COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

ELECTRONIC APPLICATION OF KENTUCKY UTILITIES COMPANY AND LOUISVILLE GAS AND ELECTRIC COMPANY FOR CERTIFICATES OF PUBLIC CONVENIENCE AND NECESSITY AND SITE COMPATIBILITY CERTIFICATES	)))))	**CASE NO. 2025-00045**

TESTIMONY OF SEAN O'LEARY

ON BEHALF OF JOINT INTERVENORS
KENTUCKIANS FOR THE COMMONWEALTH,
KENTUCKY SOLAR ENERGY SOCIETY,
METROPOLITAN HOUSING ASSOCIATION,
AND MOUNTAIN ASSOCIATION

June 16, 2025

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I. INTRODUCTIONS & QUALIFICATIONS

Q. Please state for the record your name and business address.

A. My name is Sean O'Leary. My business address is 216 Franklin Street, Suite 400, Johnstown, PA 15901.

Q. By whom are you employed and in what position?

A. I am a co-founder and senior researcher at the Ohio River Valley Institute ("ORVI"), a public policy think tank. My areas of focus include energy, petrochemicals, and economic development in the greater Ohio Valley.

Q. On whose behalf are you testifying in this proceeding?

A. I am testifying on behalf of Kentuckians for the Commonwealth, Kentucky Solar Energy Society, Metropolitan Housing Association, and Mountain Association (collectively, "Joint Intervenors").

Q. Please describe your professional background.

A. I am a co-founder and senior researcher at ORVI. Prior to founding ORVI I was the founder—and for twenty years the president—of MarketLab, Incorporated, a marketing analytics and consulting company that served the pharmaceutical and consumer packaged goods industries. After retiring from MarketLab in 2016, I served as Director of Communications at the NW Energy Coalition in Seattle, Washington. Then, in 2020, I teamed with Eric De Place to found ORVI as a non-profit, public policy think tank that focuses on issues of economic development and public well-being in northern and central Appalachia. This included helping Kentucky address the housing crisis that emerged after flooding ravaged parts of the state in 2022, with my ORVI colleague, Eric Dixon, and

Rebecca Shelton at Appalachian Citizens' Law Center.[1] My full qualifications are listed in my resume attached as Exhibit SO-1.

Q. Have you previously filed expert witness testimony in other proceedings before this Commission or before other regulatory commissions?

A. I have not previously testified before the Kentucky Public Service Commission ("Commission"). I have testified before the West Virginia Public Service Commission.

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to comment on issues related to the certificates of public convenience and necessity ("CPCNs") requested by Louisville Gas and Electric Company ("LG&E") and Kentucky Utilities Company ("KU") (collectively, "Companies") for the natural gas combined cycle combustion turbine ("NGCC") Brown 12 and Mill Creek 6 facilities, the significant financial risks those projects involve, and the resulting impacts of such projects on LG&E and KU ratepayers.

II. SUMMARY OF RECOMMENDATIONS

Q. Please summarize the requests in this proceeding.

A. In response to projected increases in power demand, principally from potential data center development, LG&E and KU are requesting that the Commission grant CPCNs for the purpose of upgrading environmental technology at an existing coal unit, the construction of two new gas-fired power plants, and the addition of 400 megawatts ("MWs") of battery storage.

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[1] Rebecca Shelton & Eric Dixon, *The Road to Flood Disaster Recovery: Resources for Housing and Outstanding Need*, ORVI (Feb. 19, 2023), https://ohiorivervalleyinstitute.org/the-road-to-flood-disaster-recovery/.

Q. Please summarize your findings and recommendations in this case.

A. Based on my review, I find the degree of financial risk posed to LG&E and KU ratepayers is unacceptably high in light of uncertainty of the increased demand, as well as the fact that utilities have failed to adequately consider both (1) the costs and risks of the measures they propose; and (2) alternative strategies, including enhanced demand-side management ("DSM") and energy efficiency ("EE) programs. On those grounds, I offer the following observations.

1. LG&E and KU's plan for new gas plants to serve possible future data centers could require infrastructure investments for which the utilities may not be compensated by the data centers, resulting in significant costs falling on other ratepayers.
2. LG&E and KU's budgeting for the construction of two new gas-fired power plants fails to take into consideration recent increases in construction costs, which may be 20% to 30% greater than those anticipated by the utilities.
3. Expansion of gas generation will make the utilities and their customers highly vulnerable to major cost increases should future federal or state laws require utilities to decarbonize.
4. The increase in demand forecasted by LG&E and KU is highly uncertain, posing the risk that either these or other generating facilities could become stranded assets for which ratepayers would be on the hook.
5. The growth and increasing cost-effectiveness of grid-enhancing technologies, demand-side resources, and demand response offer LG&E and KU the ability to calibrate resource expansion to actual need.

Finally, these risks would be incurred without much likelihood that the economic development benefits the Commonwealth seeks will be realized. A strategy more focused on DSM/EE would, on the other hand, produce significant economic benefits while also helping to address the challenge of increasing demand.

III. LG&E AND KU'S PROPOSAL FOR THE BROWN 12 AND MILL CREEK 6 FACILITIES RISKS CREATING UNCOMPENSATED COSTS THAT MAY FALL ON OTHER RATEPAYERS.

Q. Is LG&E and KU's plan for new gas plants and other infrastructure to serve data centers likely to result in uncompensated costs that may fall on other ratepayers?

A. Yes. While this Commission tries to enforce the cost causation principle, the following factors will make doing so difficult.

Due to rapidly escalating costs for the construction and operation of new gas-fired plants, the generation that LG&E/KU are seeking to build now to support possible future data centers would come at a significantly greater cost than power from existing resources. As a result, the utilities' overall cost per unit will increase. In order to help insulate existing customers from the substantial costs of serving data centers, the Commission should (1) ensure that generation is built only for load that there is a high degree of certainty will actually materialize, (2) require the Companies to ensure that the data centers are as efficient and load-flexible as possible, and (3) adopt a tariff that can help ensure that incremental costs of serving data centers are paid for by the data centers, by requiring them to do things such as paying minimum monthly charges or an allocated share of additional rates, as well as any associated capital costs the utility incurs. While necessary, even a protective tariff may fail to recover the full costs caused by a new data center customer. For example, unlike most customers, data centers have access to alternative generation sources as well as other means of managing load and avoiding demand charges. These include AI-enabled load management software and proprietary generation and storage systems. These kinds of resources will make it nearly impossible in practice to ensure that all of the actual incremental costs are recovered from the data centers rather than other ratepayers. As such, while establishing a protective tariff is critical to reducing the impacts to other ratepayers of serving data centers, it is important to keep in mind that even with such tariffs, significant costs will almost certainly end up falling on existing residential, commercial, and industrial customers.

This problem is inherent when attempting to recover what are, in effect, fixed costs with variable revenue. Even a tariff based on the presumption that all resources serving the data centers would be dedicated and would operate at a 100% capacity factor would be problematic since it would remove any incentive for the data centers to operate efficiently or reduce load in periods of high demand. This would, in turn, reduce the system's overall flexibility and reliability.

These issues and others are discussed in detail in a recent report[2] from Eliza Martin and Ari Peskoe at Harvard University.

