COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

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
LONNIE E. BELLAR
CHIEF OPERATING OFFICER
KENTUCKY UTILITIES COMPANY AND
LOUISVILLE GAS AND ELECTRIC COMPANY

Filed: December 15, 2022

INTRODUCTION

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

A. My name is Lonnie E. Bellar. I am the Chief Operating Officer 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. A complete statement of my education and work experience is attached to this testimony as Appendix A.

Q. Have you previously testified before this Commission?

A. Yes, I have testified before this Commission numerous times.

Q. What is the purpose of your direct testimony?

A. Under my supervision the Companies have performed extensive analysis and concluded that the most cost-effective supply-side method of meeting customer need, while at the same time complying with applicable environmental regulations, is to construct two 621 megawatt (MW) net summer rating 1x1[1] J or H-Class[2] natural gas combined cycle combustion turbine ("NGCC") facilities, one at LG&E's Mill Creek Generating Station in Jefferson County, Kentucky ("Mill Creek NGCC"[3]) and the other at KU's E.W. Brown Generating Station in Mercer County, Kentucky ("Brown NGCC"[4]). The Companies have also concluded that they should: (1) construct a 120 MWac[5] solar photovoltaic ("solar") electric generating facility in Mercer County,

---

[1] 1x1 is one gas turbine, one heat recovery steam generator, and one steam turbine connected to a single generator.
[2] A J or H Class natural gas turbine is essentially defined as a firing temperature in excess of 2600°F (about 1426°C) and up to about 2900°F (1600°C).
[3] This will be Mill Creek Unit 5.
[4] This will be E.W. Brown Unit 12.
[5] Final capacity will be based on the final design and layout of the solar facility. It is anticipated that the capacity could vary +-10%.

Kentucky (Mercer County Solar Facility; (2) purchase a 120 MWac solar facility to be built by a third-party solar developer in Marion County, Kentucky ("Marion County Solar Facility"); (3) construct a 125 MW four-hour (500 MWh total) battery energy storage system ("BESS") facility at KU's E.W. Brown Generation station ("Brown BESS"); and (4) enter into four Purchase Power Agreements (PPAs) totaling 637 MW. My testimony will explain the details of these plans and ask the Commission to approve them, inclusive of the proposed DSM-EE programs no later than October 1, 2023.

RETIREMENT ANALYSIS OF EXISTING GENERATION FACILITIES

Q. Have the Companies evaluated the retirement dates for certain existing generating units?

A. Yes. The Companies presented an analysis as part of my direct testimony and specifically in my Exhibit LEB-2 in the most recent rate cases.[6] That analysis identified that the then projected remaining economic life for Mill Creek Unit 1 should be updated to 2024 and the then remaining economic lives for E. W. Brown Unit 3 and Mill Creek Unit 2 should be updated to 2028. The analysis related to Mill Creek Unit 1 continues to remain valid and the Companies have updated the analysis for Mill Creek Unit 2 and E.W. Brown Unit 3. The Companies further updated the analysis for Ghent Unit 2 due to the changes in environmental regulations presented in the testimony of Philip A. Imber.

If finalized as proposed, the Good Neighbor Plan, as discussed in Mr. Imber's testimony, would have a significant impact on Ghent Unit 2 and Mill Creek Unit 2. Mr. Imber's testimony notes the Companies request to the EPA which if granted would

[6] The most recent rate cases were Case No. 2020-00349 (KU) and 2020-00350 (LG&E).

allow the option of evaluating replacement generation as a Good Neighbor Plan compliance alternative, providing support for an assumption in Stuart A. Wilson's analysis of continued operation of Mill Creek Unit 2 and Ghent Unit 2 through 2028 if the units are to be retired. The Companies had previously anticipated retiring Mill Creek Unit 2 in 2028 and operating Ghent Unit 2 essentially continuously until retiring the unit in 2034. But the fully implemented Good Neighbor Plan, as discussed in Mr. Wilson's testimony, makes it uneconomical to continue operating these units because it is uneconomical to equip the units with selective catalytic reduction ("SCR") controls or operate them only outside of the Ozone Season of May 1 to September 30. Mr. Wilson's analysis supports retirement of Mill Creek Unit 2 in 2027 and Ghent Unit 2 in 2028.

The continued operation of E. W. Brown Unit 3, which is currently equipped with SCR controls, beyond 2028 was reevaluated utilizing updated information, most significantly the responses from the June 2022 Request for Proposals. Retiring E. W. Brown Unit 3 in 2028 continues to result in a least cost plan for serving customer requirements.

Exhibit SAW-1 to Mr. Wilson's testimony serves as support for the retirement date conclusions and recommended associated generation portfolio replacement additions. It demonstrates that the retirement of Mill Creek Unit 2 in 2027 and the retirement of Ghent Unit 2 and E. W. Brown Unit 3 in 2028 result in a least cost plan for meeting customer requirements.

