COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matters of:

ELECTRONIC APPLICATION OF KENTUCKY UTILITIES COMPANY FOR AN ADJUSTMENT OF ITS ELECTRIC RATES, A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY TO DEPLOY ADVANCED METERING INFRASTRUCTURE, APPROVAL OF CERTAIN REGULATORY AND ACCOUNTING TREATMENTS, AND ESTABLISHMENT OF A ONE-YEAR SURCREDIT	)	CASE NO. 2020-00349
ELECTRONIC APPLICATION OF LOUISVILLE GAS AND ELECTRIC COMPANY FOR AN ADJUSTMENT OF ITS ELECTRIC AND GAS RATES, A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY TO DEPLOY ADVANCED METERING INFRASTRUCTURE, APPROVAL OF CERTAIN REGULATORY AND ACCOUNTING TREATMENTS, AND ESTABLISHMENT OF A ONE-YEAR SURCREDIT	)	CASE NO. 2020-00350

KENTUCKY SOLAR INDUSTRIES ASSOCIATION, INC.
RESPONSE TO KENTUCKY PUBLIC SERVICE COMMISSION
STAFF'S SECOND REQUEST FOR INFORMATION

Comes now the Kentucky Solar Industries Association, Inc. (KYSEIA), by and through counsel, and submits its response to Kentucky Public Service Commission Staff's Second Request for Information.

Respectfully submitted,

/s/David E. Spenard
Randal A. Strobo
Clay A. Barkley
David E. Spenard

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NOTICE AND CERTIFICATION FOR FILING

Undersigned counsel provides notice that the electronic version of the paper has been submitted to the Commission by uploading it using the Commission's E-Filing System on this 20th day of April 2021, and further certifies that the electronic version of the paper is a true and accurate copy of each paper filed in paper medium. Pursuant to the Commission's March 16, 2020, and March 24, 2020, Orders in Case No. 2020-00085, *Electronic Emergency Docket Related to the Novel Coronavirus Covid-19*, the paper, in paper medium, will be filed at the Commission's offices within 30 days of the lifting of the state of emergency.

/s/ David E. Spenard
David E. Spenard

NOTICE REGARDING SERVICE

The Commission has not yet excused any party from electronic filing procedures for this case.

/s/ David. E. Spenard
David E. Spenard

Kentucky Solar Industries Association, Inc.
KY PSC Case No. 2020-00349 and
Case No. 2020-00350
Response to Commission Staff Second Request for Information

Witnesses Responsible:
Benjamin D. Inskeep

1. Refer to the Direct Testimony of Benjamin D. Inskeep, page 15, lines 3–21. In order to determine the value of exports over a long-term time horizon, state whether there is a best practice for determining an appropriate discount rate to use in such a long-term study (e.g. Weighted Average Cost of Capital or Prime rate). Provide references to support your response.

Response:

The choice of discount rate or rates in a cost-benefit analysis is particularly critical because it can have a substantial impact on the overall results. Regardless of the discount rate or rates selected, Mr. Inskeep recommends the use of sensitivity analyses with respect to the discount rate(s) so that there is transparency and clarity in how the choice of discount rate(s) impacts the overall results and conclusions.

The best practices for considering the appropriate discount rate are described in the National Standard Practice Manual for Benefit-Cost Analysis of Distributed Energy Resources. It explains (p. G-1) that "There are three categories of discount rates typically considered for DER assessments: WACC [weighted average cost of capital], average customers' discount rate, and societal discount rate. A fourth option is some combination of these three categories." It goes on to provide considerations for selecting a discount rate based on a series of questions related to time preference considerations and risk considerations. *See* "National Standard Practice Manual for Benefit-Cost Analysis of Distributed Energy Resources," Appendix G, available at https://www.nationalenergyscreeningproject.org/wp-content/uploads/2020/08/NSPM-DERs_08-24-2020.pdf.

