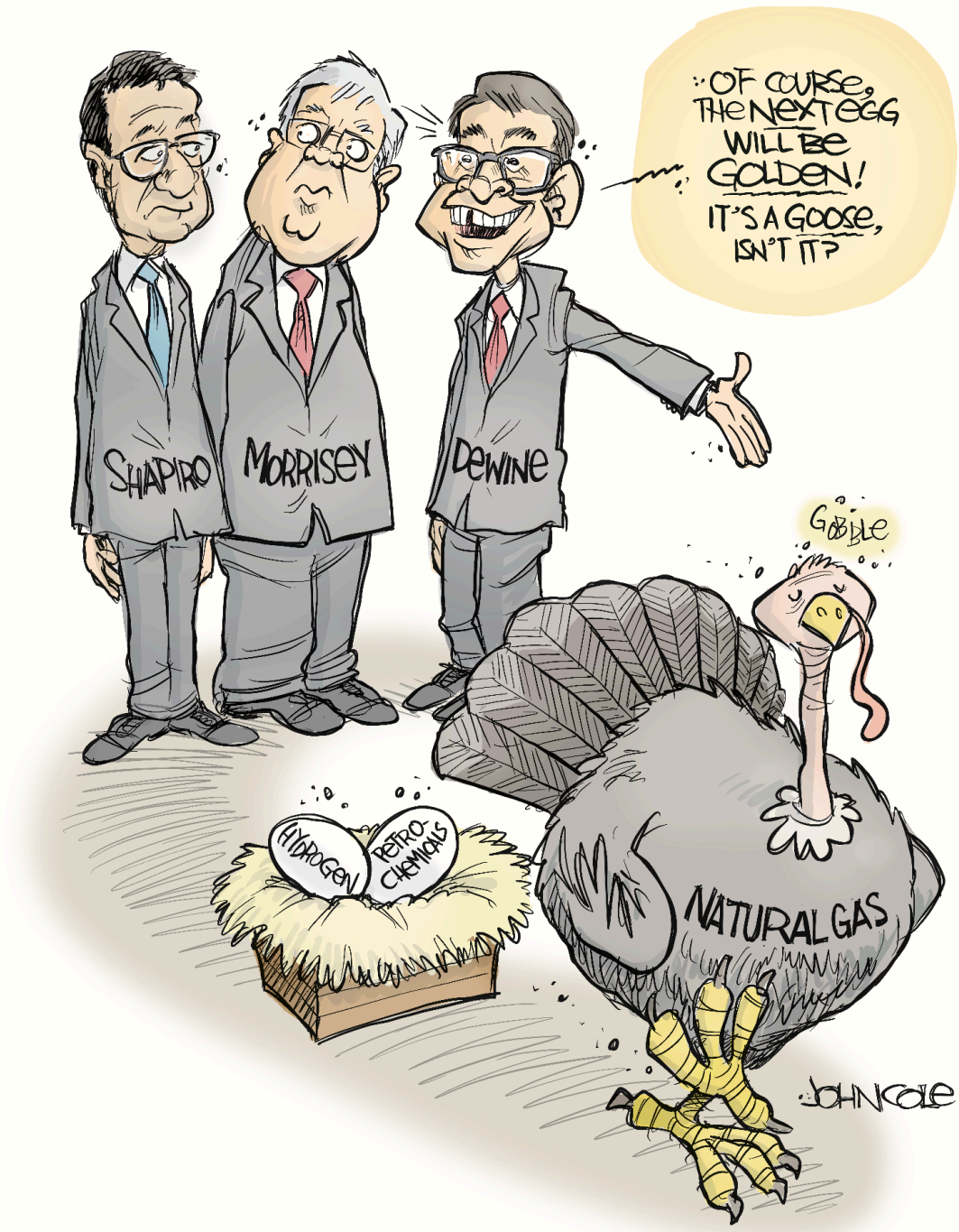

FRACKALACHIA UPDATE 2025

Data Centers & LNG Replace Petrochemicals & Hydrogen as the Natural Gas Boom's Shiny Objects That are Destined to Disappoint

Ohio River Valley Institute

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July 2025

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KEY FINDINGS

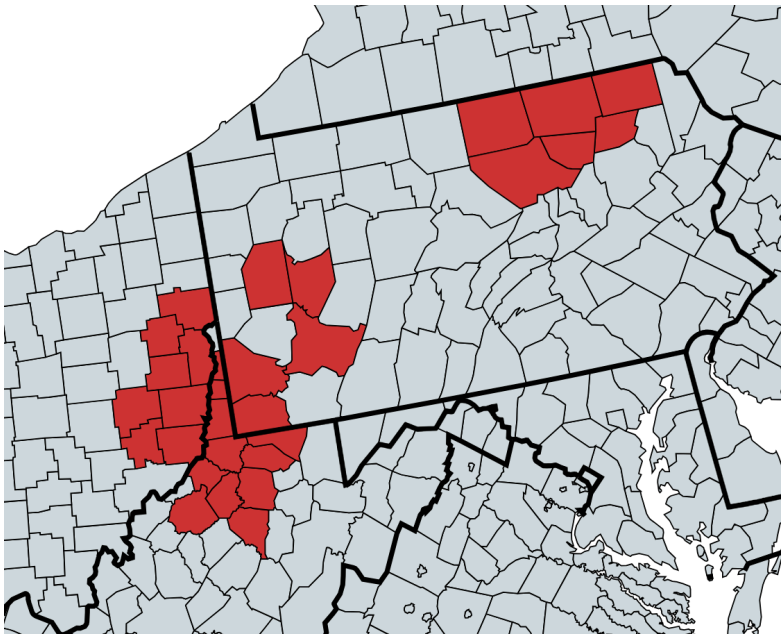
Ohio, Pennsylvania, and West Virginia have staked much of their economic futures on the ability of natural gas and its downstream industries to deliver jobs and prosperity. **But they haven't and won't because they can't.**

- Expectations that Appalachia's natural gas boom would be an economic game-changer and that would serve as a foundation for job growth and prosperity continue to go unfulfilled.
- **Frackalachia's economy is going in reverse.** Indicators of economic prosperity have fallen into absolute decline in the 30 counties of Ohio, Pennsylvania, and West Virginia that produce 95% of Appalachian gas:
    - **Jobs have decreased by 1%** despite 14% growth nationally;
    - **Income growth has slowed to 75% of the national average**;
    - **Population has dropped by 3%** despite 10% growth nationally.
- Industries and sectors that are downstream of natural gas, have either failed to develop (petrochemicals and hydrogen) or have demonstrated a chronic inability to deliver job and income growth even when they do expand (gas-fired power generation).

INTRODUCTION

Some places, usually in the developing world, are said to suffer from "the resource curse", which consigns them to persistent economic stagnation or outright decline despite abundant natural resources and high levels of economic output. But we don't have to explore other countries to find examples. We have one right here in the United States.

Frackalachia is a 30-county region in the Ohio River valley and northeastern Pennsylvania that is home to one of the world's richest natural gas fields or "plays". The Marcellus and Utica shale plays produce nearly a third of US natural gas, an amount equivalent to 3% of global natural gas consumption. The thirty Ohio, Pennsylvania, and West Virginia counties highlighted below are responsible for 95% of Appalachian production.



Their prolificacy is astonishing considering that as recently as 20 years ago natural gas production in Appalachia was negligible. But then a drilling technique called hydraulic fracturing, or fracking, opened up the region's reserves of gas that had been locked in previously impervious shale formations. And fracking remade the region's economy, turning Frackalachia into a powerhouse of economic growth, at least as measured by gross domestic product (GDP). But there was a problem.

Despite immense GDP growth, the region, which has suffered from depopulation and job loss since the collapse of the American steel industry in the 1970s and 1980s, continued to decline economically. Populations and employment fell and income growth badly lagged that of the nation. These effects are captured in a few simple metrics.

Between 2008, prior to the start of the Appalachian natural gas boom, and 2023, GDP in the 30 principal gas-producing counties of Ohio, Pennsylvania, and West Virginia grew nearly 13% faster than that of the nation. But the growth in GDP masked the dismal real-world economy in the region:

- The number of jobs based in Frackalachian counties fell by one percent even as it grew 14% nationally.
- Incomes in the Appalachian natural gas counties grew at a rate that was only three-quarters that of national income growth.
- The Appalachian natural gas counties' population declined by 3% while the nation's population grew by 10%.

Frackalachia's economy is going in reverse.

This combination of rising GDP and growing productivity accompanied by reductions in population and jobs constitutes an economic paradox. How could our most familiar measures of economic prosperity have gone so badly out of whack that they fail to reflect the lived reality of people and communities?

And there is a deeper mystery. Why do so many of the region's policymakers seem blind to the failure of the rise of the natural gas industry to reverse the region's economic decline? Why do policymakers regularly cite gas industry-driven GDP growth and investment as justifications for funneling tax breaks, grants, subsidies, and regulatory relief to an industry that is manifestly failing to improve economic conditions? Why, despite the empty storefronts and abandoned homes that litter the region and which all can see, do policymakers continue to regard natural gas expansion as not just a contributor to economic recovery but as the principal solution to the region's economic problems?

So strongly do many policymakers hold the conviction that natural gas is an engine for economic recovery and prosperity, their support isn't limited to just the gas industry. It extends to downstream industries, which are heavy consumers of natural gas, including petrochemicals[1] and power generation[2]. Collectively, these three industries form what has been called Appalachia's Shale Crescent economy[3] - an industrial triad that many believe can awaken the region from its now 50-year long torpor and restore it to prosperity.

These policymakers see recent trends, such as rising exports of natural gas (LNG) and growing demand for electricity to power data centers, industry, and electric vehicles, as reasons to believe the region's natural gas industry can and will grow more. And they respond by offering even greater support.

As of this writing, the states of Ohio, Pennsylvania, and West Virginia are funneling billions of taxpayer dollars to the natural gas, petrochemical, and power generation industries. And they nearly always do so in the name of economic development. In addition to the plethora of tax breaks, subsidies, and regulatory favors granted during

the last fifteen years, as of this writing:

- The Ohio legislature recently enacted Senate Bill 2 and House Bill 15[4], which encourage the development of gas-fired power generation, particularly in conjunction with the construction of data centers, and reduce the power of local governments to regulate such development.
- The Pennsylvania Senate has passed Senate Bill 102, which would prevent any municipality that imposes limits or requirements on natural gas development that are more onerous than those contained in state law from receiving any share of Act 13 impact fee revenues paid to the state by the gas producers.
- And West Virginia recently enacted House Bill 2014[5], which is designed to encourage the development of data centers powered by coal and natural gas.

Meanwhile, in recent legislative sessions, Ohio has erected a series of regulatory and procedural barriers to the development of wind and solar power, Ohio and West Virginia have largely gutted utility-based energy efficiency programs, and West Virginia has repeatedly attempted to enact policies that would require coal-fired power plants in the state to operate even when it is uneconomic to do so.

The tragedy is that, even if these legislative measures succeed in helping the natural gas, petrochemical, and power generation triad to flourish, it will still not produce significant growth in jobs or income. This report explains why, it documents and quantifies the region's economic development failures, and it attempts to explain why the gas, power, and petrochemical triad, as well as trends such as data center expansion and industrial electrification upon which Frackalachia's hopes for economic development and renewal have been placed, are structurally incapable of fulfilling the hopes of people and policymakers.

In short, the report will answer the fundamental question that dogs all three industries. How can trillions of dollars of investment and all the earnings from product sales, which inflate GDP figures, deliver almost no measurable economic benefit to the region in which the activity is based?

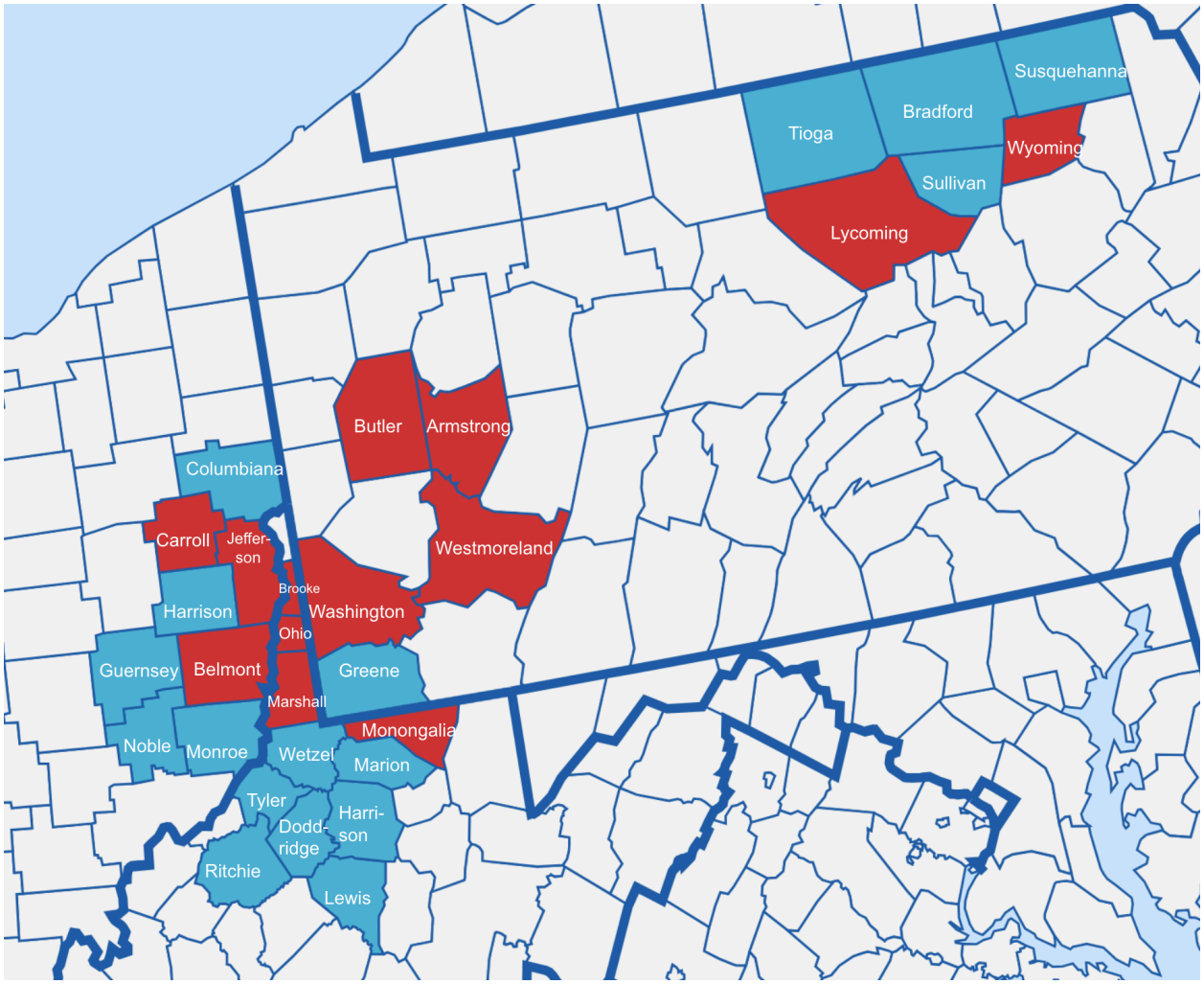
By answering this question, I hope this report will help "clear the deck" so that the region's policymakers can begin exploring new industries, technologies, and development strategies that are more durable and effective than those which have consumed their efforts since the dawn of Appalachia's natural gas boom.

WELCOME TO FRACKALACHIA

The Ohio River Valley Institute's original 2021 report on Frackalachia focused on just 22 counties in Ohio, Pennsylvania, and West Virginia, which at the time were responsible for over 90% of Appalachian gas production.[6] However, the gas industry's continued geographic expansion has pushed the number of counties that produce more than 50 million cubic feet of gas annually up to 30. Together, these 30 counties are responsible for 95% of all Appalachian gas production and 31% of all US production.

