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Pennsylvania's Shrinking Economic Fossil Fuel Footprint Leaves a Widening Fiscal Gap

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Key Findings

Pennsylvania's budget deficit will widen as state spending outpaces tax receipt growth.

The largest economic contributions from the state's coal industry, its petrochemical sector, and its natural gas business are several years in the rearview.

Tax credits that are 26 times the size of effective tax rates on the fossil fuel industry are adding fuel to the fire.

The state's tax policy toward natural resource extraction should be revised to align industry contributions with policy goals.

Executive Summary

Pennsylvania's budget is heading towards a crisis. The state's expanding deficit is unabated as projected spending is growing at twice the pace of tax receipts. The fossil fuel industry's structural decline and the state's prior decisions to forego adequate tax revenue from the sector are important contributors to the state's fiscal problems.

Pennsylvania's Independent Fiscal Office (IFO) February 2026 Budget Brief noted that the Fiscal Year 2025-26 General Fund deficit was estimated to rise to $3.9 billion before climbing to $6.7 billion in FY2026-27 (see Table 1). Before FY2018-19, the state's revenue was growing faster than spending. But these patterns have reversed in recent years, and the condition is projected to worsen over the next two fiscal years.

Table 1: Pennsylvania General Fund Revenue and Spending ($ Billion)

Fiscal Year	Gross Revenue	Refunds +Lapses	Net Revenue	Spending	Surplus-Deficit	General Fund	Rainy Day Fund
13–14	28.61	(0.68)	27.93	(28.40)	(0.47)	0.08	-
14–15	30.59	(1.25)	29.34	(29.15)	0.19	0.27	-
15–16	30.90	(1.03)	29.87	(30.13)	(0.25)	-	-
16–17	31.67	(1.27)	30.40	(31.94)	(1.54)	(1.54)	-
17–18	34.57	(1.05)	33.52	(31.95)	1.57	0.02	0.02
18–19	34.86	(1.11)	33.75	(33.40)	0.35	-	0.34
19–20	32.28	(0.95)	31.33	(34.09)	(2.76)	(2.73)	0.34
20–21	40.39	(1.04)	39.35	(34.01)	5.34	-	2.87
21–22	48.13	(1.15)	46.98	(39.35)	7.63	5.54	4.97
22–23	44.92	(0.68)	44.24	(40.80)	3.44	8.08	6.03
23–24	45.47	(1.40)	44.07	(44.86)	(0.79)	6.63	6.99
24–25	46.41	(1.14)	45.27	(47.82)	(2.55)	4.16	7.40
25–26	48.32	(1.70)	46.62	(50.54)	(3.93)	0.26	7.83
26–27	48.93	(2.15)	46.78	(53.49)	(6.71)	-	1.44
Average Annual Growth Rates							
FY2014 to FY2019			3.90%	3.30%			
FY2020 to FY2024			5.50%	6.10%			
FY2025 to FY2027			2.80%	6.10%			
Note: FY2025–2026 and FY2026–2027 are estimates							

Source: Independent Fiscal Office Budget Brief, February 2026.

Pennsylvania's officials have plotted a course for the state's spending that will wipe out its General Fund surplus balance and will severely deplete its Rainy-Day Fund (RDF). The IFO has estimated the RDF surplus will drop from $7.8 billion in FY2025-26 to $1.4 billion by the end of FY2026-27. During this time, IFO predicts spending will grow twice as fast as revenue.

This paper offers a pragmatic view of the role of fossil fuels in the modern Pennsylvania economy. We find the industry provides only a small—and declining—contribution to the state's economic and fiscal standing.

Compared with peer fossil fuel-producing jurisdictions such as Texas, Pennsylvania has failed to capitalize on its producers' private gains. As the natural gas boom from more than a decade ago recedes, employment in fossil fuel extraction and petrochemicals production is faltering.

Future extraction employment faces structural headwinds in a rapidly changing economy. Pennsylvania was a pioneer in American industrialization, in the dawn of the oil age, and in the fracking revolution. But the narrative that fossil fuels are a bedrock of the commonwealth's modern economy—one that policymakers and industry interests have long advanced—is not backed up by the data.

As the Pennsylvania legislature considers options to raise revenue and manage its deficit, the state's application of its taxing authority to natural resources should be a part of the discussion. Further, the ill-advised logic promoted to subsidize the construction and operation of the state's first ethane cracker is a harbinger of arguments claiming "we have abundant cheap natural gas" to justify future development and subsidies using public monies, rather than transparent, peer-reviewed economic analysis. These arguments should be met with healthy skepticism.

Peer Comparison of Natural Resource Tax Revenues

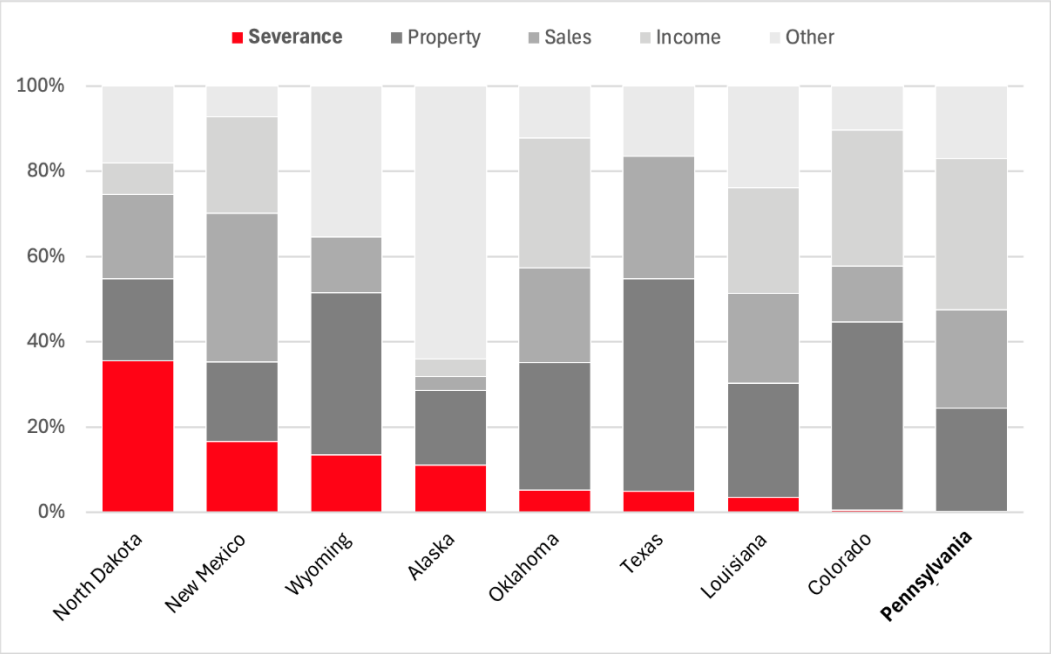
Pennsylvania's Underwhelming Tax Receipts

Observing how natural gas production is taxed sheds light on the issue—Pennsylvania, the nation's second-largest producer of natural gas, is not receiving much wealth from the resources extracted from its land.

