

COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

ELECTRONIC TARIFF FILINGS OF)	
LOUISVILLE GAS AND ELECTRIC COMPANY)	
AND KENTUCKY UTILITIES COMPANY)	
TO REVISE PURCHASE RATES FOR)	CASE NO.
SMALL CAPACITY AND LARGE CAPACITY)	2023-00404
COGENERATION AND POWER PRODUCTION)	
QUALIFYING FACILITIES AND)	
NET METERING SERVICE-2 CREDIT RATES)	

REBUTTAL TESTIMONY OF
STUART A. WILSON
DIRECTOR, ENERGY PLANNING, ANALYSIS AND FORECASTING
KENTUCKY UTILITIES COMPANY AND
LOUISVILLE GAS AND ELECTRIC COMPANY

Filed: April 4, 2024

1 **INTRODUCTION**

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

3 A. My name is Stuart A. Wilson. I am the Director of Energy Planning, Analysis and
4 Forecasting for Kentucky Utilities Company (“KU”) and Louisville Gas and Electric
5 Company (“LG&E”) (collectively, “Companies”) and an employee of LG&E and KU
6 Services Company, which provides services to KU and LG&E. My business address is
7 220 West Main Street, Louisville, Kentucky 40202. A complete statement of my
8 education and work experience is attached to this testimony as Appendix A.

9 **Q. Have you previously testified before this Commission?**

10 A. Yes. I have testified before the Commission on a number of occasions, including in
11 the Companies’ recent certificate of public convenience and necessity (“CPCN”) and
12 demand-side management and energy efficiency application proceeding, Case No.
13 2022-00402.¹

14 **Q. Are you sponsoring any exhibits to your testimony?**

15 A. Yes, I am sponsoring one exhibit, Rebuttal Exhibit SAW-1, which is an electronic work
16 paper with the Companies’ calculations of their current cost estimates for the Marion
17 and Mercer County Solar Facilities. The Commission granted certificates of public
18 convenience and necessity to acquire the Marion County Solar Facility and to construct
19 the Mercer County Solar Facility in Case No. 2022-00402.²

20 **Q. What is the purpose of your testimony?**

¹ *Electronic Joint Application of Kentucky Utilities Company and Louisville Gas and Electric Company for Certificates of Public Convenience and Necessity and Site Compatibility Certificates and Approval of a Demand Side Management Plan*, Case No. 2022-00402, Direct Testimony of Stuart A. Wilson (Dec. 15, 2022).

² Case No. 2022-00402, Order at 178 (Ky. PSC Nov. 6, 2023).

1 A. The purpose of my testimony is to rebut the testimony of Joint Intervenors witness
2 Andy McDonald concerning his assertion that the avoided carbon cost component of
3 the Companies' Rider NMS-2 compensation rate for energy exported to the
4 Companies' grid by NMS-2 customers is too low. As I demonstrate below, Mr.
5 McDonald's methodology is fundamentally flawed and provides no basis for increasing
6 the avoided carbon cost component.

7 **Q. What is Mr. McDonald's ultimate recommendation concerning the avoided cost**
8 **component of Rider NMS-2, and why is it flawed?**

9 A. After considering carbon pricing regimes in a handful of other states, none of which
10 applies to the Companies' operations, and the social cost of carbon, which, as the
11 Companies' witness Michael E. Hornung explains, is outside the Commission's
12 jurisdiction, Mr. McDonald ultimately recommends that the Rider NMS-2 avoided
13 carbon cost component should be determined using a cost of \$58-\$188/ton of CO₂
14 based on the estimated cost of carbon capture and sequestration ("CCS").³ Notably,
15 this very wide range comes from a single report dated January 2022 that does not
16 purport to provide estimated costs for the Companies to implement CCS.⁴ He believes
17 this is reasonable because "CCS is a main compliance alternative for the Companies'
18 coal and natural gas plants,"⁵ by which he means one of several compliance alternatives
19 for the Greenhouse Gas Rule the U.S. Environmental Protection Agency ("EPA")

³ McDonald at 17.

⁴ Moch, J., Xue, W., and Holdren, J., Carbon Capture, Utilization, and Storage: Technologies and Costs in the US Context, Harvard Kennedy School, Belfer Center for Science and International Affairs, January 2022, at 3-4 and 7-8, available at https://www.belfercenter.org/sites/default/files/files/publication/Brief_CCUS_FINAL.pdf.

⁵ McDonald at 17.