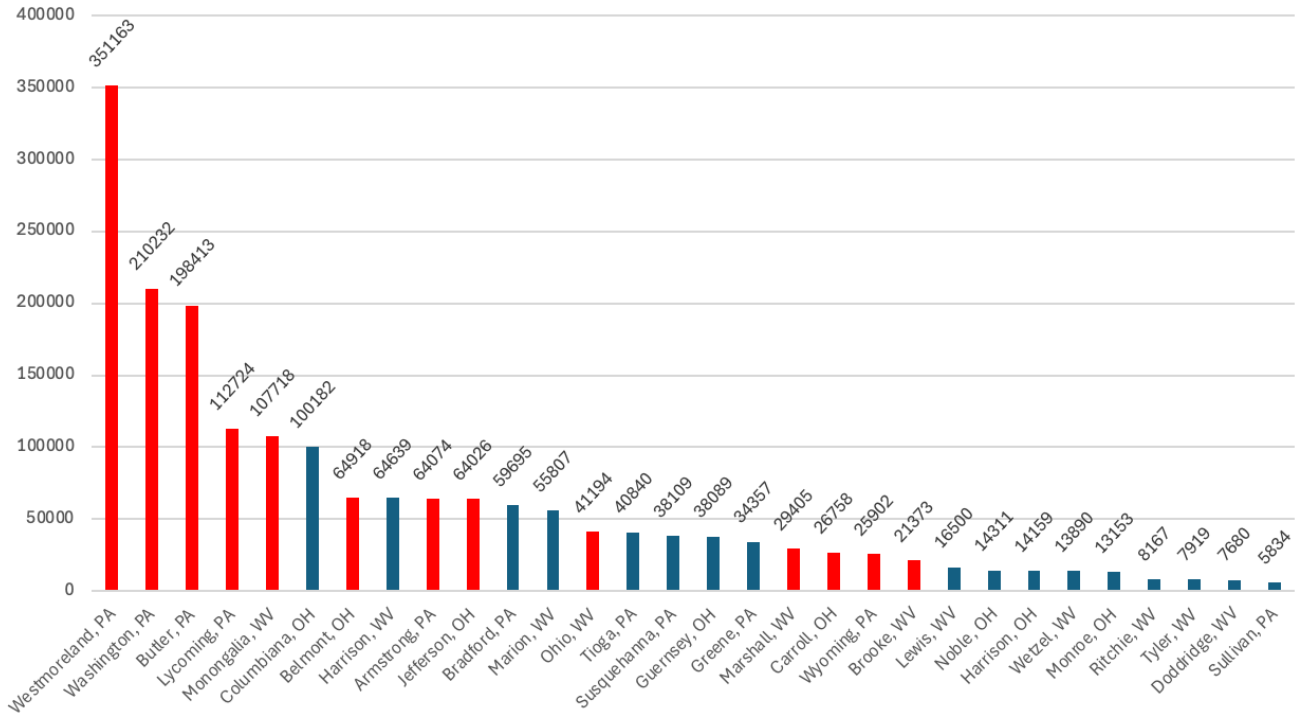
The Frackalachian counties, which are clustered in north-eastern Pennsylvania and in the greater Ohio River Valley, have a combined population of 1.85 million people as of 2024. If Frackalachia were a state, it would rank 39th in population just behind Idaho and ahead of West Virginia. When measured by growth in population, jobs, and other measures of prosperity, Frackalachia would be one of the poorest and fastest declining states in the nation.

Frackalachia includes a mixture of suburban and rural counties. In the following map, metropolitan counties are colored in red and non-metro areas in blue.



44% of Frackalachia's population of 1.85 million is found in four Pennsylvania counties - Armstrong; Butler; Washington; and Westmoreland. All are part of the Pittsburgh metropolitan area. Another 27% of the Frackalachian population is found in other metro areas, including Weirton/Steubenville, Wheeling/Belmont County, Wilkes Barre, Canton/Akron, and Morgantown. The remaining 29% of Frackalachia's population resides in rural counties that are not part of any metropolitan area. Nationally, 86% of the population lives in metropolitan areas as compared to Frackalachia's 71%, meaning that Frackalachia is more rural than the nation as a whole.

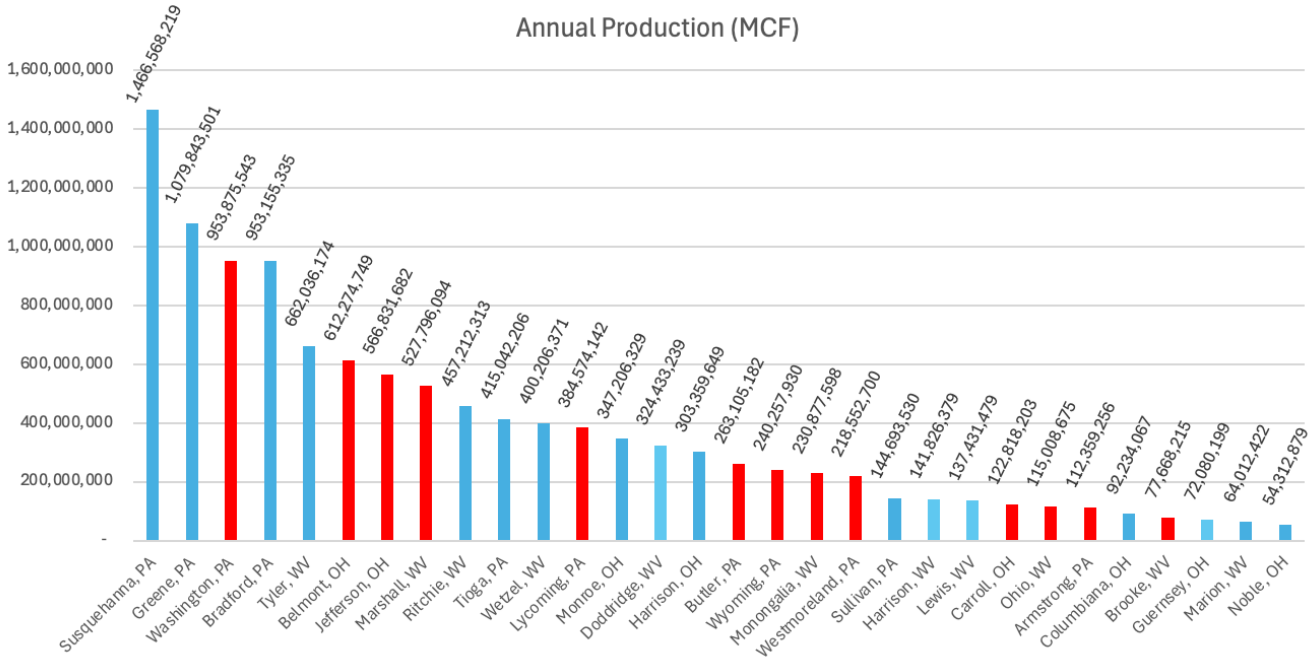
Figure 1: Population, Frackalachian Counties, 2023



Source: Bureau of Economic Analysis, CAINC1

While Frackalachia's rural counties are home to less than a third of its population, they are the source of more than 60% of the region's annual gas production.

Figure 2: Annual Production, Frackalachian Counties

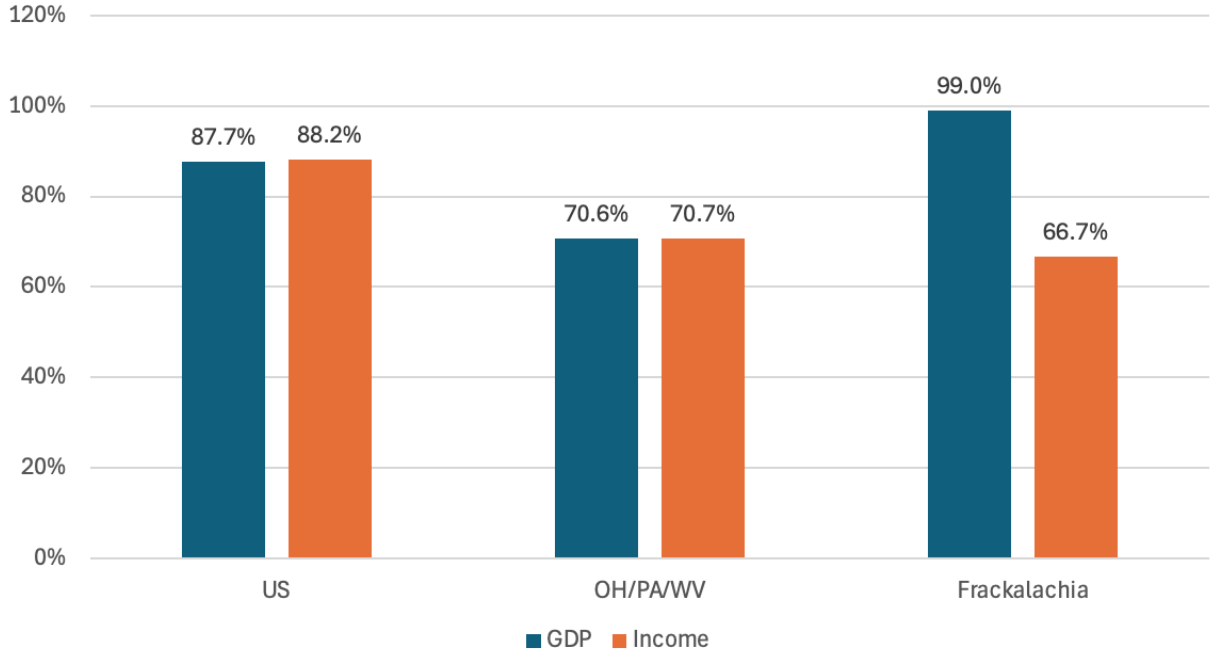


Source: Mineralanswers.com

Frackalachia's economic history, since the dawn of the Appalachian natural gas boom in 2008, has been dismal. During that period, as the US population grew by 10% and the number of jobs in the nation's economy grew by 13%, Frackalachia suffered from absolute losses of population and jobs, with the number of residents shrinking by 2.9% and the number jobs declining by 1.1%. That's despite the fact that GDP in Frackalachia grew 13% faster than it did in the US economy as a whole.

This fracturing of the usual relationship between growth in GDP and growth in other measures of local prosperity is illustrated in the following chart. Between 2008, prior to the start of the Appalachian natural gas boom, and 2023, GDP and personal income grew in concert nationally as well as in the states of Ohio, Pennsylvania, and West Virginia. However, that was not true of the thirty Frackalachian counties, where the region's strong GDP growth, which outstripped that of the nation, utterly failed to show up in the growth of incomes for the region's residents.

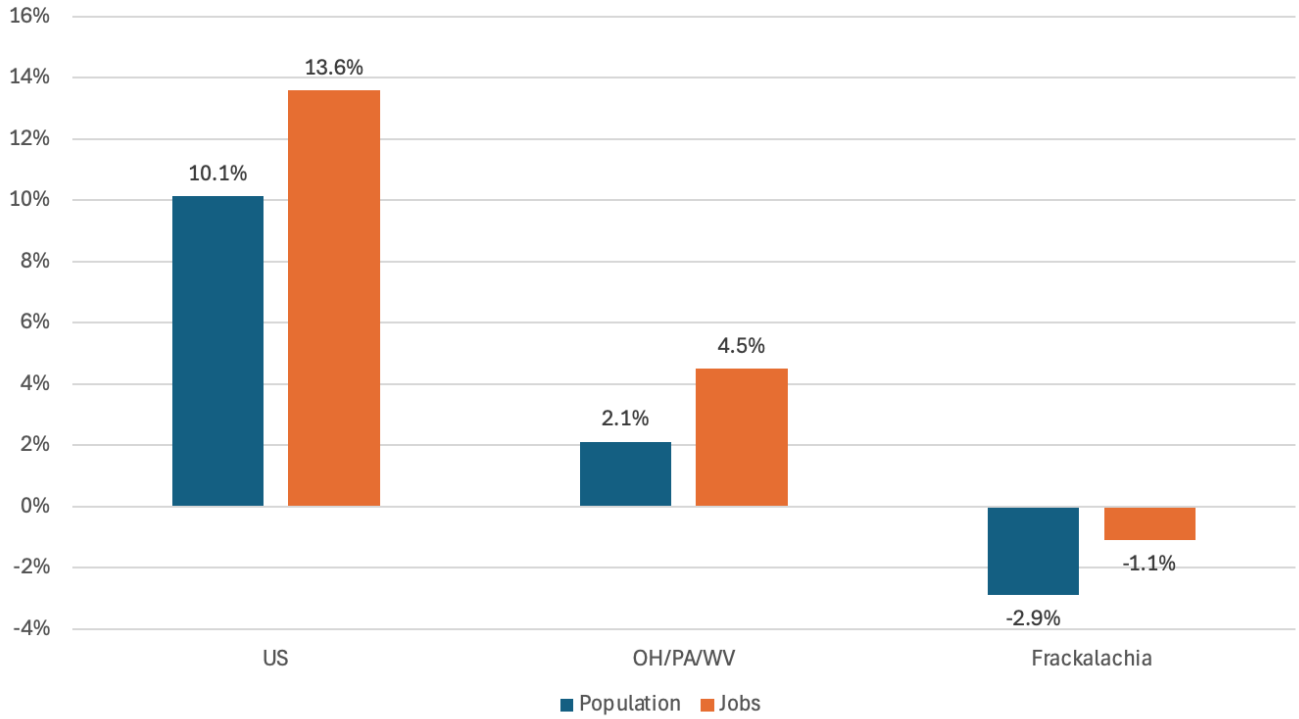
Figure 3: Percent Change in Nominal GDP and Nominal Income, 2008-2023



Source: Author's calculations of Bureau of Economic Analysis data. CAGDP2 for GDP and CAINC1 for income

Meanwhile, Frackalachia suffered absolute losses of jobs and population.

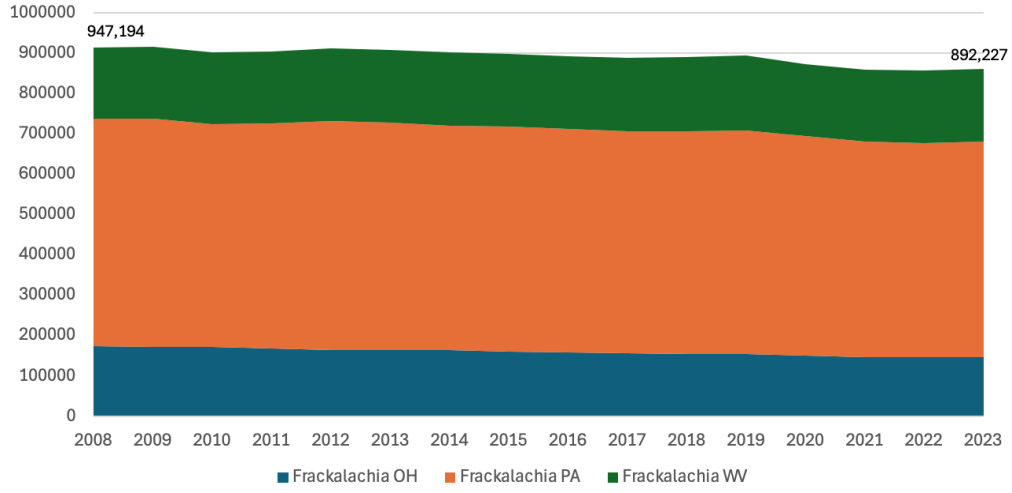
Figure 4: Percent Change in Population and Jobs, 2008-2023



Source: Author's analysis of Bureau of Economic Analysis data. CAINC1.

But the most frightening demographic trend in Frackalachia might be the erosion of the region's labor force, which is declining at twice the rate of population loss. Between 2008 and 2023, Frackalachia's labor force declined by nearly 55,000 workers, or 5.8%.

