COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter 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**

In the Matter of:

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**

SUPPLEMENTAL SURREBUTTAL TESTIMONY OF DAVID S. SINCLAIR VICE PRESIDENT, ENERGY SUPPLY AND ANALYSIS KENTUCKY UTILITIES COMPANY AND LOUISVILLE GAS AND ELECTRIC COMPANY

Filed: August 13, 2021

Table of Contents

Section 1 – Introduction and Overview

Q. Please state your name, position, and business address.

A. My name is David S. Sinclair. I am Vice President, Energy Supply and Analysis for Kentucky Utilities Company ("KU") and Louisville Gas and Electric Company ("LG&E") (collectively "Companies"), and an employee of LG&E and KU Services Company, which provides services to KU and LG&E. My business address is 220 West Main Street, Louisville, Kentucky 40202.

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to respond to the new calculation of avoided capacity rates in Mr. Barnes' Supplemental Rebuttal testimony filed on August 5, 2021, and show that, should the Commission adopt Mr. Barnes's recommended avoided capacity prices for QFs, our customers will pay tens of millions of dollars more for solar energy every year for 20 years than would otherwise be necessary if the same solar energy was procured in the competitive market; such competitive market prices should serve as the ceiling, not the floor, of avoided-cost prices the Companies' customers should pay QFs under PURPA requirements.

Q. Are you sponsoring any exhibits to your testimony?

A. Yes. I am sponsoring the following exhibits to my rebuttal testimony:

Supplemental Surrebuttal Exhibit DSS-1	All-in Rates
Supplemental Surrebuttal Exhibit DSS-2	Financial consequences
Supplemental Surrebuttal Exhibit DSS-3	Solar interconnection queue

The workpapers supporting my exhibits are filed with my testimony.

Section 2 – Analysis of Mr. Barnes's Proposed QF Rates

Q. Did Mr. Barnes propose any new changes to the Companies' SQF and LQF rates in his supplemental rebuttal testimony that were not contained in any of his prior testimony in this case?

A. Yes. Beginning at page 18, line 3 and concluding at page 20 line 3 of his supplemental rebuttal testimony, Mr. Barnes introduces entirely new information in support of a general argument made in his March 5, 2021 direct testimony. Specifically, at pages 18 through 20, Mr. Barnes now provides for the first time a new calculation of his "proxy unit method" based on the cost of natural gas cycle unit spread over 791 hours in the summer to present an avoided cost rate. Mr. Barnes first presented this proxy unit method argument in his March 5, 2021 direct testimony but omitted the calculation and detailed hours now included in his rebuttal testimony to support his contention.[1] In his July 13, 2021 Supplemental Testimony, although Mr. Barnes continued to express his general support for this recommendation, he made no specific mention of his proxy unit methodology argument and did not provide further support for or any calculation of it.[2]

On page 19 in Table 3 and on page 61 in Table 9 of his Supplemental Rebuttal Testimony he now offers his "Recommended On-Peak Capacity Rates for Riders SQF & LQF." His recommended capacity rates are based on the levelized annual cost of a simple cycle combustion turbine ("CT") converted to a $/MWh energy rate by

[1] *Direct Testimony of Justin R. Barnes on Behalf of Kentucky Solar Industries Association, Inc.*, Case No. 2020-00349, pp. 4, 20 - 21; *Direct Testimony of Justin R. Barnes on Behalf of Kentucky Solar Industries Association, Inc*., Case No. 2020-00350, pp. 4, 20-21.

[2] *Supplemental Testimony of Justin R. Barnes on Behalf of Kentucky Solar Industries Association, Inc.*, Case Nos. 2020-00249 and 2020-00350, p. 16.

assuming that the totality of the CT's levelized annual cost will be recovered over 791 summer on-peak hours.[3] He then adjusts the $/MWh price for transmission losses to determine his recommended prices for QF projects that are interconnected to the distribution system. Mr. Barnes states that the prices in Table 9 are for "Tranche 1," which appears to be for any resource that would meet the Companies' potential 100 MW capacity need in 2028. To meet the Companies' potential incremental 900 MW capacity need in 2034 he asserts that "[t]he same methodology should also be employed for Tranche 2 of capacity pricing" but does not provide the calculations. Previously in this case, notwithstanding two opportunities to do so, Mr. Barnes had proposed no values for SQF or LQF rates – avoided capacity or energy.

