned directives in mind.

6.2 Standard Offer/Form PPA

As discussed in Section 3.1.5, QFs with facilities less than or equal to 2 MW in size are eligible for DESC's Standard Offer PPA, while QFs with facilities greater than 2 MW and less than or equal to 80 MW are eligible for DESC's Form PPA. Despite applying to facilities of varying size, Company witness Mr. Folsom notes that "*both form contracts contain similar commercial terms and protections for DESC's customers*" and "*the revisions proposed in this docket are substantially the same for both documents*."[183] As such, LEI reviews these two contract documents together; the Company

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[180] South Carolina Legislature. *South Carolina Code, Title 58, Chapter 41: Renewable Energy Programs.* May 16, 2019.

[181] Merriam-Webster. *Commercially reasonable.*

[182] *See for example* Xcel Energy. *Wind Energy Purchase Agreement.* February 2013 *or* Chugach Electric Association, Inc. *Eklutna Power Purchase Agreement.* December 2018.

[183] DESC. *Direct Testimony of John E. Folsom, Jr. on behalf of Dominion Energy South Carolina, Inc. (Docket No. 2021-88-E).* June 29, 2021. P. 16, 18.

provides its proposed Standard Offer PPA and Form PPA (clean and redline copies) as Exhibit Nos. JEF-2 and JEF-3, which are included as attachments to Mr. Folsom's direct testimony.

As required under Section 58-41-20(A) of the South Carolina Code, form contract PPAs should "*contain provisions, including, but not limited to, provisions for force majeure, indemnification, choice of venue, and confidentiality provisions and other such terms, but shall not be determinative of price or length of the power purchase agreement*."[184] LEI reviewed the agreements as proposed, and can confirm that the provisions explicitly required under Act No. 62 (namely force majeure, indemnification, choice of venue, and confidentiality) are indeed addressed in not only the Company's Form PPA but also its Standard Offer PPA. Figure 17 below maps each of these provisions to the relevant section/clause in the Company's PPAs and provides a brief summary where appropriate.

Figure 17. Required provisions under Act No. 62 as covered in the Standard Offer/Form PPA

Provision	Summary/location of the provisions in DESC's Standard Offer/Form PPA
Force majeure	• Article X – Force Majeure • A Force Majeure event, as defined in Section 10.1, is "*an event or circumstance that is not reasonably foreseeable, is beyond the reasonable control of and not caused by the negligence or lack of due diligence of the Party claiming Force Majeure or that Party's contractors or suppliers, and adversely affects the performance by that Party of its obligations under or pursuant to this Agreement*." • Section 10.2 – Remedial Action: enables the non-claiming Party to terminate the Agreement upon 10 days prior written notice if the Force Majeure event is not resolved within 6 months, subject to an additional 3-month extension under certain circumstances • Section 10.4 – Notice: requires written notification of a Force Majeure event as soon as practicable, but no more than 48 hours after commencement of the event
Indemnification	• Delay Damages are calculated at a rate of $0.11/kWac per day • Performance Liquidated Damages, as defined in Section 3.5, shall equal 50% of the Net Energy Rate in $/kWh for that Contract Year multiplied by the amount of the Shortfall in kWh, and shall be paid on the monthly payment date immediately succeeding the Contract Year • If the QF has achieved Commercial Operation based on a Facility Rating which is below the Nameplate Capacity, the QF may be subject to a Buy Down Payment, as defined in Section 4.3, which shall equal (i) the Nameplate Capacity, minus the Final Installed Capacity in MWac, multiplied by (ii) $300,000
Choice of venue	• Section 15.24 – Choice of Venue: Columbia, South Carolina
Confidentiality	• Confidential Information, as defined in Section 15.14 is any "*information, including business plans, strategies, financial information, proprietary, patented, licensed, copyrighted or trademarked information, and/or technical information regarding the Facility or the Party's business*" that has been identified as Confidential Information in writing • Parties shall "*(a) protect the Confidential Information from disclosure to third parties with the same degree of care accorded its own confidential and proprietary information, and (b) refrain from using such Confidential Information, except in the negotiation and performance of this Agreement, including but not limited to obtaining financing for the Facility.*"

Source: DESC. *Exhibit Nos. JEF-2, JEF-3 (Docket No. 2021-88-E)*. June 29, 2021.

[184] South Carolina Legislature. *South Carolina Code, Title 58, Chapter 41: Renewable Energy Programs.* May 16, 2019.

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As LEI understands from a review of the filings in the current proceeding, there are several changes to the Standard Offer/Form PPA proposed by the Company which remain under dispute among the parties (specifically with CCEBA witness Mr. Levitas). These changes relate to two specific attachments to the agreements: (1) Attachment D – Insurance Requirements, and (2) Attachment F – Form of Surety Bond. LEI discusses each attachment separately in the subsections below.