In addition to the economic evaluation, the specific retirement dates for Mill Creek Unit 2 (2027) and E. W. Brown Unit 3 (2028) are tied to the in-service dates of the proposed Mill Creek NGCC and Brown NGCC. Based on construction plans and potential electric transmission constraints, the existing units at each site cannot operate at the same time as the proposed NGCC units. The retirement date for Ghent Unit 2 of 2028 is set based on the assumption of EPA granting the requested relief noted above, allowing Ghent Unit 2 to continue to operate as long as possible to support reliability during the commissioning of the proposed NGCCs.

Q. Did the Companies evaluate the retirement dates for the remaining existing coal-fired generating units scheduled to be retired in the analysis period considered in Exhibit SAW-1?

A. No. Planned retirement dates in the most recent rate cases for the analysis period are shown in the table below. Continued operation of these units until their respective anticipated retirement dates is currently expected to require stay open costs generally consistent with historical experience. Absent significant new regulatory requirements, extraordinary investment needs due to individual unit condition, or a significant reduction in customer demand, continued operation is expected to remain least-cost as compared to retirement and replacement. Continuing to operate these units will allow for the transition suggested in this case be executed in the 2020s and replacement decisions for remaining units to be made closer to the required time and with the benefit of additional information. Mr. Wilson discusses how he considered retirements for units in the Table below in his evaluation.

Unit	Retirement Year
Ghent Unit 1	2034
Ghent Unit 3	2037
Ghent Unit 4	2037
Mill Creek Unit 3	2039
Mill Creek Unit 4	2039
Trimble Count Unit 1	2045

CONSTRUCTION OF NGCCS AT MILL CREEK AND E.W. BROWN

Q. Why do the Companies need to construct new generation facilities?

A. The retirements discussed above, excluding an additional 300 MW for Mill Creek Unit 1 which is scheduled for retirement in 2024, will mean that nearly 1,200 MW of coal fired generation will need to be replaced by 2028. It is difficult to overstate the potential impact to customers of retiring nearly 1,200 MW of historically reliable capacity by 2028 if no replacement capacity is installed by then. Relying on energy markets, coupled with associated transmission availability to access those markets, to provide any shortfall is risky at best, as recent warnings concerning resource adequacy in both PJM and MISO illustrate and because all the states bordering Kentucky are also subject to the Good Neighbor Plan and will be addressing similar capacity concerns. Moreover, the cost to customers of equipping Mill Creek Unit 2 and Ghent Unit 2 with SCRs so they can continue to operate under the Good Neighbor Plan would add hundreds of millions of dollars of cost to customers and result in higher carbon emissions than the proposed NGCC units. Thus, new generation capacity and new demand side management programs will be necessary. The Companies are proposing a mix of natural gas fired generation, solar facilities, a battery energy storage facility, and demand side management to replace the retired capacity and meet increasing customer demand.

Q. Please describe the facilities the Companies propose to construct at Mill Creek and at E.W. Brown.

A. The Companies have proposed the construction of a 621 MW net summer rating NGCC unit utilizing the latest advanced J or H-Class gas turbine technology in a 1x1 configuration at Mill Creek and at E.W. Brown for a total installed capacity of 1,242 MW net summer rating. Maps, conceptual and preliminary plans and drawings for the Mill Creek NGCC and Brown NGCC are attached as Joint Application Exhibits 1 and 2, respectively. The Companies will also construct a 125 MW 4-hour (500 MWh) BESS at E.W. Brown. Maps, conceptual and preliminary plans and drawings for Brown BESS are attached as Joint Application Exhibit 4.

Q. Do the Companies have experience with the construction and operation of NGCC units?

A. Yes. The Commission issued a CPCN to the Companies in Case No. 2011-00375 for construction of a 640 MW 2x1[7] NGCC at the Cane Run Generating Station. The Companies then constructed it and have operated that unit ("Cane Run Unit 7") since construction was completed in 2015. The facility was constructed on time and under budget. The Companies have had excellent experience with Cane Rune Unit 7 and expect the same excellent experience with the NGCCs proposed in this case.

[7] 2x1 is two gas turbines, two heat recovery steam generators, one steam turbine, and three generators.

Q. Please explain the advantages of constructing one NGCC at Mill Creek and another one at E.W. Brown instead of constructing a single and larger NGCC at just one location.

A. Constructing one unit at each existing facility optimizes the use of existing assets by generating savings for customers that would not be realized if a single and larger unit was constructed at one location. Specifically, the following advantages will be derived by constructing what will be a 1x1 NGCC at each location:

- Reliability risk is reduced in that if a complication or problem occurs at one location (such as an equipment failure or other problem unique to that location), the Companies will be in a position to address that problem while keeping the other NGCC operational.
- Reliability risk is also reduced by the fact that gas supply will be diverse by the possibility of having two different natural gas suppliers on separate piping systems supplying the NGCCs at different locations. Gas supply at the Brown NGCC will be from either Texas Eastern or Tennessee Gas and gas supply at the Mill Creek NGCC will be from Texas Gas. If gas supply or gas delivery infrastructure become problematic at one location, that locational diversity will enable the Companies to keep the other NGCC operational. Also, new gas infrastructure needs at each site will be minimal compared to placing the combined gas supply needs at a single site, thus significantly reducing the associated cost incurred by the companies and by the pipeline provider.
- Using two locations will enable the Companies to better manage the burden that will be placed on the Companies' electric transmission infrastructure. This also

means that the existing substations will suffice so only minimal electric transmission upgrades will be necessary, which would not be the case with a single larger NGCC at one location.

