COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

ELECTRONIC 2021 INTEGRATED RESOURCE PLAN OF DUKE ENERGY KENTUCKY, INC.	))	Case No. 2021-00245

ATTORNEY GENERAL'S COMMENTS

The Attorney General of the Commonwealth of Kentucky, through his Office of Rate Intervention ("Attorney General"), tenders the following comments regarding the 2021 Integrated Resource Plan ("IRP" or "Plan") of Duke Energy Kentucky, Inc. ("Duke" or "the Company").

Renewable Generation Resources, and Reliability Issues

Duke's IRP indicates the Company will be adding significant quantities of renewable supply-side resources to its portfolio. The Attorney General has several concerns regarding any large-scale, rapid adoption of renewable resources in the Commonwealth. First, Kentucky's climate does not provide adequate wind and solar capacity to make large-scale, rapid adoptions of renewable resources cost-effective for utility ratepayers. Renewables are only economical when the sun is shining and the wind is blowing. Second, this intermittent nature of renewable supply-side resources, by their very definition, carries reliability risks; indeed, the nation is already experiencing major reliability problems in those regions where such a major switch to renewable sources has occurred, and which lack adequate dispatchable resources such as baseload generation to complement renewable resources.[1] The Northwest

[1] See, e.g., "Ensuring Electricity Reliability Must Be Job Number One For FERC," July 29, 2021, accessible at: https://www.utilitydive.com/news/ensuring-electricity-reliability-must-be-job-number-one-for-ferc/604034/; and "Renewable Energy Boom Risks More Blackouts Without Adequate Investment In Grid

and Southwest face growing risks as renewables continue to replace flexible coal and natural gas plants that can be dispatched when the sun goes down and wind turbines do not spin.[2] Meaningful battery capacity for wind and solar generation does not exist today and is still too costly.[3] Third, even though some states contiguous to the Commonwealth do have areas with greater renewable energy capacity factors, the Commission's IRP regulations do not require Kentucky's electric generating utilities to factor-in costs of additional transmission capacity that are frequently necessary to wheel out-of-state power into the utilities' respective service territories. The Commission and other state agencies require all such relevant data in order to develop sound planning. Fourth, the renewable energy transition will increase utility bills. Recently, the Wisconsin PSC approved a settlement which Xcel Energy and Alliant Energy reached with consumer advocacy, environmental and business groups that raised electric and natural gas rates for next year. Commissioner Ellen Nowak voted against the settlements saying, "[w]e should be going toward renewables, but the race to get there-it's going to have consequences that can be done in a more economical way that has fewer impacts on the ratepayers." Chair Rebecca Valcq noted, "I'm concerned that the agreement doesn't go far enough to protect customers, especially from bearing the brunt of the cost from retired coal plants."[4] The increased burden on ratepayers of shifting to renewables is being felt globally as well. Bjorn Lomborg, President of the Copenhagen Consensus noted that "The European

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Reliability," April 20, 2021, accessible at: https://www.forbes.com/sites/michaelshellenberger/2021/04/20/why-renewables-cause-blackouts-and-increasevulnerability-to-extreme-weather/?sh=347adada4e7

[2] "Natural gas a critical 'reliability fuel' as renewables grow, NERC says," S&P Global Market Intelligence, December 17, 2021, accessible at: https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/natural-gas-a-critical-reliability-fuel-as-renewables-grow-nerc-says-68130328.

[3] "Wind and Solar Energy Don't Work," Powerline, February 10, 2021, accessible at: https://www.powerlineblog.com/archives/2021/02/wind-and-solar-energy-dont-work.php.

[4] "Higher utility bills in store for Xcel and Alliant customers as utilities make clean energy transition," Wisconsin Public Radio, November 22, 2021, accessible at: https://www.wpr.org/higher-utility-bills-store-xcel-and-alliant-customers-utilities-make-clean-energy-transition.