6.2.1 Insurance requirements

DESC proposes the following modifications, among others, "*to conform with Dominion Energy, Inc.'s requirements for insurance*":[185]

- **timing of certificate delivery:** the Company seeks to modify the deadline within which QFs must deliver a certificate of insurance to DESC from "*at least fifteen (15) calendar days prior to the start of any work at the Facility*" as contemplated in the original language, to "*within twenty (20) days of Buyer's request*" as proposed in the current proceeding;[186]
- **increased policy minimum limits:** the Company seeks to increase the General Liability Insurance coverage required from a minimum limit of $1 million per occurrence to $2 million, and from $2 million aggregate to $4 million;
- **increased employer's liability:** the Company seeks to increase the Employer's Liability coverage required from $1 million to "*[$2 million] each accident for bodily injury by accident or [$2 million] each employee for bodily injury by disease*";[187]
- **increased environmental impairment insurance:** the Company seeks to increase the Environmental Impairment insurance coverage required from a minimum limit of $1 million per occurrence to $2 million per occurrence; and
- **added comprehensive automobile liability insurance:** the Company seeks to add the requirement for QFs to provide "*Comprehensive Automobile Liability insurance with bodily injury and property damage with a total limit of at least [$2 million] per occurrence which will cover liability arising out of any auto (including owned, hired and non-owned autos)*."[188]

Mr. Levitas, on behalf of CCEBA, argues that DESC's "*proposed insurance changes are unjustified and are unreasonable in two primary respects: (1) new timing for certificate of insurance delivery, and (2) revised coverage amounts*."[189]

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[185] DESC. *Direct Testimony of John E. Folsom, Jr. on behalf of Dominion Energy South Carolina, Inc. (Docket No. 2021-88-E).* June 29, 2021. P. 23.

[186] DESC. *Exhibit No. JEF-2 (Docket No. 2021-88-E).* June 29, 2021. Page 139 of 150.

[187] Ibid.

[188] Ibid. Page 140 of 150.

[189] CCEBA. *Direct Testimony of Steven J. Levitas on behalf of the Carolinas Clean Energy Business Association (Docket No. 2021-88-E).* July 27, 2021. P. 9.

With regards to the proposed change to the **timing of certificate delivery**, Mr. Levitas contends that "*Dominion Energy Inc's prevailing corporate practice is not a compelling reason for a proposed change that appears to give DESC unfettered discretion to require proof of insurance at any time after a PPA is signed – even far in advance of any possible construction activities*" and further argues that this "*impose[s] unnecessary costs and burdens on QFs and should be rejected as commercially unreasonable*."[190] In response to Mr. Levitas's concerns, DESC witness Mr. Folsom in his rebuttal testimony contends that "*DESC does not intend to utilize this provision to create an administrative burden for these projects, but DESC should be able to verify this aspect of a project's development pursuant to the PPA.*"[191] LEI notes that Mr. Levitas later withdrew his objection to this change during his testimony on August 24th, 2021.[192]

With regards to the **revised insurance coverage amounts**, Mr. Levitas argues that "*DESC has increased insurance requirements beyond what is commercially reasonable*" and that "*[a]rbitrary increases in the amount and scope of insurance that a QF developer must carry increase the cost of QF projects and needlessly discriminates against independent power producers.*"[193] Mr. Folsom, on behalf of the Company, reasons that while the increases in coverage amounts conform with DESC's parent company, the proposed increases also "*reflect, in part, the deployment of emerging technologies*" such as battery storage, which Mr. Folsom argues (i) increase the value of insurable property, and (ii) introduce additional safety concerns.[194] In response, Mr. Levitas in his surrebuttal testimony notes that Mr. Folsom "*offers no evidence that either concern is material enough to justify imposing additional costs on all QF developers.*"[195]

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[190] Ibid. P. 10.

[191] DESC. *Rebuttal Testimony of John E. Folsom, Jr. on behalf of Dominion Energy South Carolina, Inc. (Docket No. 2021-88-E).* August 10, 2021. P. 4.

[192] Southern Reporting, Inc. *Transcript of Testimony and Proceedings, Volume 5 (Docket No. 2021-88-E, Hearing # 11947).* August 24, 2021. P. 206.

[193] CCEBA. *Direct Testimony of Steven J. Levitas on behalf of the Carolinas Clean Energy Business Association (Docket No. 2021-88-E).* July 27, 2021. P. 8, 10-11.

[194] DESC. *Rebuttal Testimony of John E. Folsom, Jr. on behalf of Dominion Energy South Carolina, Inc. (Docket No. 2021-88-E).* August 10, 2021. P. 5.

[195] CCEBA. *Surrebuttal Testimony of Steven J. Levitas on behalf of the Carolinas Clean Energy Business Association (Docket No. 2021-88-E).* August 16, 2021. P. 7.

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LEI's opinion of DESC's proposed changes to the Standard Offer/Form PPA: insurance requirements

Timing of certificate delivery

While Mr. Levitas withdrew his objection to the proposed modification to the timing of certificate delivery, LEI does wish to point out one related inconsistency in the Company's PPA which should be amended. Specifically, LEI observes that Section 9.1 of DESC's Standard Offer/Form PPA includes an additional provision whereby QFs are required to deliver a certificate of insurance within **10 business days** of request. As requirements for certificate delivery are mentioned in two separate instances in the Company's PPA, LEI believes there should be consistency across the two clauses (i.e., Section 9.1 of the PPA, and Section 1 of Attachment D). LEI believes both instances should require certificate delivery within 20 days of request, as proposed by DESC in this docket. As such, **LEI recommends that Section 1 of Attachment D be approved as proposed, and that Section 9.1 of the PPA be amended to reference the 20-day requirement.**

Insurance coverage amounts

While LEI is not convinced that the proposed changes are necessary to protect customers, we recognize that the proposed coverage levels are generally obtainable in the marketplace. However, it is important to recognize that DESC's Standard Offer PPA and Form PPA, which include the same proposed coverage levels, apply to QFs with facilities ranging from greater than 100 kW to up to 80 MW in size. Given this broad range, LEI believes that if the proposed changes are to be adopted, it would be appropriate to scale the insurance coverage levels to vary depending on project size. As an example, LEI assessed the insurance requirements in a selection of publicly available standard offer contracts:

- **Duke Energy Carolinas and Duke Energy Progress:** the Standard Offer PPA approved by the Commission in the Duke subsidiaries' 2019 avoided cost proceeding applies to QFs with facilities up to 2 MW in size, and requires "*either the applicable home owner's insurance policy with liability coverage of at least $100,000 per occurrence or the applicable comprehensive general liability insurance policy with liability coverage in the amount of at least $300,000 per occurrence*."