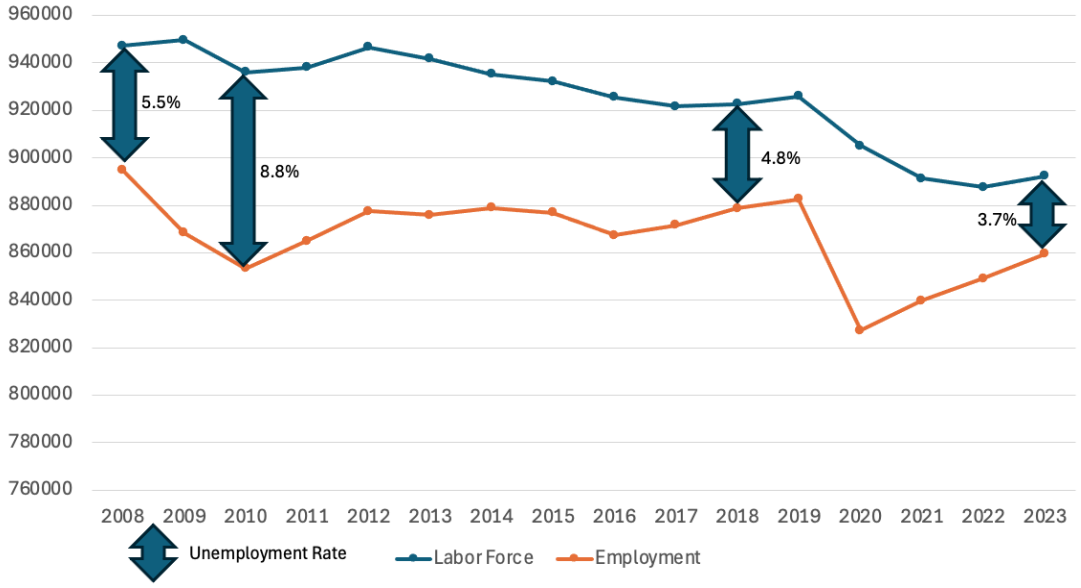
Figure 5: Labor Force, Frackalachia, 2008-2023



Source: Author's analysis of Bureau of Labor Statistics data. Local Area Unemployment Statistics.

Ohio was particularly hard-hit, losing more than 26,000 workers, which represents 15% of the labor force in that state's Frackalachian counties. So, while Frackalachia, like the nation as a whole, has seen the unemployment rate decline in the years following the Great Recession of 2009 and 2010, the decline in Frackalachia didn't come about because the economy added jobs. Rather, it happened because the region lost workers even faster than it lost jobs.

Figure 6: Labor Force, Employment Rate, and Unemployment Rate, Frackalachia, 2008-2023



Source: Author's analysis of Bureau of Labor Statistics data. Local Area Unemployment Statistics.

The accelerated loss of residents of working age is doubly damning for Frackalachia because, in addition to eroding the tax base, it also erodes the region's talent pool, which makes it harder than it would be otherwise to attract industry and new employers. Also, far from countering the erosion, the natural gas industry is contributing to it.

COMPARING FRACKALACHIA TO STATES IN THE US ECONOMY

To appreciate the depth of the Frackalachian paradox in which measures of prosperity suffer even as GDP grows, it's helpful to translate the primary metrics - GDP, jobs, income, and population - into the changes in share of the US economy that Frackalachia and its counties have achieved during the gas boom era. In that time, Frackalachia's share of US economic output as measured by GDP has risen by 6%, which, if Frackalachia were a state, would result in it ranking 13th among the fifty states and the District of Columbia.

But, by every measure of prosperity, Frackalachia's share of the US economy has not just shrunk, it has done so by double digits across the board. Its share of jobs has declined by nearly 13%, income by over 11%, and population by more than 13%. In the following chart, shares that grew between 2008 and 2023 are highlighted in green, those that fell are highlighted in pink.

Figure 7: Change in Shares of GDP, Jobs, Income, and Population, 2008-2023 (Ranked by GDP Change)

	GDP	JOBS	INCOME	POPULATION
Utah	28.1%	18.6%	29.5%	16.7%
North Dakota	26.4%	0.8%	11.4%	8.3%
Washington	22.0%	2.3%	16.1%	8.1%
Idaho	14.6%	9.5%	23.6%	16.0%
Nebraska	12.0%	-6.4%	3.6%	-0.1%
Florida	11.1%	19.0%	13.7%	11.6%
Texas	9.8%	16.3%	10.9%	14.1%
Colorado	9.5%	8.1%	19.0%	9.0%
Tennessee	9.0%	3.9%	7.9%	3.3%
South Dakota	6.7%	-3.0%	8.3%	3.8%
Arizona	6.6%	6.7%	10.5%	7.4%
Georgia	6.4%	8.5%	4.7%	5.1%
FRACKALACHIA	**6.0%**	**-12.9%**	**-11.4%**	**-13.4%**
South Carolina	6.0%	5.6%	9.2%	7.4%
California	5.9%	2.0%	5.9%	-3.3%
Montana	5.3%	-1.4%	12.6%	4.6%
New York	4.4%	-2.5%	-7.0%	-7.2%
Oregon	3.5%	-2.5%	9.9%	1.9%
Massachusetts	1.1%	-0.7%	1.1%	-1.4%
Nevada	0.3%	8.6%	9.6%	9.4%
North Carolina	-0.3%	3.7%	1.3%	5.5%
Iowa	-1.8%	-11.5%	-7.9%	-3.7%
New Hampshire	-2.2%	-7.3%	-2.2%	-3.8%
Maine	-2.6%	-10.5%	-1.8%	-5.0%
Indiana	-4.3%	-5.4%	-1.5%	-3.3%
Minnesota	-4.3%	-8.4%	-1.9%	-1.0%
Virginia	-4.7%	-2.7%	-3.8%	0.7%
Arkansas	-5.1%	-6.2%	1.6%	-3.6%
District of Columb	-5.3%	-4.8%	9.6%	7.0%
Delaware	-5.5%	0.8%	0.5%	5.9%
Ohio	-5.9%	-8.9%	-8.8%	-7.3%
Kansas	-6.0%	-10.9%	-10.4%	-5.1%
Maryland	-6.3%	-4.0%	-11.2%	-1.3%
Alabama	-7.0%	-5.7%	-6.7%	-2.1%
Kentucky	-7.3%	-6.5%	-5.5%	-4.2%
Wisconsin	-7.4%	-10.6%	-6.9%	-5.1%
Michigan	-8.4%	-7.6%	-8.5%	-8.5%
Illinois	-10.0%	-10.3%	-12.6%	-10.5%
Hawaii	-10.4%	-11.1%	-9.6%	-2.3%
Missouri	-10.7%	-9.1%	-6.3%	-5.4%
Vermont	-11.3%	-13.6%	-9.5%	-6.2%
Pennsylvania	-11.4%	-7.9%	-9.2%	-6.8%
Rhode Island	-12.4%	-7.3%	-10.1%	-5.6%
New Jersey	-12.9%	-2.4%	-9.8%	-2.8%
West Virginia	-13.6%	-18.5%	-14.3%	-13.1%
New Mexico	-14.8%	-12.6%	-7.8%	-4.8%
Oklahoma	-15.4%	-7.0%	-9.2%	0.0%
Mississippi	-15.4%	-8.2%	-14.4%	-9.9%
Louisiana	-21.6%	-8.0%	-15.9%	-6.6%
Connecticut	-22.0%	-11.3%	-19.5%	-7.2%
Alaska	-34.4%	-12.7%	-15.1%	-3.3%
Wyoming	-35.2%	-8.0%	-5.7%	-3.3%

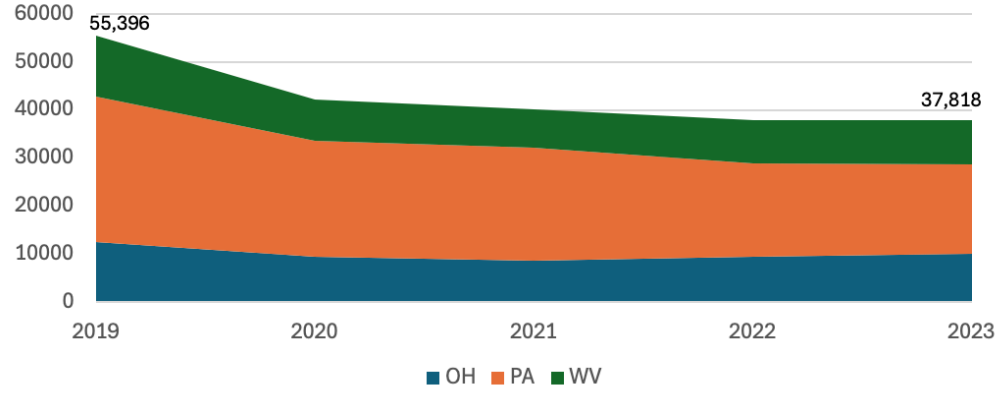
Source: Bureau of Labor Statistics, Bureau of Economic Analysis

NATURAL GAS EMPLOYMENT COLLAPSES

In the Bureau of Economic Analysis breakdown of the economies of Ohio, Pennsylvania, and West Virginia in 2023, the Mining sector, which includes mining and quarrying of all minerals as well as oil and gas, made up slightly less than 2% of GDP. Fracking and related activities made up just a fraction of that.

Natural gas extraction, drilling, and support services, along with pipeline construction and transportation, contributed just 37,818 jobs out of Ohio's, Pennsylvania's, and West Virginia's combined total of 12.1 million jobs, according to the Quarterly Census of Employment and Wages (QCEW). In other words, the shale-related natural gas industry contributed just over three-tenths of 1% of all jobs in Ohio, Pennsylvania, and West Virginia. Perhaps more notable is the fact that, in the last four years, fracking-related employment plunged by 17,422 workers, a loss of three out of every ten jobs in the industry.

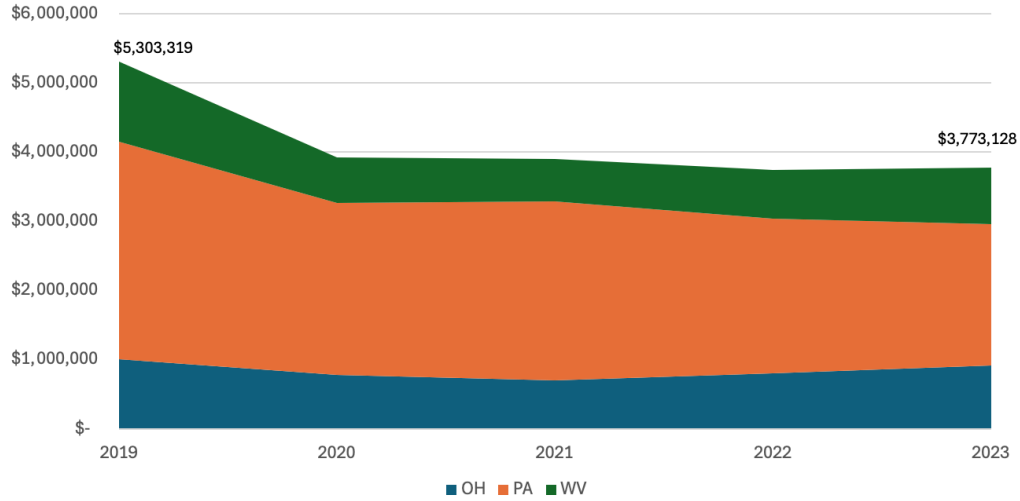
Figure 8: Shale-related Natural Gas Employment, Frackalachian States, 2019-2023



Source: Bureau of Labor Statistics NAICS codes 2111, 213111, 213112, 23712, 4862

Wages paid by the industry declined in near lockstep, dropping 29% between 2019 and 2023 and resulting in a loss of a little over $1.5 billion to worker incomes annually.

Figure 9: Total Wages, Frackalachian States, 2019-2023



Source: Bureau of Labor Statistics NAICS codes 2111, 213111, 213112, 23712, 4862

These effects are also reflected in industry productivity data. Between 2019 and 2024, the US oil and gas extraction sector as a whole increased output by 1.8%. But the increase in output was offset by gains in productivity, which increased by 5.3%, resulting in a decline of 3.3% in the number of hours worked.

Table 1: Percent Change in Labor Productivity, US Oil and Gas Extraction Sector, 2019-2024

		Annual percent change, 2019-2024

	Employment (thousands)	Labor productivity	Unit labor costs	Output	Hours worked	Labor compensation	Hourly compensation
Oil and gas extraction	123.2	5.3	-1.6	1.8	-3.3	0.2	3.6

Source: Bureau of Labor Statistics, Table 3, Table 3. Labor productivity, unit labor costs, and related data, 2019-2024

In circumstances such as these, it's highly likely that genuine measures of prosperity, such as jobs and wages, can decline even as GDP grows, which is exactly what happened in Frackalachia between 2019 and 2023.

Figure 10: Change in Mining Sector GDP, Total Wages, and Jobs, Frackalachia, 2019-2023

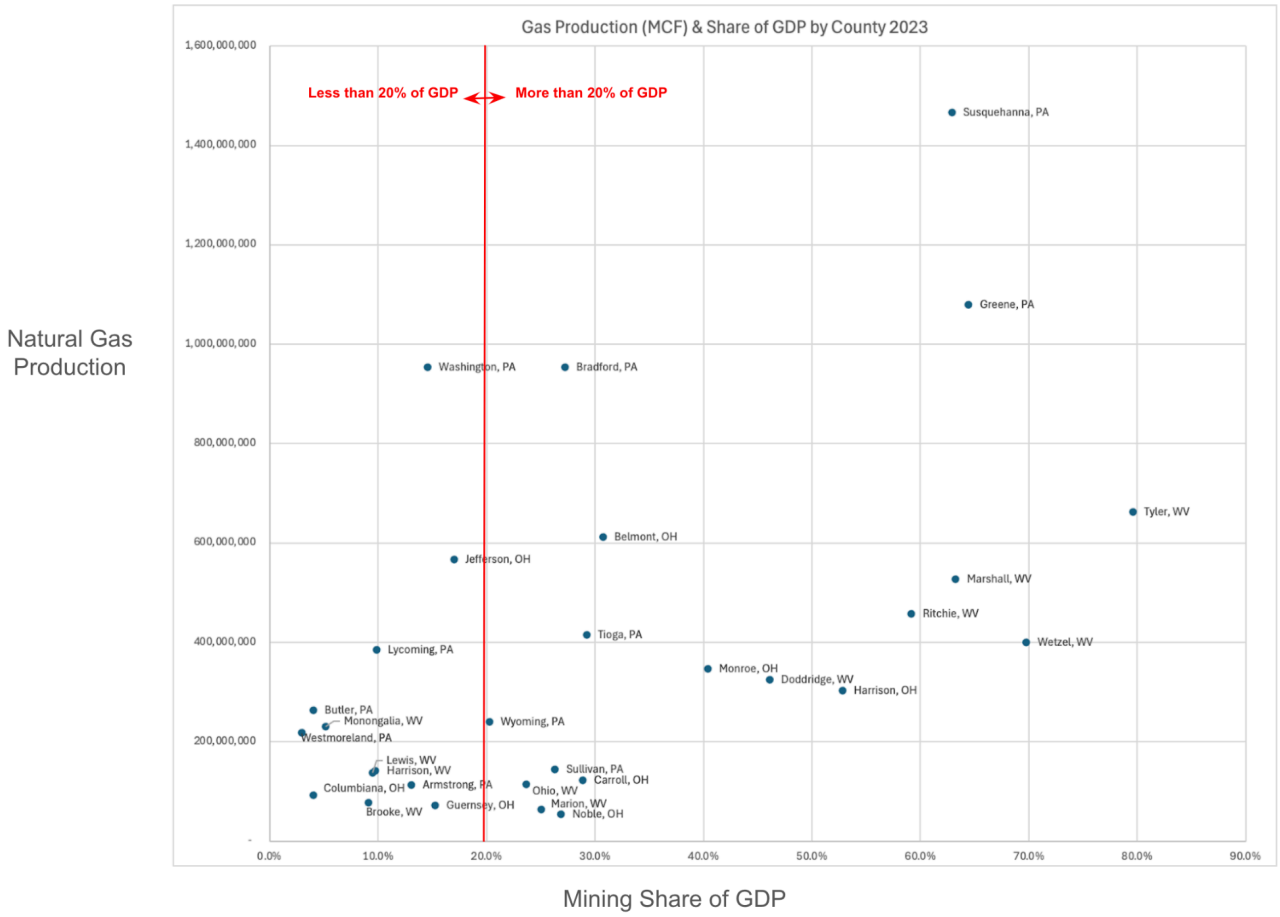
Source: Author's calculations using Bureau of Economic Analysis and Bureau of Labor Statistics data

FRACKING PREVALENCE CORRELATES TO WORSE ECONOMIC OUTCOMES

The assertion that the natural gas industry is leading Frackalachia toward an economic bottom rather than to recovery is also supported by an examination of the data from another perspective. The expansion of Frackalachia from the original 22 counties to 30, brings into the fold a number of heavily populated counties which produce large volumes of gas, but in which natural gas and the mining sector as a whole make up a comparatively small share of their economies as measured by GDP.

Of the current 30 Frackalachian counties, there are twelve in which the mining sector, which includes the gas industry, represents less than a fifth of total GDP. In these "Low-Share" counties, the mining sector represents a combined 7% of total GDP. Meanwhile, in the remaining 18 "High Share" Frackalachian counties, the mining sector represents a dominating 42% of GDP.