- By using two locations, the Companies can also more efficiently utilize existing space, existing water supply, and existing site facilities (utilities, security, and communications) to keep costs relatively low.
- Each site already has sufficient existing personnel who will be used to operate each new NGCC.
- Each new NGCC will provide additional tax base and jobs in their respective communities, where existing units will be retired, which will help two local economies rather than just a single economy.
- Having two different sites for construction of the NGCCs will reduce execution risk of the full generating capacity being installed. In executing the construction of each project from initial efforts through commercial operation, numerous issues and variables can affect the timing and completion of that construction. The Companies will manage those risks; however, having two sites spreads those execution risks such that an execution risk experienced at one site likely will not affect the other site at all. More specifically, utilizing existing electric transmission and gas facilities at each site reduces execution risk associated with the completion of additional construction projects, particularly those required outside the existing plant property, necessary for the operation of the NGCC units.
- Finally, as Mr. Imber explains in his testimony, the Companies' proposal of installing the NGCCs at two existing locations allows for the existing air quality

emission limits to be used with little to no modification when taking into account the planned coal unit retirements at the Mill Creek and E.W. Brown locations. Although the proposed NGCCs will still require an air permit and compliance with all applicable environmental requirements, the utilization of the existing permitted emissions of Mill Creek Units 1 and 2 and E.W. Brown's Unit 3 will allow the proposed NGCCs to "net out" of the Prevention of Significant Deterioration ("PSD") air permitting process for nitrogen oxides ("NO_x"), sulfur dioxide ("SO_2"), and particulate matter ("PM") that would be required for a new "green field" site. That "netting out" would not be possible if a single larger unit is constructed at E.W. Brown and would not be possible to avoid PSD at Mill Creek given the continued operation of Units 3 and 4.

Q. Is demolition necessary at Mill Creek and E.W. Brown to make room for the NGCCs?

A. Minor demolition is needed for siting of the new Mill Creek NGCC unit. KU plans to demolish the E.W. Brown Units 1 and 2 prior to construction of the new Brown NGCC to provide adequate safety clearance for the construction of the NGCC and to avoid demolition risk in the future from demolishing Units 1 and 2 after the Brown NGCC becomes operational.

Q. Are there significant environmental benefits of using NGCC technology at Mill Creek and E.W. Brown?

A. Yes. First, NGCC technology does not produce combustion by-products that would require the same beneficial reuse marketing or dry landfill needs as coal-fired technology. Additionally, when compared to existing Mill Creek Units 1 and 2 and

E.W. Brown Unit 3, emissions of particulate matter, CO_2 and NO_X will be greatly reduced, while emissions of SO_2 will be all but eliminated. The reduction in NO_X emissions are also incorporated into meeting the Companies' requirements under the final Cross-State Air Pollution Rule allowance allocations.[8] The reduction in NOx emissions will allow for compliance with the Good Neighbor Plan.[9] The NGCCs will emit much less CO_2 than the retiring coal-fired units, emitting approximately 65% less CO_2.

Q. Are there significant operational benefits to using NGCC technology as compared to coal-fired generation?

A. Yes. Certainly, compliance with environmental regulations is less burdensome when operating gas-fired generation instead of coal-fired generation. But NGCCs also have tremendous operational advantages in meeting fluctuating and volatile customer demand because of the speed with which they can be ramped up or down depending on need. Based on the advance J & H-class turbine technology, NGCCs can ramp up at a rate up to 75-80 MW per minute. They will be able to go from zero to full capacity in a matter of minutes and then back to zero if they are not needed to serve load to maximize efficiencies. For coal-fired generation, ramp rates are less than 10 MW per minute and cycling units on and off line can take multiple hours or more depending on the beginning state of the unit.

The NGCC ramping ability is particularly useful to support the Companies' proposed expanding solar portfolio, including the solar facilities proposed in this case.

[8] See the Direct Testimony of Mr. Imber for a discussion of the current status of the Cross State Air Pollution Rule.

[9] See the Direct Testimony of Mr. Imber for a discussion of the EPA's Good Neighbor Plan.

For solar generation, even a passing cloud can greatly affect solar generation immediately, and, of course, solar generation is not possible at all as soon as it becomes dark. Thus, increased reliance on solar generation requires the ability to very quickly respond to rapid changes in the amount of solar generation. The fast ramping times NGCCs can achieve will position the Companies well to react to the volatility and intermittence of solar generation allowing for the integration of greater levels of solar generation.