Value of solar studies conducted for jurisdictions have used different discount rates. For instance, the District of Columbia Value of Solar study used a lower discount rate of 3% compared to Pepco's WACC because many avoided costs are not capital costs (e.g., avoided energy costs, including line losses, and avoided RPS costs) and because many policy goals in that jurisdiction implied a greater emphasis on future benefits, suggesting the lower discount rate was appropriate. It also included sensitivity analyses on the discount rate used in determining the social cost of carbon (5%, 3%, and 2.5%). *See* "Distributed Solar in the District of Columbia," pp. 152-154 (excerpts attached as exhibit 1), available at https://www.synapse-energy.com/sites/default/files/Distributed-Solar-in-DC-16-041.pdf.

The Minnesota Value of Solar calculation, as well as a value of solar study completed for Maine, used different discount rates for different categories of benefits. In general, the WACC is used for most categories. The "risk free" discount rate, based on the yields of current Treasury securities,

is used for Avoided Fuel Costs. The environmental discount rate, based on a societal discount rate used for future environmental benefits, is used in the calculation of Avoided Environmental Costs. *See* "Minnesota Value of Solar: Methodology," pp. 20-21 (excerpts attached as exhibit 2), available at https://mn.gov/commerce-stat/pdfs/vos-methodology.pdf. *See also* "Maine Distributed Solar Valuation Study," pp. 28-29 (excerpts attached as exhibit 3), available at https://www.maine.gov/mpuc/electricity/elect_generation/documents/MainePUCVOS-FullRevisedReport_4_15_15.pdf.

Kentucky Solar Industries Association, Inc.
KY PSC Case No. 2020-00349 and
Case No. 2020-00350
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Witnesses Responsible:
Justin R. Barnes

2. Refer to the Direct Testimony of Justin R. Barnes (Barnes Testimony), pages 8–9. Explain what methodology you would propose for calculating a fuel price hedging value to include in the avoided energy cost. Provide as much detail as possible, including citations to substantiate the approach.

Response:

Mr. Barnes recommends that fuel hedging value be determined under methodology used by Clean Power Research (CPR) in its 2015 Maine Distributed Solar Valuation study for the Maine Public Utilities Commission (see link below). A complete description of the methodology is available starting at p. 39 (PDF at p. 45, excerpts attached) under the heading of Avoided Fuel Price Uncertainty. The 25-year inputs and levelized results of the calculation are shown in Table 35 at p. 99 (PDF at p. 105, excerpt attached). The steps in the methodology are shown below:

- Obtain the natural gas futures price for year i.
- Calculate the amount of avoided fuel based on an assumed heat rate and on the amount of anticipated plant degradation in year i, and calculate this future cost.
- Obtain the risk-free interest rate corresponding to maturation in year i.
- Discount the expense to obtain the present value using the risk-free discount rate.
- Subtract from this result the energy value, which is obtained by discounting the future expense at the utility discount rate. Note that this may not be equal to the energy value obtained through the use of electricity market values.
- The remaining value is the avoided risk.
- Levelize the avoided risk value using the risk-free discount rate.

This approach reflects a conceptual framework under which a utility invests money that it would have otherwise needed to spend to fix its future natural gas costs in a risk free security. The gross cost of generating electricity using those fixed prices is determined using a representative heat rate for a natural generation unit. The energy value of the generation (discounted at a higher utility discount rate) is subtracted from the gross cost of generating electricity based on a fixed price contract to arrive at the hedge value. CPR performed this calculation based on an assumed solar generation annual profile, but the same approach could be used for other technologies.

CPR Maine Solar Valuation Study: https://www.maine.gov/mpuc/electricity/elect_generation/documents/MainePUCVOS-FullRevisedReport_4_15_15.pdf.

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3. Refer to the Barnes Testimony, page 20, lines 11–12.

    a. List and cite "the assumptions used in the IRP" that should be used to calculate "the capacity contribution applied to non-dispatchable resources, such as solar or wind".

    b. Describe a methodology for translating these assumptions into a $/kWh avoided capacity cost for such resources. Provide as much detail as possible, including citations to substantiate the calculation approach.

Response:

This response responds to both subparts of this question collectively because they involve inter-related concepts.