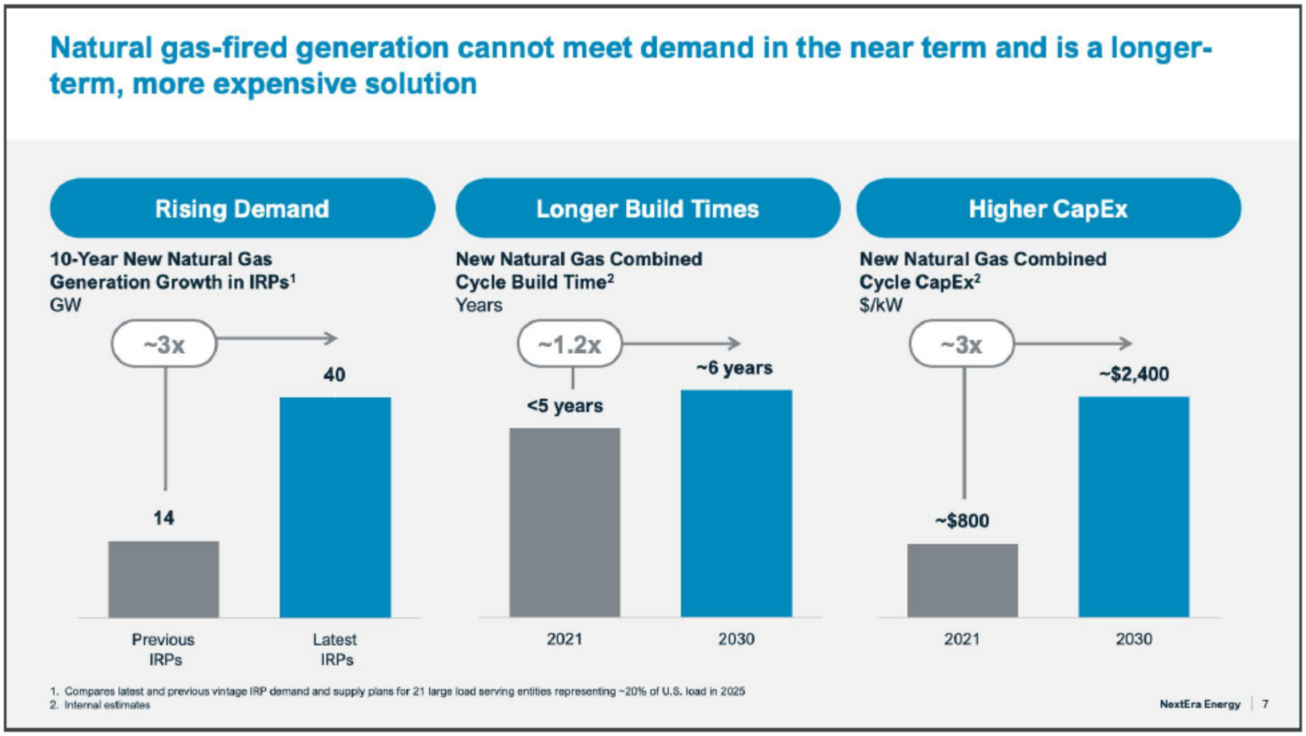
Q. Does LG&E and KU's budgeting for the construction of two new gas-fired power plants adequately take into consideration recent increases in construction costs?

A. No, it does not. The Application calls for the construction of the 645-MW Mill Creek 6 plant at a cost of $1.415 billion or $2,194 per kilowatt ("kW"), and the construction of the 645-MW Brown 12 plant at a cost of $1.383 billion or $2,144 per kW.[3] Based on recent marketplace activity and the Companies' inability to acquire pricing or select an Engineering, Procurement, and Construction contractor, these figures may fall short of

[2] Eliza Martin & Ari Peskoe, *Extracting Profits from the Public: How Utility Ratepayers Are Paying for Big Tech's Power*, Harvard Univ. (Mar. 2025), https://eelp.law.harvard.edu/wp-content/uploads/2025/03/Harvard-ELI-Extracting-Profits-from-the-Public.pdf.
[3] Direct Testimony of David L. (Dave) Tummonds, Senior Director, Project Engineering on Behalf of Kentucky Utilities Company and Louisville Gas and Electric Company, Case No. 2025-00045, at 10:17-18 (Feb. 28, 2025).

the actual cost by 20% or more. In his March 2025 investor briefing,[4] John Ketchum, CEO of NextEra Energy, the nation's largest operator of gas-fired power plants, told investors that the cost of natural gas combined cycle power plants had risen to $2,400/kW.

Figure 1-NextEra Energy March Investor Presentation[5]



In the accompanying earnings call,[6] Ketchum went further, saying that possible tariffs could push the figure to between $2,600 and $2,800/kW. By comparison, Ketchum said,

[4] NextEra Energy, *March Investor Presentation* (Mar. 2025), https://www.investor.nexteraenergy.com/~/media/Files/N/NEE-IR/news-and-events/events-and-presentations/2025/2025%20March%20Investor%20Deck.pdf ("March 2025 NextEra Presentation").
[5] *Id.* at slide 7.
[6] Emma Penrod, *NextEra Energy CEO urges 'energy pragmatism' amid rising costs, demand*, Utility Dive (Apr. 24, 2025), https://www.utilitydive.com/news/nextera-energy-ceo-urges-energy-pragmatism-amid-rising-costs-demand/746207/.

"Renewables and storage are the most cost-effective energy and capacity solutions and are ready now."[7]

Ketchum was not alone among CEOs. Constellation Energy's Joseph Dominguez told investors, during that company's first quarter earnings call, "it's obvious that we're playing a new game in terms of cost" and that "certain natural gas plant constructions, for instance, had tripled their cost in some cases over the past decade."[8] Enverus Intelligence Research recently concluded that gas capital expenditures now range from $2,200/kW to $3,000/kW, after being relatively stable near $1,000/kW until 2024.[9] And, in its recently issued 2025 energy update, the consultancy, McKinsey & Company, assumed a possible cost range of $2,200 to $3,200/kW[10] for the construction of new plants.

It should also be noted that while the companies assert that capital cost increases for combined cycle and simple cycle natural gas plants are likely to be matched by higher capital costs for competing technologies, the claim has not been quantitatively demonstrated. Moreover, some of the resource options available to the Companies, such as demand response, energy efficiency, and other measures that contribute to load flexibility, often do not require major capital investments.

[7] March 2025 NextEra Presentation, slide 9.
[8] Energy News, *Constellation Energy's first-quarter earnings misses estimates due to rising costs* (updated May 6, 2025), https://energynews.oedigital.com/energy-markets/2025/05/06/constellation-energys-firstquarter-earnings-misses-estimates-due-to-rising-costs.
[9] Corianna Mah & Scott Wilmot, Enverus, Stranded Sparks: Texas Energy Fund Gas Project Withdrawals (Jun. 9, 2025).
[10] Jesse Noffsinger et al., *The cost of compute: A $7 trillion race to scale data centers*, McKinsey Quarterly, Ex. 2, n.3 (Apr. 28, 2025), https://www.mckinsey.com/industries/technology-media-and-telecommunications/our-insights/the-cost-of-compute-a-7-trillion-dollar-race-to-scale-data-centers.

Q. If LG&E and KU expand natural gas generation to meet data center demand, will they incur an added risk of cost increases should, at some future date, the federal government require the power sector to decarbonize or invoke penalties for failing to do so?

A. Yes. In 2021, ORVI conducted an analysis to determine how much it would cost to retrofit existing coal and gas-fired power plants for carbon capture and sequestration. That analysis found that the cost of generation in gas-fired plants would roughly double.[11] The finding has since been validated in analyses by the U.S. Energy Information Administration[12] and the National Energy Technology Laboratory.[13]

The ORVI report used an incremental carbon capture cost of $85/metric ton of carbon dioxide ("CO_2") equivalent ("$MTCO_2$"),[14] which is less than the figure arrived at two years later in an Energy Futures Initiative report.[15] The Energy Futures Initiative report concluded that CO_2 mitigation of combined cycle plants would cost over $90/$MTCO_2$ even after taking into account savings that are likely to be realized as learning and

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[11] Sean O'Leary & Ben Hunker, *Carbon Capture, Use, and Sequestration (CCUS) Would Decarbonize the Electric System…in the Worst Possible Way*, ORVI, at 4 (Oct. 2021), https://ohiorivervalleyinstitute.org/wp-content/uploads/2021/10/CCUS-Report-FINAL-3.pdf ("*Carbon Capture, Use, and Sequestration*").
[12] U.S. EIA, *Assumptions to the Annual Energy Outlook 2025: Electricity Market Module*, at 6, 28-29 (Apr. 2025), https://www.eia.gov/outlooks/aeo/assumptions/pdf/EMM_Assumptions.pdf.
[13] Tommy Schmitt et al., *Cost and Performance of Retrofitting NGCC Units for Carbon Capture – Revision 3*, Nat'l Energy Tech., at 3 & 28 (May 31, 2023), https://www.osti.gov/servlets/purl/1961845 (comparing costs for non-capture cases (B31A and B32A) with the cost of various capture cases).
[14] O'Leary & Hunker, supra note 11, at 4.
[15] Jeffrey D. Brown et al., *Turning CCS projects in heavy industry & power into blue chip financial investments*, Energy Futures Initiative, at ES-6 (Feb. 2023), https://efifoundation.org/wp-content/uploads/sites/2/2023/02/20230212-CCS-Final_Full-copy.pdf.

economies of scale are brought to bear.[16]

Finally, the figures from all of these sources were calculated before the recent spike in the costs of NGCC-related capital costs.