Q. What particular technology advancement could NGCC technology take advantage of in the coming decades?

A. Although carbon capture technology is prohibitively expensive at this time and geological formations greatly limit the amount of storage for captured carbon, as the technology develops in the coming years, NGCC allows for better capture and lower cost due to the flue gas properties of gas-fired emissions versus coal-fired emissions should this capture technology become viable and adopted at a macro-level in the US. The Companies have a long history of supporting research and development around carbon capture for coal plants and more recently have extended those efforts to NGCC plants. The proposed NGCCs will reduce carbon emissions by up to 65% compared to the coal-fired units the Companies propose to retire by 2028.

Also, given the efficiency advantage of NGCCs, the development of viable and cost effective Hydrogen supply resource would allow for lower carbon emissions via blending Hydrogen with natural gas or Hydrogen as a fuel source. All OEMs that provide NGCC technology are designing their gas turbines to combust hydrogen in the future should it become economically viable or mandated.

Q. Please describe the construction plans for the NGCCs.

A. The Companies plan on constructing the NGCCs so that the Mill Creek NGCC will be operational prior to June 1, 2027 and the Brown NGCC will be operational prior to June 1, 2028. The request for quotations will target April 1st for each year to provide construction/commissioning scheduled contingency to account for potential weather issues, supply side issues, and force majeure type events. Thus, once regulatory approvals are obtained, the Companies will make every effort to construct and place the NGCCs into commercial operation by those dates. To that end, the Companies have already begun work on developing the specifications for the NGCC units, including the power island that consist of the gas turbine, heat recovery steam generator, SCR, steam turbine and electric generator. They have also begun work on developing the engineering, procurement, and construction ("EPC") contract bid package for the NGCCs. The Companies plan to issue a Request for Proposals ("RFP") for the NGCC power islands and long-term service agreements ("LTSA") early in the first quarter of 2023 and issue the RFP for the EPC contracts in the third quarter of 2023. The Companies have also begun developing the Title V air permit applications, have submitted the generation interconnection requests to TranServ International (the Companies' Independent Transmission Organization or "ITO") to interconnect to the LG&E/KU transmission system, begun the siting documentation, and had discussions with both natural gas pipeline companies.

As described in David S. Sinclair's testimony, the Companies have concluded that a significant part of the lowest reasonable cost option for serving load and ensuring cost-effective environmental compliance is to build the NGCCs. The build process will include an Owner's Engineer ("OE") which will support our Project Engineering and Power Production staffs. As they did for the Cane Run NGCC project, the Companies have contracted with the engineering firm HDR to serve as the OE. HDR will also assist with design optimization, environmental permitting, and procurement efforts in a support role to our Project Engineering department in similar fashion as they have done for the Trimble County Unit 2 supercritical coal-fired unit and the Cane Run Unit 7 NGCC unit. With timely regulatory approval and receipt of the construction permits, completion of the NGCCs can meet the targeted commercial operation dates.

Q. Please describe the construction timeline for the NGCCs.

A. Once the regulatory approvals are received, the commercial process will begin in earnest to solicit the RFP for the power islands. Once the OEM for the power islands is selected, the RFP for the EPC (which will include the best evaluated power island OEM) will be issued to the market. The critical time element for construction of an NGCC is the acquisition and delivery of the power island. Current market indications from the power island OEMs and EPC firms currently constructing NGCCs are that substantial completion is 33-36 months after order execution, followed by 3-4 months of startup, final testing, and commissioning to reach commercial operation. In total, the Companies estimate that it will take approximately 35 to 40 months from execution of the EPC contract until commercial operation, not considering time required for permitting and regulatory approvals.

Q. Are there permits that will be required as part of the construction?

A. Yes. The environmental permits are discussed in Mr. Imber's testimony. In addition, permits normally required for construction (plumbing, building, etc.) will be obtained at the appropriate time as necessary.

Q. Why are the Companies seeking a CPCN at this time?

A. The Companies are requesting a CPCN at this time so that they can ensure the timely execution of their cost-effective plans, maximize the emission "netting out" opportunities with the retirements of the coal-fired units, and position themselves to meet their obligation to reliably serve customers in the years ahead. The proposed in-service dates of new generation and PPAs assume a level of compliance timing relief from current Good Neighbor Plan requirements. Lack of that relief will add additional urgency to the timing of approvals of the Companies' recommend plan.

The Companies also recognize that it may take a number of months for approval of the CPCN and the necessary pre-construction environmental permits. We also know from experience that the large scope of the projects requested will require an intensive process of qualifying suppliers, evaluation of bids and earnest negotiations. In light of the complexity of the construction project and the anticipated market impacts due to the EPA regulations, difficulties and resulting delays are possible. Taking all of that into account, in order to have new generation resources operational when the Companies will need them and to achieve environmental regulation compliance, we believe it is imperative to seek Commission approval at this time.

Q. Mr. Imber states that the final Good Neighbor Plan is expected in March 2023. Why don't the Companies wait until the final rule's issuance to file this application?