(a-b) As an initial matter, there are two ways that an avoided capacity credit for QF generation could be calculated:

- Approach #1: A capacity credit ($/kWh) that applies only to generation delivered during defined on-peak hours, or
- Approach #2: A technology-differentiated rate that applies to all delivered energy, where capacity compensation is modeled for a hypothetical like resource and spread out over annual modeled production for that resource.

Approach #1 has the benefit of not requiring resource assumptions or modeling because compensation is, in effect, self-adjusting for the generation characteristics of an individual generation unit. However, it has the drawback of potentially providing highly inconsistent revenue streams under circumstances where capacity compensation is only provided during a few months of an annual period (e.g., a summer-only on-peak period), and may entail additional metering charges. The seasonality of compensation may create cash flow issues for QFs and departs from how utilities recover costs from like rate-based assets on a consistent year-round basis.

With respect to subpart (a) of this request, only Approach #2 requires the pre-determination of an effective capacity contribution for different types of resources. In many utility IRPs this is defined as a specific % of nameplate for hypothetical resource additions (e.g., 100 MW of solar, wind, etc.) expected to be available to serve peak needs. In the utilities 2018 Joint IRP, KU/LGE stated that the Brown Solar Facility was assumed to produce 90% of its nameplate capacity rating at the time of the peak (see p. 6-18, footnote 40 at p. 64 of the PDF linked below, excerpt attached).

However, the utilities also specify a zero contribution to winter peaks (see p. 8-7 at PDF p. 87, excerpt attached).

2018 Joint IRP Volume I: https://psc.ky.gov/pscecf/2018-00348/rick.lovekamp%40lge-ku.com/10192018102925/3-LGE_KU_2018_IRP-Volume_I.pdf

It is not immediately clear to Mr. Barnes how the companies incorporated either seasonal capacity contribution amount into their assessment of potential future resources. Regardless of the convention used to determine effective capacity for a resource in a utility's IRP, the assumed capacity contribution uses in the IRP (i.e., % of nameplate) should also be used to assign a capacity contribution for like QF resources. The methodology for establishing the appropriate capacity contribution for different resources should be reviewed, and if necessary modified, in a utility's IRP.

A resource's effective capacity value is most commonly assessed based on its effective load carrying capability (ELCC), which is directly tied to analyses of loss of load probability (LOLP). In order to develop an ELCC value based on LOLP, each hour of a year with a non-zero LOLP is given a specified weight based on that probability. Hourly production for different resource types is multiplied by each hourly weight and the result is then summed to produce an annual peak availability factor in MW. The ELCC in percentage terms is the peak availability factor divided by the nameplate capacity of a resource. The hourly production could be determined based on a modeled "typical" system, or be based on actual metered generation from systems already in place within a given utility territory. The Companies' Loss of Load Expectation (LOLE) study from their 2018 Joint IRP can be used to establish the hourly weighting. It is Mr. Barnes' understanding that the Companies also use LOLE as an input to calculating class allocations of generation capacity costs in their cost of service study. Mr. Barnes has not reviewed the results of this analysis and whether or how if might differ from the study used in the 2018 Joint IRP. His reference to "the assumptions used in the IRP" is reflective of the fact that LOLE studies are commonly used in IRPs and typically not used directly in class cost of service studies.

The development of a capacity rate should also use IRP-based assumptions, most specifically the capital cost and fixed operations and maintenance ("O&M") costs for the next capacity resource. The Companies' 2018 Joint IRP suggest that this would be a natural gas combined cycle unit (see IRP Volume I at Table 15, PDF at p. 44, excerpt attached). Volume III of the 2018 Joint IRP (PDF at p. 25, excerpt attached) lists capital costs for a new NGCC unit at $1,070/kW and fixed O&M costs at $11/kW-year.