  In contrast, the Large QF PPA applies to facilities above 2 MW and up to 80 MW in size and requires: (a) Worker's Compensation and Employer's Liability Insurance of not less than $500,000 each accident/employee/disease; (b) Commercial General Liability Insurance of at least $1 million per occurrence/$2 million in the aggregate; (c) Commercial/Business Automobile Liability Insurance of at least $1 million each accident; (d) Property Damage insurance on an all risk of loss basis; and (e) Pollution Legal Liability (if needed) with a minimum of $1 million per occurrence;

(continued…)

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- **PacifiCorp (Oregon):** the Standard PPA for new QFs applies to facilities of 10 MW or less and requires Commercial General Liability insurance with a minimum single limit of $1 million. Notably, this insurance requirement only applies to facilities above 200kW; and
- **Southern California Edison:** the Standard Contract applies to facilities of 20 MW or less and requires the following: (i) Workers' Compensation Insurance; (ii) Employer's Liability Insurance with limits of not less than $1 million (each accident/policy limit/each employee); (iii) Commercial General Liability Insurance of not less than $1 million (combined single limit per occurrence and annual aggregate); (iv) Commercial Automobile Liability Insurance with a combined single limit of not less than $1 million per occurrence; and (v) Umbrella/Excess Liability Insurance on an occurrence basis "*providing coverage excess of the underlying Employer's Liability, Commercial General Liability, and Commercial Automobile Liability insurance, on terms at least as broad as the underlying coverage, with limits of not less than [$10 million] per occurrence and in the annual aggregate. The insurance requirements … can be provided by any combination of Seller's primary and excess liability policies.*"

LEI acknowledges that the examples presented above do not constitute a universal survey of publicly available standard offer contracts in place across the country. However, the sample of contracts reviewed does indicate that lower insurance coverage levels than those proposed by DESC may be appropriate for QFs with smaller facilities. As such, **LEI recommends that the insurance coverage amounts in the Standard Offer PPA be maintained at current levels, and the proposed higher coverage amounts be approved only for the Form PPA.**

Sources: DEC and DEP. *Johnson DEC, DEP Exhibits 4 (Docket No. 2021-89-E and 2021-90-E).* May 17, 2021; DEC and DEP. *Johnson Stipulation Exhibit 5 (Docket No. 2021-89-E and 2021-90-E).* July 23, 2021; PacifiCorp. *Oregon Standard Power Purchase Agreement (New QF).* Effective August 11, 2016; SCE. *Standard Contract for Qualifying Facilities with a Power Rating that is Less than or Equal to 20 MW.*

6.2.2 Form of Surety Bond

DESC proposes substantial modifications to its Form of Surety Bond to "*conform with Dominion Energy, Inc.'s form for such a bond*."[196] As noted by Mr. Folsom in his live testimony, the Form of Surety Bond contains "*a lot of edits … essentially because this is a new form*."[197] Given the extent of the proposed changes, LEI focuses on the two modifications which Mr. Levitas finds "*are particularly unreasonable*":[198]

[196] DESC. *Direct Testimony of John E. Folsom, Jr. on behalf of Dominion Energy South Carolina, Inc. (Docket No. 2021-88-E).* June 29, 2021. P. 23.

[197] Southern Reporting, Inc. *Transcript of Testimony and Proceedings, Volume 3 (Docket No. 2021-88-E, Hearing # 11947).* August 20, 2021. P. 209.

[198] CCEBA. *Direct Testimony of Steven J. Levitas on behalf of the Carolinas Clean Energy Business Association (Docket No. 2021-88-E).* July 27, 2021. P. 11.

- **timing for payment:** "*DESC proposes to change the time period within which the surety must make payment under the bond. Under the existing bond form, the surety must pay within 15 days of demand. DESC now proposes to make payment due within 10 days after demand*";[199] and
- **waiver of surety defenses:** "*[t]he current surety bond form does not require the surety to waive legal defenses to payment that it is otherwise entitled to assert under state law. However, DESC now proposes to require a Surety to waive all rights and defenses, counterclaims, setoffs, cross-claims, or any other claim that Surety or Principal may have*."[200]

With respect to the first modification, Mr. Levitas suggests that the proposed reduction in timing for payment should be rejected because "*surety providers consider a 10-day payment period to be too short and are often unwilling to execute surety bonds containing such a short payment period*."[201] Regarding the second modification, Mr. Levitas argues that "*this type of waiver provision is a poison pill that will very likely dissuade any surety from issuing a bond in favor of a QF*."[202] In response, Mr. Folsom on behalf of the Company contends that "*these changes were included by DESC as yet additional measures to ensure that its customers are adequately protected*" and that "*DESC's parent company has utilized this form of surety bond in the marketplace for a number of years*."[203]

LEI's opinion of DESC's proposed changes to the Standard Offer/Form PPA: Form of Surety Bond

It is LEI's view that modifying forms to conform with parent company practice is not sufficient justification for making a change. Changes should instead respond to a material risk to customers before being proposed. That said, based on LEI's previous experience obtaining surety bonds, we do not believe the proposed changes would make surety bonds more difficult to obtain in the marketplace.