Q. Although Mr. Barnes did not provide the avoided capacity prices for Tranche 2 were you able to calculate these prices using his methodology?

A. Yes. I was able to replicate his method for calculating Tranche 1 avoided capacity prices and thus was able to apply the same methodology to determine pricing for Tranche 2 as he recommended. These prices are shown in Table 1 in Supplemental Surrebuttal Exhibit DSS-1.

Q. Have you calculated the all-in rate for LQFs using Mr. Barnes's newly proposed rates?

A. Yes. Table 2 in Supplemental Surrebuttal Exhibit DSS-1 shows the all-in rates (combines avoided capacity and avoided energy) for a single axis tracking solar facility by beginning contract year (2022 through 2026) for Tranche 1 and 2 using two avoided energy prices. In one case, the avoided energy rate of $24.32/MWh, which is the

[3] Barnes Supplemental Rebuttal at page 18, lines 19-21, and page 19, lines1-9.

Companies' 20-year avoided energy cost but levelized at Mr. Barnes's recommended risk-free rate, is used.[4] Note that I do not agree with his use of a risk-free discount rate but am using it only because I am trying to produce what I believe his recommendation would be if he had provided the calculation. The second all-in energy rate is the average annual on-peak PJM South Import LMP for 2017 to 2019 of $32.54/MWh that was previously discussed by Mr. Barnes in the context of NMS-2 avoided energy rates.[5]

I included two energy prices in my analysis because, although Mr. Barnes's supplemental rebuttal testimony provided clarity for the first time about his new recommended avoided capacity prices and the hours in which they should apply, his recommendations about an avoided energy price remain vague and uncertain. Therefore, it was necessary to use two energy prices in my analysis of the impact of the avoided generation capacity proposal Mr. Barnes specified for the first time in his supplemental rebuttal testimony.

Finally, to calculate the all-in LQF rates for a single axis tracking solar project, it was necessary to weight Mr. Barnes's avoided capacity prices by the amount of energy that such a project is expected to produce during the 791 summer on-peak hours that the rate would apply. This weighting was based on the solar profiles that I used to calculate avoided energy and capacity prices in Exhibits DSS-1 and DSS-2 to my Supplemental Direct Testimony.[6]

Table 2 in Supplemental Surrebuttal Exhibit DSS-1 shows that the Tranche 1 all-in LQF rate for a single axis tracking solar project whose contract begins in 2026

[4] Barnes Supplemental Rebuttal at page 28, lines 5-9.
[5] *See* Sinclair Supplemental Rebuttal at page 14.
[6] *See* Companies' response to PSC 7-34.

would range from $55.33/MWh to $63.55/MWh depending on the avoided energy price. The same QF meeting the projected Tranche 2 capacity need (after 100 MW of Tranche 1 has been met) would receive a price of $41.93/MWh to $50.15/MWh. The lower price for Tranche 2 is driven by the discounting of the 2034 capacity need to 2026. Clearly customers should not pay full price today for something they do not need until 2034.

Tables 4a and 4b in Supplemental Surrebuttal Exhibit DSS-1 show the percent difference of Mr. Barnes's recommended all-in LQF prices for single axis tracking solar compared to market prices represented by the Rhudes Creek Solar PPA and the LevelTen price index shown in Table 3. These tables show that Mr. Barnes's recommended prices for a contract beginning in 2026 range from 27 percent to 128 percent higher than market, depending on the tranche, avoided energy price, and market price alternative. These differences in price are huge and indicate that Mr. Barnes's proposed methodology is not remotely reflective of actual costs that customers could pay to procure solar energy.