1 proposed in May 2023 but has not yet finalized.⁶ Notably, he believes this avoided cost
2 should be applied beginning in 2024,⁷ notwithstanding his assertion that CCS for large
3 generating units is not yet commercially available and the necessary transportation and
4 sequestration infrastructure does not yet exist.

5 This recommendation is flawed in at least two respects, both of which I address
6 at length below. First, Mr. McDonald’s recommendation lacks any analysis to suggest
7 that CCS would be the Companies’ sole or even primary means of Greenhouse Gas
8 Rule compliance, significantly overstates plausible CCS cost because it omits Section
9 45Q tax credits, and is disconnected from the proposed Greenhouse Gas Rule’s text
10 and practical reality regarding the timing of compliance costs.

11 Second and more fundamentally, he overlooks the reality that *all* current NMS-
12 2 facilities are solar, and a kWh of energy exported by an NMS-2 customer avoids just
13 as much carbon cost as does a kWh from a utility-scale solar facility (after accounting
14 for line losses). Particularly following the Companies’ recent and ongoing experience
15 with utility-scale solar power purchase agreements (“PPAs”) and utility-owned solar,
16 the current market price for such solar energy in Kentucky is now well established. As
17 I show below, that price does not justify increasing the avoided carbon cost component
18 of Rider NMS-2.

⁶ 88 Fed. Reg. 33,240 (May 23, 2023), available at <https://www.federalregister.gov/documents/2023/05/23/2023-10141/new-source-performance-standards-for-greenhouse-gas-emissions-from-new-modified-and-reconstructed>.

⁷ McDonald at 17.

1 at-scale (such as CO₂ pipelines and storage reservoirs),”⁹ which would tend to make
2 CCS *less* likely to be the lowest reasonable cost compliance alternative, not the *sole*
3 compliance alternative the Companies would pursue. This alone undermines his
4 recommended avoided carbon cost range.

5 Second, even if CCS were the sole compliance technology available to the
6 Companies, Mr. McDonald’s asserted avoided cost range is flawed and far too high.
7 The EPA’s own analysis supporting the proposed Greenhouse Gas Rule gives an all-in-
8 levelized net cost of CCS for “a representative new base load stationary combustion
9 turbine” ranging from \$19 to \$44 per ton of carbon sequestered (adding \$6 to \$15 per
10 MWh to the levelized cost of energy).¹⁰ The EPA’s range is dramatically lower than
11 Mr. McDonald’s proposed \$58 to \$188 per ton of sequestered carbon in large part
12 because Mr. McDonald omitted the effect of CCS-related Section 45Q tax credits even
13 though the paper he cites for CCS costs explicitly discusses them.¹¹ These credits are
14 non-trivial: \$85/ton of sequestered CO₂. This significant omission causes Mr.
15 McDonald’s recommendation to be unreliable.

⁹ McDonald at 10.

¹⁰ 88 Fed. Reg. 33,301 (May 23, 2023):

Even considering that the IRC section 45Q tax credits are currently available for only 12 years and would, therefore, only offset costs for a portion of a new NGCC turbine’s expected operating life, the current overall CO₂ abatement costs of CCS of a 90 percent capture amine-based post combustion capture system, accounting for the tax credit, are \$44/ton (\$49/metric ton) and the increase in the LCOE is \$15/MWh. These costs assume a stable 30-year operating life, transport, storage, and monitoring costs of \$10/metric ton, and do not include any revenues from sale of the CO₂ following the 12-year period when the IRC section 45Q tax credit is available. An alternate costing approach is to assume all capital costs are amortized during the 12-year period when tax credits are available. These tax credits are a significant source of revenue and would lower the incremental generating costs of the unit. Therefore, under the 12-year costing approach the EPA increased the assumed annual capacity factor from 65 to 75 percent. The 12-year CO₂ abatement costs are \$19/ton (\$21/metric ton) and the increase in the LCOE is \$6/MWh. These costs are for a combined cycle unit with a base load rating of 4,600 MMBtu/h with an output of approximately 700 MW. These costs could be higher for small units and lower for larger units.

¹¹ Moch, J., Xue, W., and Holdren, J., Carbon Capture, Utilization, and Storage: Technologies and Costs in the US Context, Harvard Kennedy School, Belfer Center for Science and International Affairs, January 2022, at 3-4 and 7-8, available at https://www.belfercenter.org/sites/default/files/files/publication/Brief_CCUS_FINAL.pdf.

