COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

ELECTRONIC 2021 JOINT INTEGRATED RESOURCE PLAN OF LOUISVILLE GAS AND ELECTRIC COMPANY AND KENTUCKY UTILITIES COMPANY	))))	CASE NO. 2021-00393

LOUISVILLE/JEFFERSON COUNTY METRO GOVERNMENT'S COMMENTS TO THE LOUISVILE GAS AND ELECTRIC COMPANY AND KENTUCKY UTILITIES COMPANY 2021 JOINT INTEGRATED RESOURCE PLAN

Louisville/Jefferson County Metro Government (LMG) submits the following comments on the 2021 Joint Integrated Resource Plan of Louisville Gas and Electric Company and Kentucky Utilities Company.

COMMENTS

Louisville Metro Government is a large customer of LG&E and represents a broader customer class of over 750,000 residents. LMG leadership and Metro Council have recognized the urgent need to mitigate climate change effects and address environmental inequities.

In 2016, LMG conducted a greenhouse gas emissions inventory and in 2018 set a reduction target of 80% by 2050 compared to 2016 levels. At that time, this reduction target was in line with the best science available. Around the time this target was set, the International Panel on Climate Change released their 2018 report which again highlighted the need to keep global warming below 1.5 degrees Celsius. The report also established that in order to achieve this, emissions of

greenhouse gases would need to fall by 45 percent from 2010 levels by 2030, reaching 'net zero' around 2050.[1]

In September 2019, Mayor Greg Fischer declared a climate emergency calling for action to address the increasing climate effects of heat and flooding. In February 2020, Metro Council passed Louisville Metro Resolution No. 0009, Series 2020 which resolved to support:

- 100% clean, renewable electricity for LMG operations by 2030
- 100% clean energy for LMG operations by 2035, and
- 100% clean energy community-wide by 2040.

Recognizing that our emissions reduction target was not in line with the goal of keeping global warming below 1.5 degrees Celsius, in 2022 LMG joined the Department of Energy's Better Climate Challenge and committed to reducing municipal greenhouse gas emissions 50% by 2032 from the 2016 baseline.[2] These goals align with LG&E/KU's parent company PPL's goal to achieve a 70% reduction in carbon emissions from 2010 levels by 2035.

LMG is making progress towards its carbon reduction goals but the ability to achieve these goals relies in large part on the carbon intensity of LG&E/KU's grid mix. The decisions made regarding this IRP will be of critical importance to LMG's ability to meet its renewable energy and emissions reduction goals. We offer these comments on the 2021 LG&E/KU Integrated Resource Plan:

Maximize use of energy efficiency in IRP planning and expand access to efficiency programs for low-income customers.

LMG's Emissions Reduction Plan calls for improvements in energy efficiency for residential buildings, commercial/institutional buildings, and manufacturing industries and construction. Home energy efficiency retrofits will play a significant role in both reducing

[1] https://www.ipcc.ch/2018/10/08/summary-for-policymakers-of-ipcc-special-report-on-global-warming-of-1-5c-approved-by-governments/
[2] https://betterbuildingssolutioncenter.energy.gov/partners/louisville-ky

greenhouse gas emissions and lowering energy burden for low-income[3] families in Louisville, who often live in older homes that are less energy efficient due to older windows that leak air, gaps in insulation, and older appliances.[4]

Nationally, US households spend an average of 3.1% of income on home energy bills. Households that spend more than 6% on home energy are considered energy burdened, and those that spend more than 10% are considered severely energy burdened. More than 25% of US households experience an energy burden and about 50% of those face a severe energy burden. An even higher percentage of low-income households experience energy burden. For households with income below 200% of the federal poverty level, 67% face an energy burden and of those 60% face a severe energy burden.[5]

Nationally, the average energy burden for low-income households making 80% or less of AMI is 7.2%.[6] Half the low-income households in Louisville have an energy burden greater than 7.6%, and a quarter of them, over 12.7%.[7]