Figure 11: Gas Production (Mcf) and Mining Share of GDP, Frackalachian Counties, 2023



Source: Author's calculations using Bureau of Economic Analysis and Mineralanswers.com data

The data show that, in Low-Share Frackalachian counties, GDP grew by 88.1% between 2008 and 2023. But, in the High-Share counties, GDP grew by a remarkable 140.2%. As a result, per capita GDP is also significantly higher in the High-Share counties ($87,894) than it is in the Low-Share counties, where it comes in at just $71,289.

Therefore, were per capita GDP a flawless predictor of economic prosperity, one would expect that High-Share counties would be much better off than Low-Share counties.

But we haven't yet looked at income and, when we do, this expectation gets turned on its head. Per capita incomes in the High-Share counties are $10,000 *less* than incomes in High-Share counties.

Table 2: GDP and Income Stats, Low-Share vs. High-Share Counties

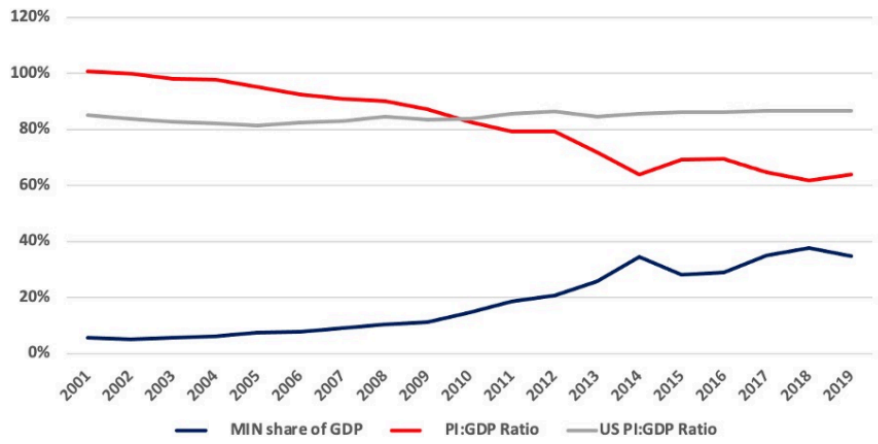
	Low-Share Counties (<20% Mining GDP)	High-Share Counties (>20% Mining GDP)
Mining Share of GDP (Average)	6.7%	42.5%
Nominal GDP Change, 2008-2023	93.8%	140.2%
Per Capita GDP	$71,289	$87,894
Per Capita Income	$62,792	$52,079
Ratio of Income to GDP (PI:GDP)	88.1%	60.3%

The High-Share counties also suffered much higher rates of job loss and population loss. The principal reason for this outcome is neatly captured in the chart's final statistic, the ratio of personal income to GDP (PI:GDP).

In the US economy and in most US states, the relationship between GDP and income is relatively stable with income typically coming in between 80% and 90% of GDP in any given year. In 2023, the nation's ratio of income to GDP was 84.8%, which is in line with the 88.1% figure for Frackalachia's Low-Share counties where mining represented less than 20% of GDP. However, in Frackalachian High-Share counties, the income to GDP ratio was a mere 60.3%. That means that only about 60 cents of every dollar of output showed up as income for residents in High-Share counties. So even though the economies in High-Share counties produced more output and grew faster than the economies of Low-Share counties, residents in High-Share counties received less income and did worse economically.

This outcome was predictable because it has been observed before. In 2021, the same phenomenon was recorded for the original 22 Frackalachian counties. The following chart shows a clear correlation between the rise in mining as a share of GDP in natural gas counties and the corresponding decline in the share of GDP that lands as income for residents in the counties.

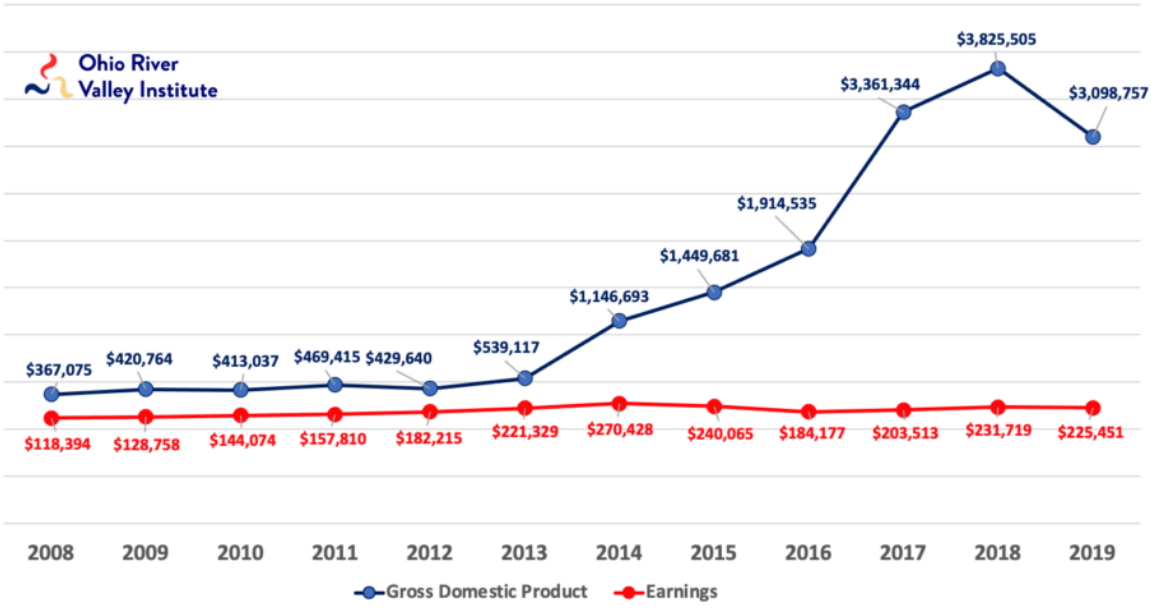
Figure 12: Mining Share of GDP and PI:GDP, Frackalachian Counties, 2001-2019



Source: Author's calculation using Bureau of Economic Analysis data

The same dynamic is also found in a separate 2021 Ohio River Valley Institute report which contained this chart showing that in Frackalachia's Belmont County, Ohio, earnings for workers in the industry remained flat even as mining sector GDP skyrocketed.

Figure 13: Mining GDP and Earnings, Belmont County, Ohio, 2008-2019



Source: Bureau of Labor Statistics

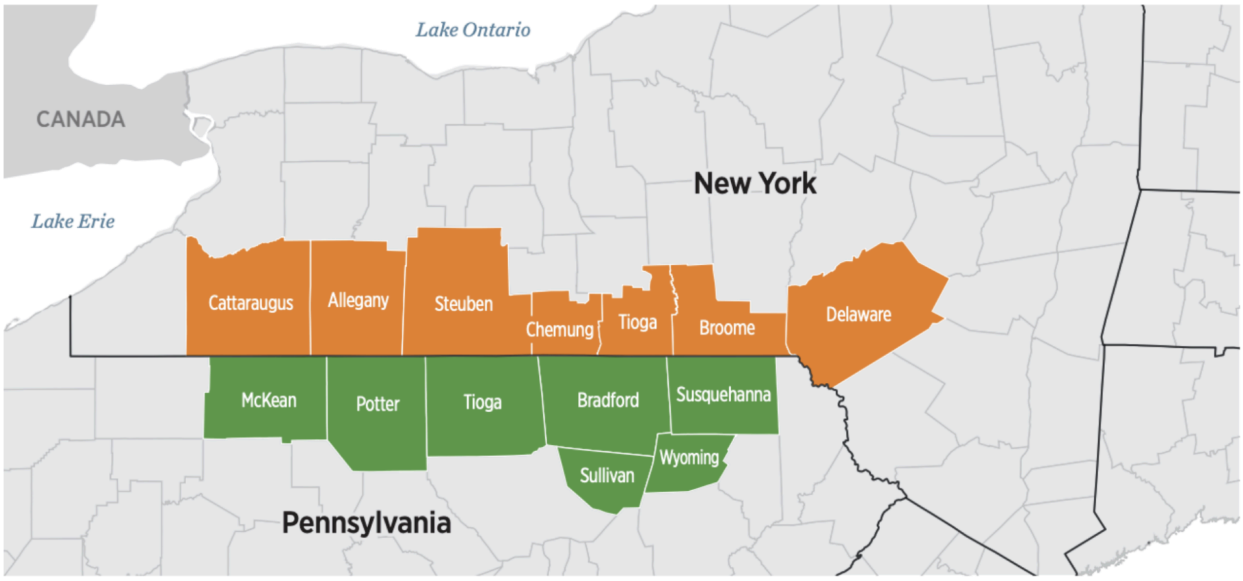
The inescapable conclusion is that, wherever fracking expands in Appalachia, it may produce increases in output as measured by GDP but it does very little to increase incomes or inject stimulus into host economies.

A CASE STUDY: HOW GDP DATA ARE USED TO MISREPRESENT THE ECONOMIC IMPACTS OF FRACKING

In April 2025, the Heritage Foundation issued a report[7], which argued that, because New York state banned fracking in 2010, seven of its counties that sit atop the Marcellus shale "lost out on around $11,000 per resident or $27,000 per household". The clear implication is that people and households in the seven counties would be financially much better off were fracking allowed. Beyond being misleading, such a claim glaringly ignores the actual impact that fracking has on local economies.

The "lost" $11,000 per resident and $27,000 per household represent the authors' inferred difference between the actual per capita GDP in the seven New York counties and the much higher per capita GDP their calculations show the counties would have achieved were fracking permitted. The basis for this inference is a comparison to the

GDP performance of a "control group" of seven adjoining counties in northeastern Pennsylvania, where fracking is permitted:



SOURCE: Don Knaus, "The Twin Tiers Twins," Mountain Home, February 11, 2025, https://web.archive.org/web/20170824135555/https://www.mountainhomemag.com/people-life/the-twin-tiers-twins/ (accessed March 31, 2025).

SR317 heritage.org

The authors not only rely on per capita GDP as their preferred measure of "well-being", they go out of their way to emphasize its superiority to other metrics as a means of measuring prosperity. They write:

> *"The variable of most interest is GDP per capita, which is a more comprehensive measure of well-being than the number of jobs. While job growth captures only the number of positions created, it does not account for the quality of those jobs, income levels, productivity, or overall economic output. GDP per capita, on the other hand, reflects the total economic activity per person, incorporating both employment and income effects, as well as broader productivity trends. This metric allows assessment not just of whether fracking bans influence employment, but also how they shape overall prosperity and living standards in the region."*

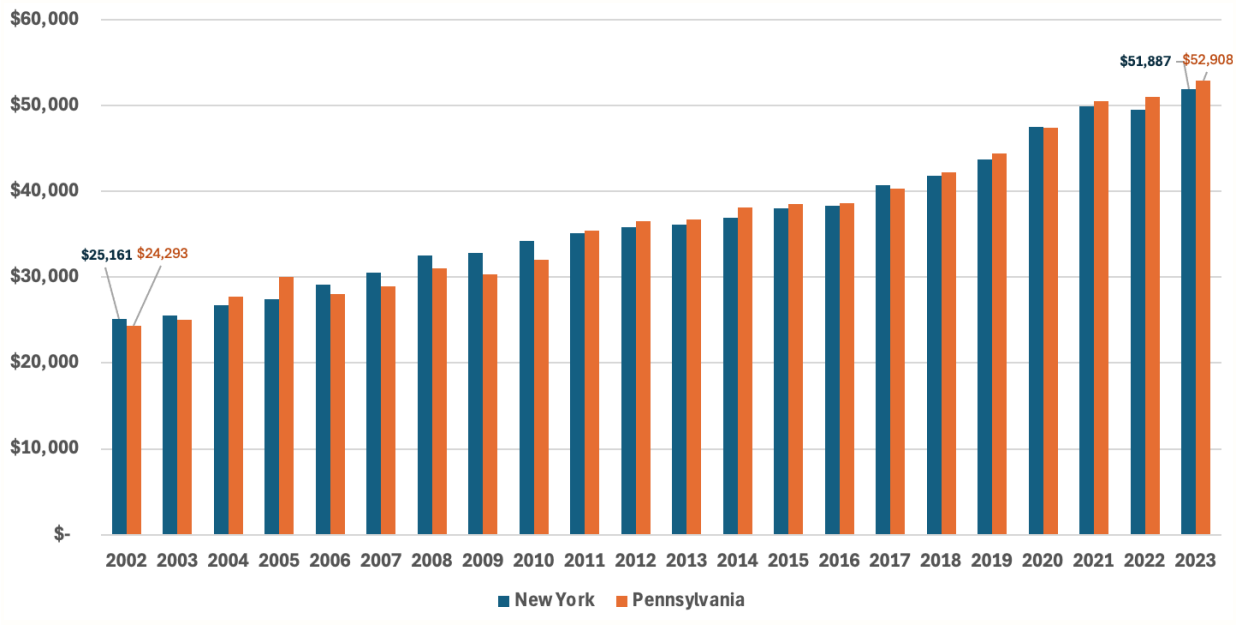
This sudden emphasis on GDP as a performance metric is odd given that the authors featured an entirely different metric - per capita income - in their headline when they claimed that the New York counties lost out on "around $11,000 per resident". Why didn't they stick with per capita income as the primary metric of success?

Perhaps because per capita income tells a story that flatly contradicts the one the authors try to tell.

The New York and Pennsylvania counties included in the study have long had comparable levels of per capita personal income, and have often swapped slight but always temporary leads. That was true before the fracking boom began and, awkwardly for the Heritage report authors, that continues to be the case since the advent of the fracking boom, which began in around 2008.

Nowhere in the per capita income data do we see an $11,000 bump supposedly provided by fracking in the Pennsylvania counties.

Figure 14: Per Capita Income, New York vs. Pennsylvania Marcellus Counties, 2002-2023

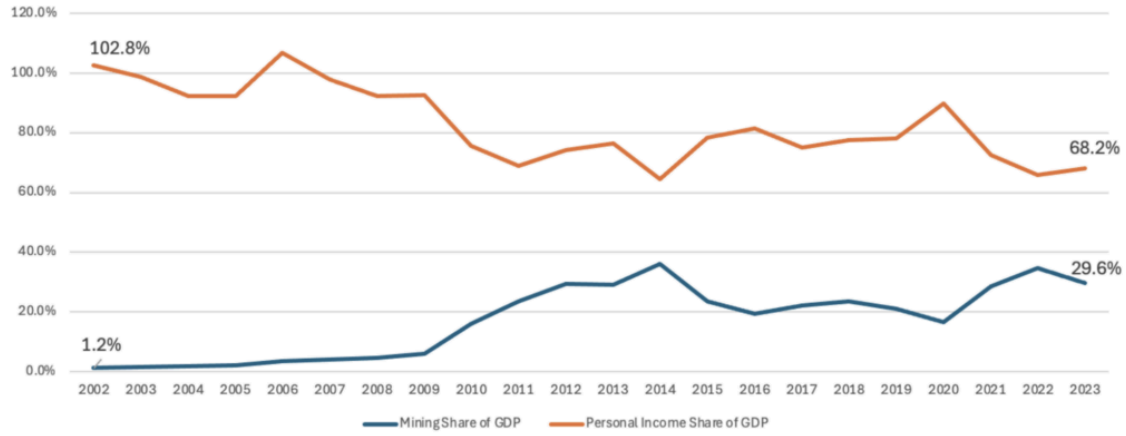


Source: Author's calculations using Bureau of Economic Analysis data

So, where did the additional $11,000 per person go? It went to fracking company shareholders, to creditors, to out-of-state service providers, and others who got nearly all of the incremental investment and revenue generated by fracking. Very little of the money ever entered the economies of the seven Pennsylvania counties in which gas production took place.

This outcome is evident in the following chart which illustrates how as mining sector GDP grows, the share of GDP that lands as income in the Pennsylvania counties plummets to the point that the latter almost completely offsets the former.

Figure 15: Mining Share of GDP and PI:GDP, Pennsylvania Frackalachian Counties, 2002-2023



Source: US Bureau of Economic Analysis
Note: Data were not available for Sullivan County, PA, which is excluded from this chart.

Despite this now well documented phenomenon of fracking GDP growth failing to meaningfully generate job and income growth in local economies, the industry and its defenders continue to claim - falsely - that it is an engine for job creation and prosperity.