As such, LEI recommends that any future changes proposed by the Company be justified first and foremost in response to a material impact to customers. However, because we do not believe that QF developers would be significantly harmed in this instance, **LEI recommends the Commission adopt the Form of Surety Bond as proposed by DESC.**

6.3 NOC Form

As discussed in Section 3.1.6 and described by Company witness Mr. Folsom, the NOC Form is a non-contractual form that QFs can deliver to DESC to "*[lock]-in avoided cost rates without having to execute a PPA*," and in exchange for this ability "*the QF must evidence a "substantial commitment"*

[199] Ibid. P. 11.

[200] Ibid. P. 12.

[201] Ibid. P. 11.

[202] Ibid. P. 12.

[203] DESC. *Rebuttal Testimony of John E. Folsom, Jr. on behalf of Dominion Energy South Carolina, Inc. (Docket No. 2021-88-E).* August 10, 2021. P. 5-6.

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on its part to sell the electric output of its facility to DESC, which will ultimately occur under a subsequent PPA."[204] Importantly, the establishment of a standard NOC Form was specifically required under Act No. 62, with Section 58-41-20(D) of the South Carolina Code stating:

> *A small power producer shall have the right to sell the output of its facility to the electrical utility at the avoided cost rates and pursuant to the power purchase agreement then in effect by delivering an executed notice of commitment to sell form to the electrical utility. The commission shall approve a standard notice of commitment to sell form to be used for this purpose that provides the small power producer a reasonable period of time from its submittal of the form to execute a power purchase agreement. In no event, however, shall the small power producer, as a condition of preserving the pricing and terms and conditions established by its submittal of an executed commitment to sell form to the electrical utility, be required to execute a power purchase agreement prior to receipt of a final interconnection agreement from the electrical utility.*[205]

The Company provides the most recent iteration of its proposed NOC Form (clean and redline copies) as Revised Exhibit No. JEF-1, which is included as an attachment to Mr. Folsom's rebuttal testimony. Specifically, DESC's NOC Form is an 8-page document that sets out the following items and terms, among others:

- the **name**, **address**, and **contact information** for the QF;
- **site location** and **technical details** related to the facility, such as: the maximum gross and net power production capacity as listed in the QF's self-certification form filed with FERC; 8760 production forecasts for the facility, which the QF is asked to include as an attachment to the NOC Form;
- requires the QF to **commence delivery of output** from its facility to DESC within 365 days of submitting the NOC Form;
- sets the **delivery term** at ten years, or "*such lesser period that may be mutually agreed to in a PPA executed by the Parties*";[206]
- requires the QF to submit a **non-refundable fee** of $5,000 along with its NOC Form; and
- sets forth the amount of **liquidated damages** owed to DESC in the event of termination of the NOC Form, which is equal to the following and must be received by the Company within 15 days: the sum of (i) $5,000 per MWac for maximum gross power production capacity, up to 20 MWac, plus (ii) $2,000 per MWac above 20 MWac.

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[204] DESC. *Direct Testimony of John E. Folsom, Jr. on behalf of Dominion Energy South Carolina, Inc. (Docket No. 2021-88-E).* June 29, 2021. P. 7.

[205] South Carolina Legislature. *South Carolina Code, Title 58, Chapter 41: Renewable Energy Programs.* May 16, 2019.

[206] DESC. *Revised Exhibit No. JEF-1 (Docket No. 2021-88-E).* August 10th, 2021. Page 11 of 17.

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As LEI understands from a review of the filings in the current proceeding, there are two changes to the NOC Form proposed by the Company which remain under dispute among the parties (specifically with CCEBA witness Mr. Levitas):

- **site control certification:** DESC seeks to add item 4(iii) to the list of certifications in the NOC Form, which is proposed to read: "*Seller has taken meaningful steps to obtain site control of the Project Site adequate to commence construction of the Facility*";[207] and
- **permitting and zoning certification:** DESC seeks to modify the language in item 4(iv) from "*[t]he documents attached hereto as Exhibit A establish that Seller has secured control of the Project Site for at least the length of the Delivery Term*" to "*[t]he documents attached hereto as Exhibit B establish that Seller has secured – or has submitted all applications and filing fees necessary to secure – all local permitting and zoning approvals for the Project Site necessary to commence construction of the Facility*."[208]

LEI's opinion of DESC's proposed changes to the NOC Form

LEI believes that the original language pertaining to site control should be maintained, and thus the changes proposed by DESC should be rejected.

The original language from the NOC Form read simply: "*[t]he documents attached hereto as Exhibit A establish that Seller has secured control of the Project Site for at least the length of the Delivery Term.*" This language was approved by the Commission in the 2019 avoided cost proceeding and was thus deemed to be commercially reasonable. LEI notes that this language also aligns exactly with language in the NOC Form approved in the equivalent 2019 avoided cost proceeding for the two Duke subsidiaries (i.e., Docket Nos. 2019-185-E and 2019-186-E).

With regards to requiring proof that the QF has secured or applied for all local permitting and zoning approvals necessary to commence construction, LEI first notes that a similar requirement is not included in the NOC Form of the two Duke subsidiaries. In addition, and as observed by Mr. Levitas, securing permits and approvals is a condition for achieving Commercial Operation as dictated in DESC's Standard Offer/Form PPA. Specifically, the Standard Offer/Form PPA requires that the QF must satisfy the following conditions (among others) to achieve Commercial Operation:

(continued…)

[207] Ibid.