In 2008, LG&E set a goal to save enough energy to prevent the need for a new power plant.[8] Due to the extensive DSM program offerings during that time, LG&E was successful and saved over 1.15 million megawatt hours or the equivalent of powering 96,000 homes for a year. Of the programs offered during that time, only a few are still in place (see below). It was predicted that costs for DSM programs would drop from $45 million to about $14 million per year when the expanded program offerings were allowed to expire due to no longer being "cost effective." [9]

[3] LG&E/KU defines low-income as 80% of the Area Median Income (AMI) and below.
[4] https://www.starenergypartners.com/blog/energy-efficiency/out-with-the-old-why-older-homes-are-less-energy-efficient/#:~:text=Older%20homes%20suffer%20from%20worn,benefits%20at%20the%20same%20time!
[5] https://www.aceee.org/sites/default/files/pdfs/u2006.pdf
[6] https://www.aceee.org/sites/default/files/publications/researchreports/u1602.pdf
[7] https://www.aceee.org/sites/default/files/publications/researchreports/u1602.pdf
[8] https://lge-ku.com/residential-energy-efficiency/expired-programs
[9] https://lge-ku.com/newsroom/articles/2018/10/08/kpsc-approves-dsm-filing-minor-modifications

According to the ACEEE report "Low-Income energy efficiency programs: A baseline assessment of programs serving the 51 largest cities," in 2015 LG&E spent $1.6 million on low-income programs. This investment saved 3,884 MWh of energy, a savings of 30-49 kWh per low-income customer.[10]

Current DSM offerings for residential customers are:

- WeCare (Weatherization, Conservation Advice, and Recycling Energy) is a voluntary program designed to create energy savings through weatherization and energy education for income-eligible customers.
- Residential Demand Conservation which provides a device attached to a central conditioner or heat pump that allows LG&E to safely cycle equipment off and on for brief periods during "peak" summer days.

Other programs currently offered provide comparison shopping for energy efficient appliances, an option for early adoption of an advanced meter, and energy efficiency tips and resources. Only the WeCare program provides direct savings to low-income families.

Yet this IRP defers the evaluation of any new DSM programs until the implementation of advanced meters. We recommend that the PSC encourage LG&E/KU to maximize the utilization of energy efficiency programs particularly for low-income customers in this IRP and all subsequent resource planning activities. This not only lowers energy burden for residents but addresses concerns around meeting peak demand by reducing total energy use, particularly during times of extreme heat or cold.

Best practices[11] for programs to support low-income customers include:

- Offering a range of eligible measures
- Coordinating with Weatherization Assistance Program and other organizations on program delivery
- Providing a portfolio of programs
- Addressing health and safety
- Developing dual fuel and fuel-blind programs

[10] https://www.aceee.org/sites/default/files/low-income-baseline-1117.pdf

[11] Low-Income energy efficiency programs: A baseline assessment of programs serving the 51 largest cities. ACEEE 2017. https://www.aceee.org/sites/default/files/low-income-baseline-1117.pdf

- Coordinating with bill payment assistance programs

We recommend LG&E/KU evaluate the previous DSM programs which resulted in significant savings in both energy and cost to low-income customers.

Accelerate carbon reduction in LG&E/KU's grid mix

The majority of greenhouse gas emissions in Louisville are from building electricity use—residential, commercial/institutional, and manufacturing and construction. LMG's Emissions Reduction Plan[12] calls for a 70% reduction in carbon intensity factor in energy generation in order to meet emissions reduction goals. The carbon intensity factor represents the carbon dioxide (CO_2) emissions per unit of energy produced. Lowering the carbon intensity factor directly reduces emissions of CO_2 and CO_2 equivalents (CO_2e), the greenhouse gases responsible for climate change.