1 Third, *none* of the compliance alternatives in the proposed Greenhouse Gas
2 Rule would require implementation prior to 2032.¹² Thus, Mr. McDonald’s
3 recommendation to establish the avoided carbon cost component of NMS-2 in the range
4 of “\$58 - \$188 per ton CO₂ *starting in 2024* and then escalating annually” is both
5 disconnected from the proposed Greenhouse Gas Rule’s text and practical reality.¹³
6 The Companies will pay *zero* dollars per ton of CO₂ for CCS in 2024 both because it
7 is impossible to construct the infrastructure to do so in this calendar year and because
8 there is no requirement to do so.

9 All of these errors and omissions would make Mr. McDonald’s
10 recommendation unreliable even apart from the more fundamental flaw in his approach
11 that I discuss below.

12 **CUSTOMERS SHOULD PAY NO MORE FOR DISTRIBUTED SOLAR THAN THE**
13 **COST OF A COMPARABLE AMOUNT OF UTILITY-SCALE SOLAR**

14 **Q. Is there an even more fundamental flaw in Mr. McDonald’s NMS-2 avoided**
15 **carbon cost approach?**

16 A. Yes. Mr. McDonald’s recommendation ignores the reality that *all* of the Companies’
17 nearly 3,300 NMS-2 customers have solar generation.¹⁴ Thus, when establishing
18 NMS-2 rates, an important limiting factor to the plausible magnitude of any avoided
19 cost component is the avoided cost of other solar generation, particularly utility-scale
20 solar generation. In other words, if all customers are obligated to pay NMS-2

¹² See, e.g., U.S. Environmental Protection Agency, “Overview Presentation: Clean Air Act Section 111 Regulation of Greenhouse Gas Emissions from Fossil Fuel-Fired Electric Generating Units,” at 8 and 13, available at https://www.epa.gov/system/files/documents/2023-05/111%20Power%20Plants%20Stakeholder%20Presentation2_4.pdf.

¹³ McDonald at 17 (emphasis added).

¹⁴ Indeed, of all the Companies’ NMS-1 and NMS-2 customers, only 11 of them have non-solar generation, the last of which was installed more than five years ago.

1 customers for solar-generated electricity exported to the Companies' grid, they should
2 have to pay *at most* what comparable utility-scale solar electricity would cost.¹⁵

3 **Q. What are the appropriate NMS-2 rate components to compare to utility-scale**
4 **solar costs to ensure comparability?**

5 A. The Commission's prescribed eight components for setting NMS-2 rates are: (1)
6 avoided energy cost, (2) avoided generation capacity cost, (3) avoided ancillary
7 services cost, (4) avoided carbon cost; (5) avoided environmental compliance cost; (6)
8 avoided transmission cost; (7) avoided distribution cost; and (8) jobs benefits.¹⁶ Items
9 6, 7, and 8 (avoided transmission and distribution costs and jobs benefits) are not
10 accounted for in market utility-scale solar pricing; therefore, they should not be
11 included when comparing such market pricing to the avoided cost components of
12 NMS-2. But the other five NMS-2 components are indeed costs that would be equally
13 well avoided by distributed solar and utility-scale solar; therefore, it is appropriate to
14 compare the sum of those five NMS-2 components to current market prices for utility-
15 scale solar to ensure that all customers are not overpaying for solar-generated energy
16 exported by NMS-2 customers.

17 **Q. Why should the cost of utility-scale solar act as a cap on what customers should**
18 **pay for the sum of the five NMS-2 rate components you described above?**

¹⁵ I say "at most" because it is certainly possible that there might be lower-cost means of providing service than additional solar even at utility-scale market prices. In that case, it would be uneconomical for all customers to compensate solar NMS-2 customers for the sum of the five NMS-2 components I discussed above at the avoided cost of utility-scale solar; some lower amount would be appropriate. Utility-scale solar pricing is a *cap* on the amount customers should have to pay for the five discussed components of NMS-2 rates, not a floor.

¹⁶ See, e.g., *Electronic Application of Kentucky Power Company for (1) A General Adjustment of Its Rates for Electric Service; (2) Approval Of Tariffs and Riders; (3) Approval of Accounting Practices to Establish Regulatory Assets and Liabilities; (4) Approval of a Certificate of Public Convenience and Necessity; and (5) All Other Required Approvals and Relief*, Case No. 2020-00174, Order (Ky. PSC May 14, 2021).

1 A. If the Greenhouse Gas Rule is finalized as proposed, lowest reasonable cost compliance
2 will require significant changes to the Companies’ generation portfolio, which will
3 likely include solar. Therefore, any distributed solar that is added prior to these changes
4 might reduce the amount of solar the Companies would otherwise acquire for
5 Greenhouse Gas Rule compliance, but it will not enable customers to avoid other
6 Greenhouse Gas Rule compliance costs.