Figure 1 shows that Pennsylvania has ample room to increase taxes on natural gas producers if the state used a different valuation method for natural gas extraction. We will explore the components that explain why taxing the well rather than production was a poor choice. The main idea for now is that Pennsylvania officials chose not to follow industry norms for taxing the oil and gas industry.

The fees and levies charged by Pennsylvania appear overly generous compared to the effective rates paid by other oil and gas-producing states. Currently, the fees that Pennsylvania producers pay on natural gas extraction are an immaterial portion of the state's budget. As a percentage of total state taxes, Pennsylvania's Impact Fees (levied just on horizontally drilled natural gas wells) are 0.3% of state tax revenues—a pittance of what other states collect from their oil and gas producers.

Figure 1: Major Sources of State Tax Receipts for FY2024



Source: IEEFA calculations from FY2024 Annual Comprehensive Financial Reports of ND, NM, WY, AK, OK, TX, LA, CO, PA and Pennsylvania Public Utility Commission.

State severance taxes for oil and gas production (and coal in Wyoming and North Dakota) in fiscal year 2024 were:

- Texas, $8.1 billion
- North Dakota, $3.1 billion
- New Mexico, $2 billion
- Alaska, $1.1 billion
- Oklahoma, $883 million
- Louisiana, $841 million
- Wyoming, $729 million

- Colorado, $186 million

The corresponding impact fees reported in Pennsylvania, $164.5 million from its producing wells in FY2024, were $22 million less than the revenues of its smallest peer, Colorado. Pennsylvania is inferior in levying and collecting taxes on natural resources, on both a relative and absolute basis.

Relative Structural Taxing Deficit – Effective Tax Rate Comparison

Unlike most oil and gas-producing states, Pennsylvania has no severance tax (i.e., a tax on the value of extracted natural resources based on prevailing commodity prices) on natural gas production. Instead, the state levies an impact fee that assesses a value per well over a 15-year period, where the assessed well value for tax purposes diminishes each year. To summarize, Pennsylvania's tax calculation depends on the average annual price of natural gas and the age of the well to compute the fee per gas well in Pennsylvania; other states tax the value of production from all producing wells.

In the following example (Table 2), Texas and Pennsylvania's natural gas production data (for calendar years 2014 to 2024, as reported by the Energy Information Administration) and natural gas tax collections (for fiscal years 2015 to 2025) are tallied. Natural gas production in Texas was 1.4 times than in Pennsylvania, but revenue from natural gas production taxes was 9.3 times greater.

Table 2: Texas Severance Tax Compared to Pennsylvania Impact Fee

Description	Texas	Pennsylvania
CY2014 to CY2024 Marketed Natural Gas Production (million cubic feet)	101,797	70,240
FY2015 to FY2025 Tax Revenue from Natural Gas Production ($ million)	$20,886	$2,250
Effective Tax Rate per thousand cubic feet of natural gas	**$0.21**	**$0.03**

Source: EIA, Texas Comptroller of Public Accounts, Pennsylvania Public Utility Commission.

Dividing the total severance taxes (or impact fees) by their respective marketed production levels yields an average effective tax rate imposed by Texas and Pennsylvania on a per unit of natural gas produced. Texas has charged $0.17 per million cubic feet (mcf) more than Pennsylvania over the last 10 years. The difference between the two states is staggering; if

Pennsylvania had applied an equivalent effective tax rate to Texas, its coffers would have benefited by an additional $12.2 billion over the same period.

We recently wrote about how the Railroad Commission of Texas is spending more money to plug abandoned oil and gas wells and mitigate environmental damage.[1] Pennsylvania faces similarly escalating well-plugging liabilities, but any backstop to the mandated funds for plugging orphaned wells is shrinking as the effective tax on producing natural gas wells (due to its chosen taxing formula) is getting progressively smaller. So, Pennsylvania is falling further behind in its purpose of collecting impact fee funds "to cover the local impacts of drilling" with each successive year.[2]

The folly of Pennsylvania's impact-fee tax formula is highlighted by the decline in tax revenue even as natural gas production increased. Producer impact fees in 2014 were $223.5 million from wells producing about 4.1 trillion cubic feet of dry natural gas.[3] A decade later, with annual production having grown to 7.4 trillion cubic feet of dry natural gas, the state's impact fees in 2024 were just $164.5 million, a drop of about $58 million in taxes on an additional 3.0 trillion cubic feet produced.[4],[5] To summarize: Pennsylvania received 26% less in taxes after an 80% increase in production volume.

The story is similar on a per-well basis. In 2011 (the first year of the impact fee), 4,333 wells charged an impact fee, averaging $47,129. The impact fees in 2024 averaged $13,563 for the 12,135 wells taxed that year, marking a 71% drop in the tax rate per well while the number of wells taxed increased nearly threefold since the impact fee was initiated. Because the average taxed amount per well is shrinking over time, the impact fee taxing formula was intentionally designed to favor the natural gas industry, rather than the public it is supposed to protect.[6]

Reverse Taxing on Steroids

About 15 to 20 years ago, as the shale revolution was taking hold in Pennsylvania, officials responsible for economic development began pushing the idea that marrying plastics manufacturing with the already growing supply of natural gas and natural gas liquids would be a win for local economic activity and a win for the company that built the first ethane cracker in the

[1] IEEFA. Liability for Texas Orphan Wells Soars as Numbers, Depths, and Costs Rise Sharply. May 19, 2026.
[2] Pennsylvania Public Utility Commission. Act 13 Impact Fee.
[3] Pennsylvania Public Utility Commission. PUC Posts Details on $223.5 Million in Gas Drilling Impact Fee Disbursements for 2014. June 10, 2025.
[4] Pennsylvania Public Utility Commission. PUC Announces $164.5 Million in Natural Gas Impact Fees for Pennsylvania Communities. June 23, 2025.
[5] Pennsylvania Department of Environmental Protection. Dry Gas Production Volumes.
[6] Pennsylvania Public Utility Commission. Producer Impact Fee Report.

region. They envisioned creating a petrochemical corridor that rivaled what already exists along the Gulf Coast in Texas and Louisiana.