It is important to remember that the LQF rate is available to projects up to 80 MW, which is very similar in size to the 100 MW Rhudes Creek Solar PPA that I used as a market indicator and the majority of the solar proposals from the Companies' 2019 renewable RFP.[7] It would clearly be imprudent to pay $41.93/MWh for solar energy when the exact same solar energy could be obtained for around $28/MWh to $33/MWh in the market.

[7] *See, e.g., Electronic Application of Louisville Gas and Electric Company and Kentucky Utilities Company for Approval of a Solar Power Contract and Two Renewable Power Agreements to Satisfy Customer Requests for a Renewable Energy Source under Green Tariff Option #3*, Case No. 2020-00016, Direct Testimony of David S. Sinclair, Exh. DSS-2, "2019 Resource Assessment: Renewable RFP" (PSC Ky. Jan. 23, 2020).

Q. Please explain why your analysis uses contracts beginning in 2026.

A. Based on the Companies' recent experience in the market for solar PPAs, it takes around 3 to 4 years to develop, finance, and construct a solar project of the size that would qualify for a transmission connected QF (maximum QF size is 80 MW). While it is conceivable that the project could come on-line in 2025, the extra $2/MWh to $3/MWh for 20 years available for the 2026 beginning year versus the 2025 price would encourage developers to delay their project if possible.

Q. Have you analyzed the financial implications to customers' energy costs should the Commission adopt Mr. Barnes's proposed QF rates?

A. Yes, Tables 2a and 2b in Supplemental Surrebuttal Exhibit DSS-2 show that Mr. Barnes's recommended LQF rates applied to single axis tracking solar projects would increase customer's annual costs for solar energy by $24.3 million to $54.7 million, depending the avoided energy price and market price alternative. For example, if all 1,000 MW of 2028 and 2034 capacity need was met by new solar LQFs beginning in 2026 using PJM avoided energy pricing, then customers' annual cost for solar energy would be $54.7 million higher than a market-based PPA like Rhudes Creek Solar. Since these prices would be available for 20 years, the total extra cost to customers over that time period would be almost $1.1 billion.

A comparison using the lower avoided energy rate based on the Companies' costs with the higher LevelTen solar index price would still cause annual customer costs to increase by $24.3 million or $486 million over 20 years. It is imprudent to burden customers with such excessive costs when the same exact solar technology can be procured for tens of millions less.

Finally, the financial comparisons shown in Tables 2a and 2b exclude any renewable energy certificate ("REC") value that is typically part of a market priced PPA such as Rhudes Creek Solar. Year-to-date, the Companies have sold Brown solar RECs for $7.80/REC in order to reduce the cost of the project for customers. Similar REC sales are planned that will reduce the energy costs from the Rhudes Creek Solar PPA that will be used to serve all customers' load. As I stated in my Supplemental Direct Testimony, FERC has previously ruled that RECs are not part of a QF contract.[8] As can be seen in Tables 2a and 2b, the annual solar energy from 1,000 MW would be around 2.3 million MWh. Therefore, every $1 in REC price sales from a market price alternative would increase the relative cost of a QF by $2.3 million annually. At current REC prices, the forgone savings from the market price alternative compared to the LQF would cost customers $17.94 million annually.[9]

Q. Is it reasonable to expect that 1,000 MW of LQF solar will be installed should the Commission adopt Mr. Barnes's recommended rates?

A. Yes. Based on current market conditions for solar projects and the tremendous price incentive that Mr. Barnes's recommended QF pricing would be to large solar developers, there is every reason to expect the 1,000 MW of LQF solar will be installed should the Commission adopt Mr. Barnes's recommended rates. First, the data in our 2019 renewable RFP, the LevelTen solar price index, and recently Commission-approved solar PPAs with Big Rivers Electric Corporation[10] shows that developers are

[8] Sinclair Supplemental at page 6, lines 14-17.
[9] $7.80 per REC multiplied by 2.3 million MWh is $17.94 million.
[10] *See Electronic Application of Big Rivers Electric Corporation for Approval of Solar Power Contracts*, Case No. 2020-00183, Big Rivers' Filing in Response to Commission Order on Confidential Treatment Application Exhs. 1-3 (PSC Ky. Apr. 23, 2021).