[208] Ibid. Pages 11-12 of 17.

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> *(f) Seller has submitted to Buyer a certificate of an officer of Seller familiar with the Facility stating that, to the best knowledge of such officer after due inquiry,* ***all Permits, consents, licenses, approvals, and authorizations required*** *to be obtained by Seller from any Government Agency* ***to construct and to operate the Facility*** *in compliance with applicable law and this Agreement* ***have been obtained and are in full force and effect****, and that Seller is in compliance with the terms and conditions of this Agreement and each Project Contract in all material respects.* [emphasis added]

LEI believes this requirement is best addressed in the Standard Offer/Form PPA, where it is included already, and as such does not need to be included as a condition to execute the NOC Form.

Overall, LEI sees no compelling reason to adopt the changes proposed by DESC. The original language regarding site control was approved in the 2019 avoided cost proceeding and strikes a reasonable balance between protecting customers by ensuring QFs demonstrate a sufficient commitment to seeing their project through to completion, while not subjecting QFs to unreasonably onerous requirements. LEI also sees no reason for the language regarding site control to diverge from that included in the NOC Forms of other electric utilities operating in the state. For these reasons, **LEI recommends the proposed changes to the Company's NOC Form should be rejected.**

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7 Concluding remarks

LEI has carefully reviewed the evidence entered into the hearing record and conducted its own independent analysis of DESC's avoided cost methodology, rates, and terms and conditions. LEI discusses several observations made through its review of the proceeding in Section 7.1 below, which is followed in Section 7.2 by a summary of LEI's final opinion consistent with the language of the law.

7.1 Observations regarding the proceeding

7.1.1 Transparency and degree of cooperation

While LEI found DESC to be highly responsive to interrogatories, this is only one part of being transparent. LEI posed nine interrogatories through three rounds of requests, and on average DESC responded within two days, well within the statutory 20 days allowed to them.[209] However, transparency should be judged primarily not based on whether questions were answered when asked, but rather on whether the application was presented in a way which minimizes the need for interrogatories in the first place.

By this measure, LEI believes that there is room for improvement. For example, when presenting forecast results, it is important to also clearly discuss underlying assumptions such as gas prices, entry and exit assumptions, load growth assumptions, whether other scenarios were run, and other key drivers.[210] Confidential information need not be disclosed but can be described, as with the turbine costs discussed in Section 4.2.2.2. Presentation of SAS results is also unusual, and contrasts with the presentation of a detailed study of loss of load calculations that was submitted in the Duke subsidiaries' IRP proceeding and referenced in their joint avoided cost application. Providing more detail in the application itself would reduce stakeholder costs in reviewing the application, and would likely reduce the burden on the applicant of responding to interrogatories as well. It is also important that both the applicant and intervenors be granted the presumption of acting in good faith; criticisms are not simply "throwing rocks."

7.1.2 Relevance of developer returns

Developer returns are not relevant to the calculation of avoided costs. Furthermore, LEI found no evidence in the record to support the idea that developers are making 20-30% returns. Widely used industry sources, such as investment bank Lazard, cite much lower numbers; in its review of '*Solar PV versus Gas Peaking and Wind versus CCGT – Global Markets*', Lazard notes: "*equity IRRs [internal rates of return] are assumed to be… 7.5%-9% for the US.*"[211] In other publications, Lazard

[209] In response to LEI's nine data requests, DESC provided 613 files in 340 folders, totaling 4.02 GB of material.

[210] LEI generally agrees with the categories of necessary information to include in the application that appear in the list presented by Witness Sercy on p. 34 of his direct testimony, though perhaps not the level of granularity.

[211] Lazard. *Levelized Cost Of Energy, Levelized Cost Of Storage, and Levelized Cost Of Hydrogen: Solar PV versus Gas peaking and Wind versus CCGT – Global Markets.* October 19, 2020.

cites equity return numbers as high as 12%.[212] LEI's experience suggests developer equity return expectations across the development cycle in the range of 8-10%, which compares to DESC's authorized return on equity of 9.5%.[213] In addition, returns may vary throughout the development cycle, and developers receive no compensation for failed projects.[214]

7.1.3 One in ten years reliability standard

Transcripts of testimony refer to discussion of the "one in ten years" standard.[215] LEI believes these references should be to loss of load in one day in ten years.[216] This equates to 24 out of 87,600 hours, or around 0.03%.

7.1.4 Best way to procure renewables going forward

Chairman Williams asked what the best way would be to procure new renewables going forward.[217] LEI believes that the best approach, in jurisdictions where there is no access to competitive wholesale markets, is for the utility to be directed to issue requests for proposals RFPs consistent with an approved IRP. The utility itself can participate in the RFP provided it agrees to abide by the same contract terms as the bidders, and the utility may also be allowed to earn a reasonable fee for administering the contracts. An independent evaluator is necessary to oversee such processes to assure fairness, particularly in the event that the utility bid is selected. The utility can provide, as part of the RFP, some guidance regarding where on its system is most and least costly to interconnect. Instituting such an RFP-based process provides the benefits of coordination based on an IRP, price discovery based on a competitive process, and reasonable opportunities for incumbent participation.

7.1.5 Fallacies of misplaced precision

It is important to recognize the limitations on the ability to determine "actual" avoided costs. There will always be some degree of imprecision in the results, and the presence of small increments of time where costs may be over or underestimated does not mean that the overall estimates are necessarily unreliable. All models are assumptions driven, which means it is critical to understand both the assumptions and the limitations of the model. Suggestions that the

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[212] Ibid.