THE COUNTIES OF FRACKALACHIA

When compared to the nation's economy and the combined economies of Ohio, Pennsylvania, and West Virginia, the thirty counties that make up Frackalachia have experienced superior growth in gross domestic product but have greatly underperformed in local measures of prosperity, including income, job, and population growth, the latter two of which have fallen into absolute decline. We have also seen that these trends — higher-than-average GDP performance accompanied by lower-than-average performance for local measures of prosperity — are compounded in counties where the mining sector dominates.

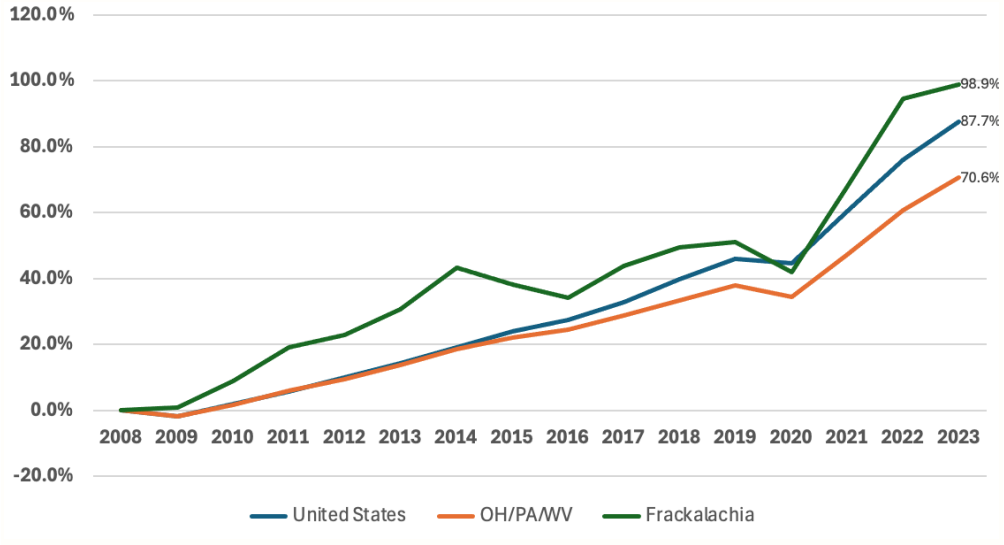
In other words, the greater the role of fracking in local economies, the worse those economies are likely to be. That said, the economic performance of the different Frackalachian counties varies. So, we will examine their GDP, jobs, income, and population performance individually.

GDP PERFORMANCE

Gross domestic product represents the total value of all goods and services, produced by both the private sector and government, in a given geography, in this case counties. The figures provided below reflect "nominal" or "current dollar" GDP, meaning that they are not adjusted to account for the effects of inflation. Using nominal GDP rather than "real" GDP, which does account for inflation, makes it possible to draw meaningful comparisons with income data, which are discussed in the next section.

Since the beginning of the fracking boom, GDP in Frackalachia has grown nearly 13% faster than it has in the nation and fully 40% faster than GDP in the combined economies of Ohio, Pennsylvania, and West Virginia.

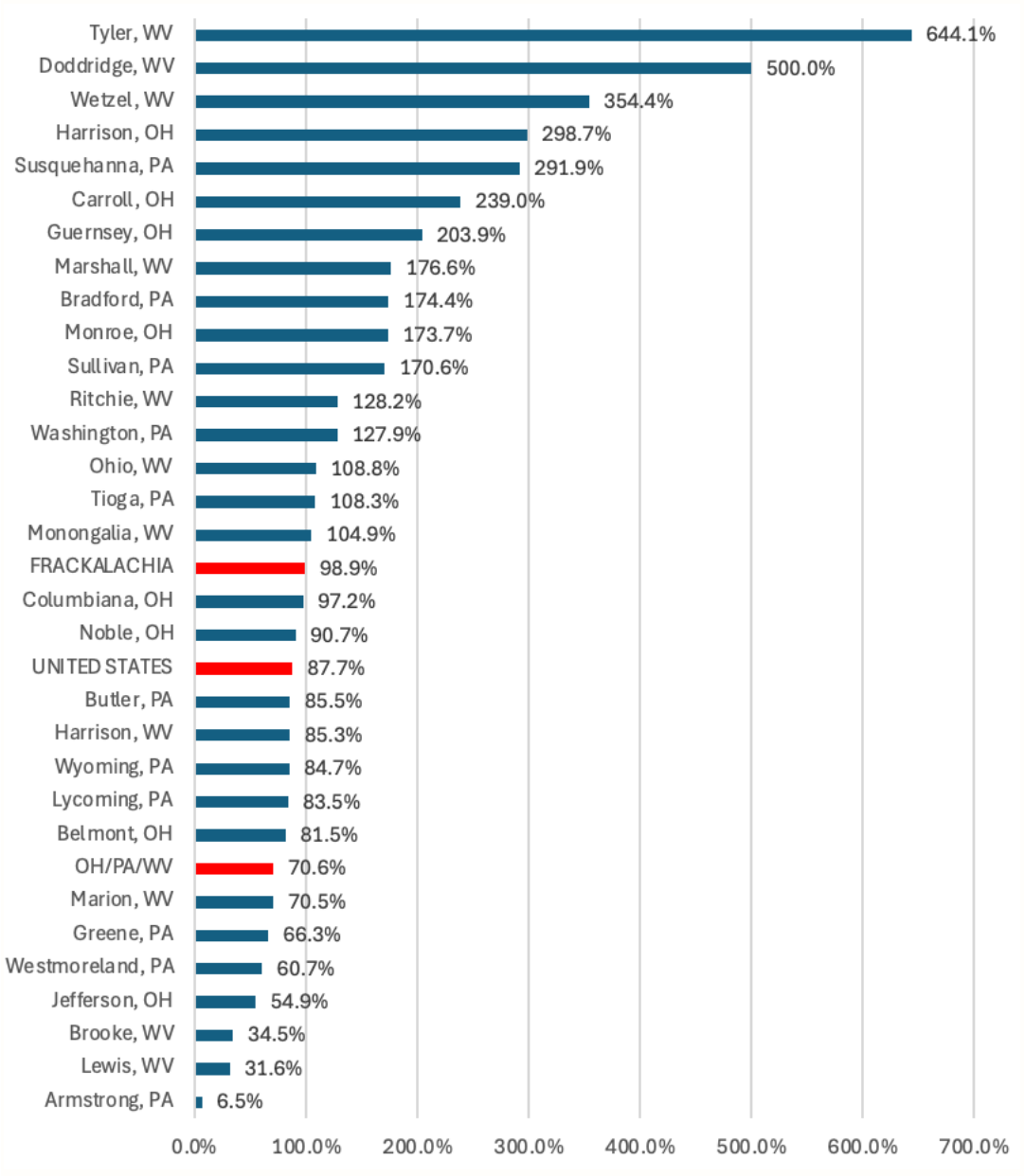
Figure 16: Change in Nominal GDP, 2008-2023



Source: US Bureau of Economic Analysis

The rate of cumulative GDP growth in some Frackalachian counties is more than 200% during the period covered, which is more than twice the pace of the US economy. The counties in which that is true have comparatively small populations and are largely rural. Meanwhile, counties with the least GDP growth are typically those in which the mining sector represents a small share of GDP. However, as we shall see when we examine individual counties' performance for jobs, income, and population, there is little if any discernible correlation between rates of GDP growth and measures of local economic prosperity.

Figure 17: Percent Change in Nominal GDP, Frackalachian Counties, 2008-2023



Source: Author's calculation of Bureau of Economic Analysis data

JOBS PERFORMANCE

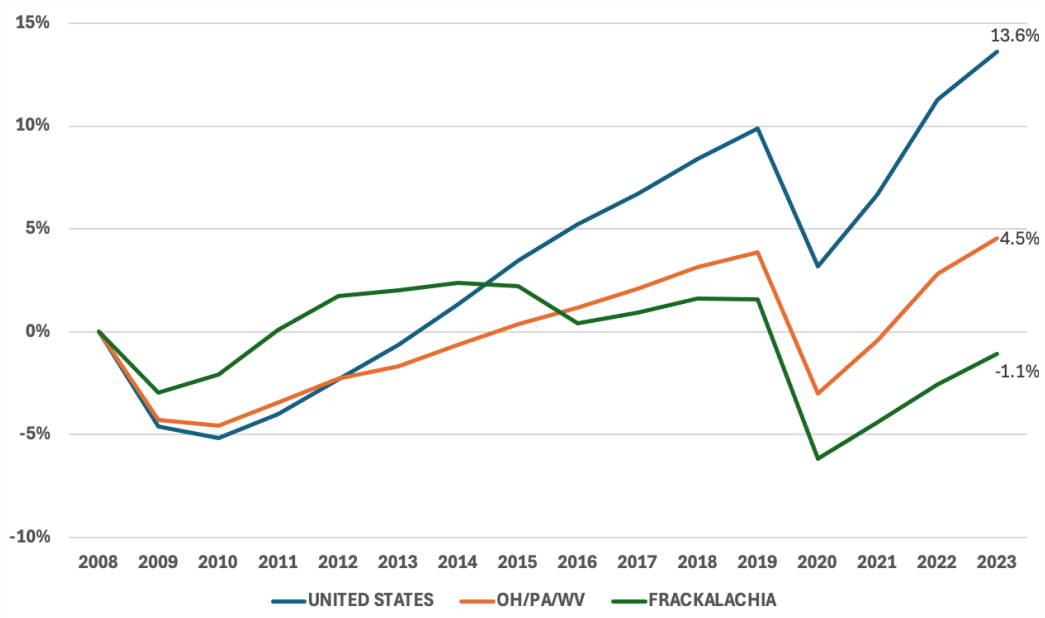
"Jobs" is the principal currency in much of the nation's political discourse. During the last presidential campaign, in which Pennsylvania was a hotly contested state, we saw advertisements claiming that as many as 500,000 jobs in the state depend on fracking for natural gas.[8] However, Bureau of Labor Statistics data clearly show that the actual number is much smaller than that.

For the year 2023, the Bureau of Labor Statistics' Quarterly Census of Employment and Wages recorded just 18,636 fracking-related jobs in Pennsylvania. That's a little over three-tenths of one percent of Pennsylvania's 5.96

million jobs in 2023. And, as we saw earlier, the number of fracking-related jobs in Pennsylvania has plummeted by more than 30% in the last four years even as the industry's output continued to rise and GDP in Frackalachia continued to outstrip GDP growth in the US and in the combined states of Ohio, Pennsylvania, and West Virginia.

These trends have combined to plunge the thirty Frackalachian counties into a condition of absolute job loss even as employment in the states of Ohio, Pennsylvania, and West Virginia grew by 4.5% and employment nationally grew by nearly 14%.

Figure 18: Change in Jobs (QCEW), 2008-2023

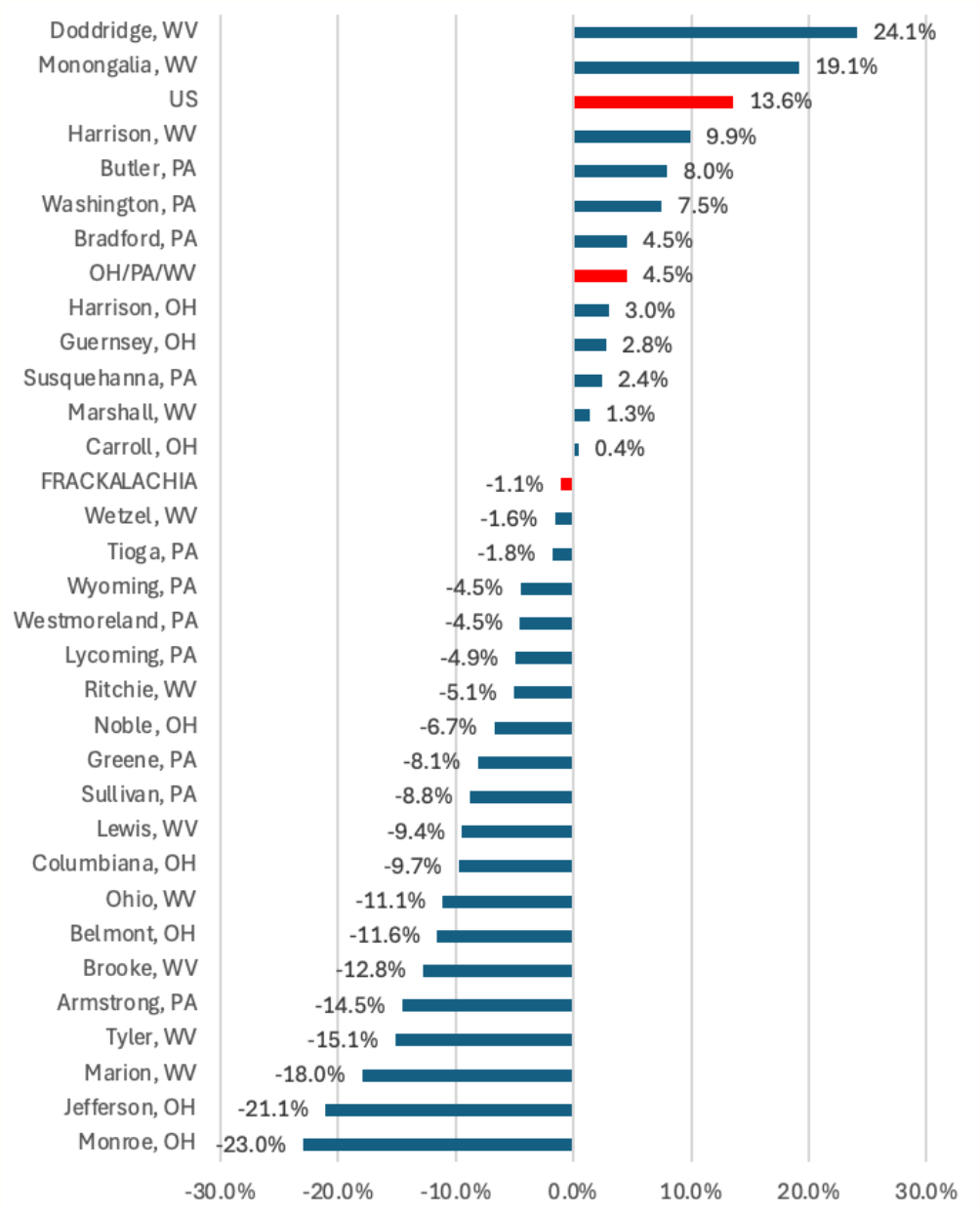


Source: Author's calculations using data from the Bureau of Labor Statistics, Quarterly Census of Employment & Wages

Among Frackalachia's 30 counties, just two had job growth in excess of that of the nation. And only six had growth that exceeded that of Ohio, Pennsylvania, and West Virginia. The other 24 lagged behind, with 20 of the 24 experiencing absolute losses of jobs.

In all, between the beginning of the natural gas boom in 2008 and 2023, Frackalachian counties lost 7,605 jobs.

Figure 19: Percent Change in Jobs (QCEW), Frackalachian Counties, 2008-2023



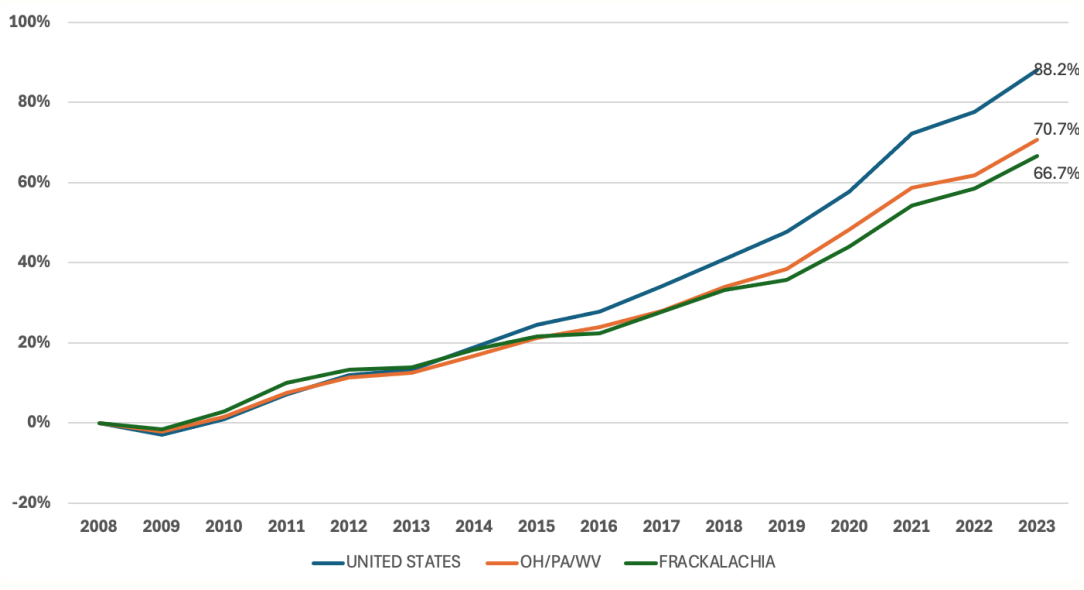
Source: Author's calculations using data from the Bureau of Labor Statistics, Quarterly Census of Employment & Wages

INCOME PERFORMANCE

Income growth is highly correlated with growth in jobs, so it's not surprising that Frackalachia, which trails both the nation and the combined states of Ohio, Pennsylvania, and West Virginia for job growth, also does so for income growth.