2018 Joint IRP Volume III: https://psc.ky.gov/pscecf/2018-00348/rick.lovekamp%40lge-ku.com/10192018102925/5-LGE_KU_2018_IRP-Volume_III.pdf

As noted above, a capacity rate could be defined as a rate for energy production during on-peak hours (Approach #1) or a rate for all production from specific resource types (Approach #2). For Approach #1, the on-peak hours should utilize the Company's LOLE study to appropriate define the appropriate on-peak period(s). This would be an exercise similar to how pricing windows for time-varying retail rates are typically developed. The specific rate would be arrived at by dividing the annualized capacity-related revenue requirement for the proxy unit ($/kW-year) over the

number of on-peak hours, producing a $/kWh rate. For example, a capacity rate of $50/kW-year divided across 720 annual on-peak hours translates to a rate of $0.0694/kWh.

Under Approach #2 the annualized capacity-related revenue requirement would remain the same, but the effective capacity contribution for a specific resource type would be used to pro-rate the capacity value. For instance, if the annualized capacity cost is $100/kW and the solar ELCC is 40%, the solar capacity value is $40/kW. That amount would be divided by annualized solar production using the same assumptions that were used to determine the ELCC. For instance, if annualized solar production is 1,600 kWh/kW of nameplate, the capacity rate is $0.025/kWh for all solar production.

Please also note that demand-related losses should be incorporated into the capacity rate as an adder. For instance, a QF that does not export to the transmission system does not incur transmission losses and the rate should therefore be grossed up to account for that fact (e.g., multiplied by 1.03 if transmission demand losses are 3%).

The Minnesota Value of Solar (VOS) Methodology used to establish rate credits due to customers of community solar garden facilities contains a more detailed description of the calculation of avoided capacity costs, inclusive of the discounting and levelizing protocols that were used to develop 25-year levelized rates. The Minnesota VOS methodology is reflective of Approach #2 as it is specific to solar and applies a capacity rate to all solar production. However, the basic methodology could also be applied to Approach #1 by omitting the ELCC proration step and instead using the full annualized capacity cost to define an on-peak

MN VOS Methodology: https://mn.gov/commerce-stat/pdfs/vos-methodology.pdf

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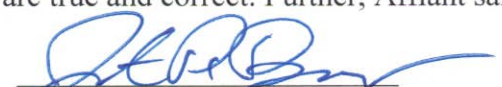
AFFIDAVIT OF JUSTIN BARNES
VERIFICATION

JURISDICTION)
)
County of Wise, Virginia)

The undersigned, Justin Barnes, being first duly sworn, states the following: The Responses to the Commission Staff's second set of Data Requests attached thereto constitute the direct testimony of Affiant in the above-styled case. Affiant states that he would give the answers set forth in the Responses if asked the questions propounded therein. Affiant further states that, to the best of his knowledge, his statements made are true and correct. Further, Affiant saith not.



Name of Witness

Before me appeared Justin Barnes

SUBSCRIBED AND SWORN to before me on this 20th day of ~~March 2021~~ April 20, 2021 mH.

NOTARY PUBLIC

My Commission Expires: 06/30/2023

City/County of Wise
Commonwealth of Virginia
The foregoing instrument was acknowledged before me
this 20th day of April 2021 by
Justin Barnes
(Name of person seeking acknowledgment)

Notary Public's signature
Notary registration number: 7627853
My commission expires: 06/30/2023

MARY LEE HAGY
NOTARY PUBLIC
REG. #7627853
MY COMMISSION EXPIRES
06/30/2023
COMMONWEALTH OF VIRGINIA

Notary Seal

COMMONWEALTH OF KENTUCKY

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AFFIDAVIT OF BENJAMIN INSKEEP
VERIFICATION

JURISDICTION)
)
County of Marion)

The undersigned, Benjamin Inskeep, being first duly sworn, states the following: The prepared responses constitute the testimony of Affiant in the above-styled case. Affiant states that he would give the answers set forth in the responses if asked the questions propounded therein. Affiant further states that, to the best of his knowledge, his statements made are true and correct. Further, Affiant saith not.

Benjamin Inskeep

SUBSCRIBED AND SWORN to before me this 20th day of April, 2021.

RYAN T LEWIS
NOTARY PUBLIC
SEAL
STATE OF INDIANA
Commission Number NP0732597
My Commission Expires 03/24/2029

NOTARY PUBLIC

My Commission Expires: _____