A. The proposed Good Neighbor Plan highlights the importance of moving on these issues sooner rather than later. More than three years elapsed from the time the Commission approved construction of the Companies' only natural gas combined cycle unit, Cane Run Unit 7, to the date the unit achieved commercial operation. That occurred at a time when there were not such pronounced supply chain and labor availability concerns, and when the entire industry was not seeking to build such units in a short timeframe to achieve a regulatory compliance deadline. Furthermore, a best-case outcome for the final Good Neighbor Plan would allow Mill Creek Unit 2 and Ghent Unit 2 to operate economically only until replacement generation is available. Therefore, advancing this process as soon as reasonably possible is necessary to ensure safe and reliable service at the lowest reasonable cost, and it is prudent for the Companies to seek approval for their new supply- and demand-side proposals now rather than delay them.

Q. Do the Companies have a suggested date for a final order in these proceedings?

A. While the Companies recognize the scope of the analysis presented herein and the burden on the Commission to process this case, an order by October 1, 2023 supports the execution of the Companies' proposed plans.

Q. Can the Companies cost-effectively comply with the Good Neighbor Plan with the addition of only one NGCC?

A. No. Construction of only one NGCC will jeopardize the Companies' ability to comply with the Good Neighbor Plan in the most cost-effective manner. As Mr. Imber explains, not having both NGCCs would likely mean selective catalytic controls at coal-fired units which would not be subject to the requested alternative Good Neighbor Plan compliance option flexibility noted previously.

Q. Have the Companies performed any construction work for the NGCCs at this time?

A. No. However, as indicated previously, the Companies have performed development engineering to size the units, locate the units at Mill Creek and E.W. Brown, as well as other pre-engineering activities necessary to prepare a conceptual scope, estimate and schedule. The Companies are proceeding with development of the engineering, permitting, and bidding processes for the power island, LTSA and EPC contracts, as well as continuing to develop execution plans for all other associated onsite work necessary to implement the NGCCs. Unless entering into one or more of those supply or EPC contracts is necessary to guard against significant market price increases or equipment delivery risks, the Companies will not enter into contracts prior to approval by this Commission. Should entering into contracts be necessary prior to final regulatory approvals, any such contracts will have cancellation clauses, including specific deferment schedules contingent on receiving the necessary regulatory approvals (including the approval of this Commission).

Q. Will any significant natural gas transmission work have to be performed in connection with the construction of the NGCCs?

A. No, not in cost comparison to the total cost of each project. For the Mill Creek NGCC, a new 16-inch gas pipeline with onsite gas compression of less than a mile in length will be necessary to receive gas from Texas Gas. The line and new city gate will be built both in and adjacent to the existing 345 kV electric transmission right-of-way serving Mill Creek. The companies will install new gas compression at the site to feed the NGCC as was done for Cane Run Unit 7. The Companies have consulted with Texas Gas and have learned that Texas Gas has adequate capacity to serve the gas transportation needs without significant pipeline construction on its system. In total, the gas transmission work for the Mill Creek NGCC is only 3% of the total project cost. For the Brown NGCC, the Companies will need to install new gas compression at the site to allow the existing pipeline to serve the current simple-cycle gas turbines and the Brown NGCC. The Companies have consulted with Tennessee Gas and have learned that Tennessee Gas has adequate capacity to serve the gas needs of the Brown NGCC. Thus, the Brown NGCC will be served by either Tennessee Gas or Texas Eastern. For the Brown NGCC project, gas transmission cost is only 3% of the total project cost.

Q. What are the expected construction costs of the NGCCs?

A. The Mill Creek NGCC cost is expected to be approximately $662 million for generation, including the costs of the new gas pipeline. The Brown NGCC cost is expected to be $700 million.

Q. What will be the annual operating cost of the NGCCs?

A. The annual operating cost in 2027 dollars for the Mill Creek NGCC is expected to be $3.7 million in fixed O&M costs and $1.06/MWh in variable O&M costs. The annual operating cost in 2028 dollars for the Brown NGCC is expected to be $4.2 million in fixed O&M costs and $1.08/MWh in variable O&M costs.

Q. How do the Companies plan to transmit power from the NGCCs to serve their load?

A. Power from the new NGCCs will be transmitted using the existing network transmission infrastructure, with very minor modifications, given the Companies "retire and replace" plan. On site interconnection facilities will also be constructed or modified at Mill Creek and E.W. Brown, as needed, to interconnect the NGCCs with the transmission network at each plant site.

By using existing infrastructure, the Companies do not believe any significant system upgrades will be necessary that would require new right-of-way acquisition or electric transmission CPCNs to integrate the Mill Creek and Brown NGCCs with the transmission network. Required electric transmission modifications represent approximately 1% of the total cost of the Mill Creek and Brown NGCC units, and those costs have been included in Mr. Wilson's analysis described in his testimony.

<u>CONSTRUCTION AND PURCHASE OF SOLAR FACILITIES</u>

Q. Why are the Companies proposing the construction of the 120 MWac Mercer County Solar Facility and the purchase of the 120 MWac Marion County Solar Facility?

A. The Companies have concluded that part of a least reasonable cost plan to meet projected load is to have a diversified mix of generation. That diversification includes the construction of the 120 MWac Mercer County Solar Facility[10] and the purchase of the 120 MWac Marion County Solar Facility to be constructed by a third party. Given the Companies' positive experience with its existing solar facilities, the volatility of and potential increases in fuel prices, and the possibility of future carbon constraints,

[10] Mr. Wilson's Resource Assessment explains how the development of this facility's location evolved from Muhlenberg County to Mercer County.

the Companies believe the two solar facilities will be valuable additions to their generation portfolio.