The extreme disconnect between Frackalachia's mining-driven GDP growth and its meager income growth reflects the natural gas industry's inability to spur job and income growth. The disconnect is structural in nature and, therefore, will not be overcome merely by increases in gas production.

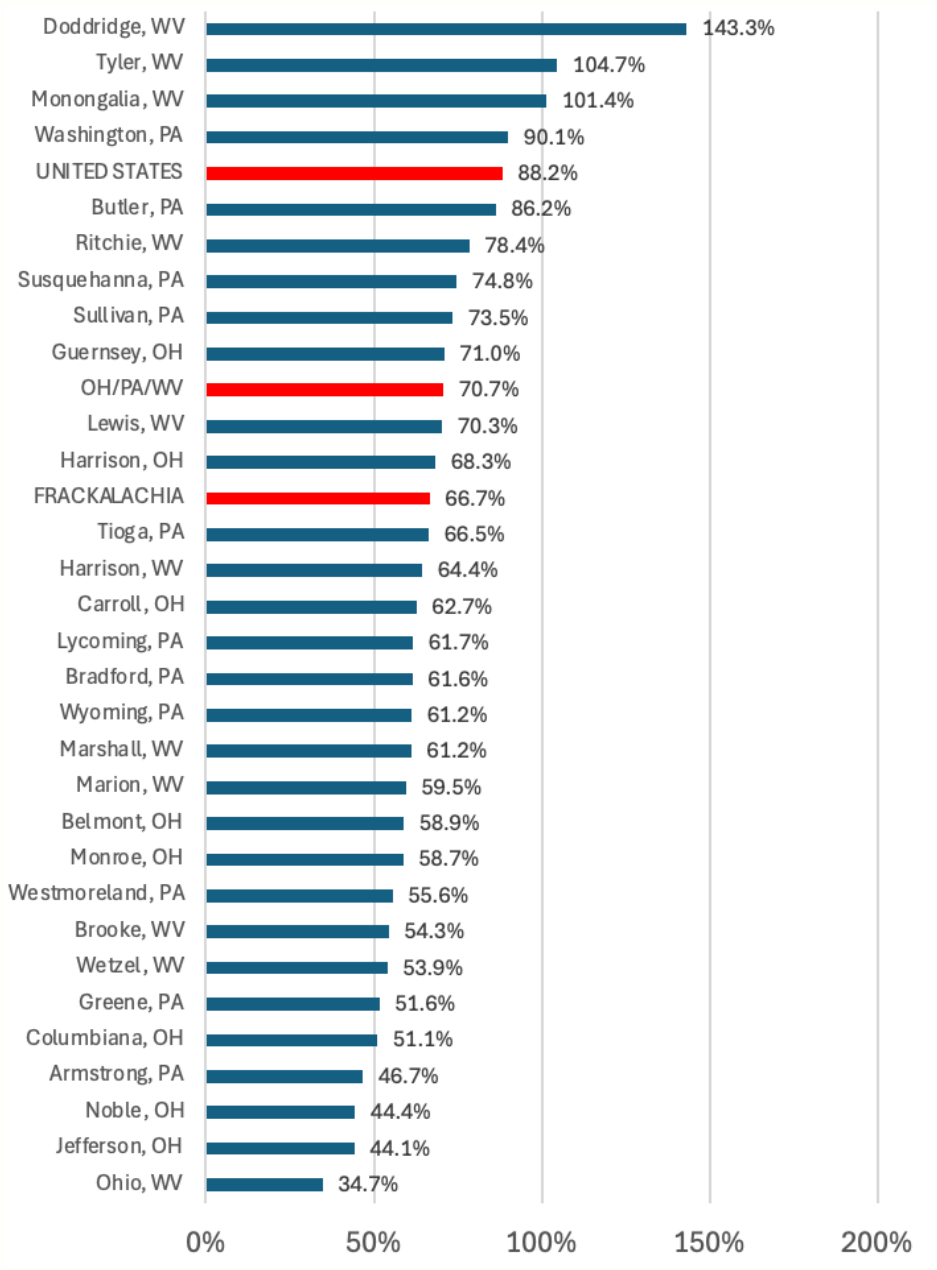
Figure 20: Change in Income, 2008-2023



Source: Author's calculations using Bureau of Economic Analysis data

All but four Frackalachian counties trail the nation for income growth and 21 of the remaining 26 also trail the combined economies of Ohio, Pennsylvania, and West Virginia.

Figure 21: Percent Change in Income, Frackalachian Counties, 2008-2023



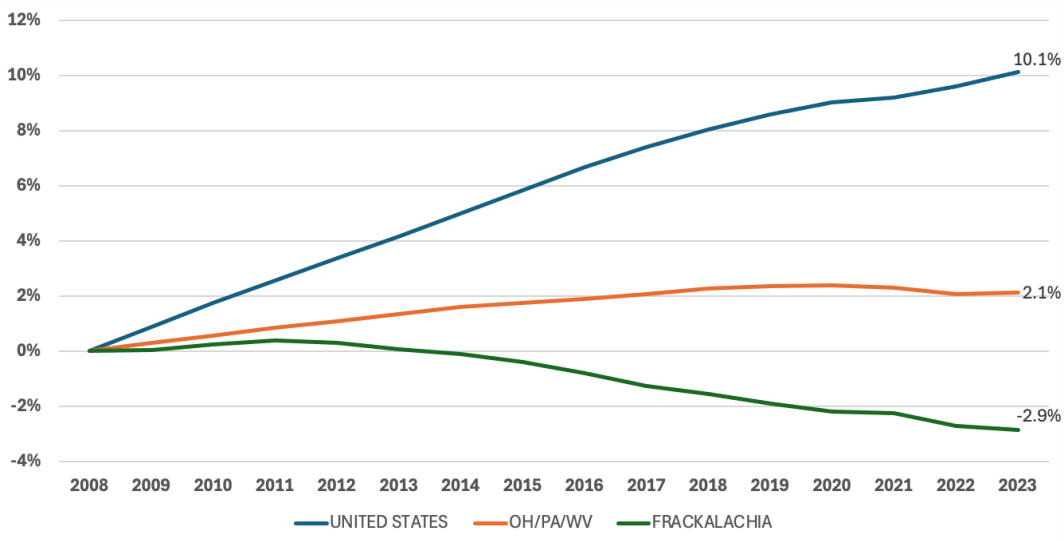
Source: Author's calculations using Bureau of Economic Analysis data

POPULATION PERFORMANCE

In no area is Frackalchia's decline more pronounced than in population change. The fact that the loss of residents exceeds Frackalachia's loss of jobs suggests a deeper and more insidious form of economic decline. In addition to failing to add jobs, Frackalachia is also experiencing an evaporation of its talent pool.

While the number of jobs in Frackalachia declined by 1.1% between 2008 and 2023, its labor force declined by 5.8%. And, in Ohio's eight Frackalachian counties, the decline in the number of workers was an astonishing 15.4%. In a world where companies prioritize access to talent when they consider where and when to expand, this kind of decline can be crippling to an area's economic development prospects.

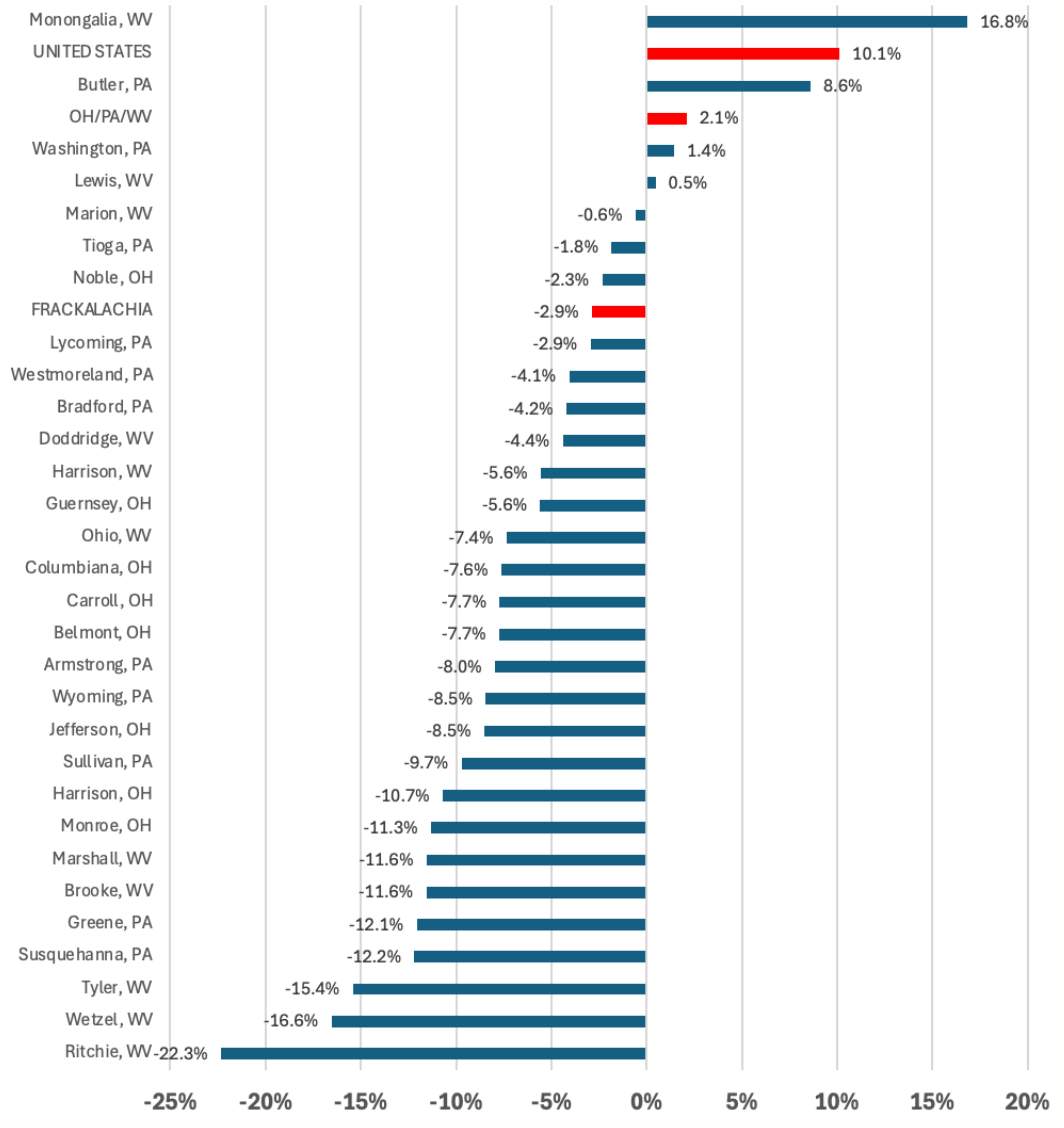
Figure 22: Change in Population, 2008-2023



Source: Author's calculations using US Bureau of Economic Analysis data

26 of Frackalachia's 30 counties have suffered population loss since 2008, a period of time during which the nation's population grew by 10% and even the states of Ohio, Pennsylvania, and West Virginia experienced a 2.1% gain. In nine of those counties, the losses of population were greater than 10%.

Figure 23: Percent Change in Population, Frackalachian Counties, 2008-2023



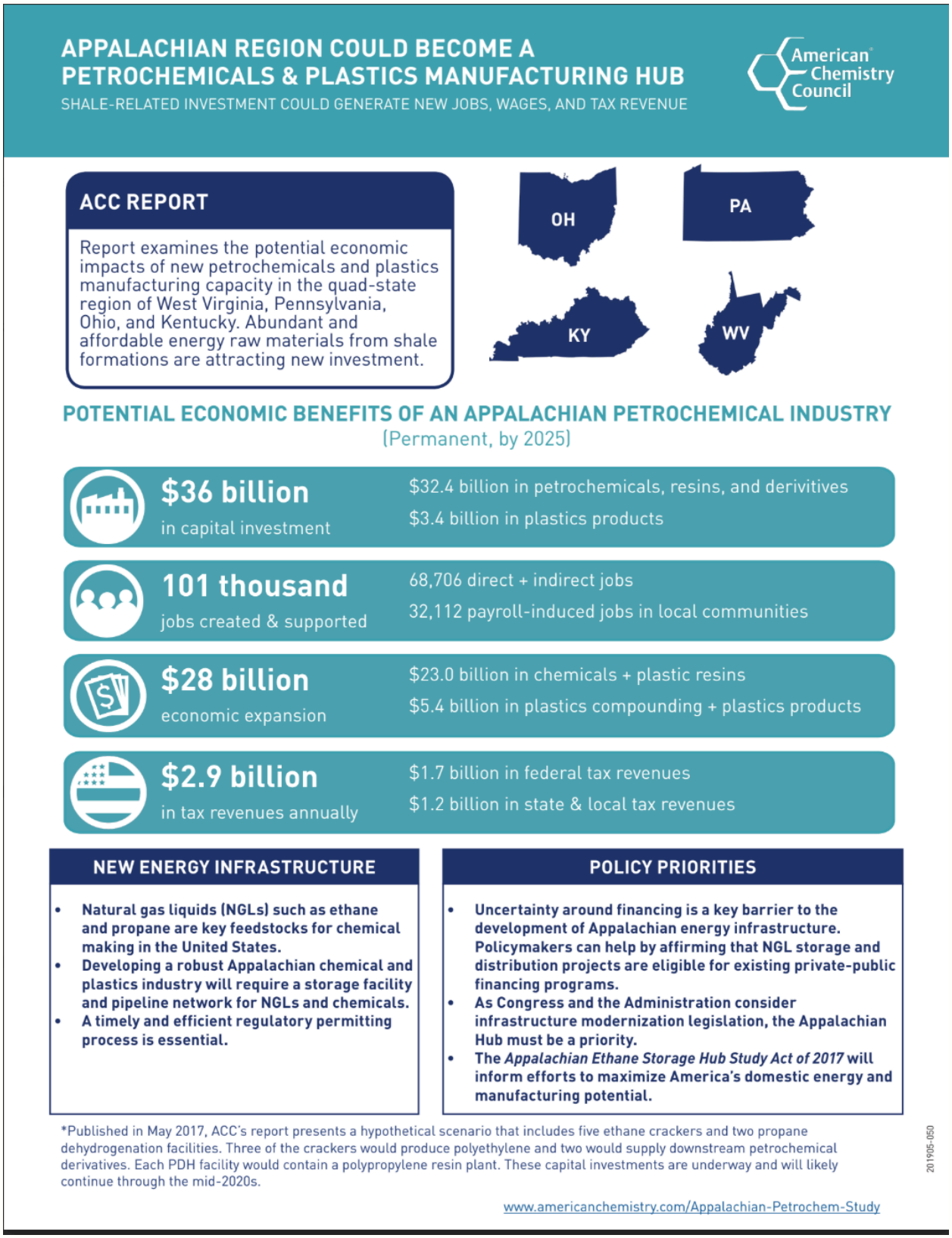
Source: Author's calculations using US Bureau of Economic Analysis data

SHINY OBJECTS SHAPING POLICYMAKING AND FRACKALACHIA'S FUTURE

Despite the Appalachian natural gas industry's failure to induce prosperity or to even contribute meaningfully to job and income growth at a regional level, its image as an engine of economic development has only been slightly tarnished in the minds of many policymakers. That is in part because, as the industry's failure has continued year after year, making it harder to ignore, proponents and supporters have diverted attention to related downstream industries that it is argued seize on the competitive advantages offered by the region's gas abundance to expand and, in doing so, deliver on the promise of prosperity.