Union, which gets 17% of its electricity from solar and wind - the highest percentage in the world - also has some of the highest consumer electricity costs."[5] Fifth, renewables cannot support baseload generation and lack the ability to meet increased demand. As a recent PJM report notes, "The proliferation of intermittent resources will also increase the need for controllable resources such as gas-fired combustion turbines and combined-cycle plants that can ramp and/or start up quickly."[6] Electrification of homes and cars will indeed increase demand. Weather events, heat waves, and winter storms bring certain increases to demand. Potential challenges of the electric grid to meet these increased demands should alarm both Washington D.C. and state capitols, as Robert Bryce of the Foundation for Research on Equal Opportunity stated in his *Wall Street Journal* opinion piece: "Regulators and policy-makers should be preserving nuclear plants and making sure coal plant closures do not further damage grid resilience."[7] Sixth, renewables present significant transmission and grid issues. As East Kentucky Power Cooperative CEO Anthony "Tony" Campbell noted in his letter to President Biden concerning grid reliability, "The emerging picture is of an electric grid that is steadily becoming less fuel secure . . ."[8] Vistra CEO Curt Morgan noted that, "PJM did a study that said that, with 50% penetration of renewables, they need a 70% reserve margin." [9] American Electric Power, in a letter to congressional offices, stated that the Clean Electricity

[5] "Want to Lock Down the Climate?" Bjorn Lomborg, President of the Copenhagen Consensus, *Wall Street Journal* Opinion, September 30, 2021, accessible at: https://www.wsj.com/articles/covid-lockdown-climate-fossil-fuels-electricity-energy-production-africa-carbon-emission-11632943155.

[6] "*Reliability in PJM: Today and Tomorrow*," PJM Interconnection, March 11, 2021, at 25.

[7] "Get Ready for the Blackouts," Robert Bryce, research fellow at the Foundation for Research on Equal Opportunity, *Wall Street Journal* Opinion, September 7, 2021, accessible at: https://www.wsj.com/articles/blackouts-generac-electric-grid-texas-california-biden-decarbonize-renewables-climate-11631043410.

[8] EKPC President & CEO Anthony "Tony" Campbell Letter to President Biden, July 13, 2021. Copy attached as Exhibit 1.

[9] "IPPs See Danger in Swift Move from Gas and Coal," RTO Insider, December 15, 2021, accessible at: https://www.rtoinsider.com/articles/29241-ipps-see-danger-swift-move-from-gas-coal. *See also "Energy Transition in PJM: Frameworks for Analysis*," PJM Interconnection, Dec. 15, 2021, at 8.

Performance Program would, "adversely impact reliability and resilience of the electric grid."[10] In fact, PJM cautions that in a scenario of accelerated renewables adoption, ". . . the total hours of transmission line congestion increased by about 50%, and a significant amount of renewable curtailment was needed to manage transmission limitations and minimum generation events."[11]

Kentucky does not want — or need — a grid like California, "that is over-reliant on intermittent energy resources, voluntary service curtailments and imports from other regions."[12] Agencies whose decisions impact generation selection, including FERC, should manage grid transformation in a way that supports reliability and resilience by identifying and committing to flexible generation as renewable deployment grows.[13] Finally, unlike some states, Kentucky has not adopted a renewable energy policy. In fact, Kentucky's current statutes support the burning of coal. *See* KRS 278.020(1)(c).

The Commission and Duke should pursue the steps necessary to ensure affordability and reliability are not compromised in the race to renewables. This includes operating fossil fuel plants for as long as economically feasible, and thus minimizing any stranded costs arising from retirement of plants prior to the end of their useful operating lives.

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[10] "Major utility questions Biden's signature climate plan," E&E News, September 15, 2021, accessible at: https://www.eenews.net/articles/major-utility-questions-bidens-signature-climate-plan/.

[11] "*Energy Transition in PJM: Frameworks for Analysis*," PJM Interconnection, December 15, 2021, at 12.

[12] EKPC President & CEO Anthony "Tony" Campbell Letter to President Biden, July 13, 2021. Copy attached as Exhibit 1.

[13] "Natural gas a critical 'reliability fuel' as renewables grow, NERC says," S&P Global Market Intelligence, December 17, 2021, accessible at: https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/natural-gas-a-critical-reliability-fuel-as-renewables-grow-nerc-says-68130328.

Respectfully submitted,

DANIEL CAMERON
ATTORNEY GENERAL

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Certificate of Service

Pursuant to the Commission's Order dated July 22, 2021 in Case No. 2020-00085, and in accord with all other applicable law, Counsel certifies that an electronic copy of the forgoing was served and filed by e-mail to the parties of record.

This 13th day of January, 2022

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Assistant Attorney General

EXHIBIT 1

EAST KENTUCKY POWER COOPERATIVE

July 13, 2021

President Joseph R. Biden
The White House
1600 Pennsylvania Avenue, N.W.
Washington, DC 20500

President Biden,

The events of 2021 continue to heighten my concern that the reliability of the U.S. power grid may be compromised if policy-makers do not navigate the evolution in the generation portfolio carefully, especially as policies carry us farther from conventional generation technologies.