In Louisville's 2016 GHG inventory, comparing 2010 to 2016, emissions were found to have decreased by about 10%, almost entirely due to the transition of the Cane Run generating station from coal to natural gas. Not only did this reduce climate change-causing emissions, it also improved air quality by reducing particulate matter, carbon dioxide, and sulfur dioxide (SO_2).[13]

Shifting the mix of fuel sources used to generate electricity for Louisville Metro will have the single largest impact on emissions. Electricity generation and consumption within Louisville represent the greatest source of greenhouse gas emissions, accounting for 9,883,480 tons of CO_2e in 2016, or approximately 62% of total emissions. According to LMG's Emissions Reduction Plan, a 70% reduction in carbon intensity factor associated with the generation of electric power[14]

[12] https://louisvilleky.gov/government/sustainability/emissions-reduction-plan.

[13] Improved asthma outcomes observed in the vicinity of coal power plant retirement, retrofit and conversion to natural gas. 2020. Casey et al. Nature Energy. https://www.nature.com/articles/s41560-020-0600-2

[14] The 70 percent energy generation intensity factor reduction mirrors PPL's, LG&E/KU's parent company, stated goal of reducing the company's CO_2 emissions by 70 percent from 2010 levels by 2035 https://www.pplweb.com/sustainability/climate-action/.

would potentially result in a cumulative 40% reduction in greenhouse gas emissions over the business-as-usual scenario.[15]

LMG applauds LG&E/KU's work in pilot-scale carbon capture at the E.W. Brown generating station in Harrodsburg, Kentucky. This partnership with the University of Kentucky Center for Applied Research has lowered carbon capture costs by 40% and is one of the few plants in the country with an active carbon capture unit. We eagerly anticipate the next phase of this research: studying carbon capture with natural gas.[16]

The US Environmental Protection Agency has recently indicated that in the coming year, new rules will be rolled out for mercury, ozone, water, and coal ash that will likely change the calculus of energy production costs for fossil fuels, particularly coal.[17] We strongly encourage LG&E/KU to model early closure of all coal-fired power plants as Duke Energy Carolinas, LLC and Duke Energy Progress, LLC did in their 2020 IRP[18] in the "Earliest Practicable" scenario. Nearby states such as Indiana[19] and Illinois[20] have both found that shifting investments to solar and battery storage will save ratepayers money and significantly reduce carbon emissions even when retiring coal assets early.

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[15] Because the benefits of fuel switching will be felt across all sectors that use electricity and because of how electricity-based emissions are assigned in LMG's Emissions Reduction Plan, the vast majority of the emissions reductions are allocated across the end-use sectors, i.e., residential, commercial, and manufacturing buildings.
[16] At the forefront of research and technology for the benefit of the environment. LG&E/KU, March 2, 2022. https://lge-ku.com/newsroom/articles/2022/03/02/forefront-research-and-technology-benefit-environment?fbclid=IwAR27LCeDL3XlV8WlEqbXYldjgqCq5itIYWxhzVEBeQ4sqxx9NOCGHlQIUPI.
[17] What the EPA's New Plans for Regulating Power Plants Mean for Carbon. Scientific American, March 11, 2022. https://www.scientificamerican.com/article/what-the-epas-new-plans-for-regulating-power-plants-mean-for-carbon/?fbclid=IwAR1Ly9HcUmXHTf1cJhzjrYRD9njfF8-OJiRAwpG5lGVmfZnQ7nIHDim-z6A.
[18] City of Charlotte Initial Comments on Duke Energy Carolinas, LLC and Duke Energy Progress, LLC's Integrated Resource Plan. https://starw1.ncuc.net/NCUC/ViewFile.aspx?Id=066d6aeb-73b6-45d8-817a-7cab0fe603d8.
[19] Report: Closing Coal Plants Would Save Indiana Customers Money, Reduce Pollution. October 22, 2019. https://www.wboi.org/news/2019-10-22/report-closing-coal-plants-would-save-indiana-customers-money-reduce-pollution.
[20] Investing in local solar can help Illinois meet clean energy targets and save ratepayers money. https://www.dailyherald.com/discuss/20210521/investing-in-local-solar-can-help-illinois-meet-clean-energy-targets-and-save-ratepayers-money.