[213] S&P Global. *Dominion Energy concludes 1st SC electric rate case in constructive settlement.* August 27, 2021.

[214] For every successful project that meets a developer's hurdle rate, there may be two or three in which the developer has invested time, effort, and funds which do not proceed, meaning developer average returns across successful and failed projects are lower than the target in any single project.

[215] *See for example* Southern Reporting, Inc. *Transcript of Testimony and Proceedings, Volume 3 (Docket No. 2021-88-E, Hearing # 11947).* August 20, 2021. P. 145.

[216] *See for example.* NERC. *Standard BAL-502-RFC-02.*

[217] Asking DESC witness Mr. Neely, "*[s]o in your opinion, would it be better for Dominion Energy South Carolina to build, own, and operate their own solar facilities as opposed to buying power from solar QFs?*" (Source: Southern Reporting, Inc. *Transcript of Testimony and Proceedings, Volume 2 (Docket No. 2021-88-E, Hearing # 11947).* August 19, 2021. P. 153)

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assumptions used in the Guidehouse study are "grossly inadequate" or that the results are only a "rough approximation" are exaggerated, but claiming that simulations are "extremely reliable" is also misleading. Simulations are only "reliable" at presenting the way in which the interactions of assumptions produce a series of results based on the mechanics of the model. While LEI does not agree that "*accurately identifying the VIC in historical data is not practical*,"[218] it is also true that, while historical data can inform projections, the VIC needs to be based on future system configurations rather than those which prevailed in the past.

7.1.6 Holistic consideration of risk

Many discussions of avoided cost focus narrowly on the cost to consumers from additional contracts, and concerns regarding potential stranded costs – i.e., costs for capacity that is not needed in the future. But the goal of "*reduc[ing] the risk placed on the using and consuming public*"[219] may require a wider focus. After a period of historically low fuel prices, robust reserve margins, and falling costs for some types of capacity, it is possible that market conditions may have reached a trough. At the same time, recent extreme weather events have tested the resiliency of the electric power system.

Consideration of the date of first need may also need to incorporate the risk of reduced reliability (what if the utility's date of first need is wrong?) resulting in a risk of under-procurement. Furthermore, while in a falling cost environment, regulators may fear locking customers into contracts too early in the cost curve, in a period of potentially increasing inflation, shorter term PPAs may not protect consumers from rising costs. Availability of QFs also provides a degree of competition to utilities that otherwise have minimal exposure to it, and provides diversity of ownership and operation.

Although the Commission cannot correct rates in ten-year contracts that turn out to be unfavorable to customers, the converse is also true: if contracts are at prices that turn out to be less than true avoided costs, developers cannot seek an upwards revision to their contracts. The value of this hedge needs to be considered when assessing avoided cost levels. QFs are held to the fixed price in their contracts; they cannot return to ratepayers for more money if they experience cost overruns, or if after experiencing a succession of cost overruns, they cancel a project.

7.2 LEI's overall opinion consistent with directives from Act No. 62

As initially presented in Section 2.2, Act No. 62 directs the Commission to ensure the following in order to preserve the nondiscriminatory treatment of small power producers:

1. "*rates for the purchase of energy and capacity fully and accurately reflect the electrical utility's avoided costs*";

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[218] DESC. *Rebuttal Testimony of Eric H. Bell, P.E. on behalf of Dominion Energy South Carolina, Inc. (Docket No. 2021-88-E).* August 10, 2021. P. 5.

[219] South Carolina Legislature. *South Carolina Code, Title 58, Chapter 41: Renewable Energy Programs.* May 16, 2019.

2. "*power purchase agreements, including terms and conditions, are commercially reasonable and consistent with regulations and orders promulgated by the Federal Energy Regulatory Commission implementing PURPA*"; and
3. "*each electrical utility's avoided cost methodology fairly accounts for costs avoided by the electrical utility or incurred by the electrical utility, including, but not limited to, energy, capacity, and ancillary services provided by or consumed by small power producers including those utilizing energy storage equipment. Avoided cost methodologies approved by the commission may account for differences in costs avoided based on the geographic location and resource type of a small power producer's qualifying small power production facility.*"[220]

Along with assuring customers do not overpay for QF power, these can be thought of as among the Commission's key objectives in the avoided cost proceedings. LEI provides its overall opinion of DESC's 2021 avoided cost proceeding in the textbox below, which pulls together the conclusions reached in each of the previous sections of this report, and assesses these against the three objectives outlined above.

LEI's overall opinion of DESC's 2021 avoided cost proceeding

Based on a thorough and independent review of the application, testimony, and related filings and workpapers submitted in DESC's 2021 avoided cost proceeding, LEI recommends the following:

Avoided capacity cost calculations and resulting rates:

- **Avoided capacity cost rates:** LEI recommends avoided capacity cost rates of $81.99/kW-year ($0.30367/kWh) be adopted, which adjusts DESC's proposed rates to incorporate the impact of: (i) matching the size of the capacity change and the size of the generator, (ii) using EIA-based cost assumptions for an aero-CT, and (iii) inclusion of a 1.05 PAF.
- **Technology neutrality and seasonal allocations:** on the issue of technology neutrality, LEI recommends the use of a single avoided capacity rate. On the issue of seasonal allocation, LEI would recommend that going forward DESC assess the value of summer capacity, and provide more clarity and data substantiation on why it believes summer capacity has little to no value should it reach that conclusion.