While it may be hoped that the federal government would pick up some of the tab, it is unlikely that it would cover the entire cost. Doing so would cost the federal government something in the neighborhood of $100 billion every year, which would represent a greater than 20% increase in the nation's electric bill.[17] The scale of the challenge and the cost of carbon capture and storage was driven home when, despite passage of the Inflation Reduction Act, three years ago in August, no carbon capture projects in the power generating sector have begun construction or advanced beyond the evaluation stage.[18]

LG&E and KU risk bearing an especially heavy burden because their generation resources are still dominated by coal and gas. Even if planned retirements go forward, LG&E and KU will still acquire 64% of their power from coal and another 29% from gas, with just 7% coming from clean energy resources.[19] A 2023 Team Kentucky report found that, in 2020, LG&E and KU emitted 29.4 million tons of CO_2.[20] The cost of

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[16] *Id.*
[17] *Carbon Capture, Use, and Sequestration* at 4.
[18] Global CCS Institute, *Global Status of CCS 2024: Collaborating for a Net-Zero Future*, Section 5.0 (2024), https://www.globalccsinstitute.com/wp-content/uploads/2024/11/Global-Status-Report-6-November.pdf.
[19] *Future*, LG&E-KU, https://lge-ku.com/future (last visited June 11, 2025) ("Once our planned unit retirements occur and our replacement generation is in service, our generation energy mix will change to: 64% coal, 29% natural gas and 7% renewable energy.").
[20] Evan Moser, *Kentucky Energy Profile, 8th Ed., Team Kentucky Energy and Environment Cabinet*, at 33 (2023), https://eec.ky.gov/Energy/KY%20Energy%20Profile/Kentucky%20Energy%20Profile%202023.pdf.

mitigating these emissions by means of carbon capture and storage would be approximately $2.4 billion annually.[21] If even a fraction of that figure were shouldered by ratepayers, it would be a major hit. And powering data centers with gas-fired power makes the potential hole deeper and the hit bigger.

Q. How reliable are demand forecasts in which data center expansion plays a major role? And would a failure by the data center developer to construct their proposed facilities potentially saddle LG&E, KU, and their ratepayers with stranded or underutilized capacity?

A. Demand forecasts in which data center development is a major component are notoriously unreliable, with a recent report from RMI finding that "[l]oad growth from data centers carries perhaps the highest forecast uncertainty of any relevant large end use today." [22] There are multiple reasons for this uncertainty.

First, co-location data centers like the one proposed in this case are subject to competition for tenants. So, while at present demand for data center services may outstrip supply, that has not always been the case and may cease to be the case in the future. The following chart from GreenStreet MIM, reproduced below, shows that for most of the last decade,

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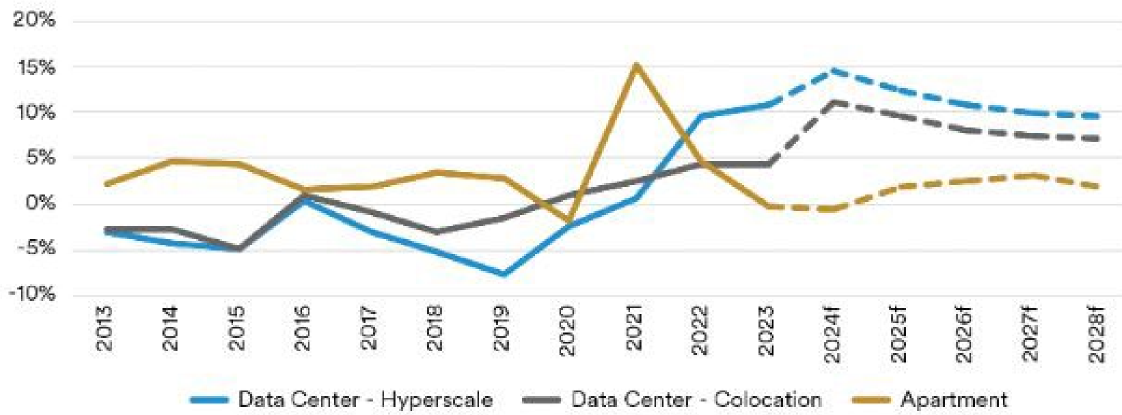
[21] This figure is the product of 29.4 million tons and an average cost of $81/metric tons of CO_2. *See* William J. Schmelz et al., *Total cost of carbon capture and storage implemented at a regional scale: northeastern and midwestern United States*, Interface Focus, at 14 (June 6,2020), https://geology.rutgers.edu/images/stories/faculty/miller_kenneth_g/20-Schmelz.Interface.pdf ("the lowest total costs to store natural gas-fired emissions [are] over $80 [per] ton.").

[22] Jeffrey Sward et al., *Get a Load of This: Regulatory Solutions to Enable Better Forecasting of Large Loads*, RMI, at 20-21 (Feb. 2025), https://rmi.org/wp-content/uploads/dlm_uploads/2025/03/Get_a_load_of_this_Load_Forecasting.pdf; *see also* Bruce Guenin, *Thermal Facts & Fairy Tales: Whatever Happened to the Predicted Data Center Energy Consumption Apocalypse?*, Electronic Cooling (May 30, 2019), https://www.electronics-cooling.com/2019/05/thermal-facts-fairy-tales-whatever-happened-to-the-predicted-data-center-energy-consumption-apocalypse/.

before their recent rise, data center revenues trailed those of apartments on a per-square-foot basis.[23]

Figure 2-Average Data Center Revenue per Available Foot (Rev PAF) Growth Across the United States



Source: GreenStreet, MIM. As of June 2024.

But, as supply catches up with demand, data center operators will face increasing competition, giving tenants greater leverage. And, if tenancy rates drop, utilities, along with data center operators, risk reductions in sales.

Second, many imagined data center projects are never built, a fact which has been acknowledged by independent system operators ("ISOs") such as ERCOT[24] and utilities,

[23] William Pattison et al., *The Future of Data Centers: Trends, Challenges, and Opportunities*, MetLife Investment Management, Ex. 6 (July 23, 2024), https://investments.metlife.com/insights/real-estate/the-future-of-data-centers-trends-challenges-and-opportunities/#:~:text=In%202018%2C%20the%20total%20amount,over%20the%20next%20three%20years.

[24] Pablo Vegas et al., *Item 8.1: Long-Term Load Forecast Update (2025-2031) and Methodology Changes*, ERCOT, at 9 (Apr. 2025), https://www.ercot.com/files/docs/2025/04/07/8.1-Long-Term-Load-Forecast-Update-2025-2031-and-Methodology-Changes.pdf ("Reduce all new Data Center Demand to 49.8% of Requested Amount" as a result of "[a]ctual experience for data centers.").

such as Duke Energy in North and South Carolina, where the company "discounts" projected data center loads by 30% to 60%.[25] When scoping out potential locations for construction, developers often consider multiple locations and explore opportunities with multiple utilities only to finally settle on one.[26] And, because there are no standard guidelines or criteria that must be met before a utility can include a new service inquiry in its load forecasts, the rigor with which industry queries are evaluated is highly variable.