7 Note that this basic principle is always true. Under any given set of current
8 circumstances and projected future circumstances—including current and projected
9 solar market prices—there is a theoretically optimal amount of solar resources for a
10 given utility. Adding solar beyond that point would be suboptimal by definition; all
11 other things being equal, the only reason to acquire more solar would be if one could
12 obtain it for *less* than the market price. Thus, setting aside the three NMS-2
13 components I previously discussed, the maximum customers should have to pay for the
14 remaining five NMS-2 components is the market price for comparable utility-scale
15 solar.

16 **Q. What is the current market price of utility-scale solar available to the Companies?**

17 A. The current market price of utility-scale solar available to the Companies is well
18 established. The Companies’ current estimated levelized cost of energy from the
19 Marion County and Mercer County Solar Facilities for which the Commission granted
20 the Companies a CPCN just five months ago in Case No. 2022-00402 is about
21 ████████ MWh to ████████/MWh. Fully accounting for the net cost of utility-scale solar
22 energy would require subtracting the potential revenue from renewable energy
23 certificate (“REC”) sales for energy produced by such facilities. Since January 2020,

1 the Companies have always received at least \$6.00/REC for Brown Solar RECs, and
2 more recently they have received much more. In 2023, the Companies received REC
3 revenues averaging \$21.15 per MWh for solar RECs sold from their Brown Solar
4 Facility. In January and February 2024, the Companies sold Brown Solar RECs for
5 \$27.00/REC. The Companies are not forecasting any particular REC pricing, but for
6 completeness it is important to note that REC revenue would offset a portion of utility-
7 scale solar costs as long as a market for RECs exists.

8 Regarding Rider NMS-2, subtracting the avoided distribution cost, avoided
9 transmission cost, and jobs benefits components from the Companies' proposed NMS-
10 2 compensation rates in these tariff filings results in values of \$61.63/MWh for LG&E
11 and \$65.51/MWh for KU.¹⁷ There are no offsetting REC revenues to account for
12 because, to the extent they exist, Rider NMS-2 customers receive them.

13 Clearly, after accounting for any plausible level of REC revenues for utility-
14 scale solar, these values show that increasing the avoided carbon cost component of
15 NMS-2 while holding the other four components constant would result in all customers
16 overpaying for NMS-2 exported energy relative to the cost of utility-scale solar.¹⁸
17 Indeed, these values suggest that the sum of the five NMS-2 components discussed
18 above should *decrease*, not increase, though that is not what the Companies are
19 proposing in these tariff filings. Therefore, there is no economic rationale for

¹⁷ See LG&E-KU Generation Planning & Analysis, 2024-2025 Qualifying Facilities Rates & Net Metering Service-2 Bill Credit (Oct. 2023) at 17.

¹⁸ Importantly, this comparison does not consider the timing of the Companies' assumed need for capacity (2030). The Marion and Mercer County Solar Facilities were approved to meet a 2028 need for capacity. Customers would pay a discounted value today to meet a 2030 capacity need, but this discounting is ignored here to simplify the comparison.

1 increasing the NMS-2 avoided carbon cost component at all, much less to the levels

2 Mr. McDonald has recommended.

3 **Q. Does this conclude your testimony?**

4 **A. Yes.**

The entire
Rebuttal Exhibit SAW-1
is Confidential
and provided
separately
under seal.

APPENDIX A

Stuart A. Wilson, CFA

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Kentucky Utilities Company
Louisville Gas and Electric Company
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Louisville, Kentucky 40202
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Previous Positions (all LG&E-KU)

Manager, Generation Planning & Analysis	October 2009 – April 2016
Manager, Sales Analysis & Forecasting	May 2008 – October 2009
Supervisor, Sales Analysis & Forecasting	Aug 2006 – April 2008
Economic Analyst	Aug 2000 – July 2006
Compensation Analyst	Aug 1999 – July 2000
Business Analyst June	1997 – July 1999

Professional/Trade Memberships

CFA Society of Louisville

Education & Certifications

E.ON Emerging Leaders Program	2004-2006
CFA Charterholder	2003
LG&E Energy Leadership Development Program	1997-2002
Indiana University, Master of Business Administration	1997
University of Louisville, Master of Engineering in Electrical Engineering	1995
University of Louisville, Bachelor of Science in Electrical Engineering	1995

Civic Activities

Big Brothers Big Sisters of Kentuckiana, Board of Directors	2017 – Present
Barren Heights Christian Retreat, Board of Directors	2015 – 2021