Officials reasoned a large tax credit on ethane consumption would "assure that all facets of the petrochemical supply chain would remain in PA."[7] So, the state legislature crafted a law that incentivized the construction and operation of a petrochemical complex by offering tax credits based on the plant's feedstock consumption, specifically with a $0.05 per gallon tax credit on ethane used in the plant if certain criteria were met.[8]

Shell took them up on their offer, reaching a final investment decision (FID) in 2016 and completing construction of their Beaver County, Penn., plant in 2022, both late and likely over budget. An IEEFA analysis focused on the expanding financial risks Shell Polymers Monaca faced during construction.[9] There were several headwinds pressuring the plastics industry that Shell ignored when they decided to build this plant. IEEFA projected that the project's construction costs were likely much greater than proposed and viewed Shell's outlook for its outputs (polyethylene and plastic resin pellets) as unfavorable. The marketplace had indicators suggesting Shell was facing weaker demand and lower prices due to slowing economic activity and industry-wide plastics overcapacity, with the timing pointing to a slump when the plant was scheduled to commence operations.

IEEFA was concerned that Pennsylvania had incentivized this project with more than $1 billion dollars in tax credits and suspected that the likelihood the people of the commonwealth would ever see economic benefits flowing back to the community was almost zero. Another IEEFA analysis conducted after Shell Polymers Monaca became operational highlighted the recent poor financial performance of Shell's entire Chemical Division, and the concern that Shell Polymers Monaca is destroying value for the division and the entire company.[10]

Shell has said it cannot operate its Pennsylvania complex at satisfactorily profitable levels since operations commenced in late 2022. The poor performance at the plant has prompted Shell to seek a buyer or large investor to reduce its exposure to dilutive operating margins in its overall financials and lower its risk profile.[11] The plant's poor financial performance has also caused workers at Shell Polymers Monaca to worry about their long-term job prospects.[12]

[7] Pennsylvania Senate. GOP Notes on PA Resource Manufacturing Tax Credit. June 28, 2013
[8] Pennsylvania House of Representatives. House Committee on Appropriations Fiscal Note. June 29, 2012.
[9] IEEFA. Shell's Pennsylvania Petrochemical Complex: Financial Risks and a Weak Outlook. June 4, 2020.
[10] IEEFA. Shell's Petrochemical Problem in Pennsylvania. October 1, 2025.
[11] WPXI. Shell Exploring Sale of Chemical Assets Including Plant in Beaver County. March 5, 2025.
[12] The Times. Shell's $14B PA Plant Struggles, Seeks Buyer Amid Job, Profit Concerns. February 18, 2026.

Now that the actual underperformance of Shell's petrochemical complex in Pennsylvania is uncontestable, we can establish whether our hyperbole that this tax credit is an example of "reverse taxing on steroids" is justified.

We believe any conclusion depends on comparing what was given away to lure industry with how the industry is taxed.

First, take the tax credit of $0.05 per gallon of ethane consumed by Shell at its petrochemical plant. Using a small unit of measurement—gallons—when the plant's capacity is typically reported in barrels diminishes perceptions by a factor of 42 (i.e., there are 42 gallons per barrel). **Reported in barrels, the ethane tax credit is $2.10 per barrel.**

Ethane has a larger heat content than methane (i.e., natural gas). And ethane is a byproduct of the natural gas production stream. It can either be separated and sold as a natural gas liquid or rejected and absorbed for sale as natural gas. So, we can get an apples-to-apples comparison between the ethane tax credit and the impact fee paid by natural gas producers on an effective rate per unit produced by considering both relative to their measured heat content as a point of commonality.

The standardized heat content of ethane and natural gas (a.k.a., methane) is measured in British thermal units (BTUs). Further, we can use stoichiometry to quantitatively compare the taxes paid by industry with the tax credits granted to the industry on a per-unit basis. We previously computed that oil and **gas producers were paying an effective tax of $0.03 per mcf** on average for natural gas in Pennsylvania based on dividing actual taxes paid for producing wells by actual production from those wells over the past decade. This will serve as our yardstick comparison of ethane tax credits awarded to Shell Polymers Monaca.

The conversion factors are:[13]
MMBtu per mcf of natural gas is 1.036
MMBtu per barrel of ethane is 2.783
1 barrel = 42 gallons
Tax credit is $0.05 per gallon = $2.10 per barrel (42 gallons)

Computations:
$2.10 per barrel divided by 2.783 MMBtu/barrel = $0.755 per MMBtu
$0.755 MMBtu times 1.036 MMBtu/mcf = **$0.78 per mcf**

[13] Energy Information Administration. Monthly Energy Review, Appendix A. April 2026.

Dividing the equivalent $0.78 per mcf tax credit by our computed effective tax rate of $0.03 per mcf illustrates that the state of **Pennsylvania is awarding a tax credit that is 26x larger than what it levies against the industry!**

In late May 2026, the July 2026 Henry Hub futures contract was $3.02 per MMBtu, or $3.13 per mcf. So, Pennsylvania is currently giving Shell a tax credit worth about 25% of the cost of one unit of natural gas sold. Conversely, Pennsylvania is effectively charging about 1.0% taxes on each unit of natural gas produced. From this perspective, we can clearly see how generous the state of Pennsylvania is toward petrochemical manufacturing, based on the excessive tax credit granted to Shell.

Structurally Challenged Environment

An Aging Population and Workforce

A March 2026 press release from the governor's office that boasted, "Pennsylvania One of the Top Three States for Job Growth in 2025" suggested the state is on a solid economic path.[14] But the job growth the state experienced, which in the prior year exceeded the national average, needs context and significant warnings about Pennsylvania's economic outlook.

Chiefly, the state's population growth is weakened by an older-than-average population, where death rates exceed birth rates, according to Pennsylvania's IFO.[15] The IFO predicts the "natural" decrease in population will overwhelm net migration into the state over the coming decade, leading to a decline in the state's population.