Even data center projects that have received final investment decisions are subject to cancellation, which we saw when Microsoft chose not to move forward with planned data centers in Ohio.[27] The phenomenon of data centers failing to come to fruition has given rise to the phrase "phantom load" [28] and caused some utilities to pursue greater

[25] John D. Wilson & Zach Zimmerman, *The Era of Flat Power Demand is Over*, Grid Strategies, at 17 (Dec. 2023), https://gridstrategiesllc.com/wp-content/uploads/2023/12/National-Load-Growth-Report-2023.pdf.

[26] Brian Martucci, *A fraction of proposed data centers will get built. Utilities are wising up.*, Utility Dive (May 15, 2025), https://www.utilitydive.com/news/a-fraction-of-proposed-data-centers-will-get-built-utilities-are-wising-up/748214/.

[27] Georgia Butler, Microsoft pauses $1bn data center plans in Licking County, Ohio: *Another data center project bites the dust*, Data Centre Dynamics Ltd. (DCD) (Apr. 8, 2025), https://www.datacenterdynamics.com/en/news/microsoft-backs-away-from-1bn-data-center-plans-in-licking-county-ohio/.

[28] *See, e.g.,* Peter Freed & Allison Clements, *How to reduce large load speculation? Standardize the interconnection process*, Utility Dive (Feb. 19, 2025), https://www.utilitydive.com/news/data-center-large-load-interconnection-process-clements/740272/ ("Whether it shows up as several different load interconnection requests for one viable project or a single request for a half-baked opportunity, the result is a significant amount of "phantom" load that not only inflates demand projections across the country but also introduces material uncertainty and inefficiency into individual utilities' load interconnection processes."); Bianca Giacobone, *Phantom data centers are flooding the load queue*, Latitude Media (March 26, 2025), https://www.latitudemedia.com/news/phantom-data-centers-are-flooding-the-load-queue/.

commitment from putative data center developers before including projects in their load forecasts.[29]

In Indiana, Indiana Michigan Power has agreed to a series of requirements that it says would protect current ratepayers from many of the risks and costs associated with data center development.[30] The provisions require "large load" customers that have a contract capacity of at least 70 MW for a single location or 150 MW in aggregate to:

- Remain covered by the large load tariff for at least twelve years with the option to add a "load ramp period" of up to five years.
- Monthly billing based on the month's highest 15-minute peak, with the provision that billing cannot go below 80% of contract capacity or 80% of the customer's highest bill in the preceding 11 months.
- Meet several collateral requirements.

The Commission previously approved similar provisions in the case of Kentucky Power Company's Large Load Tariff.[31]

The problem of envisioned industry expansion failing to manifest is something with which Appalachia has painful experience. A decade ago, policymakers at all levels of

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[29] *See* American Electric Power, *2024 Load Forecast Adjustments to the PJM Load Analysis Subcommittee* (Oct. 25, 2024), https://www.pjm.com/-/media/DotCom/committees-groups/subcommittees/las/2024/20241025/20241025-item-03f---aep-large-load-request.ashx%20slide%203 (including in its load forecast only projects anticipated before 2030 with a letter of authorization and an electric service agreement signed or in progress, and 60% of the interconnection queue with land control where capacity is constrained for projects anticipated from 2030 to 2045).

[30] Order of the Commission, In re Verified Petition of Indiana Michigan Power Company for Approval of Modifications to its Industrial Power Tariff – Tariff I.P., Cause No. 46097(Ind. Util. Regul. Comm'n Feb. 19, 2025), https://iurc.portal.in.gov/_entity/sharepointdocumentlocation/2b48cf93-d9ee-ef11-be20-001dd80b8c52/bb9c6bba-fd52-45ad-8e64-a444aef13c39?file=ord_46097_021925.pdf.

[31] Order, *In the Matter of: Electronic Tariff Filing of Kentucky Power Company to Revise Its Industrial General Service Tariff*, Case No. 2024-00305, at 5 (Ky. P.S.C. Mar. 18, 2025), https://psc.ky.gov/pscscf/2024%20Cases/2024-00305//20250318_PSC_ORDER.pdf.

government were excited about the rise of what was then called America's "second petrochemical cluster"—a cluster of businesses that make and use plastic. These makers and users were expected to emerge from the region's natural gas boom. In a report that was promoted by the U.S. Department of Energy, the American Chemical Council envisioned the construction of five world-class ethane cracker plants as well as four other major petrochemical projects in the Ohio River Valley.[32] The cracker plants were expected to spin off an ecosystem of upstream suppliers and downstream customers that would collectively support over 100,000 jobs in the region.[33]

Instead, little of the petrochemical cluster was realized. Only one Appalachian ethane cracker was built and, as will very likely be the case with the data center proposed for Louisville, it has produced no measurable economic benefit for the region of Pennsylvania where it is located, despite receiving $1.6 billion in state subsidies.[34] Recently, it was reported that Shell is searching for buyers of its chemicals assets.[35]

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[32] Amer. Chem. Council, *Appalachian Region Could Become a Petrochemicals & Plastics Manufacturing Hub* (May 6, 2019), https://www.americanchemistry.com/better-policy-regulation/energy/resources/appalachian-region-could-become-a-petrochemicals-plastics-manufacturing-hub.

[33] *Id*.

[34] Julia Stone & Eric de Place, *Beaver County Data Analysis: 2025 Update*, ORVI, at 1, 2 (2025), https://ohiorivervalleyinstitute.org/wp-content/uploads/2025/02/Beaver-County-2025-Update-FINAL-1.pdf (concluding that "by nearly every measure of economic activity, today Beaver County is worse off than it was before the Shell plant was announced in 2012. Today, Beaver County has fewer jobs, fewer businesses, and fewer residents. In fact, after adjusting for inflation, Beaver County's annual GDP has contracted 12% from its 2012 levels, rather than grown.").

[35] Ben Dummett et al., *Shell Explores Sale of Chemicals Assets in U.S. and Europe*, Wall Street Journal (Mar. 2, 2025), https://www.wsj.com/business/deals/shell-explores-sale-of-chemicals-assets-in-u-s-and-europe-170b6d02.

Of the remaining eight foundational cluster projects, none have been built.[36] A number have been cancelled and the rest have simply evaporated as the economics for such ventures, which were never good, have deteriorated further over the last decade.

Will the data center boom fizzle out as spectacularly? Probably not. Few things do. But it is quite likely that fewer data centers and less capacity will be required than is currently anticipated.

The second potential problem is that the energy consumption of the data centers that are built may fall well short of forecasts. That is because rising costs create opportunities for innovation and alternative solutions that will reduce the need for power. Already, we are seeing:

- More efficient software as exemplified by the splash DeepSeek made, when it unveiled a platform that was, among other things, more energy efficient than its competitors.
- More energy efficient chips.[37]
- More energy efficient hardware and infrastructure, including both computing machinery and the buildings in which it is housed.

J. P. Morgan's annual energy report titled "Heliocentrism"[38] quoted Professor Paul Joskow of MIT, who put the issue this way:

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[36] *Compare* Amer. Chem. Council, *Potential Economic Benefits of an Appalachian Petrochemical Industry* (May 2017), *with Ethylene Crackers*, EIA U.S. Energy Atlas (last updated Feb. 18, 2025), https://atlas.eia.gov/datasets/ethylene-crackers/explore?location=34.941918%2C-99.448726%2C3.50.

[37] Barış Sanli, *Is the Forecasted AI Power Demand Exaggerated?*, LinkedIn (June 11, 2024), https://www.linkedin.com/pulse/forecasted-ai-power-demand-exaggerated-bar%C4%B1%C5%9F-sanl%C4%B1-tnlde/.

[38] Michael Cembalist, *Eye on the Market: Heliocentrism Objects may be further away than they appear*, J.P. Morgan (Mar. 4, 2025), https://privatebank.jpmorgan.com/nam/en/insights/latest-and-featured/eotm/annual-energy-paper.

> There are strong incentives to reduce both training and computation cost by developing more energy efficient chips and to develop and apply software innovations that require less training, fewer model solutions and much less movement of model solutions between nodes/chips on the network. The recent DeepSeek announcement from China should be a warning that such improvements are on the horizon.