(continued…)

[220] South Carolina Legislature. *South Carolina Code, Title 58, Chapter 41: Renewable Energy Programs.* May 16, 2019.

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Avoided energy cost calculations and resulting rates:

- **Avoided energy cost rates:** LEI recommends DESC's proposed PR-1 and standard offer non-solar QF energy rates be adopted.
- **Gas price outlook:** LEI views the price outlook used be DESC as within a reasonable range of potential outcomes.
- **Standard offer non-solar energy pricing periods:** LEI believes DESC's pricing periods for standard offer rates are sufficient for purposes of this proceeding.
- **Solar-specific energy rates:** LEI recommends that a single technology-neutral energy rate (i.e., DESC's proposed non-solar QF energy rates) be used in place of separate rates specific to standalone solar QFs.

VICs and mitigation protocol:

- **Appropriate level of the VIC:** LEI believes that the best approach is to continue with the VIC at the current interim level of $0.96/MWh subject to true up or down based on the results of a comprehensive independent study. However, if the Commission believes that it must set a fixed VIC as part of this proceeding, LEI concurs with Mr. Horii that DESC's proposed VIC for Tranche 1 of $1.80/MWh may be a reasonable value.
- **Calculation methodology for the SSVM mitigation protocol:** LEI agrees with DESC's proposed mitigation protocol and SSVM calculation, so long as the modifications which Mr. Bell noted in his rebuttal testimony are incorporated (namely (i) calculating solar QF production variability relative to forecast rather than actual, and (ii) allowing solar owners to aggregate production data from across the QFs that they own).
- **SSVM mitigation protocol – revenue quality meter requirement:** LEI recommends that to the extent the production meter recording QF generation as required under the Standard Offer/Form PPA can provide the necessary data, this meter should be used for the SSVM calculation.
- **SSVM mitigation protocol – deadline for submissions:** LEI recommends that Mr. Burgess's recommendation to extend the deadline to five business days be rejected, and the two-business day requirement proposed by DESC be adopted.
- **SSVM mitigation protocol – two-strike provision:** LEI recommends that DESC's proposed two-strike disqualification provision be rejected.

(continued…)

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Standard Offer/Form PPA:

- **Insurance requirements – timing of certificate delivery:** to ensure consistency throughout the Standard Offer/Form PPA, LEI recommends that Section 1 of Attachment D be approved as proposed by DESC, and that Section 9.1 of the PPA be amended to reflect the proposed 20-day requirement.
- **Insurance coverage amounts:** LEI recommends that the insurance coverage amounts in the Standard Offer PPA be maintained at current levels, and the proposed higher coverage amounts be approved only for the Form PPA.
- **Form of Surety Bond:** LEI recommends the Commission adopt the Form of Surety Bond as proposed by DESC.

NOC Form:

- **Site control:** LEI believes that the original language pertaining to site control should be maintained, and thus the changes proposed by DESC should be rejected.

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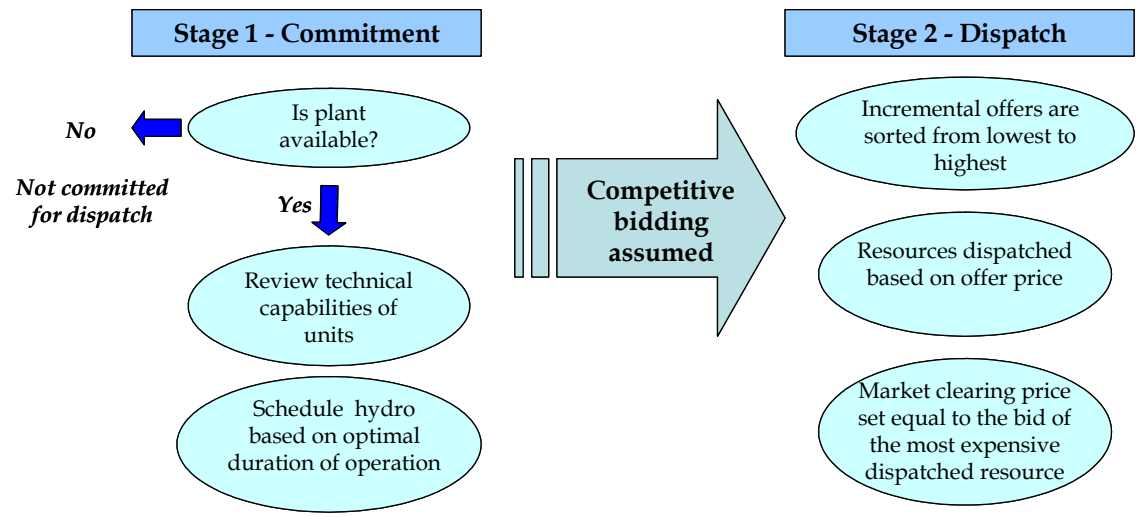
8 Appendix A: Overview of POOLMod forecasting methodology

For the wholesale energy prices outlook, we employed our proprietary simulation model, POOLMod, as the foundation for our electricity price forecast. POOLMod simulates the dispatch of generating resources in the market subject to least cost dispatch principles to meet projected hourly load and technical assumptions on generation operating capacity and availability of transmission.