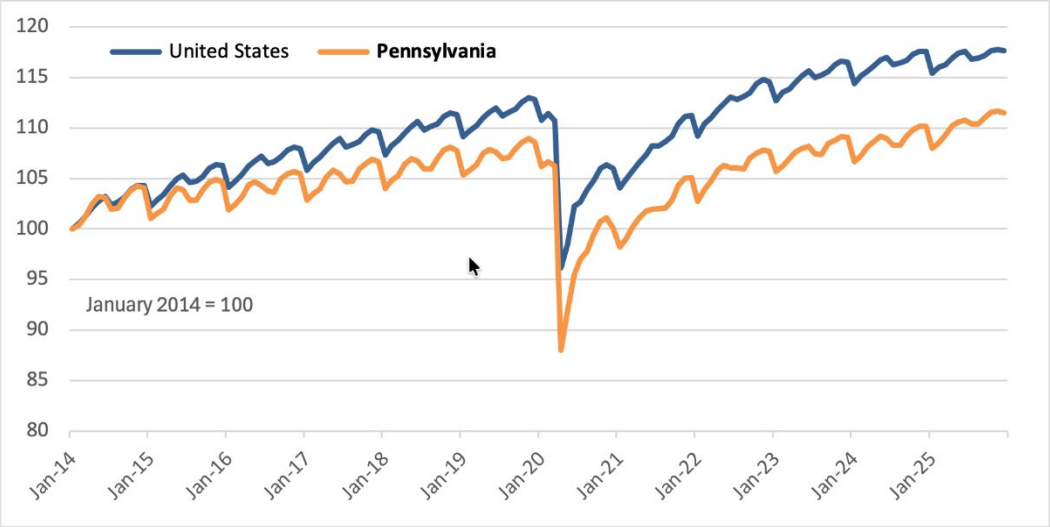
Additionally, the age disparity between Pennsylvania and the national average, with Pennsylvania being about two years older, reduces the state's labor participation rate, which ranks 33rd in the nation.[16] In December 2025, Pennsylvania's labor force participation rate was 61.6%, lagging the national rate of 62.4% by about 80 basis points. The state's contraction of its working-age population also does not help matters.[17]

The long-term trend in job growth is different from Pennsylvania's experience in 2025. The state's employment (see Figure 2) lags the national growth figure. National nonfarm payrolls

[14] Pennsylvania.GOV. Pennsylvania One of the Top Three States for Job Growth in 2025 Thanks to Shapiro Administration's Efforts to Bring Economic Development to the Commonwealth. March 6, 2026.
[15] Independent Fiscal Office. Pennsylvania Demographic Outlook. October 2025.
[16] United States Congress - Joint Economic Committee. 2025 Joint Economic Report – Pennsylvania Employment Update. December 2025.
[17] *Ibid*.

have increased 17.6% since January 2014, far outpacing Pennsylvania's nonfarm payrolls, which have climbed only 11.4% over the same period.

Figure 2: Total Nonfarm Employment, Pennsylvania vs. United States (Not Seasonally Adjusted)



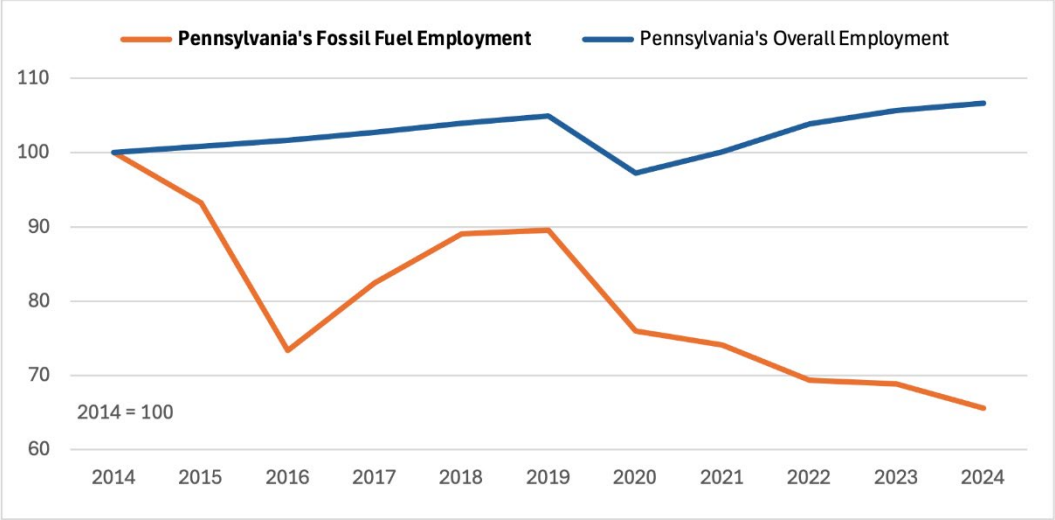
Source: Federal Reserve Bank of St. Louis (FRED).

The correlations between population growth, employment growth, and economic growth within any region are typically strong relationships. A shrinking population does not bode well for either its economy or its employment prospects. As we will show, employment in the fossil fuel industries is trending worse than the state's overall workforce.

Weakening and Shrinking Fossil Fuel Industry Employment

Pennsylvania's fossil fuel industries are shedding jobs, despite natural gas production gains from fracking in the Marcellus Shale. From 2014 to 2024, across the 22 industries that collectively represent direct employment for oil and gas, coal, and petrochemical industries (i.e., the fossil fuel industry), the number of workers dropped 34% from 66,000 to 44,000 in Pennsylvania. Meanwhile, the state's employment numbers climbed 7% over the 10-year period, rising from 5.6 million to 6 million employees (see Figure 3).

Figure 3: Pennsylvania's Fossil Fuel Industry and Overall Employment Comparison



Source: BLS QCEW for 22 NAICS codes: (211120 – Crude Petroleum Extraction ; 211130 – Natural Gas Extraction, 213111 – Drilling Oil and Gas Wells; 213112 – Support Activities for Oil and Gas Operations; 221210 – Natural Gas Distribution; 237120 – Oil and Gas Pipeline and Related Structures Construction; 324110 – Petroleum Refineries; 324191 – Petroleum Lubricating Oil and Grease Manufacturing; 325211 – Plastics Material and Resin Manufacturing; 333132 – Oil and Gas Field Machinery and Equipment Manufacturing; 424710 – Petroleum Bulk Stations and Terminals; 424720 – Petroleum and Petroleum Products Merchant Wholesalers (except Bulk Stations and Terminals); 486110 – Pipeline Transportation of Crude Oil; 486210 – Pipeline Transportation of Natural Gas; 486110 – Pipeline Transportation of Refined Petroleum Products; 212114 – Surface Coal Mining, 212115 – Underground Coal Mining; 213113 – Support Activities for Coal Mining; 324199 – All Other Petroleum and Coal Products; 333131 – Mining Machinery and Equipment Manufacturing; 423520 – Coal and Other Mineral and Ore Merchant Wholesalers.