While the Companies have argued that "DeepSeek and other technologies could cause electricity load to be higher or lower than forecasted,"[39] the likelihood that it will result in load that is higher than forecasted is remote. That is because higher-than-forecasted load growth would require lower-than-forecasted prices in order to make computing accessible to a much larger universe of users. And it would have to do so at a time when energy, which makes up approximately 60% of total costs for service provider data centers and 46% of total costs for enterprise data centers,[40] is rising in price. Consequently, computing costs would not only have to come down, they would have to come down enough to both offset power-related cost increases and provide a significant discount as compared to current computing costs. That is a lot to expect from functions that make up less than half of the total cost burden.

Finally, we should recall that, as with the never realized Appalachian petrochemical cluster, the power sector has its own history of "load growth fever." The fever hit the Pacific Northwest in 1972 and eventually faded, but not without leaving wreckage in its wake.

Expectations of massive growth in electricity demand caused Washington state and the

[39] LG&E-KU Resp. to KCA Request 2-4.
[40] *IDC Report Reveals AI-Driven Growth in Datacenter Energy Consumption, Predics Surge in Datacenter Facility Spending Amid Rising Electricity Costs*, IDC (Sept. 2024), https://my.idc.com/getdoc.jsp?containerId=prUS52611224.

Pacific Northwest to embark on a scheme to construct five nuclear power plants at a cost of over $4 billion.[41] But the utilities that subscribed to the Washington Public Power Supply System watched in bewildered astonishment as project costs skyrocketed and doubts about the accuracy of the load forecast proliferated.[42] Eventually, the project's budget ballooned from $4 billion to $24 billion, causing utilities that could not pass along the skyrocketing costs to ratepayers to drop out.[43] As a result, investors lost confidence and the project collapsed.[44] In the end, although construction was started on three of the nuclear plants and completed on one, Washington Public Power Supply System ended up defaulting on over $2 billion worth of municipal bonds. At the time, it was the largest municipal bond default in the nation's history.[45]

That may seem like ancient history, but as recently as 2007, the U.S. EIA forecasted that electricity sales would have a compound annual growth rate of 1.4% through the year 2030.[46] Had that occurred, between 2005 and 2023, total US sales would have grown by 28.4%, from 3,660 billion MW in 2005 to 4,700 billion MW in 2023.[47] Instead, actual

[41] Jay MacDonald, *The Washington Public Power Supply System Agreed Thursday to…*, UPI (Apr. 29, 2982), https://www.upi.com/Archives/1982/04/29/The-Washington-Public-Power-Supply-System-agreed-Thursday-to/3826388900800/.
[42] David Wilma, *Washington Public Power Supply System (WPPSS)*, History Link (July 10, 2003), https://www.historylink.org/file/5482.
[43] *Id*.
[44] *Id*.
[45] *Id*.
[46] Paul Holtberg et al., *Annual Energy Outlook 2007 With Projections to 2030*, U.S. EIA, at 107 (Feb. 2007), https://railroads.dot.gov/sites/fra.dot.gov/files/fra_net/15007/Annual%20Energy%20Outlook%202007.pdf.
[47] *Id*. at 109.

sales grew by 5.5%, one-fifth as much, to 3,861 MW.[48]

Q. Are there other forces or trends that could greatly reduce the need for additional gas-fired power generation?

A. Yes. LG&E and KU have at their disposal a wide array of potential solutions for demand growth that seem not to have been thoroughly considered when its most recent Integrated Resource Plan was prepared. And, because these solutions would help avoid the need for increased generating capacity, they may be more cost-effective than the generating resources proposed in its Application.

LG&E and KU and their customers have a vested interest in developing and maintaining load flexibility. Doing so allows the utility to maximize its load factor and minimize its need for added generating resources, thus reducing costs. Because data centers are often sources of large demand, even comparatively small levels of load flexibility can significantly contribute to utilities' ability to maintain overall load flexibility and minimize costs.

A recent study from the Nicholas Institute at Duke University suggests a number of ways in which utilities can work with both hyperscalers and colocation operators and, in the case of colocation centers, their tenants, to achieve meaningful levels of load flexibility.[49] The study also describes how these practices are being brought to bear in markets, such

[48] U.S. EIA, *Electricity explained: Use of electricity Basics* (last updated Dec. 18, 2023), https://www.eia.gov/energyexplained/electricity/use-of-electricity.php.
[49] Tyler H. Norris et al., *Rethinking Load Growth: Assessing the Potential for Integration of Large Flexible Loads in US Power Systems*, Nicholas Inst. for Energy Env't & Sustainability, at 5-14 (2025), https://nicholasinstitute.duke.edu/sites/default/files/publications/rethinking-load-growth.pdf.

as ERCOT, which offers flexible load interconnection options.

The Duke report also discusses the particular challenges that data centers pose and ways in which the challenges are being addressed.

Figure 3-Implementation of Computational Load Flexibility[50]

Category	Examples
Operational flexibility	· Google deployed a "carbon-aware" temporal workload–shifting algorithm and is now seeking to develop geographic distribution capabilities (Radovanović 2020). · Google data centers have participated in demand response by reducing non-urgent compute tasks during grid stress events in Oregon, Nebraska, the US Southeast, Europe, and Taiwan (Mehra and Hasegawa 2023). · Enel X has supported demand response participation by data centers in North America, Ireland, Australia, South Korea, and Japan, including use of on-site batteries and generators to enable islanding within minutes (Enel X 2024). · Startup companies like Emerald AI are developing software to enable large-scale demand response from data centers through recent advances in computational resource management to precisely deliver grid services while preserving acceptable quality of service for compute users
On-site power	· Enchanted Rock, an energy solutions provider that supported Microsoft in building a renewable natural gas plant for a data center in San Jose, CA, created a behind-the-meter solution called Bridge-to-Grid, which seeks to provide intermediate power until primary service can be switched to the utility. At that point, the on-site power transitions to flexible backup power (Enchanted Rock 2024, 2025).
Market design and utility programs	· ERCOT established the Large Flexible Load Task Force and began to require the registration of large, interruptible loads seeking to interconnect with ERCOT for better visibility into their energy demand over the next five years (Hodge 2024). · ERCOT's demand response program shows promise for data center flexibility, with 750+ MW of data mining load registered as CLRs, which are dispatched by ERCOT within preset conditions (ERCOT 2023a). · PG&E debuted Flex Connect, a pilot that provides quicker interconnection service to large loads in return for flexibility at the margin when the system is constrained (Allsup 2024, St. John 2024).
Cryptomining	· A company generated more revenue from its demand response participation in ERCOT than from Bitcoin mining in one month, at times accommodating a 95% load reduction during peak demands (Riot Platforms 2023).

The Duke study finds that utilities such as Santee Cooper and Dominion South Carolina that have loads comparable to LG&E and KU can potentially create between 0.4 and 0.9

[50] *Id.* at 14, Table 3 reproduced here as Figure 3.

GW of headroom by implementing load flexibility measures that require small curtailments of between 0.25% and 1% by data centers.[51]

That said, the strategies suggested by the Duke study do not constitute a stand-alone solution. They would need to be supplemented with complementary strategies to reduce the utilities' overall energy demand and load, including greater employment of energy efficiency programs with which many utilities reduce peak loads by between 1% and 2%,[52] and demand response, with which utilities shave peak loads by 10% or more.[53] These resources can be supplemented by distributed generating resources and the adoption of enhanced grid management systems that can deploy integrated resources in an optimal fashion. This multifaceted approach is likely to be less expensive than construction of new gas-fired capacity, more quickly implemented, and scalable in proportion to demand. Consequently, only after its possibilities have been exhausted should LG&E and KU turn to the addition of utility-scale generation.

[51] *Id.* at 4, Fig.1.
[52] Mike Specian et al., *2023 Utility Energy Efficiency Scorecard*, ACEEE, at 62 (Aug. 2023), https://www.aceee.org/sites/default/files/pdfs/U2304.pdf.
[53] Steven Nadel, Demand response programs can reduce utilities' peak demand an average of 10%, complementing savings from energy efficiency programs, ACEEE (Feb. 9, 2017), https://www.aceee.org/blog/2017/02/demand-response-programs-can-reduce.