Continue Expanding Use of Renewable Energy and Battery Storage

LMG acknowledges gas combustion is less carbon intensive than coal combustion. LMG also acknowledges that retiring coal plants necessitates replacement with other sources. The City's understanding is that coal replacement with clean energy portfolios (a combination of renewables, energy efficiency, demand response, and storage) can provide the same services as gas plants at lower costs, and with better public health and environmental outcomes. An independent analysis of the economics of clean energy portfolios found that they have declined in cost by 80 percent since 2010, cost less than 90 percent of proposed gas-fired generation, and are projected to undercut operating costs of existing gas plants within 10-20 years.[21]

In 2020, the International Energy Administration's *World Energy Outlook 2020* report found that solar is currently the cheapest electricity source in history in many parts of the world, including the largest markets like the United States, European Union, China, and India. As such, renewables, particularly solar photovoltaics are the least-cost option and will continue to remain so, especially as energy demand increases and the price of renewables continues to fall.[22]

Legitimate concerns around reliably meeting peak demand with non-dispatchable resources can be addressed through the use of utility-scale battery storage. Cost projections from the National Renewable Energy Lab's 2021 update show 4-hour battery storage cost relative to 2020 costs continuing to drop precipitously until 2030, with continuing declines under two of three scenarios. This report shows by 2030 costs for utility-scale battery storage will decline by 28% to

[21] The risky economics of the new natural gas infrastructure in the United States. GreenBiz, September 17, 2019. https://www.greenbiz.com/article/risky-economics-new-natural-gas-infrastructure-united-states.
[22] International Energy Administration, World Energy Outlook 2020: https://iea.blob.core.windows.net/assets/a72d8abf-de08-4385-8711-b8a062d6124a/WEO2020.pdf

58% and by 28% to 75% by 2050.[23] Analysts say that by 2030, 5 gigawatts of large-scale battery storage will be cost-effective in similar markets such as North Carolina.[24]

LMG suggests that LG&E/KU consider the publicly stated GHG reduction and renewable energy goals of Louisville, other customers, and their parent company in the evaluation of IRP scenarios. We encourage LG&E/KU to utilize more renewable energy and battery storage in their resource planning and to increase the utility-scale renewable energy procurement opportunities available to large customers.

Acknowledge the external costs of fossil fuel combustion

It is well settled that energy production from fossil fuels contributes to emissions of criteria air pollutants, including SO_2, nitrogen oxides (NOx), and particulate matter (PM), as well as hazardous air pollutants. The report "Environmental Quality and the U.S. Power Sector: Air Quality, Water Quality, Land Use, and Environmental Justice," found that economic damage from coal-fired power plants is largely associated with high emissions of SO_2, NOx, and PM, particularly fine particulates ($PM_{2.5}$).[25] Each of these pollutants has a direct public health impact. Some, like SO_2 and NOx are also precursors for the formation of $PM_{2.5}$ and Ozone, respectively.[26] These pollutants contribute significantly to uncontrolled asthma, respiratory symptoms, and respiratory-related hospitalizations as well as other chronic conditions. This, in turn, results in elevated public health costs and reduced quality of life.

[23] Cost Projections for Utility-Scale Battery Storage: 2021 Update. National Renewable Energy Lab, June 2021. https://www.nrel.gov/docs/fy21osti/79236.pdf

[24] Energy News Network, January 8, 2019. https://energynews.us/2019/01/08/study-batteries-are-coming-to-n-c-but-how-many-how-soon-depends-on-policy/

[25] https://info.ornl.gov/sites/publications/files/Pub60561.pdf

[26] Louisville Metro Air Pollution Control District, 2020 Multipollutant Stakeholder Group Final Report, https://louisvilleky.gov/air-pollution-control-district/document/finalmpsgreportpdf-0