Pennsylvania's fossil fuel employment is lagging the national average, which is also facing a long-term decline. Nationally, fossil fuel employment has dropped 20% since 2014 (see Figure 4), driven by a structural decline in oil and gas jobs. More than a decade ago, it was becoming apparent that the shale boom would not translate into employment growth in most states, including Pennsylvania.[18]

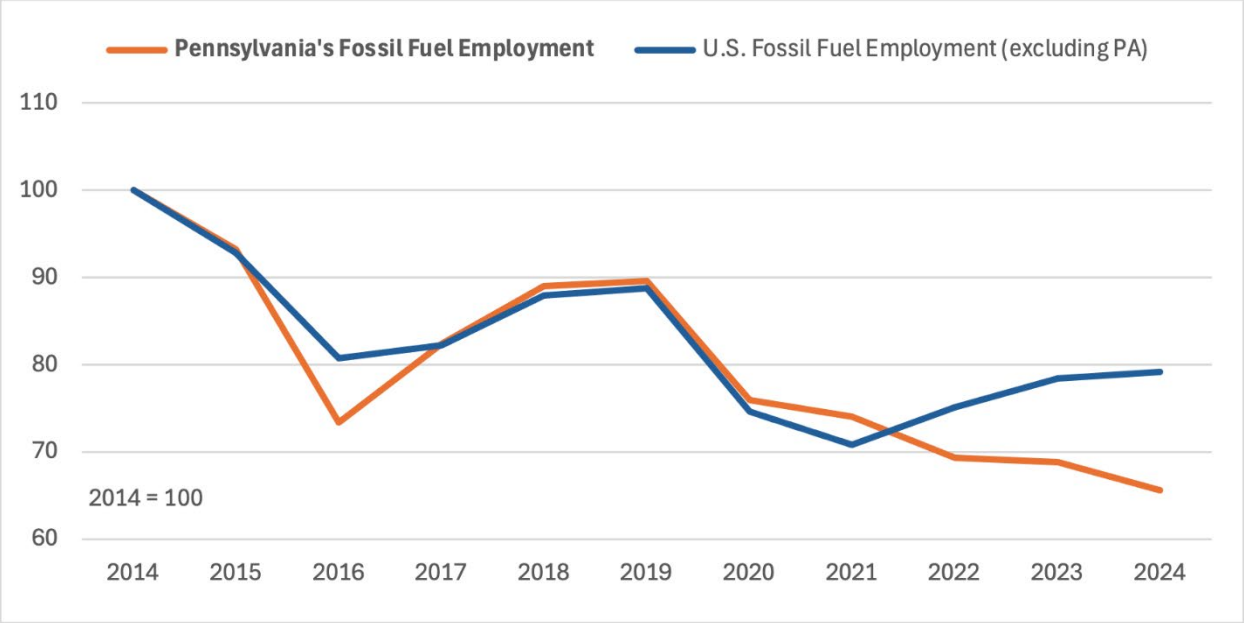
Besides being a capital-intensive process (i.e., higher fixed costs with reliance on equipment favored over labor), efficiency gains are resulting in higher production levels in both upstream and downstream operations derived from fewer workers per unit (see section "**Segmented fossil fuel industry employment in Pennsylvania**," discussed later in this report). And Pennsylvania's worsening fossil fuel employment picture relative to national trends is a recent phenomenon.

Before the COVID-19 pandemic, state and national employment figures in the fossil fuel industry were similar. The post-pandemic decline is likely a function of how the natural gas business has performed relative to the oil industry. Pennsylvania's hydrocarbon production is almost entirely natural gas, but the state is not located near a natural gas export hub. As a result, Pennsylvania

[18] The Conversation. The False Promise of Fracking and Local Jobs. January 27, 2015.

has not benefited as much from the Ukraine/Russia supply shock or the Iran war as Gulf Coast producers.

Figure 4: Pennsylvania's Fossil Fuel Employment vs. US Fossil Fuel Employment*



Source: BLS QCEW for 22 NAICS codes: (211120 – Crude Petroleum Extraction ; 211130 – Natural Gas Extraction, 213111 – Drilling Oil and Gas Wells; 213112 – Support Activities for Oil and Gas Operations; 221210 – Natural Gas Distribution; 237120 – Oil and Gas Pipeline and Related Structures Construction; 324110 – Petroleum Refineries; 324191 – Petroleum Lubricating Oil and Grease Manufacturing; 325211 – Plastics Material and Resin Manufacturing; 333132 – Oil and Gas Field Machinery and Equipment Manufacturing; 424710 – Petroleum Bulk Stations and Terminals; 424720 – Petroleum and Petroleum Products Merchant Wholesalers (except Bulk Stations and Terminals); 486110 – Pipeline Transportation of Crude Oil; 486210 – Pipeline Transportation of Natural Gas; 486110 – Pipeline Transportation of Refined Petroleum Products; 212114 – Surface Coal Mining, 212115 – Underground Coal Mining; 213113 – Support Activities for Coal Mining; 324199 – All Other Petroleum and Coal Products; 333131 – Mining Machinery and Equipment Manufacturing; 423520 – Coal and Other Mineral and Ore Merchant Wholesalers.
**US employment figures exclude Pennsylvania.*

Segmented Fossil Fuel Employment Losses in Pennsylvania

Bureau of Labor Statistics' (BLS) Quarterly Census of Employment and Wages (QCEW) data shows that Pennsylvania's fossil fuel industry accounted for 43,927 jobs, less than 1% of the state's 6 million workers in 2024. Dividing the fossil fuel industry into three segments:

- The largest component is oil and gas employment. It totaled 21,670 jobs but only accounts for 0.36% of the state's workforce.
- The next-largest segment, petroleum and petrochemical manufacturing, claimed 14,766 jobs or 0.25% of the state's workforce.
- Coal jobs account for just 6,861 or 0.11% of all Pennsylvania jobs.

Each segment is smaller than it was 10 years ago and quite small compared to the state's overall workforce.

Notice that coal's employment levels have been hardest hit, with absolute employment down about 48% from 13,000 to less than 7,000 jobs over the decade. The decline in coal employment is caused by a simple fact: Pennsylvania's coal is no longer economical in many settings.