willing to accept significantly less than $41.93/MWh (low end of Mr. Barnes's recommended price range) for solar projects in the 80 MW range. Second, as shown in Supplemental Surrebuttal Exhibit DSS-3, the LG&E and KU transmission system presently has around two dozen projects in its generation interconnection study queue. Although many of these projects are in excess of 80 MW, given Mr. Barnes's highly lucrative proposed LQF rate, it would make only good economic sense for developers to break these projects into 80 MW blocks to qualify for the QF rate. Based on my professional experiences to date, I can assure this Commission that developers will respond to such a large financial incentive.

Q. Please explain why your analysis focuses on just single axis tracking solar for transmission connected LQF projects.

A. I focused on this particular example for several reasons. First, single-axis tracking is the current state of the art for large solar installations and an 80 MW QF would likely use such a technology. Second, while Mr. Barnes's recommended pricing claims to be "technology neutral," Kentucky is not naturally situated with favorable wind generation sites. In fact, I don't recall ever seeing a proposal in past RFPs from a Kentucky wind project. A QF project must be located on the LG&E and KU transmission system otherwise there is no obligation to purchase.

Finally, in the interest of keeping the presentation straightforward and easier to understand, I have focused on the most likely technology and projects that would be incented by Mr. Barnes's pricing. The financial cost of SQF rates based on Mr. Barnes' newest methodology is even greater since his recommended avoided capacity prices for "distribution connected" QFs is even higher. As the person responsible for

assembling the lowest reasonable cost generation portfolio to serve our customers' energy needs, my concerns with Mr. Barnes's recommended QF rates is the rate level, not its application to a particular project size or technology.

Q. Are there any potential LQF and SQF costs that Mr. Barnes has discussed that are not included in your financial analysis of his newly proposed avoided generation capacity costs for QFs?

A. Yes. Mr. Barnes's testimony on his newly proposed QF generation capacity rates does not specify whether he is recommending including a CO_2-cost adder for LQF and SQF rates. Therefore, I did not include that in my financial analysis. However, if he is recommending a CO_2-cost adder, then my financial analysis indicates that every $1/MWh would add $2.3 million annually to the cost of his newly recommended avoided generation capacity cost rates.

Q. Is there a simple explanation for why Mr. Barnes's newly proposed SQF and LQF avoided capacity rate results in such a high cost for solar generation compared to purchasing solar in the market?

A. Yes. His methodology assumes that all generation technology is interchangeable – a MW is a MW regardless of the technology used to create it. He assumes that a combustion turbine ("CT") has value only in 791 hours a year (June to September, Monday through Friday, 11 a.m. to 8 p.m.) and so the full annual cost of the generator must be paid for in those 791 hours. This is simply not true. A CT is a useful generation technology because it can start and ramp quickly, run for a short number of hours or for days at a time if necessary, and can operate in all weather conditions. These capabilities are reflected in the price of the technology. The Companies have a fleet of

over 2,000 MW of CTs because their capability is critical to reliably serving load throughout the year—all 8,760 hours of the year, not just 791 hours per year. On the other hand, in the real-world marketplace, developers of solar projects know that their technology is not the same as a CT and that their competition is other solar developers. To be successful, they price their technology according to its capabilities and their cost structures, not those of a CT. The financial analysis presented in my testimony is "technology neutral" because it was utility scale QF-priced solar versus utility scale market-priced solar.

Section 3 – Summary and Recommendations

Q. Please summarize your recommendations regarding Mr. Barnes's new approach to setting LQF and SQF avoided capacity rates.

A. The Commission should reject Mr. Barnes's recommended avoided capacity rates. Setting QF rates at the level now recommended by Mr. Barnes would increase customers' annual energy costs by tens of millions for the exact same solar energy that could otherwise be obtained from a market-based source clearly fails the regulatory definition of avoided costs. This is particularly important to bear in mind in the context of QFs, from which the Companies must purchase energy and capacity with relatively few limitations. Therefore, Mr. Barnes's efforts to promote solar comes at a highly unreasonable price to customers. More solar generation is likely going to be a part of the Company's future generation fleet, but it should be added using the same lowest-reasonable cost, market-based principles that have served customers well for decades.