IV. THE ECONOMIC BENEFITS OF BROWN 12, MILL CREEK 6, AND THE POTENTIAL DATA CENTER CUSTOMERS ARE LIKELY TO BE MODEST, ESPECIALLY COMPARED TO THE ECONOMIC IMPACTS OF INVESTMENTS IN DISTRIBUTED GENERATION AND ENERGY EFFICIENCY.

Q. What are the economic impacts of the proposed CCGTs, the potential data center load growth, and of the alternative approach to meeting demand growth?

A. The economic benefits of the proposed CCGTs and the potential data center customers are likely to be modest. In our research, we regularly find that levels of local economic benefit are highly correlated with how many people proposed projects directly employ, particularly over the long run, and how much of the income they generate lands in host communities as opposed to in the hands of shareholders, investors, and others who often reside elsewhere.[54]

We also find that some industries are distinguished by their tendency to repatriate income away from the communities in which it is generated. Typically, these industries are highly capital-intensive and not very labor-intensive. Among the most extreme in this regard are extractive industries, such as oil and gas development, petrochemical manufacturing, and power generation, including gas-fired generation but also including utility-scale renewable generation.

Data centers also fall into the category of being highly capital intensive and not very labor-intensive. In February, the Wall Street Journal published an article titled, "The AI Data Center Boom is a Job-Creation Bust," which explained that the jobs per square foot

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[54] Sean O'Leary et al., *Destined to Fail: Why the Appalachian Natural Gas Boom Failed to Deliver Jobs & Prosperity and What It Teaches Us*, ORVI, at 9-26 (July 2021), https://ohiorivervalleyinstitute.org/wp-content/uploads/2021/07/Destined-to-Fail-FINAL.pdf.

of a planned data center project is "a fraction of the number of people who might work on the same one million square feet if it were an office park, factory or warehouse."[55] And the developer of the Powerhouse Louisville data center has also announced a project of similar size and scope in Charlotte, North Carolina. It is reported that when that data center is completed, it will directly employ between 15 and 30 people,[56] which means it would deliver the economic impact of something in between an Olive Garden and a grocery store, although depending on state and local policies, it may deliver greater tax revenue.

While Louisville's mayor has been quoted as claiming the project will bring "thousands" of jobs[57] and Powerhouse officials have been quoted as claiming "hundreds" of jobs[58], such estimates invariably include "indirect" and "induced" jobs that are not in fact provided by the facility and that it is assumed will be provided by unspecified businesses that may or may not currently exist and that may or may not actually hire additional workers.

In fact, it is unlikely that, after construction, the data center and the power plant that

[55] Tom Dotan, *The AI Data-Center Boom Is a Job-Creation Bust*, Wall Street Journal (Feb. 25, 2025), https://www.wsj.com/tech/ai-data-center-job-creation-48038b67.
[56] Joe Bruno, *Charlotte leaders concerned about noise, environmental impact of proposed data center*, WSOC-TV (Aug. 21, 2023), https://www.wsoctv.com/news/local/charlotte-leaders-concerned-about-noise-environmental-impact-proposed-data-center/DEXAWKVEEVEBNK5AL7UPMEBFIY/.
[57] Matt Vincent, *Let's Go Build Some Data Centers: PowerHouse Drives Hyperscale and AI Infrastructure Across North America*, Data Cener Frontier (Jan. 27, 2025), https://www.datacenterfrontier.com/site-selection/article/55263723/lets-go-build-some-data-centers-powerhouse-drives-hyperscale-and-ai-infrastructure-across-north-america.
[58] Marcus Green, *Developers unveil plans for large tech data center in Louisville, the 1st of its kind in Kentucky*, WDRB (last updated Jan. 17, 2025), https://www.wdrb.com/in-depth/developers-unveil-plans-for-large-tech-data-center-in-louisville-the-1st-of-its-kind/article_e7adef68-c92f-11ef-b262-bf1780db36c6.html.

powers it will directly employ even 100 people on a full-time basis. Earlier this year, the Census Bureau found that just over 500,000 Americans work in data centers[59] of which there were 5,388[60] in October of last year—an average of less than 93 jobs per center.

We regularly see this kind of meager impact on employment and income with similarly capital-intensive but not very labor-intensive industries I mentioned above. The following chart illustrates how explosive growth in the Appalachian natural gas industry over the past 20 years has delivered almost no measurable economic benefit to the Ohio, Pennsylvania, and West Virginia counties where it is based. Specifically, we examined the boom's effects on gross domestic product and incomes in six counties in northeast Pennsylvania[61].

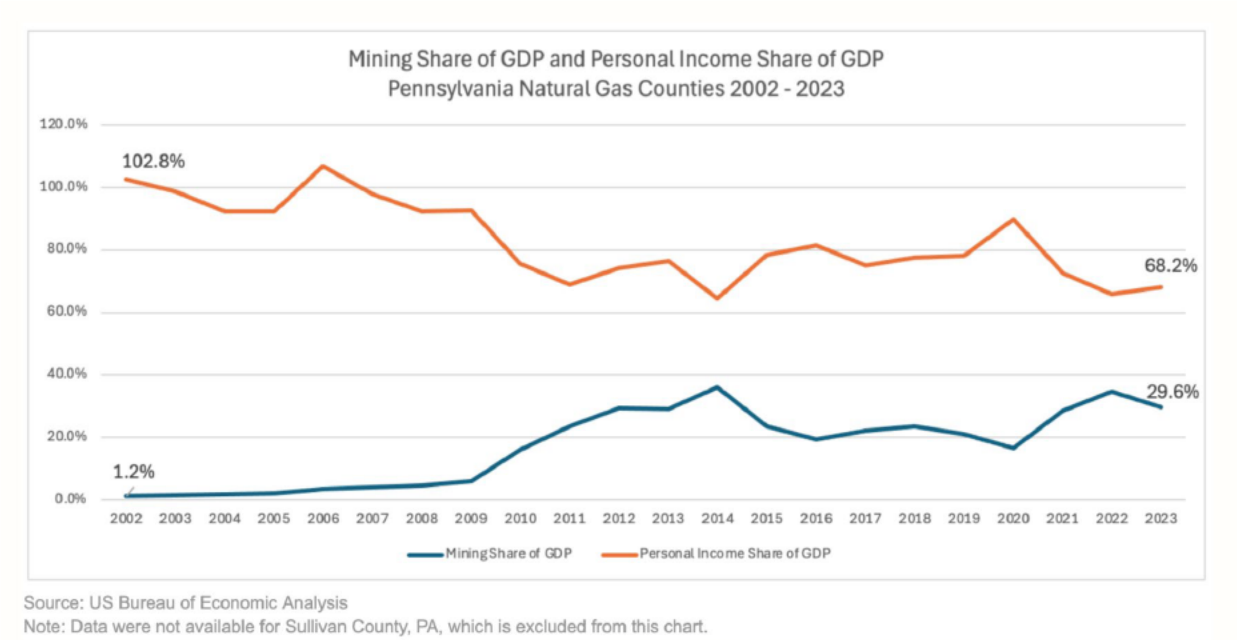
In 2002, before the natural gas boom began, the mining sector, which includes natural gas production, was responsible for only a little more than 1% of gross domestic product ("GDP") in six Pennsylvania counties that later became immense producers of natural gas.[62] Also, at that time, the amount of income that residents in the counties took home was roughly the same as the amount of output the counties generated. This relationship between GDP and income is characteristic of the US economy generally.

But, as the natural gas industry grew, eventually to the point that it was contributing

[59] Andrew Foote & Caelan Wilkie-Rogers, *Employment in Data Centers Increased by More Than 60% From 2016 to 2023 But Growth Was Uneven Across the United States*, U.S. Census Bureau (Jan. 6, 2025), https://www.census.gov/library/stories/2025/01/data-centers.html.
[60] Datacentre Solutions, *The United States counts 5,388 data centres*, https://datacentre.solutions/news/68654/the-united-states-counts-5388-data-centres (last visited May 29, 2025).
[61] Sean O'Leary, *Misleading and Just Plain Wrong*, ORVI (Apr. 21, 2025), https://ohiorivervalleyinstitute.org/misleading-and-just-plain-wrong/.
[62] *Id*.

nearly one-third of GDP in those counties, the share of GDP that landed as income for local residents declined by almost a third.