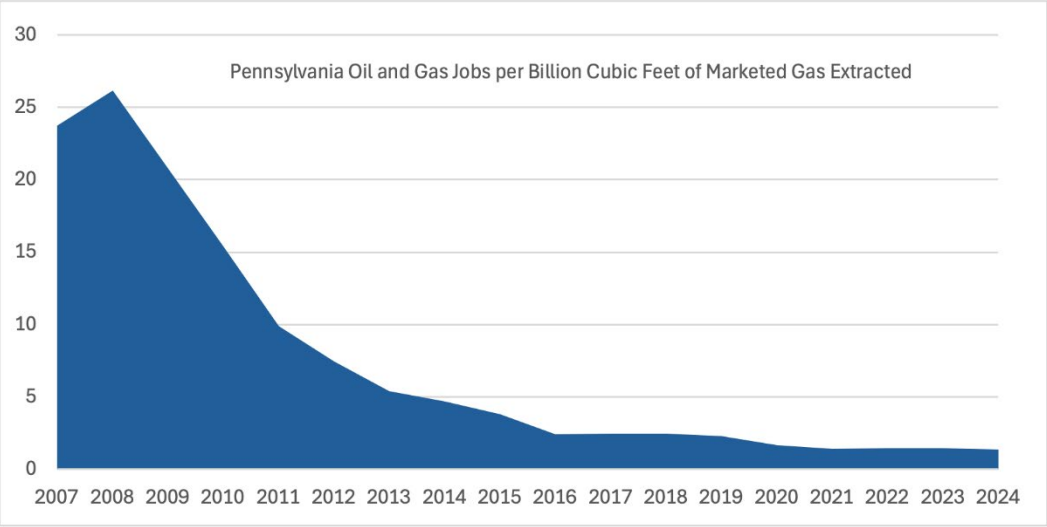
The state's coal consumption has fallen by some 49% since 2000. Capacity factors at Pennsylvania coal power plants have declined. Facility closures have continued.[19] Out-of-state coal exports (both domestic and foreign) have declined by about 45% over almost the same period, reflecting a market shift far beyond Pennsylvania's borders.[20] The retirement of aged plants, new air pollution protections, the expansion and substitution of renewable energy, and a rapid increase in natural gas supplies due to the fracking revolution have all reduced demand for coal. The result has been a decline in domestic coal consumption as the entire industry has grown less competitive.

As the fracking revolution took off, industry advocates promised that natural gas would be a different story, defining it by a popular slogan, "Drill = Jobs."[21] One estimate found that fracking could create more than 200,000 new jobs over the coming decade.[22] The reality, however, has been less direct upstream employment today than 10 years ago. Although the rapid expansion of the Marcellus shale initially boosted upstream oil and gas employment, these jobs were cyclical and only sustainable in the short term. The promised economic value creation for years

[19] IEEFA. Private Equity's Losing Bet on PJM Coal Plants. June 2022.
[20] IEEFA. Nowhere To Go but Down for U.S. Coal Capacity, Generation. October 2024.
[21] KPEL. Landry Responds to Obama's Jobs Speech. September 11, 2011.
[22] The Conversation. The False Promise of Fracking and Local Jobs. January 2015. (Quoting an industry promise that "[t]he safe and steady development of clean-burning natural gas in Pennsylvania's portion of the Marcellus Shale has the potential to create an additional 212,000 new jobs over the next 10 years on top of the thousands already being generated all across the Commonwealth")

to come (due to fracking) has proven fleeting, especially in terms of employment.[23] Oil and gas employment (i.e., upstream and midstream occupations) in Pennsylvania has fallen almost as hard as coal, despite the rapid expansion in natural gas production. Pennsylvania moved from a negligible amount of natural gas produced a quarter-century ago to now being the nation's second-largest producer, trailing only Texas.[24]

Figure 5: Productivity Gains Have Dramatically Reduced Upstream Employment



Sources: EIA, BLS QCEW; IEEFA calculations. Jobs are in oil and gas extraction, drilling, and support activities for oil and gas operations.

Innovation accompanied the initial drilling and employment boom in the Marcellus Shale. But eventually, calls for capital discipline and infrastructure capacity constraints (i.e., pipeline flows out of the region) culminated in a plateau in gas production. Once fields were proven, companies sought deeper gains in efficiency, employing technological developments such as simultaneous completions and electric frack fleets that lowered producers' costs at the expense of labor demand. The dividends of this efficiency accrued in large part to shareholders and owners, as fracking is "highly capital-intensive and non-labor-intensive" in structure—in comparison to other industries, it requires a large investment but passes a uniquely small fraction back to local economies.[25] Illustrating the decoupling between gas production and employment in Pennsylvania, more than 15 workers in the extraction sector were required for one billion cubic feet (Bcf) of gas production in 2010; the figure today has fallen to 1.4 workers. Pennsylvania oil and gas employment, which peaked in 2014 at slightly more than 37,000 jobs, fell by almost 42% over the last decade to 21,670 in 2024. Although employment for oil and gas extraction and transportation (i.e., upstream and midstream employment) is three times the size

[23] *Ibid*.
[24] Energy Information Administration. Pennsylvania. Accessed May 26, 2026.
[25] Ohio River Valley Institute. Frackalachia Update 2025. July 2025.

of the coal industry's employment, it is still just a meager 0.4% of Pennsylvania's total employment. Put simply, more gas production has not meant more jobs.

The third component of the fossil fuel sector is petroleum and petrochemical manufacturing. Petrochemical and petroleum products manufacturing employment totaled 14,766 in 2024, down 6% from 15,681 workers in 2014. So, while more stable than oil and gas or coal, direct employment from petrochemicals has declined, and all three groups are suffering when compared to the state's average employment trends.

Small Contributions to State Income Taxes

Related to false axioms that upstream oil and gas, coal mining, and petrochemical sectors create jobs, another misleading narrative that stems from their job creation is that fossil fuel jobs contribute mightily to personal income taxes paid in the state. While true that fossil fuel jobs on average are higher paying than Pennsylvania's overall average annual wages of $71,731, the claim ignores how few jobs exist across the state.

BLS data shows the highest-paid group is in oil and gas extraction, averaging an annual salary of $143,741. We can derive the best-case scenario for the entire Pennsylvania fossil fuel industry to show how little it contributes to state income taxes. Multiplying our best-case wage average—$143,741—by 43,927 fossil fuel employees yields $6.3 billion. Total wages paid across all industries within the state during fiscal year 2024 were $431.8 billion. So in the best-case scenario, the contribution to the state is only 1.5% of total state wages.