The May cyberattack leading to the temporary shutdown of the Colonial pipeline points to the critical importance of fuel security for electric utilities. Although the Colonial pipeline crisis primarily affected vehicle fuel, the implications are clear for other fuels dependent on pipeline delivery. On May 13, North American Electric Reliability Corp.'s President and CEO Jim Robb noted his concerns related to the electricity industry:

> "The Colonial pipeline attack underscores the interconnectedness of electricity with other infrastructures and is the reason we must redouble our focus on the reliability of the pipeline system that delivers essential fuel. If this had happened to a major natural gas line serving electricity generators under extreme cold weather conditions, the results could have been catastrophic."[1]

This follows the February winter storms, which exposed weather-related deficiencies in the fuel-delivery system for natural gas-fueled power plants in Texas and surrounding states, leaving millions without electric service for extended periods during the bitterly cold weather.

As I have emphasized in my previous letters, my primary concern is maintaining reliable, affordable electric service for the people and businesses of Kentucky, especially during extreme weather events such as this year's winter storms. Like Mr. Robb, I am very concerned when I consider the potential consequences if a fortune-seeking hacker or, worse, an adversarial nation-state finds a way to disrupt fuel deliveries to power plants in the midst of an ongoing extreme weather event.

[1] NERC, "Electric–Gas Interdependencies, Potential Summer Energy Shortfalls are Focus of Board Discussions," May 13, 2021. https://www.nerc.com/news/Headlines%20DL/Board%2013MAY21.pdf.

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It is worth taking a moment to consider how various electric-generating technologies are fueled, and how and when those fuels are delivered to generators.

Nuclear and coal are two technologies that, for decades, have produced dependable supplies of electricity for the U.S. Fuel can be delivered months or years ahead of time and stored securely on site for nuclear- and coal-fueled generators. The refueling process for a nuclear unit is complex; but, once complete, the plant can operate for long periods before refueling is required. Coal plants typically store 30 to 60 days of fuel on site. Coal can be delivered by truck, train or barge. Such transportation flexibility provides valuable options for emergencies, such as when a railroad track is damaged or river travel is disrupted.

Wind and solar generators rely on real-time wind and solar irradiance conditions to produce electricity. If the wind does not turn a turbine or the sun does not shine on a solar panel, no energy is generated. When these technologies generate more electricity than needed in the moment, the energy can be stored for later. But I strongly urge you and your policy advisors to have a realistic understanding of the limitations of current utility-scale battery technology. For the most part, batteries may be able to provide a few hours of energy for limited geographic areas. The future of utility-scale battery technology is promising, but it is a grave mistake to assume it, paired with renewables, can provide anywhere near the 24/7/365 reliability Americans are accustomed to. Furthermore, deployment of batteries has not begun to reach a level that could make an appreciable difference over a widespread area. EKPC operates within PJM, which estimates a summer peak of 149,000 MW for 2021[2]; the installed capacity of utility-scale batteries within the RTO as of May 2020 was 280 MW[3].

For natural gas, the fuel delivery mode is almost universally by pipe. Most natural gas power plants are served by a single pipeline; any interruption to the pipe or somewhere upstream can mean almost instantaneous power plant outages. Some natural gas plants, including EKPC's, have on-site storage of alternative fuel, such as oil, which can usually keep the plant running for another day or so. Beyond that timeframe, continuing to run the plant at full capacity without pipeline access can mean a tremendous undertaking of quickly sourcing and delivering dozens or even hundreds of truckloads of oil daily.

For many, the Colonial pipeline crisis revealed a vital fact—a large swath of the U.S. is heavily dependent on a single pipeline for its vehicle fuel. Likewise, Americans should understand they are increasingly dependent on natural gas pipelines for reliable electric service, but pipeline capacity is not growing nearly as fast as the capacity of the power plants they support. In the past decade, major interstate pipeline capacity for natural gas has expanded just 24 percent[4] while natural gas's share of U.S. electric

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[2] PJM Interconnection, "PJM Summer Outlook Forecasts Adequate Supplies To Serve Electric Demand," 5/20/21 press release, https://www.pjm.com/-/media/about-pjm/newsroom/2021-releases/20210520-pjm-summer-outlook-forecasts-adequate-supplies-to-serve-electric-demand-this-summer.ashx.

[3] PJM Interconnection, "Energy Storage Offers Efficiency, Flexibility to Power the Grid," May 18, 2020, https://www.pjm.com/-/media/about-pjm/newsroom/fact-sheets/energy-storage-fact-sheet.ashx .