Figure 4-Mining Share of GDP and Personal Income Share of GDP Pennsylvania Natural Gas Counties 2002-2023



In other words, almost none of the increase in GDP brought about by natural gas development landed as income for residents. So, not surprisingly, despite immense top-line economic growth, these counties not only saw no income growth, they also saw their populations and the number of people who held jobs went into outright decline.[63] The expected link between GDP growth and growth in local prosperity was severed. Were these counties, as well as the other counties that are major gas producers in Appalachia, considered as a state instead of region, they would rank 26th in the nation for per capita

[63] Sean O'Leary, *Frackalachia Update: Peak Natural Gas and the Implications for Appalachia*, ORVI, Sects. III & IV (Aug. 2023), https://ohiorivervalleyinstitute.org/wp-content/uploads/2023/08/Frackalachia-Update-FINAL.pdf.

GDP, but only 43rd for per capita income.[64]

The effects of data center expansion on Louisville's and Kentucky's economies will not be this stark because data centers will never command as large a share of GDP as natural gas does in these Appalachian counties. However, the direction in which it will push the local economy will be the same.

The same tendency is also true of gas-fired power plants. They, too, are highly capital-intensive, now costing more than $2 billion to build a 1,000 MW plant. However, once operational, a plant of that size typically employs only about 30 people – in other words, equivalent number of employees as an Olive Garden. A ranking of U.S. counties by the degree to which GDP exceeds income is dominated by those in which oil and gas extraction and power generation are highly prevalent. And, as data centers come to occupy a larger share of the economy, they will join oil and gas and power generation in that regard.

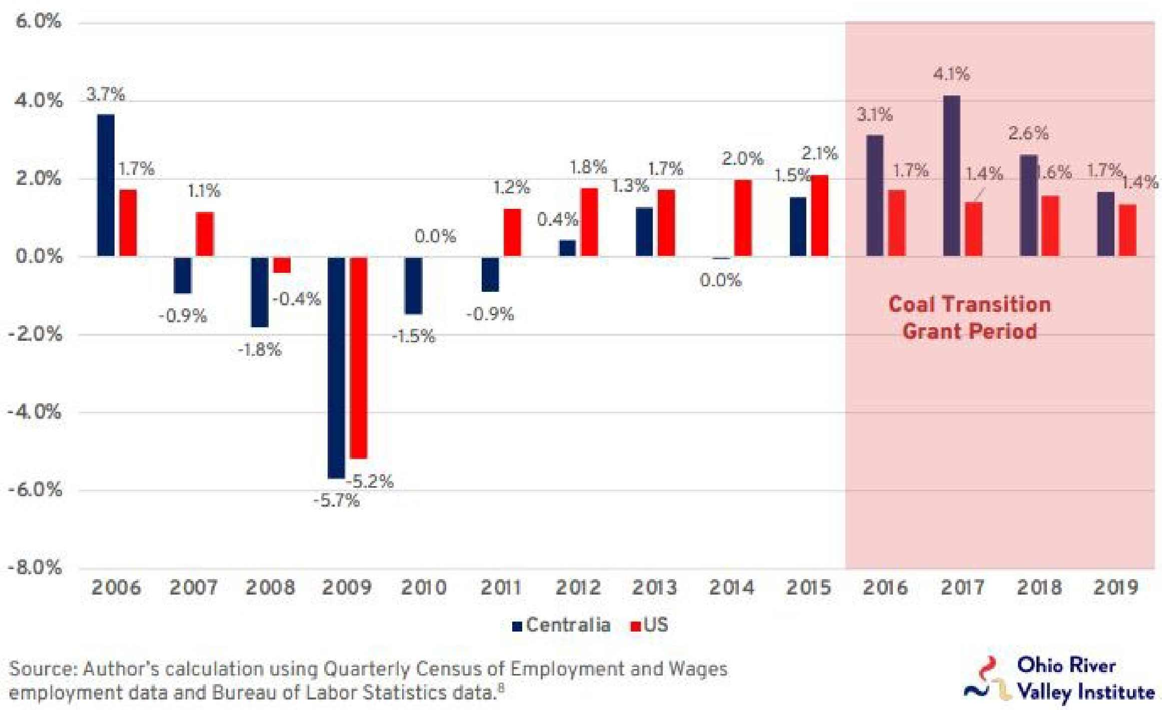
The story with the alternative strategies for dealing with load growth that I mentioned above is pretty much the opposite. Businesses involved in distributed generation and energy efficiency, which includes HVAC, door and window replacement, residential solar, insulation, and others, are generally labor-intensive and are conducted almost exclusively by local contractors whose employees live in the community. Consequently, more of the money spent on these activities goes to labor and employees spend more of

[64] Author calculation using data available at U.S. Bureau of Economic Analysis, Regional Data: GDP and Personal Income, https://apps.bea.gov/itable/?ReqID=70&step=1 (tabs: Quarterly Gross Domestic Product (GDP) By State: SQGDP1 State quarterly gross domestic product (GDP) summary & Gross Domestic Product (GDP) By County and Metropolitan Area: CAGDP1 County and MSA gross domestic product (GDP) summary) (last visited June 9, 2025).

their incomes in the local economy, which, in turn, creates jobs.

The beneficial economic impacts of investments in distributed generation and energy efficiency have been documented in an Ohio River Valley Institute report on the remarkable economic transition and rebirth of a town in Washington state that lost its largest employers—a coal mine and coal-fired power plant—but which used economic transition funds to invest in energy efficiency and distributed generation.[65]

Figure 5-Percent Change in Employment (YOY 2006-2019)[66]



Centralia, which was expected to fall into an economic crater after its loss of the mine and power plant, instead blossomed. In the four years following the start of economic transition funding, Centralia added jobs at twice the rate of the U.S economy even while

[65] Sean O'Leary, *The Centralia Model for Economic Transition in Distressed Communities*, ORVI (July 20, 2021), https://ohiorivervalleyinstitute.org/wp-content/uploads/2021/07/The-Centralia-Model-FINAL.pdf. "YOY" means Year Over Year.
[66] *Id.* at 11, Fig. 2 (reproduced here as Figure 5).

absorbing job losses from the retirement of the power plant. Later research by the economics department at Ohio State University found that the results achieved in Centralia are likely to be replicable in the Ohio River Valley.[67]

Figure 6 below is the chart from the full quantitative assessment of Centralia's Coal Transition Grants Program, conducted by the economics department at Ohio State University, which illustrates the change in employment that actually took place in Centralia as the nation descended into the COVID epidemic and compares it to the employment impacts that would have been expected in the absence of the grants program. The name "Lewis" denotes the county in Washington state where Centralia is located.