Pennsylvania's FY2024 personal income tax collections totaled $17.9 billion, the largest component of the state's $45.5 billion General Fund taxes collected.[26] Applying the 1.5% wage participation rate we calculated to $17.9 billion in taxes collected implies $269 million in personal income taxes collected from fossil fuel industry workers. Again, however, we know the amount is lower since we assume the highest average wage was paid to all fossil fuel employees.

The fact that employment and income from all components of the fossil fuel industry are relatively small and steadily shrinking certainly calls into question the practicality of giving tax credits to the industry. Investing public money in fossil fuel projects and expecting economic growth as an outcome ignores both future risks and the industry's decline. A commonsense understanding is similar to the trend observed in annual impact fees, relative personal income taxes paid by fossil fuel industry employees in Pennsylvania are falling.

[26] Pennsylvania Department of Revenue. Revenue Department Releases Fiscal Year 2024-2025 Collections, Commonwealth Collects $321 Million More Than Anticipated. July 1, 2025.

Upstream Activity Will Likely Never Return to 2011 Levels

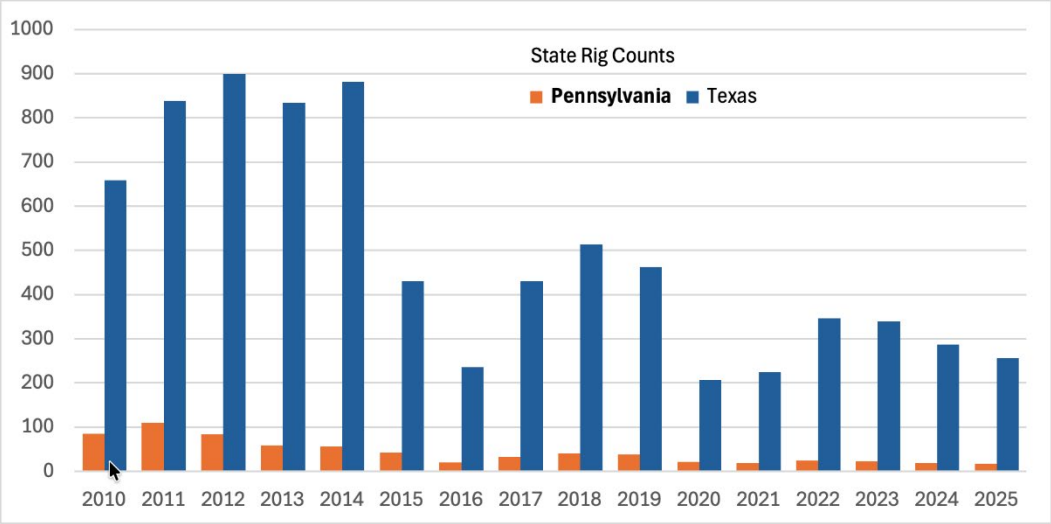
An analysis of natural gas production and the methods used to achieve it shows that they are diverging. We observe similar patterns for Texas and Pennsylvania, the largest and second-largest natural gas producers in the United States. Pennsylvania's natural gas production has increased by a factor of 13 while its rig count has dropped by 85% over the last 15 years. Natural gas production in Texas has doubled while the state's rig count fell 71% over the same period.

The industry's efficiency gains from changes in well design and completions have dramatically reduced the need for upstream personnel. In the early stages of the shale gas revolution, more wells were drilled as companies were developing their fields (i.e., proving out reserves) and their understanding of how to optimize profits. And early in this transformation, an industry-wide realization centered on data that unequivocally suggested well type curves (i.e., illustrating the predicted recovery from a well over time) improved with increased lateral well lengths in most situations. In summary, drilling fewer wells with longer laterals was a more cost-effective way to increase production than drilling more and smaller conventional vertical wells. The industry found that the technique used to get gas flowing from shale formations tended to work in many non-shale formations, as well. And it was this acceptance, along with the shale revolution maturing, that paved the way for fewer wells to be drilled each year with increasingly long laterals. Meanwhile, oil and gas production growth steadily improved while typical measures of activity, such as wells drilled and rigs used, declined annually, especially in Pennsylvania and Texas.

By looking at how rig counts, well counts, and production have changed, we can parse out some striking differences relative to each state's respective natural gas production. The data reveal the sheer magnitude of difference in production flow coming from Pennsylvania natural gas wells. It takes more wells in Texas to produce the equivalent volumes of natural gas than in Pennsylvania.

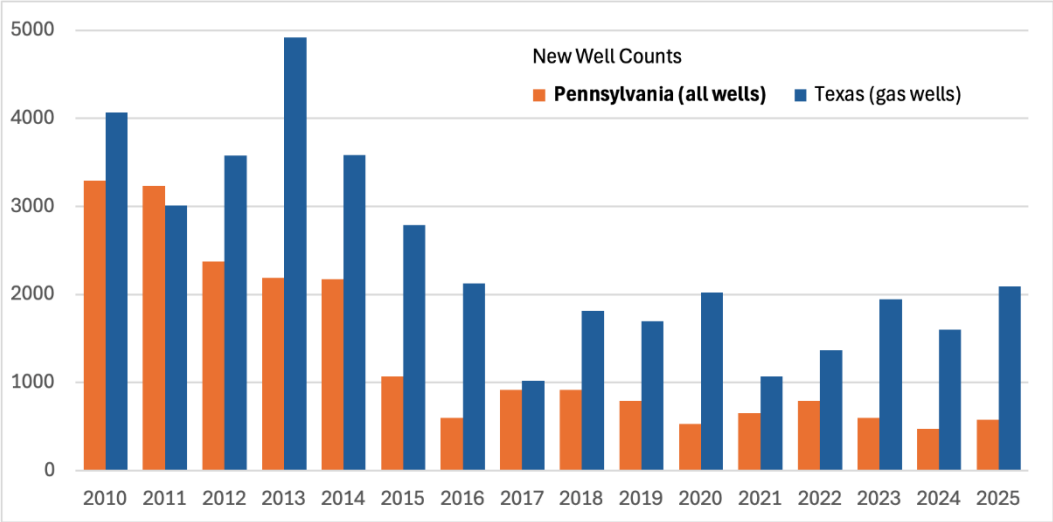
With that understanding, we present the annual average rig counts for both states over the corresponding years. In Pennsylvania (see Figure 6), the number of rigs drilling in 2025 fell to 17, down from 100 in 2011. Similarly, the Texas rig count peaked at 899 in 2012, then fell to 257 in 2025.