Q. Please describe the proposed self-build Mercer County Solar Facility.

A. This self-build proposal will be constructed with current generation bifacial silicon crystal panels, inverters, and a single axis tracker rack system to maximize generation on the available land. The Companies' Project Engineering team will lead the Companies' efforts to develop, permit, and EPC the Mercer County Solar Facility as it did for the E.W. Brown solar facility in 2016. The power generated will be transmitted to existing transmission infrastructure.

Q. Please describe the site upon which the Mercer County Solar Facility will be located.

A. The Companies plan to purchase up to 900 acres to facilitate construction of the Mercer County Solar Facility. The solar panels will be oriented on the property in a manner to maximize generation. Conceptual and preliminary plans and drawings for the self-build Mercer County Solar Facility are attached to the Joint Application as Exhibit 3.

Q. Will any construction permits be required?

A. No major construction permits are anticipated.

Q. How will power generated at the Mercer County Solar Facility be transmitted to customers?

A. The facility will interconnect with the Companies' existing transmission and distribution network per the signed large generator interconnection agreement LGE-GIS-2019-025 that will be assigned to the Companies.

Q. How much will it cost to construct the Mercer County Solar Facility and what is the expected timing of construction?

A. The Companies expect it will cost $243 million to construct the Mercer County Solar Facility. The Companies are already working on detailed specifications for the site preparation requirements, solar panel systems and associated electrical inverter connections. We expect to issue those specifications to the EPC marketplace in late 2023 and execute an agreement by the summer of 2024. Engineering, mobilization, and construction will begin in late 2024 with commercial operation in the first quarter of 2026.

Q. How much will it cost to operate the Mercer County Solar Facility on an annual basis?

A. Conceptual fixed operating and maintenance costs for the Mercer County Solar Facility are assumed to be $15.127/kW-year or approximately 1.8 million.[11]

Q. Will the Companies be constructing anything for the 120 MWac Marion County Solar Facility?

A. No. The Companies plan to contract with a third-party provider who will construct the Marion County Solar Facility. After construction is complete and fully commissioned, the Companies will purchase and operate it.

Q. Please describe the Marion County Facility that the third party has proposed to construct for the Companies' purchase?

A. The proposal is for a 120 MWac solar photovoltaic project primarily located in Marion County, Kentucky outside the city of Lebanon. The third party has obtained most of

[11] These values are quoted in 2026 dollars.

the property and easement rights necessary for the project which will require approximately 850 acres. The third party is also working on necessary permitting. The majority of the construction will occur in 2026 and the facility is expected to be in commercial operation by early 2027. The Companies expect to complete the purchase of the facility no later than mid 2027.

Q. Why have the Companies proposed to self-build the Mercer County Solar Facility but purchase the Marion County Solar Facility?

A. The fact that the Companies will build the Mercer County Solar Facility but purchase the Marion County Solar Facility reflects that a self-build project and the purchase of the Marion County Solar Facility were the two best proposals for Company owned and operated solar generation in response to the Companies' RFP. The Companies are proposing both of them in this case because of their suitability in adding a total of 240 MWac of solar generation to the Companies' generation portfolio, which is further discussed in Mr. Sinclair's testimony.

Q. How will power generated at the Marion County Solar Facility be transmitted to customers?

A. The facility will be near existing Company transmission assets where interconnection facilities will be constructed so that the power can be provided to customers through the Companies' existing transmission and distribution network. The project is currently in the Companies' transmission queue awaiting study.

Q. What is the expected purchase price of the Marion County Solar Facility and when do the Companies expect to complete that purchase?

A. The expected purchase price is $220 million and the Companies expect the purchase to be completed in 2027.

Q. Once the purchase is complete and the Companies assume operation of the Marion County Solar Facility, what will the annual operating costs be?

A. Conceptual fixed operating and maintenance costs for the Marion County Solar Facility are assumed to be $15.430/kW-year or approximately $1.9 million.[12]

CONSTRUCTION OF BROWN BESS

Q. Why are the Companies proposing the construction of the Brown BESS?

A. The Companies have concluded that an additional component of a least reasonable cost portfolio to meet projected load is to have a diversified mix of generation and a small amount of short-term back up stored power. The Companies can accomplish this by constructing the Brown BESS, which is a four-hour, 125 MW (500 MWh total) battery storage facility. Additionally, having the Brown BESS will allow the Companies to gain valuable experience with stored power. When the Commission issued a CPCN in Case No. 2014-00002 for the Companies to construct a solar facility at the E.W. Brown Generating Station, the Companies gained valuable experience in building, owning, operating, and maintaining a solar facility. The Companies expect the same for the Brown BESS as it pertains to stored power which will help guide the Companies' future decisions regarding stored power. This experience will be particularly useful if the downward trend of stored power cost continues.