[4] U.S. Energy Information Administration (U.S. EIA), Major Pipeline Crossing Multiple State Borders (Capacity in MMcfd), 2007-2020, https://www.eia.gov/naturalgas/pipelines/EIA-StatetoStateCapacity.xlsx downloaded 5/28/21.

generation ballooned from 15 percent to 35 percent.[5] In fact, since 2005, natural gas deliveries to power plants have doubled.[6]

And it is important to note that for many regions, natural gas is the primary—sometimes only—fuel to fill in gaps when renewables are not available. Plants fueled by other reliable technologies that could help fill the gap are steadily declining. While natural gas power plant capacity expanded during the past decade, 95 gigawatts (GW) of coal capacity was closed or switched to another fuel, and another 25 GW is slated to shut down by 2025.[7] U.S. electric utilities also retired nearly 9,000 MW of nuclear capacity in the past 10 years. In the next five years, the federal government forecasts no new coal plants will be built.[8] Two new nuclear units totaling 2,200 MW have been under construction for more than a decade at the Vogtle plant in Georgia, our nation's first new nuclear units in nearly 30 years. The project's numerous delays and over $13 billion in cost overruns are likely to deter proposals for new nuclear for the foreseeable future.

The emerging picture is of an electric grid that is steadily becoming less fuel secure, and that is troubling to me. I am concerned the U.S. is moving toward a grid featuring reliability similar to California's, one that is over-reliant on intermittent energy resources, voluntary service curtailments and imports from other regions. And, when those tools fail to close the gap, it is a grid that is subject to rolling blackouts, as California learned last summer.

NERC's 2021 Summer Reliability Assessment noted that most of the U.S. west of the Rockies, along with Texas, the upper Midwest and New England, are at "elevated risk to energy emergencies." And California was singled out as being at risk during normal peak summer hours and at "high risk" if demand is above normal.[9] As California ISO (CAISO) released its own projections for how it hopes to meet demand for electricity this summer, CAISO CEO Elliott Mainzer commented:

> "New resources are coming online by summer, and we have taken the lessons learned from last year to make modifications to our market and operations. This makes us cautiously optimistic that there will be enough electricity to meet demand this summer."[10]

Given California's experience last summer, I am doubtful "cautious optimism" provides much reassurance to those who depend on reliable electric service, including residential customers cooling their homes and industrial customers keeping their operations running and employees working.

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[5] U.S. EIA, Electric Power Annual 2019, Table 3.2.A Net Generation by Energy Source, 2009-2019. Downloaded from https://www.eia.gov/electricity/annual/, 5/21/21

[6] U.S. EIA, U.S. Natural Gas Consumption by End Use, http://www.eia.gov/dnav/ng/ng_cons_sum_dcu_nus_a.htm, downloaded 5/22/21.

[7] U.S. EIA, "As U.S. coal-fired capacity and utilization decline, operators consider seasonal operation," Sept. 1, 2020. https://www.eia.gov/todayinenergy/detail.php?id=44976

[8] U.S. EIA, Preliminary Monthly Electric Generator Inventory (based on Form EIA-860M as a supplement to Form EIA-860), downloaded from https://www.eia.gov/electricity/data/eia860m/ on 5/22/21

[9] North American Electric Reliability Corp., "2021 Summer Reliability Assessment," May 2021.

[10] California ISO, "California ISO Summer Assessment reaffirms that grid is better positioned for this summer, but reliability risks remain;" downloaded from http://www.caiso.com/about/Pages/News/default.aspx, 5/22/21.

As the Biden administration considers and implements policies that bring permanent change to America's energy landscape, fuel security should be given the priority it deserves in protecting the grid's reliability.

Sincerely,

Anthony "Tony" Campbell
President & CEO

CC: U.S. Energy Cabinet Secretary Jennifer Granholm
FERC Chairman Richard Glick
Senate Minority Leader Mitch McConnell
Senator Rand Paul
Senator Joseph Manchin
Congressman Andy Barr
Congressman Hal Rogers
Congressman Brett Guthrie
Congressman Thomas Massie
Congressman James Comer
Congressman John Yarmuth
Governor Andy Beshear
Kentucky Senate President Robert Stivers
Kentucky Energy and Environment Secretary Rebecca Goodman
Kentucky PSC Chairman Michael Schmitt
Kentucky PSC Vice-chairman Kent Chandler
Kentucky PSC Commissioner Talina Mathews