POOLMod consists of a number of key algorithms, such as maintenance scheduling, assignment of stochastic forced outages, hydro shadow pricing, commitment, and dispatch. The first stage of analysis requires the development of an availability schedule for system resources. First, POOLMod determines a 'near optimal' maintenance schedule on an annual basis, accounting for the need to preserve regional reserve margins across the year and a reasonable baseload, mid-merit, and peaking capacity mix. Then, POOLMod allocates forced (unplanned) outages randomly across the year based on the forced outage rate specified for each resource.

Figure 18. POOLMod's two-stage process



POOLMod next commits and dispatches plants on a daily basis. Commitment is based on the schedule of available plants net of maintenance, and takes into consideration the technical requirements of the units (such as start/stop capabilities, start costs (if any), and minimum on and off times). During the commitment procedure, hydro resources are scheduled according to the optimal duration of operation in the scheduled day. They are then given a shadow price just below the commitment price of the resource that would otherwise operate at that same schedule (i.e., the resource they are displacing).

In addition, POOLMod is a transportation-based model, giving it the ability to take into account thermal limits on the transmission network.

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10 Appendix C: LEI's qualifications

10.1 About the expert

AJ Goulding, President of LEI, has over thirty years of experience in the energy sector, having advised clients in North America, Europe, Asia, and the Middle East.

AJ has direct experience with calculation of levelized costs of new utility investments, both from the perspective of the utility and from investors. AJ has led and completed many of LEI's regulatory engagements related to utility proceedings, including testifying in US proceedings and before the Ontario Energy Board, the Alberta Utilities Commission, and the Canada Energy Regulator, among other regulators. Through these engagements, AJ has directed and authored independent reports to commissions, prepared discovery questions, responded to interrogatories from parties, authored rebuttals, provided cross-examination of expert witnesses, and provided oral testimony.

In addition to his work at LEI, AJ serves as an Adjunct Associate Professor at Columbia University, where he teaches a graduate course on electricity market design and regulatory economics, while also supervising graduate workshops.

10.2 Background on the firm

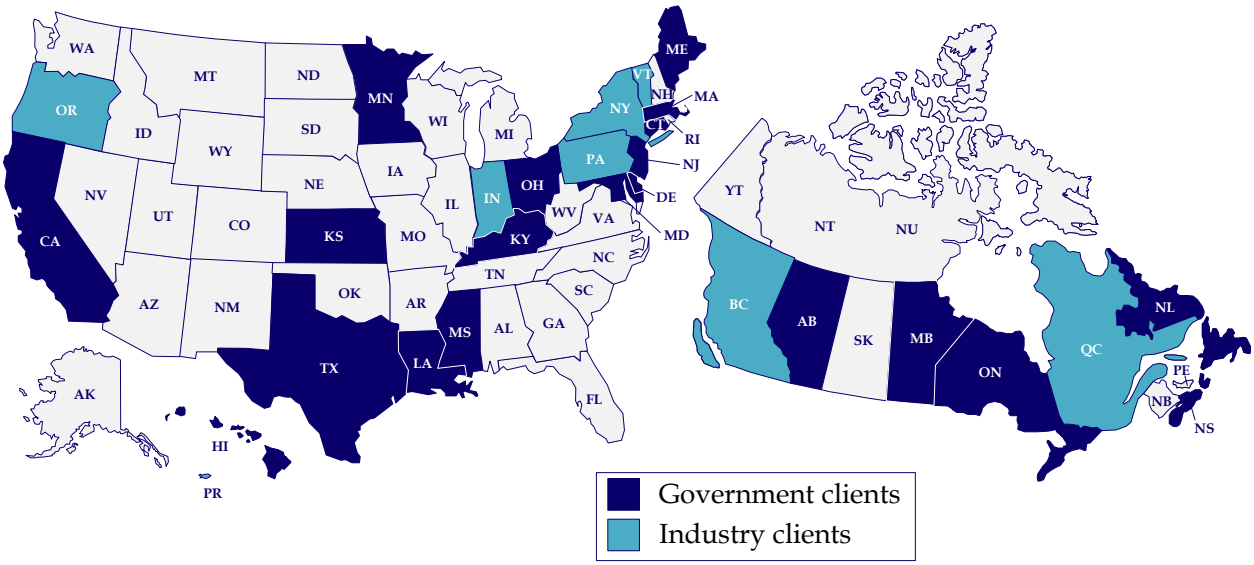
LEI is a US owned and operated global economic, financial, and strategic advisory professional services firm specializing in energy and infrastructure. The firm's areas of expertise are briefly described in Figure 19 below.

Figure 19. LEI's areas of expertise

LEI combines detailed understanding of specific network and commodity industries, such as electricity generation, transmission, and distribution, with sophisticated analysis and a suite of proprietary quantitative models to produce reliable and comprehensible results.

The firm had its start in 1996 during the initial round of liberalization and unbundling of electricity, gas, and water companies and markets in the US and overseas. Since then, LEI has advised regulators, private sector clients, market institutions, and governments on policy initiatives, market and tariff design, asset valuation, market power, and strategy in markets worldwide. Across North America specifically, LEI has advised regulatory and policy bodies in over twenty states and provinces, and worked for industry clients in a further eight states, territories, and provinces in engagements involving testifying before or facing government entities (see Figure 20). LEI's ability to comment on matters related to avoided cost calculations rest on a foundation of prior projects, including the design, application, and utilization of levelized cost of electricity ("LCOE") calculations; work for state regulators; expert testimony experience (both written and oral); expertise conducting PPA reviews and negotiations; and projects focused on the unique characteristics of renewably energy resources, including solar.

Figure 20. Selected LEI North American regulatory and policy engagements



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