Q. Please describe the proposed Brown BESS.

[12] These values are quoted in 2027 dollars.

A. The Companies will construct the Brown BESS at KU's E.W. Brown Generating Station in Mercer County, Kentucky where there is ample land for the facility. The BESS will be capable of providing 125 MW for up to four hours, 500 MWh of total stored power from the electrical transmission grid. The Companies plan is based on using Tesla's Megapack lithium-ion batteries or equivalent lithium-ion technology from other providers.[13] The Companies have not constructed a BESS project of this size, but they do have BESS experience from operating their E.W. Brown BESS test facility that has been operational since 2016 in collaboration with the Electrical Power Research Institute ("EPRI"). The Companies' Project Engineering team will lead the Companies' efforts to develop, permit, and construct through an EPC this facility. The power required to charge the BESS and the subsequently generated power will be transmitted via the existing electric transmission infrastructure at the E.W. Brown Generating Station. Maps, conceptual and preliminary plans and drawings for Brown BESS are attached as Joint Application Exhibit 4.

Q. Are there transmission advantages to constructing the Brown BESS at the E.W. Brown Generating Station?

A. Yes. The transmission network already in place at E.W. Brown allows for this integration at minimal impacts. The Companies do not anticipate any significant system modifications or upgrades will be necessary to charge or transmit power stored in the batteries other than the electric transmission system upgrades on-site to connect the BESS to the existing E.W. Brown electrical substation. As with the NGCCs and

[13] A copy of Tesla's Megapack Datasheet is included with Joint Application Exhibit 4.

the solar projects, the Companies will file, as appropriate, a generation interconnection request with their ITO for approval.

Q. Will any construction permits be required?

A. No major construction permits are anticipated.

Q. How much will it cost to construct the Brown BESS and what is the expected timing of construction?

A. The Companies expect it will cost $270 million to construct the Brown BESS but the project will be eligible for up to a 50 percent investment tax credit. The Companies expect to perform the necessary engineering for the Brown BESS in 2023 and begin construction in 2024 with commercial operation in the first quarter of 2026.

Q. How much will it cost to operate Brown BESS on an annual basis?

A. Conceptual fixed operating and maintenance costs for the Brown BESS are assumed to be $25/kW-year or approximately $3.1 million.[14]

Q. The Companies are proposing multiple complicated projects as part of the overall portfolio submitted in this case. Do you have any concerns over the Companies' ability to deliver all proposed projects?

A. No. The Companies recognize that the requested projects in this case will require a tremendous amount of time, planning, expense, and expertise. However, the Companies have proven they can and will devote the resources necessary to handle multiple complex projects contemporaneously when it is in the best interests of our customers. For example, the Companies proposed and the Commission approved multiple environmental compliance projects as part of their 2011 Environmental

---

[14] These values are quoted in 2026 dollars.

Compliance Plan cases[15] which included: (1) the construction of particulate matter control systems at all the generating units at E. W. Brown, Ghent, Mill Creek, and Unit 1 at Trimble County; removal of the flue gas desulfurization ("FGD") systems at Mill Creek Units 1 and 2 and construction of a single FGD system to serve both units; construction of a new FGD system at Mill Creek Unit 4; and removal of the existing FGD system at Mill Creek Unit 3 and tying Mill Creek Unit 3 into the FGD system that was serving Mill Creek Unit 4. The Companies managed and completed all those projects while also constructing the Cane Run 7 NGCC the Commission approved in Case No. 2011-00375.

Likewise, the Companies again proposed and the Commission approved multiple complex projects as part of their 2016 Environmental Compliance Plan cases[16] related to some 19 surface impoundments and four process water systems. There again, the Companies successfully have managed all projects. Thus, with the Companies' advanced planning and timely approvals from the Commission, the Companies' have demonstrated an ability to execute on multiple complex projects simultaneously.

<u>DEMAND SIDE MANAGEMENT AND ENERGY EFFICIENCY ("DSM-EE") PROGRAMS</u>

Q. Are the Companies proposing new DSM-EE programs in this case?

A. Yes. Under my supervision, the Companies have performed extensive study and analysis to determine what types of DSM-EE programs should be offered going forward. As a result of that effort and as explained in more detail in Lana Isaacson's

[15] Those cases were Case No. 2011-00161 (KU) and Case No. 2011-00162 (LG&E).
[16] Those cases were Case No. 2016-00026 (KU) and Case No. 2016-00027.

and John Bevington's testimony, the Companies are proposing their 2024-2030 Demand-Side Management and Energy Efficiency Program Plan.

REGIONAL TRANSMISSION ORGANIZATION ("RTO") MEMBERSHIP

Q. Did the Companies consider RTO membership in their analysis?

A. Yes. As Messrs. Sinclair and Schram address in their testimony, the Companies recently filed an updated RTO membership analysis. That analysis shows that RTO membership is not advantageous to the Companies' customers at this time. But the RTO analysis does show that the Companies' supply-side proposals in this proceeding are consistent with the resource expansion plan selected by the model used by the Companies' third-party consultant in that analysis, which was entirely independent of the Companies' analysis presented in this proceeding. The RTO analysis further indicates that the supply-side resources the Companies are proposing would likely serve customers' interests well if RTO membership became advantageous to customers in the future.