Q. Does this conclude your testimony?

A. Yes, it does.

VERIFICATION

COMMONWEALTH OF KENTUCKY)
)
COUNTY OF JEFFERSON)

The undersigned, **David S. Sinclair**, being duly sworn, deposes and says that he is Vice President, Energy Supply and Analysis for Kentucky Utilities Company and Louisville Gas and Electric Company and an employee of LG&E and KU Services Company, and that he has personal knowledge of the matters set forth in the foregoing testimony, and that the answers contained therein are true and correct to the best of his information, knowledge, and belief.

David S. Sinclair

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 13th day of August 2021.

Notary Public

Notary Public ID No. KYNP32193

My Commission Expires:

06-25-2025

Table 1: On-Peak Capacity Rates (Mr. Barnes's Proposed Methodology)

	20-Year Contract Beginning:				
Tranche 1 (2028 Capacity Need)	**2022**	**2023**	**2024**	**2025**	**2026**
Levelized CT Cost ($/MW)	72,488	81,175	90,514	100,553	111,339
Transmission Connected Rate ($/MWh)	91.64	102.62	114.43	127.12	140.76
	20-Year Contract Beginning:				
Tranche 2 (2034 Capacity Need)	**2022**	**2023**	**2024**	**2025**	**2026**
Levelized CT Cost ($/MW)	35,449	41,635	48,306	55,496	63,241
Transmission Connected Rate ($/MWh)	44.82	52.64	61.07	70.16	79.95

Table 2: All-In Costs (Mr. Barnes's Proposed Methodology; $/MWh with No Escalation)[1]

		20-Year Contract Beginning:				
Tranche	**Avoided Energy Cost**	**2022**	**2023**	**2024**	**2025**	**2026**
Tranche 1	Adjusted LKE[2]	44.51	46.93	49.53	52.32	55.33
	PJM	52.73	55.15	57.75	60.54	63.55
Tranche 2	Adjusted LKE[1]	34.19	35.92	37.77	39.78	41.93
	PJM	42.41	44.14	45.99	48.00	50.15

Table 3: Current Market Price

Source	**Price ($/MWh with No Escalation)**
Rhudes Creek	27.82
LevelTen	32.96

Table 4a: Percent Difference from Rhudes Creek Price

		20-Year Contract Beginning:				
Tranche	**Avoided Energy Cost**	**2022**	**2023**	**2024**	**2025**	**2026**
Tranche 1	Adjusted LKE[1]	60%	69%	78%	88%	99%
	PJM	90%	98%	108%	118%	128%
Tranche 2	Adjusted LKE[1]	23%	29%	36%	43%	51%
	PJM	52%	59%	65%	73%	80%

Table 4b: Percent Difference from LevelTen Price

		20-Year Contract Beginning:				
Tranche	**Avoided Energy Cost**	**2022**	**2023**	**2024**	**2025**	**2026**
Tranche 1	Adjusted LKE[1]	35%	42%	50%	59%	68%
	PJM	60%	67%	75%	84%	93%
Tranche 2	Adjusted LKE[1]	4%	9%	15%	21%	27%
	PJM	29%	34%	40%	46%	52%

[1] The costs shown are based on a single axis tracking solar facility.

[2] "Adjusted LKE" is LG&E and KU's avoided energy cost levelized with a risk-free discount rate of 1.4% (see Mr. Barnes's Supplemental Rebuttal Testimony at page 28).