Figure 6: Average Annual Rig Counts



Source: Baker Hughes North American Rig Count.[27]

Figure 7: Annual New Well Counts



Sources: Pennsylvania Department of Environmental Protection[28]*; Railroad Commission of Texas.*[29]

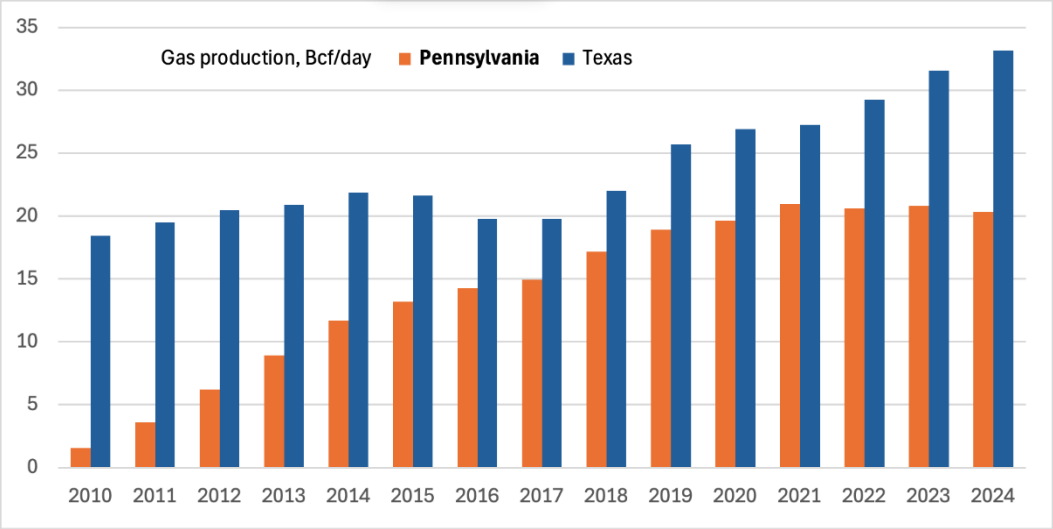
Between 2010 and 2025, operators in Texas drilled 38,699 gas wells, which (along with associated gas derived from oil wells in the state) resulted in its natural gas production increasing over time. For comparison of the same period, Pennsylvania drilled 21,172 total wells, and its change in natural gas production over the years was greater than that of Texas. The

[27] Baker Hughes. Baker Hughes North American Rig Count Report. Accessed May 26, 2026
[28] Pennsylvania Department of Environmental Protection. Spud Data. Accessed May 26, 2026.
[29] Railroad Commission of Texas. Monthly Drilling, Completion and Plugging Summaries. Accessed May 26, 2026.

obvious conclusion from this comparison is that production flow per well is much higher for Pennsylvania natural gas wells than for Texas wells.

Figure 8 highlights natural gas production in Pennsylvania, which grew significantly following the shale revolution (which kicked off with Range Resources' first unconventional well, drilled in 2004).[30] However, during the COVID-19 pandemic, the state's natural gas production plateaued, holding around 20 billion cubic feet per day over the next five years. Conversely, Figure 8 shows that the surging growth in Texas natural gas production is a more recent phenomenon. We note that its increase coincides with a stepped-up drilling of Permian unconventional oil wells targeting oil, with associated gas as a byproduct.

Figure 8: Average Annual Marketed Gas Production (Billion Cubic Feet per Day)



Source: United States Energy Information Administration.[31]

Comparing the two states illustrates how Pennsylvania's growth in natural gas production started from a much lower level than the Texas growth—in 2010, around 1.6 billion cubic feet per day (Bcf/d) compared to 18.4 Bcf/d. Although Texas was and still is the largest producer of natural gas, the state has not experienced the largest absolute change in production over the past 15 years. Pennsylvania holds that title, with production growing by 19.4 Bcf/day compared to Texas's 16.4 Bcf/day. Interestingly, Pennsylvania experienced this change in production with far fewer rigs than Texas and almost half as many wells.

To summarize the industry's evolving practices: Pennsylvania operators have increasingly relied on drilling larger, longer-lateral horizontal wells to meet production targets. Industry's best practices have steadily shifted toward extending lateral lengths, which have grown from an

[30] The American Oil & Gas Reporter. Best Practices Extend Lateral Lengths. January 2019.
[31] Energy Information Administration. Natural Gas Gross Withdrawals and Production. Accessed May 26, 2026.

average of less than 3,000 feet in 2007 to roughly 11,000 feet today in the Marcellus Shale.[32] As these longer wells deliver higher production volumes, producers now require fewer wells—and therefore fewer rigs—to sustain their drilling programs each year.

In terms of upstream employment, Pennsylvania suffers from larger well production sizes. Even if Pennsylvania had the infrastructure capacity (which it does not) to surpass Texas production levels, the employment it would generate would be far less than the figure for Texas. Innovation and superior geology point to fewer jobs in Pennsylvania from oil and gas exploration, as the industry continues to follow a shrinking employment trend that appears structural.

Conclusion

Pennsylvania's coal industry is in secular decline, as production, consumption, and jobs continue their downward trajectory. Its gas industry has been a mixed bag at best, delivering minimal public revenues and transient employment. And its petrochemicals industry has been stagnant and pressured by slumping global markets. This trend has proven to be a millstone around Shell's neck that it would like to shed, now exploring divestment after its recent investment in the state.

The energy transition is in motion. The question for policymakers is whether they want to play a role in deciding the destination. Pennsylvania has a rich history of energy innovation and has established itself as an indisputable leader in energy production today. To maintain this record, it will be important to recognize what the fossil fuel industry can and cannot offer in the future. Neither job growth nor tax revenue growth are on the radar for the fossil fuel industry.

The nature of fossil fuel's past economic contributions does not absolve policymakers from the responsibility of dealing with the consequences of the industry's continued decline. The communities on the frontlines of energy production today deserve the chance to benefit from and participate in the energy system of the future. The task of ensuring that the ongoing transition is just (especially in terms of representation relative to taxes) should be central to policymakers' agendas. This begins with an honest assessment of where the state's fossil fuel sector has been and where it is trending—down.

[32] The American Oil & Gas Reporter. Best Practices Extend Lateral Lengths. January 2019.

About IEEFA

The Institute for Energy Economics and Financial Analysis (IEEFA) examines issues related to energy markets, trends and policies. The Institute's mission is to accelerate the transition to a diverse, sustainable and profitable energy economy. www.ieefa.org

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