PARTNERSHIP OPPORTUNITIES

Q. Have the Companies explored partnership opportunities with electric providers outside the Companies' service territories that could provide benefits to the Companies' customers or to other providers' customers?

A. While the Companies are always open to discussing partnership opportunities, the Companies have carefully studied how best to serve load cost-effectively while ensuring environmental compliance under the circumstances presented by the Good Neighbor Plan regulation. As a result of that study, the Companies have concluded that the proposals set forth in this case optimize the utilization of existing site infrastructure (e.g., land, common equipment, transmission infrastructure, gas supply, personnel, and environmental permits) for the benefit of customers who have paid and are paying for those sites. Partnership opportunities are not a necessary component of achieving that optimization.

Additionally, the Companies did not receive any responses to its June 2022 RFP that included partnership opportunities on third party sites, thus seeking and successfully negotiating a partnership arrangement with a counterparty who likely had not seriously contemplated such an arrangement would be a time consuming effort. Having said that, the Companies are not philosophically opposed to future partnership opportunities so long as they reliably and cost-effectively serve the Companies' customers.

CONCLUSION

Q. What is your recommendation to the Commission?

A. I recommend that the Commission approve the Mill Creek NGCC, Brown NGCC, Mercer County Solar Facility, Marion County Solar Facility, and Brown BESS as cost-effective methods of ensuring adequate generating capacity while complying with current and proposed environmental laws. I also recommend the Commission approve the DSM-EE programs the Companies are proposing in this matter. The Companies seek these approvals by October 1, 2023 so they can work towards execution of these proposals while ensuring cost-effective environmental compliance and serving customers reliably.

Q. Does this conclude your testimony?

A. Yes, it does.

VERIFICATION

COMMONWEALTH OF KENTUCKY)
)
COUNTY OF JEFFERSON)

The undersigned, **Lonnie E. Bellar**, being duly sworn, deposes and says that he is Chief Operating Officer for Louisville Gas and Electric Company and Kentucky Utilities 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.

Lonnie E. Bellar

Lonnie E. Bellar

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 13th day of December 2022.

Judy Schooler

Notary Public

Notary Public ID No. KYNP53381

My Commission Expires:

July 11, 2026

APPENDIX A

Lonnie E. Bellar
Chief Operating Officer
Kentucky Utilities Company
Louisville Gas and Electric Company
220 West Main Street
Louisville, Kentucky 40202
Telephone: (502) 627-4830

Education

Bachelors in Electrical Engineering; University of Kentucky, May 1987
Bachelors in Engineering Arts; Georgetown College, May 1987
E.ON Academy, Intercultural Effectiveness Program: 2002-2003
E.ON Finance, Harvard Business School: 2003
E.ON Executive Pool: 2003-2007
E.ON Executive Program, Harvard Business School: 2006
E.ON Academy, Personal Awareness and Impact: 2006
Tuck Executive Education Program, Dartmouth University: 2015

Professional Experience

Louisville Gas and Electric Company
Kentucky Utilities Company

Chief Operating Officer	Mar. 2018 – Present
Sr. Vice President – Operations	Jan. 2017 – Mar. 2018
Vice President, Gas Distribution	Feb. 2013 –Jan. 2017
Vice President, State Regulation and Rates	Nov. 2010 – Jan. 2013

E.ON U.S. LLC

Vice President, State Regulation and Rates	Aug. 2007 – Nov. 2010
Director, Transmission	Sept. 2006 – Aug. 2007
Director, Financial Planning and Controlling	April 2005 – Sept. 2006
General Manager, Cane Run, Ohio Falls and Combustion Turbines	Feb. 2003 – April 2005
Director, Generation Services	Feb. 2000 – Feb. 2003
Manager, Generation Systems Planning	Sept. 1998 – Feb. 2000
Group Leader, Generation Planning and Sales Support	May 1998 – Sept. 1998

Kentucky Utilities Company

Manager, Generation Planning	Sept. 1995 – May 1998
Supervisor, Generation Planning	Jan. 1993 – Sept. 1995
Technical Engineer I, II and Senior, Generation System Planning	May 1987 – Jan. 1993

Professional Memberships

Institute of Electrical and Electronics Engineers

Civic Activities

Metro United Way – Board of Directors 2022-Present
Trees Louisville – Board of Directors 2022-Present
South East Energy Exchange Market – Board of Directors 2022
Greater Louisville, Inc.
  Board of Directors, Chair – 2020-2021
  Board of Directors, Executive Committee – 2016–Present
LG&E and KU Power of One Chair - 2018
Kentucky Science Center – Board of Directors – 2008–2016
UK College of Engineering Advisory Board – 2009 – Present
American Gas Association – Board of Directors – 2013 – Present
Southern Gas Association – Board of Directors – 2013 – Present
Metro United Way Campaign – 2008
E.ON U.S. Power of One Co-Chair – 2007