Table 1: Eligible Single-Axis Tracking Solar per Tranche

	Tranche 1 (2028 Need)	Tranche 2 (2034 Need)
Generation Capacity Need (MW)	100	1,024
Eligible Single-Axis Tracking Solar Capacity (MW)[1]	127	873

Table 2a: Annual Cost Differences ($0 RECs; $0 CO2; Adjusted LKE Avoided Energy[2], 2026 Contracts)

Market Price		Tranche 1	Tranche 2	Total
Rhudes Creek	Energy (MWh)	289,395	1,984,281	2,273,676
	Annual Cost ($M, Barnes' Methodology)	16.0	83.2	99.2
	Annual Cost ($M, Market Price)	8.1	55.2	63.3
	Difference ($M)			36.0
	Total Extra Cost over 20 Years ($M)			719.3
	Present Value (2026 Dollars)			388.5
LevelTen	Energy (MWh)	289,395	1,984,281	2,273,676
	Annual Cost ($M, Barnes' Methodology)	16.0	83.2	99.2
	Annual Cost ($M, Market Price)	9.5	65.4	74.9
	Difference ($M)			24.3
	Total Extra Cost over 20 Years ($M)			485.6
	Present Value (2026 Dollars)			262.3

Table 2b: Annual Cost Differences ($0 RECs; $0 CO2; PJM Avoided Energy, 2026 Contracts)

Market Price		Tranche 1	Tranche 2	Total
Rhudes Creek	Energy (MWh)	289,395	1,984,281	2,273,676
	Annual Cost ($M, Barnes' Methodology)	18.4	99.5	117.9
	Annual Cost ($M, Market Price)	8.1	55.2	63.3
	Difference ($M)			54.7
	Total Extra Cost over 20 Years ($M)			1,093.1
	Present Value (2026 Dollars)			590.4
LevelTen	Energy (MWh)	289,395	1,984,281	2,273,676
	Annual Cost ($M, Barnes' Methodology)	18.4	99.5	117.9
	Annual Cost ($M, Market Price)	9.5	65.4	74.9
	Difference ($M)			43.0
	Total Extra Cost over 20 Years ($M)			859.4
	Present Value (2026 Dollars)			464.2

[1] The Tranche 2 capacity of 873 MW results from an assumed 1,000 MW cap on new QF capacity (1,000 – 127 = 873).

[2] "Adjusted LKE" is LG&E and KU's avoided energy cost levelized with a risk-free discount rate of 1.4% (see Mr. Barnes's Supplemental Rebuttal Testimony at page 28).

LG&E and KU Generation Interconnection Queue – Active Projects

Solar and Solar/Battery

As of 8/11/2021

Summer Capacity (MW)	Kentucky County	Facility Type	Queue Number
8.5	Clark	Solar	LGE-GIS-2016-001
10	Mercer	Solar	LGE-GIS-2014-001
35	Harrison	Solar	LGE-GIS-2017-003
50	Madison	Solar	LGE-GIS-2020-001
86	Lyon	Solar	LGE-GIS-2017-002
98	Mercer	Solar	LGE-GIS-2019-025
100	Caldwell	Solar	LGE-GIS-2019-008
100	Grayson	Solar	LGE-GIS-2019-015
100	Hardin	Solar	LGE-GIS-2019-029
100	Caldwell	Solar	LGE-GIS-2021-001
100	Mason	Solar/Battery	LGE-GIS-2021-017
100	Boyle	Solar	LGE-GIS-2021-019
104	Ballard	Solar	LGE-GIS-2019-002
105	Mercer	Solar	LGE-GIS-2020-002
110	Washington/ Marion	Solar	LGE-GIS-2019-001
110	Bath	Solar/Battery	LGE-GIS-2021-018
120	McCracken	Solar/Battery	LGE-GIS-2021-007
120	Marion	Solar/Battery	LGE-GIS-2021-010
120	McCracken	Solar/Battery	LGE-GIS-2021-020
121	Meade	Solar/Battery	LGE-GIS-2019-003
150	Ohio County	Solar	LGE-GIS-2021-003
150	Muhlenberg	Solar	LGE-GIS-2021-004
200	Breckinridge	Solar/Battery	LGE-GIS-2019-004
200	Hardin	Solar/Battery	LGE-GIS-2021-009
1200	Clark	Solar/Battery	LGE-GIS-2021-008