The first of these shiny objects was the Appalachian Storage Hub. Originally envisioned as a facility that would store immense amounts of ethane and natural gas liquids in deep, underground caverns, the vision grew to include the creation of a second North American petrochemical cluster in which natural gas and its derivatives would not only be produced and stored, they would also be converted into ethylene and polyethylene, which in turn provide feedstock to a new cohort of plastics manufacturing businesses that would locate in close proximity.

The vision was championed by the US Department of Energy[9] and neatly summarized in an economic impact analysis, prepared by the American Chemistry Council[10].



The ACC report, which led to the creation of a regional industry-sponsored initiative called "Shale Crescent USA"[11], held out the promise of $36 billion in investment and over 100,000 jobs for the region. The centerpiece of the ACC report was the construction of five world-class ethane cracker plants for the production of polyethylene. Each of

these plants, which even at the time the ACC report was drafted, would have cost $7 to $14 billion to build, was expected to employ between 500 to 1,000 workers and serve as an economic anchor around which plastics manufacturers would cluster.

However, the ACC report and the vision's supporters failed to take into account a welter of economic factors that made its realization at best unlikely and at worst a complete non-starter. With most of the planned cracker plants unable to find investors, only one, owned by the Shell Oil Company, was built and, contrary to claims made in the ACC report, it has failed almost entirely to attract related businesses and jobs, leaving Beaver County, Pennsylvania, where the plant was built, in worse economic shape than it was before construction began[12].

As other announced or proposed cracker plants in Wood County, West Virginia, Carroll County, Ohio, and Belmont County, Ohio were cancelled or simply evaporated, it became apparent that no more would be built. At the same time, the sustained growth in gas production that had begun in 2009 appeared to be plateauing, causing the industry and its supporters to seek a new shiny object, which they found in the Appalachian Regional Clean Hydrogen Hub, otherwise known as ARCH2[13].

In the hope that hydrogen and ARCH2 could become a new growth industry that would offtake natural gas produced in the region, some fifteen companies, including what was at the time the nation's biggest natural gas producer, EQT, organized a consortium to apply for federal grants to build an integrated network of producers and consumers of low-carbon hydrogen, made from the region's natural gas.

The ARCH2 hub succeeded in being one of seven such consortiums selected for DOE funding. However, even before the selection announcement, the wheels were coming off the vision. The Ohio River Valley Institute and others pointed out that many of the participating projects had extremely weak business rationales and that the entire enterprise was likely to suffer from a lack of demand for clean hydrogen. By and large investors and many of the companies that were part of ARCH2 eventually agreed. As a result, about half of ARCH2's original slate of projects have departed, at least three of those remaining are being developed by companies whose financial conditions are shaky, and congress is now considering the administration's proposal to defund the hydrogen hubs[14]. But, as ever, two new shiny objects that are being touted as gas industry-driven economic godsends have emerged - the artificial intelligence-driven need for more power generation and the global demand for liquified natural gas (LNG) exports.

But will these forces that are going to further stimulate the industry become the "economic game-changer" that the region has long awaited?

FRACKALACHIA, DATA CENTERS, AND LOAD GROWTH FEVER

In January of this year, PJM, the organization that manages the electric grid for thirteen states in the Mid-Atlantic region and parts of the midwest as well as the District of Columbia, released an updated forecast for electricity demand. The new forecast found that peak demand in the year 2035 would be 17% higher than PJM had forecasted just months before and 50% higher than peak demand in 2024.[15]

The change was jarring because demand in PJM has generally trended down for the past two decades. PJM last set a peak demand record in 2006. The principal reason for the change is that, between last year and this year, PJM and many of the rest of us discovered artificial intelligence. Approximately three-quarters of the demand growth anticipated by PJM is attributable to new data centers and the electricity needed to power them.

Table 3: 2025 Long-Term Load Forecast, PJM

Year (Winter Season Dec – Feb)	Winter Peak (MW)	Change from 2024 Long-Term Load Forecast (MW/%)	Year	Summer Peak (MW)	Change From 2024 Long-Term Load Forecast (MW/%)
2024/25	136,127	-201 (-0.1%)	2025	154,144	651 (+0.4%)
2029/30	167,237	14,367 (+9.4%)	2030	183,883	16,010 (+9.5%)
2034/35	198,175	32,470 (+19.6%)	2035	209,923	30,301 (+16.9%)
2039/40	209,718	N/A	2040	220,224	N/A
2044/45	218,760	N/A	2045	228,544	N/A

Source: PJM

The implications of this added need (if it comes to fruition — and it may not, but more about that later) are serious.

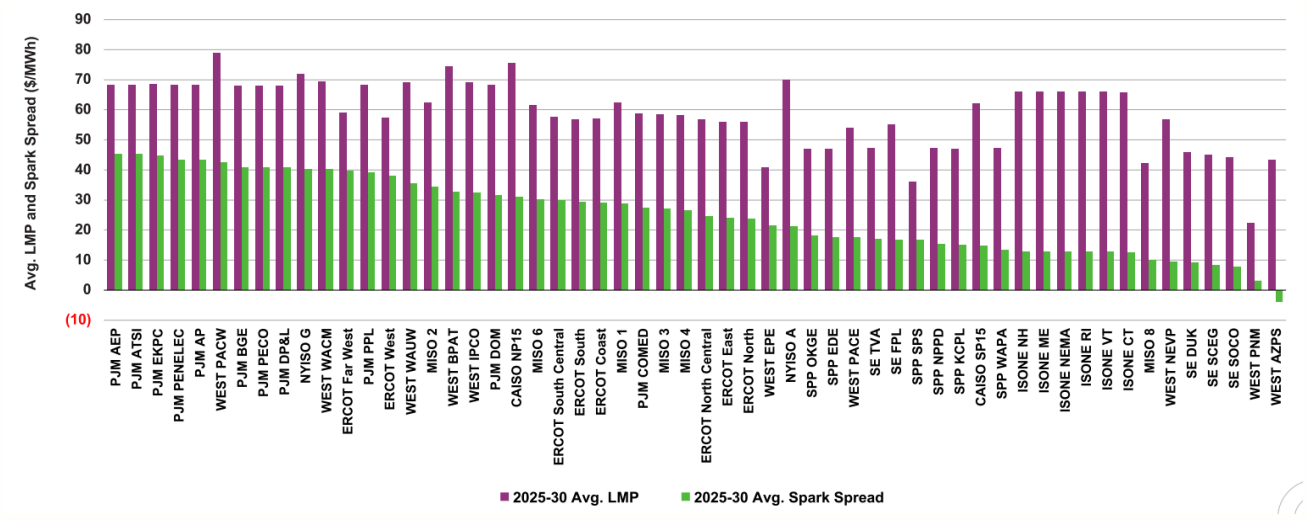
- **Electric rates are likely to rise significantly.** Already, according to PJM's market monitor, the mere expectation of data center-driven load growth will add $9.3 billion to customer utility bills in the next year.
- **Dozens and perhaps more than a hundred new power plants will have to be built in the region.** PJM may have to add or replace as much as 134 GW of resources.
- **Pollution caused by power generation will increase.** Each Gigawatt of additional gas-fired power, running 24/7, produces about 3.9 million metric tons of carbon dioxide (CO2) annually.

These implications are in large part due to the fact that, in PJM, demand growth will be met primarily by building and operating more gas-fired power plants. At least, that is what PJM proposes to do.[16] Already PJM has sought and received from the Federal Energy Regulatory Commission permission to seek 50 new power plants and to give a preference to those that burn natural gas. And that is likely to be only an interim step because, in order to meet the expected growth in demand and replace old coal- and gas-fired power plants that are expected to retire in the next decade, PJM will need more than 100 new Gigawatts of power, which is about equivalent to 100 power plants.

In all, PJM would have to add or replace an amount of capacity equivalent to two-thirds of its current generation. Depending on how much of that need is met with gas-fired power, demand for natural gas could grow by between 300 million and 600 million cubic feet per day. And that's only in the PJM region. To varying degrees grid managers and utilities around the nation and the world face similar challenges as the world electrifies.

PJM is also assisted in its pursuit of gas-fired power by market tailwinds. The following chart illustrates the Locational Marginal Price and "Spark Spread" for regions around the nation. The Locational Marginal Price (LMP) is the price paid for electricity and the spark spread is the difference between the price for electricity and the cost of the natural gas required to produce it. By both measures, PJM sub-regions generally lead the nation in offering the most profitable opportunities for natural gas generation.

Figure 24: Locational Marginal Price and Spark Spreads, 2025-2030

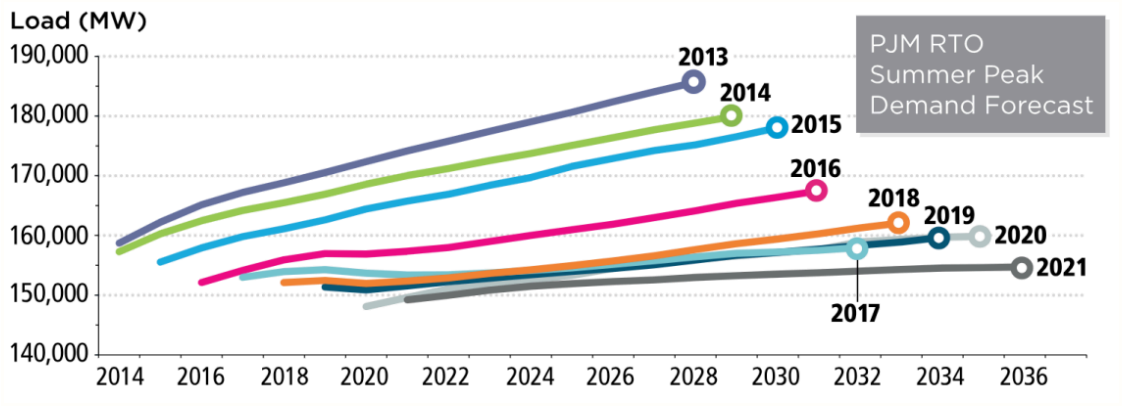


Source: Eneverus Intelligence Research

But, will the increase in electricity demand happen, at least to the degree forecast? Will demand for natural gas grow in proportion to the need for electricity? And, if the answer to both of those questions is "yes", will the resulting increase in natural gas production prove to be an economic boon or at least provide some benefit to Frackalachia?

The answer to the first question about electricity demand is that, while it will increase, it is unlikely to increase to the level forecast by PJM. PJM has a long history of overestimating demand.

Figure 25: PJM Load Growth Forecasts, 2014-2036



Source: PJM

That tendency may be exacerbated by other factors, including the double-counting by utilities of data center projects which developers explore with multiple utilities in order to accelerate construction timelines. At the same time, because of the sudden demand crunch, development costs are rapidly rising, which will force some

proposed projects from the market. Finally, data centers themselves are being forced by rising costs to become more energy efficient. They can do so by improving the energy efficiency of the buildings in which they are housed, the computer hardware they operate, and even the algorithms that they run. And the utilities that serve them can help by developing more flexible service models that enable them to shift electricity loads and optimize resources.

Source: Kleinman Center for Energy Policy[17]

Source: Gas Outlook[18]

The second question was whether demand for gas-fired power will grow in proportion to or even at a faster pace than overall demand for electricity. The answer to this question is political as much as it is economic. Were market forces left to their own devices, the PJM region like some other regions would be seeing increasing mitigation of demand growth by heightened efforts to improve energy efficiency combined with growing reliance on wind, solar, and battery resources, and greater reliance on demand-side resources, including distributed generation and storage.

Many of these trends are at work in Texas, where renewable energy and storage now meet more than a third of electricity demand, up from less than half that number just ten years ago. And, as renewable resources acquire a greater share of generation, utility rates in Texas are actually going down and are now more than 20% below those in Ohio, Pennsylvania, and West Virginia.

However, political opposition to transitioning the power system to renewables is strong in the Appalachian region. In addition to state subsidies that support reliance on natural gas and coal, the states of Ohio and West Virginia have erected barriers to energy efficiency programs thereby contributing simultaneously to higher electric bills and less economic development to which energy efficiency is a major contributor.

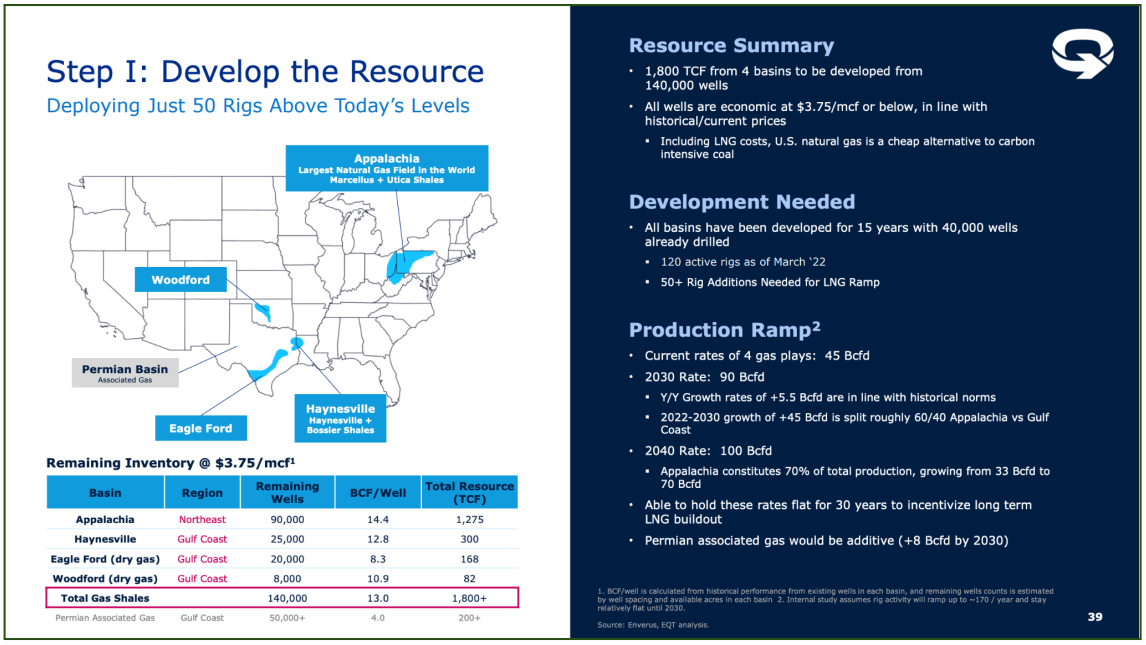
The final question was whether a data center-driven increase in demand for gas-fired power will result in more jobs and higher income. The answer is that it almost certainly would not. That's because, like the fracking industry, the power generation industry is one of the least labor-intensive sectors of the US economy. A typical 1,000 MW natural gas power plant employs on average about 30 people, which is not enough to make a significant economic difference in almost any county.

Indeed, multiple Frackalachian counties, including Guernsey County in Ohio and Westmoreland County in Pennsylvania, have seen the construction of new gas-fired power plants in recent years. And, as the data reported earlier show, neither county, despite the combined presence of increased natural gas production and new power plants, has experienced an uptick in employment or overall economic recovery.

In summary, stacking three non-labor-intensive industries - natural gas production, power plants, and data centers - on top of each other does not alter the underlying dynamic which ties them together. By requiring few workers and injecting very little of the revenue that they generate into local economies, they have little if any beneficial economic effect for host communities. And, if as appears likely, expectations of data center-driven demand for electricity are exaggerated, then we run the risk of worsening economic conditions by burdening ratepayers with the cost of facilities and power generating capacity that may ultimately not be utilized.