Air pollution affects everyone, but especially those most vulnerable: senior citizens, very young children, and people who already have respiratory ailments such as asthma, emphysema, and chronic obstructive pulmonary disease (COPD).[27] Casey et al. (2020) found that after the closure of the Cane Run Road power plant and the addition of scrubbers to the Mill Creek facility, SO_2 emissions fell by 9.6 million and 12.9 million kg, respectively, resulting in a reduction in both acute asthma outcomes—measured by zip code level asthma-related hospitalizations and emergency room visits—as well as daily symptoms for *Louisville* residents.[28] In short, actions taken that improve local air quality reduce health impacts associated with air pollution exposure, mitigate the economic consequences of elevated public health costs, and improve quality of life.

While fossil fuels have powered our nation and provided reliable energy for decades, they have also led to the current climate crisis due to the heat-trapping effect of the greenhouse gases released during their combustion. Within one month, the Commonwealth of Kentucky experienced two climate disasters: In December of 2021 the deadliest and longest-tracked tornado killed at least 74 people in Kentucky and destroyed the town of Mayfield. On New Year's Day, a state of emergency was declared due to severe storms, heavy rain, and extensive flooding. These two unlikely events demonstrate the increasing occurrence of severe weather made more likely by climate change.

We can no longer afford to ignore the direct connection between greenhouse gas emissions and climate change. Without a GHG reduction of 50% by 2032, we risk catastrophic effects on our infrastructure, environment, and public health. While climate change affects everyone in the

[27] Louisville Metro Center for Health Equity, 2017 Health Equity Report, https://louisvilleky.gov/government/center-health-equity/health-equity-report

[28] Improved asthma outcomes observed in the vicinity of coal power plant retirement, retrofit and conversion to natural gas. 2020. Casey et al. Nature Energy. https://www.nature.com/articles/s41560-020-0600-2

community, it impacts some residents far more than others. In a 2012 Urban Heat study by Georgia Tech's Urban Climate Lab, Louisville was found to be the fastest warming urban heat island in the Unites States. This phenomenon of rising urban heat will only increase the energy demand for cooling in the coming years, thereby increasing energy costs for residents and businesses and disparately affecting those in higher heat areas. Climate change exacerbates many existing stressors related to health, income, housing quality and availability, and hazardous materials exposure.[29,] While the PSC has not historically included the external costs of burning fossil fuels, *these costs are real* and will continue to rise without immediate action. As taxpayers, we all pay for destructive storms, damaged infrastructure, increased rates of disease, and a multitude of other expenses resulting from fossil fuel combustion even if these costs are not reflected on our energy bill.

In its latest report, the IPCC states that "Without immediate and deep emissions reductions across all sectors, limiting global warming to 1.5°C is beyond reach." This requires that emissions peak by 2025 at the latest and be reduced by at least 43% by 2030.[30] Increases in global average temperature 1.5 degrees Celsius above pre-industrial levels will result in catastrophic changes including biodiversity loss, increases in severe weather, damage to infrastructure, climate migration, and even loss of life. We implore the PSC and LG&E/KU to consider these costs when evaluating the future of energy in Kentucky.

[29] Louisville Metro Office of Sustainability, 2020 Draft Prepare Louisville: Building a Climate Resilient City Plan, https://louisvilleky.gov/sustainability/document/preparelouisvilleadaptationplandraftforpubliccommentpdf
[30] https://www.ipcc.ch/report/ar6/wg3/resources/press/press-release

Respectfully submitted,

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CERTIFICATE OF SERVICE

In accordance with the Commission's July 22, 2021 Order in Case No. 2020-00085, *Electronic Emergency Docket Related to the Novel Coronavirus COVID-19*, this is to certify that the electronic filing was submitted to the Commission on April 22, 2022; that the documents in this electronic filing is a true representation of the materials prepared for the filing; and that the Commission has not excused any party from electronic filing procedures for this case at this time.

/s/ Quang Nguyen
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