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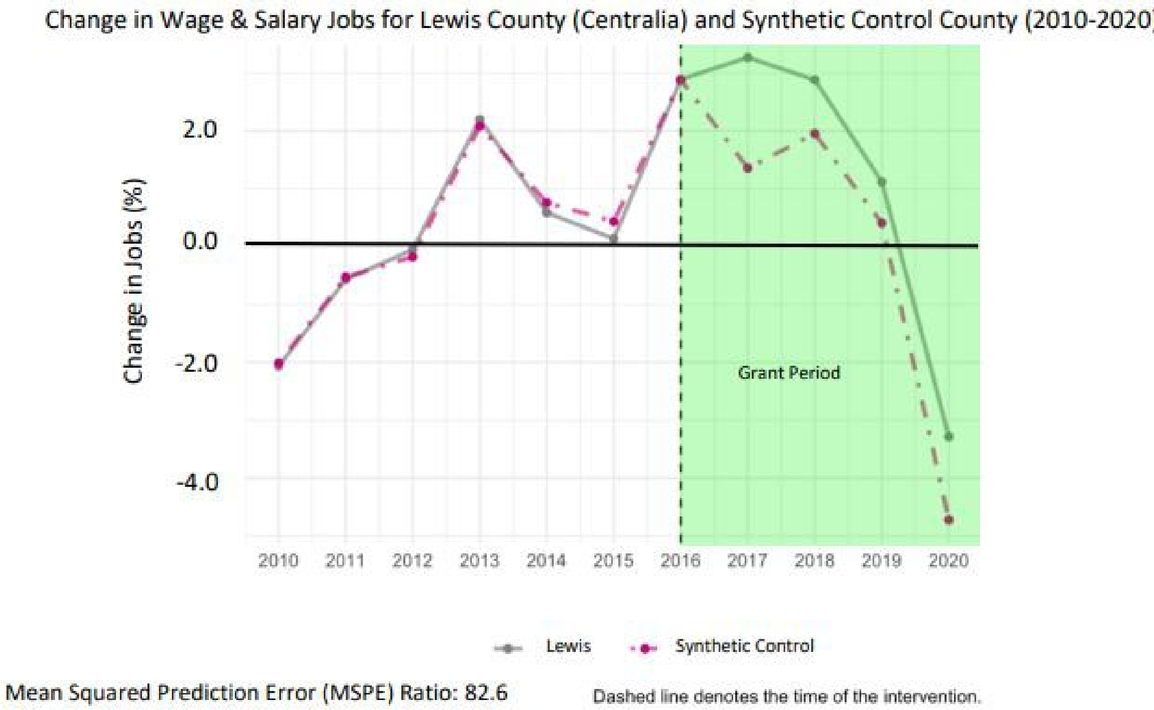
[67] Mark Partridge & Nick Messenger, *Landing page: A Bigger Bang Approach to Economic Development: An Application to Rural Appalachian Ohio Energy Boomtowns*, ORVI (Sept. 20, 2023), https://ohiorivervalleyinstitute.org/a-bigger-bang-approach-to-economic-development/; Mark Partridge & Nick Messenger, *Final Report: A Bigger Bang Approach to Economic Development: An Application to Rural Appalachian Ohio Energy Boomtowns*, Ohio State Univ., at 59-63 (2023), https://ohiorivervalleyinstitute.org/wp-content/uploads/2023/09/Centralia_Final-1.pdf ("Ohio State Final Report").

Figure 6-Synthetic Control Analysis Results Part 1[68]



The Ohio State analysis concluded that the Coal Transition Grants Program was a primary driver of economic recovery and that, because of the similarities between Centralia's economy and those in the Ohio Valley, it is likely that the results are replicable.[69]

Q. Does this conclude your testimony?

A. Yes.

[68] Ohio State Final Report at 61, Fig. 14 (duplicated here as Figure 6).
[69] *Id*. at 68-70.

VERIFICATION

The undersigned, Sean H. O'Leary, being first duly sworn, deposes and says that he has personal knowledge of the matters set forth in the foregoing testimony and that the information contained therein is true and correct to the best of his information, knowledge, and belief, after reasonable inquiry.

____

Subscribed and sworn to before me by SEAN HAROLD O'LEARY this 16th day of JUNE, 2025.

______________________________ Notary Public

My commission expires: 10/14/2026

Notary Public
State of Washington
DEANGELO RAPADA
COMMISSION# 23006202
MY COMMISSION EXPIRES
October 14, 2026

EXHIBIT SO-1

Sean O'Leary- Résumé

Sean O'Leary brief bio

Sean O'Leary is a senior researcher at the Ohio River Valley Institute where he focuses on economic development, energy, and petrochemicals. Sean has written reports on the economic impacts of the natural gas industry in Appalachia, the prospects for petrochemical expansion in the region, and economic development strategies. He researched and developed the Centralia Model for economic development, which was presented at the recent COP 28 conference by the United States and the Net Zero World Initiative as a prototype for effective economic transition in distressed communities. Sean has also written about coal, natural gas, and their role in the economies of Appalachia in a book, a newspaper column, and blog titled, "The State of My State". Sean is a native of Wheeling, WV and lives in Indianola, Washington.

SEAN O'LEARY
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603-661-3586

OHIO RIVER VALLEY INSTITUTE, Senior Researcher AUGUST 2020 – PRESENT

At ORVI I study energy and petrochemical markets and public policy as it relates to economic development in the greater Ohio Valley and the states of Ohio, Pennsylvania, and West Virginia. The Ohio River Valley Institute is an independent, nonprofit research and communications center—a think tank—founded in 2020. We equip the region's residents and decision-makers with the policy research and practical tools they need to advance long-term solutions to some of Appalachia's most significant challenges.

NW ENERGY COALITION, Director of Communications SEPTEMBER 2016 – AUGUST 2020

Managed all public-facing communications in digital, broadcast, and print media for NWEC, a 40 year-old public policy think tank based in Seattle, Washington. NWEC plays a critical role in developing energy transition policies in Washington, Oregon, Idaho, and Montana. Among many major achievements, NWEC drove adoption of Washington's renewable portfolio and energy efficiency standards in 2006, the Clean Energy Transformation Act in 2019, and the Centralia Coal Transition Funds, which are helping workers, families, businesses, and organization successfully adapt to the retirement of a major coal-fired power plant.

MARKETLAB/OMNIPROSE, Founder & President SEPTEMBER 1997 – SEPTEMBER 2016

MarketLab was a marketing analytics and communications consulting company that provided strategic, creative, and market modeling services to leading healthcare companies including Johnson & Johnson, Bayer, and Pfizer. Under the Omniprose banner, Marketlab provided content for consumer and professional marketing campaigns, corporate communications, and employee training programs.

CONSUMER PROFILES, INC, Director Strategic Marketing March 1995 – September 1997

Developed an information automation business that focused on the consumer packaged goods and pharmaceutical industries. The initiative produced the ZeroBase Strategic Planning Model and a new consumer profiling and segmentation technique used to plan marketing strategies for Rx products. ZeroBase was licensed by Nabisco and by Warner-Lambert to analyze brand performance and plan promotional strategies for 11 Nabisco brands and 17 Warner-Lambert brands. The profiling and segmentation techniques developed as part Zerobase were used to conduct research for the launch of major prescription medications including two of the largest selling drugs in history, Lipitor and Celebrex.

EPSILON, Director, Consumer Packaged Goods — March 1987 – March 1995

Now a major digital media company, Epsilon was at the time the preeminent database management and marketing communications provider to the not-for-profit community of fundraisers and membership organizations as well as commercial clients in consumer products and financial services. After starting as Director of Production Services, I was promoted to the position of Director of the Consumer Packaged Goods vertical market, a role in which I developed and managed accounts including Quaker Oats, Bausch & Lomb, Warner-Lambert, DowBrands, PepsiCo, Anheuser-Busch, and Chanel.

AUTHOR — 1997 – Current

Columnist & Commentator: From 2010 to 2013 author of The State of My State column for the Journal in Martinsburg, West Virginia focusing on economic and public policy issues relating to the state of West Virginia. Many of the columns from that period were captured in a book of the same title. Today, The State of My State continues as a blog.

Playwright: The author of six professionally produced plays including POUND, which ran Off Broadway in 2018. The plays have received recognition from the National Endowment for the Arts, the National Arts Club, and the West Virginia Department of Culture.

EDUCATION

BA, Philosophy, Bethany College, Bethany, West Virginia

SELECTED REPORTS

Appalachia's Natural Gas Counties: Contributing More to The U.S. Economy and Getting Less in Return (February 2021)

Destined to Fail: Why the Appalachian Natural Gas Boom Failed to Deliver Jobs and Prosperity and What it Teaches Us (July 2021)

The Centralia Model for Economic Transition in Distressed Communities (July 2021)

Misplaced Faith: How Policymakers' Belief in Natural Gas is Driving Rural Pennsylvania into An Economic Dead End (August 2022)

Frackalachia Update: Peak Natural Gas and The Economic Implications for Appalachia (August 2023)