FRACKALACHIA AND UNLEASHED LNG

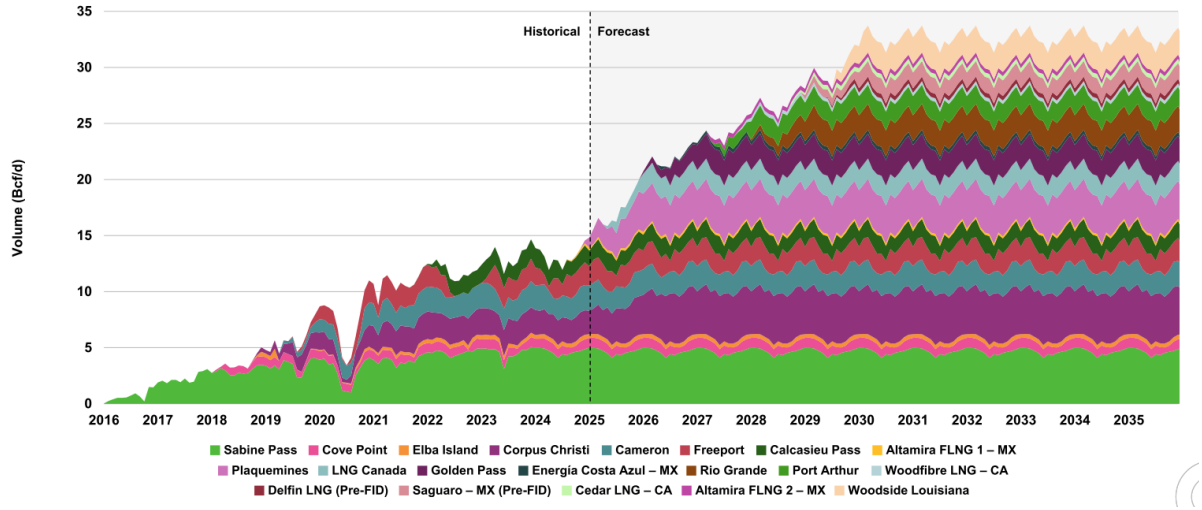
Toby Rice, the CEO of Appalachia-based natural gas producer EQT, is chief advocate of, using his term, "unleashing LNG".[19] Through dozens of media appearances - in person, online, on TV, and in print - Rice has promoted a vision in which liquified natural gas replaces coal globally and, in doing so, greatly reduces greenhouse gas emissions. By Rice's calculation, this transition could result in Appalachia more than doubling its production of natural gas.



The problem with Rice's vision is that it won't happen, nor should it. The plan would leave the world far short of the level of emission reduction it needs to achieve, raise costs both for energy and in the form of other burdens it would impose, and, with respect to the subject matter of this report, it would do little to benefit Appalachia economically and would likely cause significant economic damage.

In any case, Rice's vision is merely aspirational and a serious outlier among forecasts for the growth of LNG exports. Conventional forecasts suggest that LNG exports will roughly double in the next decade, an increase of about 16 to 17 billion cubic feet per day, which is less than half the figure suggested by Rice.

Figure 26: US LNG Exports (Bcf/d), 2016-2035

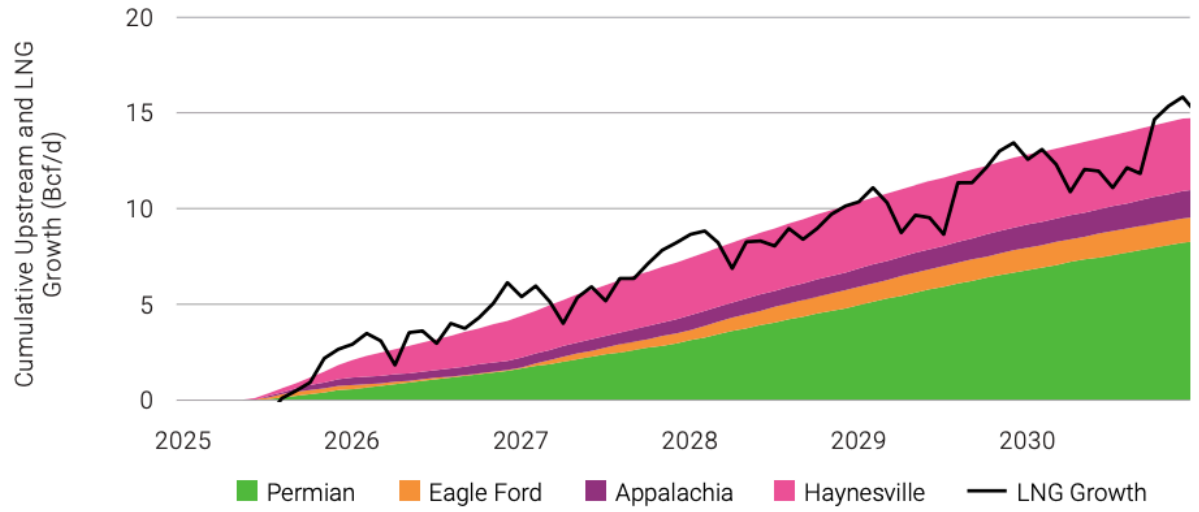


Source: Enverus Intelligence Research

It's also less than half the amount of gas already produced in Appalachia every day. Finally, a careful look at the legend on the preceding chart shows that nearly all US exports are expected to come from the southwest and Gulf Coast regions. So, while natural gas is a fungible commodity, the first beneficiaries of greater exports will be producers closer to the ports from which gas is being shipped.

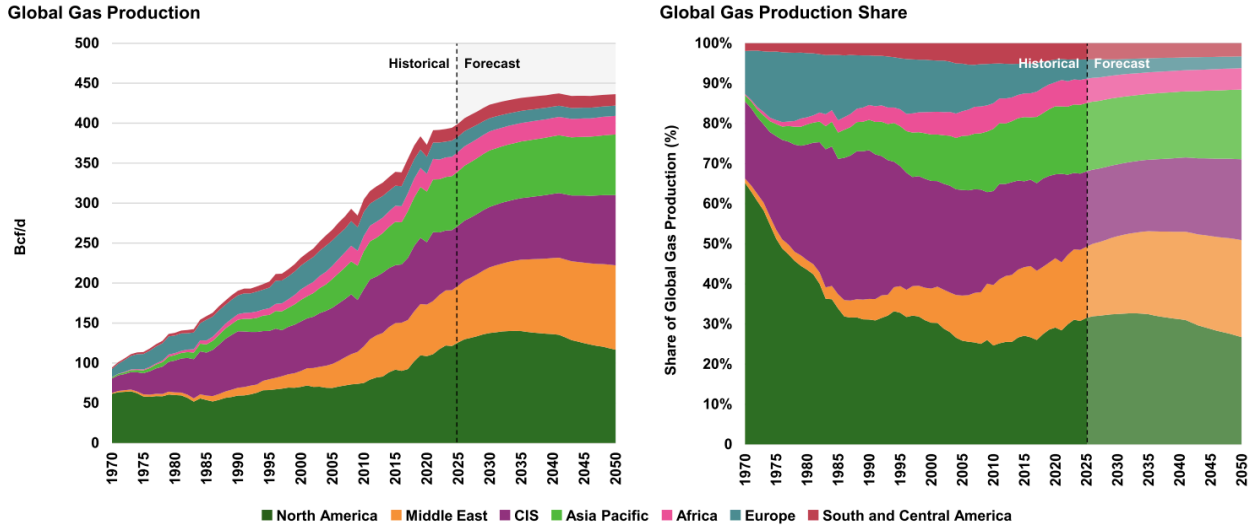
Another consideration not addressed by Rice is that other estimates see US gas production peaking in the next decade and most of the globe's incremental demand in the meantime being met by other regions of the country - the Permian and Haynesville basins in particular - and other nations, including Saudi Arabia and Qatar.

Figure 27: North American LNG Exports



Source: Enverus Intelligence Research

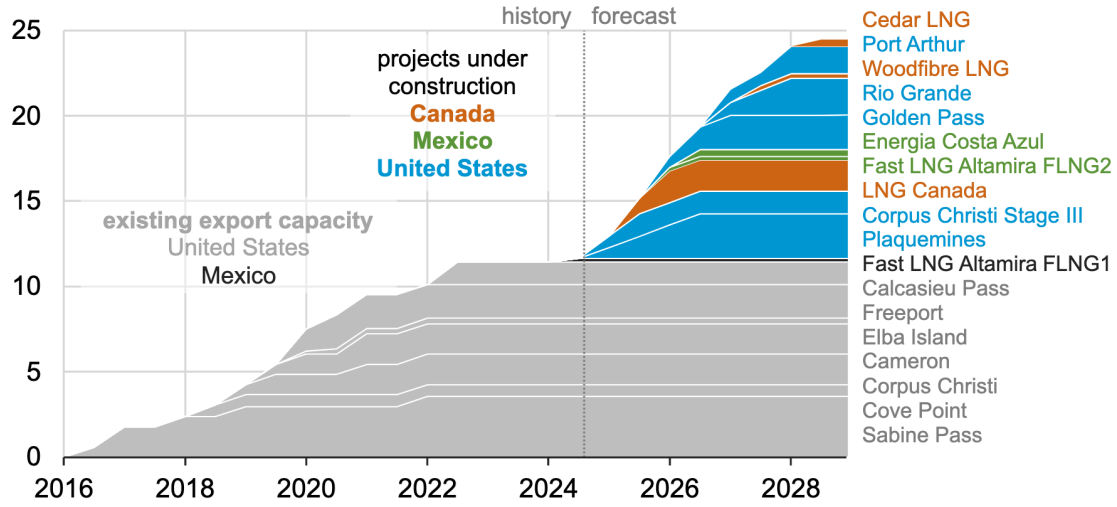
Figure 28: Global Gas Production and Share of Global Gas Production, 1970-2050



Source: Enverus Intelligence Research

Finally, it should be pointed out that these more sober expectations are in line with expectations from the Energy Information Administration[20].

Figure 29: North American LNG Export Capacity (Bcfd) by Project, 2016-2028



Source: US Energy Information Administration

The take-away is that, while LNG exports may result in some increase in Appalachian natural gas production, the increase is unlikely to be major. This is also reflected in EIA's Short-Term Energy Outlook, which over the next two years expects marketed natural gas production to grow by 7.5% in the Permian and Haynesville regions, but only by 0.5% in Appalachia.

Table 4: US Natural Gas Supply, Consumption, and Inventories

	2024				2025				2026				Year		
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	2024	2025	2026
Supply (billion cubic feet per day)															
U.S. total marketed natural gas production	**113.3**	**112.1**	**113.1**	**114.2**	**115.6**	**116.7**	**115.7**	**115.5**	**115.2**	**116.3**	**116.6**	**117.3**	**113.2**	**115.9**	**116.3**
Alaska	1.1	1.0	0.9	1.0	1.1	1.0	0.9	1.0	1.0	1.0	0.9	1.0	1.0	1.0	1.0
Federal Gulf of America (a)	1.8	1.8	1.8	1.8	1.8	1.8	1.7	1.7	1.8	1.8	1.6	1.6	1.8	1.8	1.7
Lower 48 States (excl GOA) (b)	110.4	109.3	110.4	111.4	112.7	113.9	113.1	112.7	112.3	113.6	114.1	114.6	110.4	113.1	113.7
Appalachia region	35.9	34.9	35.5	35.9	36.4	36.6	35.9	35.9	36.6	36.9	36.5	36.4	35.6	36.2	36.6
Bakken region	3.2	3.4	3.4	3.3	3.1	3.2	3.3	3.3	3.2	3.2	3.3	3.2	3.3	3.2	3.2
Eagle Ford region	6.8	6.8	6.7	6.6	6.3	6.3	6.2	6.2	6.0	6.1	6.1	6.1	6.7	6.3	6.1
Haynesville region	15.8	14.3	14.3	13.9	15.1	15.6	15.3	15.0	14.8	15.5	16.7	17.6	14.6	15.2	16.2
Permian region	23.8	24.5	26.3	27.0	25.8	27.4	27.8	27.9	27.7	28.0	28.0	27.8	25.4	27.2	27.9
Rest of Lower 48 States	24.9	25.2	24.2	24.7	26.0	24.9	24.6	24.4	24.0	23.7	23.6	23.6	24.8	25.0	23.7

Source: US Energy Information Administration[21]

If these forecasts are accurate, LNG exports are unlikely to have a major impact on Appalachian production and, therefore, little impact on the economics of the region. Appalachian Gas industry leaders would like that to not be the case and they are pinning their hopes for a greater role on proposed expansions of pipeline capacity to the eastern seaboard and Gulf Coast. But the economics are daunting.

CONCLUSION

For more than 15 years, the natural gas industry has been touted as an "economic game-changer" for Appalachia. In response to that billing, policymakers in the federal government as well as state and local governments have arranged tax breaks, adopted industry-friendly regulations, and given grants to gas producers as well as to downstream industries, including petrochemicals, plastics, and hydrogen. Now, with the advent of artificial intelligence, the proliferation of data centers, and the promise of new export markets for liquified natural gas, they

continue to do the same, still in thrall to the belief that, if it expands markets for Appalachian natural gas, it must be good.

However, the data incontrovertibly say otherwise. The numbers tell us that wherever natural gas is produced, economic conditions as measured by jobs, income, and population remain stagnant or deteriorate. Moreover, they tell us the reasons for this outcome lie in the nature of the gas industry and its downstream industries. They are highly capital-intensive and non-labor-intensive enterprises that employ few workers, especially locally, and while they may generate large amounts of income, little of it is injected into local economies. Instead, the bulk of the money invested and earned goes to shareholders, investors, and suppliers, nearly all of whom live someplace other than where the gas, the plastics, the hydrogen, or the data processing are produced.

Even the huge amount of investment these industries require — and would ostensibly bring to the region — is dissipated by the fact that most of it goes to the purchase of goods and services elsewhere. And, of the comparatively small portions that do stay in the region to pay construction workers during the period in which large facilities are being built, the jobs they provide are temporary, rarely lasting for more than a year or two. So, as we have unhappily observed in the case of the Shell Petrochemical Complex in Beaver County, Pennsylvania, once construction is complete, jobs numbers quickly revert to their pre-project levels or, as in the case of Beaver County, they get even worse.

Meanwhile, some policymakers' obsession with supporting these star-crossed industries blinds them both to the damage being done and, as importantly, to opportunities to pursue other, more viable and effective economic development strategies. Organizations such as JobsOhio, the Pennsylvania Department of Economic and Community Development, and the West Virginia Economic Development Authority squander hundreds of millions of dollars and untold labor hours pursuing and assisting projects and enterprises that are gloriously branded "The Shale Crescent", "The Appalachian Clean Hydrogen Hub", "The Tri-State Carbon Capture Hub", and "The Appalachian Storage Hub", which either never come to fruition or, if they do come to fruition, it's in an attenuated form that provides little or no economic benefit to the region.

Still, each of these, in its time, served as a shiny object that reflected back to policymakers their dreams of economic recovery in a region that has seen little of it over the past half-century. Now, we are dazzled by data centers and LNG exports and all that we are told they promise. And yet, if we examine them critically, we see the same flaws that rendered the natural gas boom and all of its descendant industries almost valueless for Frackalachia. That means, it doesn't matter whether data centers and LNG exports flourish or fail. It doesn't even matter if they produce impressive edifices such as the Shell Petrochemical Complex or the Guernsey Power Station, or, whether, like the PTT cracker in Belmont County, Ohio or the Project ASCEND cracker in Wood County, West Virginia, they never come into being except in Powerpoint presentations. Either way, their economic struggles are likely to continue..

In contrast to these outcomes, the Ohio River Valley Institute and others propose alternative economic development strategies that have genuine promise. But policymakers often respond with polite but patronizing indifference or, in some cases, outright hostility, when they see in the suggested alternatives threats to the industries whose interests they have concluded are identical with the public interest. At times, policymakers' identification of particular industries interests with the public interest can lead to bizarre and even absurd statements, such as when a Pennsylvania state legislator recently railed in opposition to a bill that he argued would undercut the state's ability to land major petrochemical projects such as one in his home county . . . except that the project to which he was referring doesn't actually exist. The only existence it enjoys is in Powerpoint slides from its sponsor, an undercapitalized, largely notional company based in Texas that has so far announced and failed to build at least four multi-billion dollar petrochemical complexes in three different states. In fact, the company has never managed to build or operate a major industrial facility anywhere.

Sadly, that situation isn't an outlier. There are literally dozens of proposed natural gas and petrochemical-related projects, which have captured policymakers' imaginations and often public funds as well, but which have not and probably won't ever be realized because their business plans or backers are financially or economically unsound. Still, even in their spectre-like states of being, they hold more sway over many policymakers than better and viable strategies grounded in different industries with which policymakers lack the affinity they feel for natural gas.

Both problems - policymakers' slavish devotion to the gas industry and its descendants and their aversion to ideas and strategies that aren't familiar - can only be overcome by constant education that forces them to recognize and come to terms with the economic realities of various industries as well as those of their constituents and communities. Hopefully, this report will contribute to that effort.

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