



Shell's Monaca Plant Exposes Pennsylvania's Failed Trickle-Down Petrochemical Renaissance

*The Private Petrochemical Plant Is No Substitute for a Real
Economic Development Strategy*

Abhishek Sinha, Energy Finance Analyst, Petrochemical
Trey Cowan, Energy Finance Analyst
Suzanne Mattei, Energy Policy Analyst
Cecelia Opatken-Ringdal, Editor and Content Strategist



Contents

Key Findings	3
Executive Summary	4
Background.....	6
Pennsylvania’s Heavy Investment in a Project by a Dutch-Based International Corporation Yielded One Petrochemical Complex With Unimpressive Financial Results	7
The Plan Didn’t Work: Pennsylvania’s Subsidies of the Petrochemical Sector Did Not Spur Substantial Expansion of the Industry in the State.....	11
The Petrochemical Sector’s Proportionate Contribution to Employment in Pennsylvania Has Declined.....	14
The Chemical Manufacturing Sector’s Relative Contribution to Pennsylvania’s GDP Has Declined...	16
Pollution Problems at Shell Polymers Monaca Highlight the Need to Assess the Risks of Projects and the Compliance Records of Sponsors Who Seek Public Financial Incentives	17
Conclusion	19
About IEEFA.....	20
About the Authors	20

Figures and Tables

Figure 1: Number of Jobs in Petrochemical, Plastic Materials, and Resin Manufacturing, Pennsylvania, in 2000 Compared With 2024.....	4
Figure 2: Location of Shell Polymers Monaca in Pennsylvania.....	7
Figure 3: Shell Polymers Monaca plant, Potters Township, Beaver County, Penn.....	8
Figure 4: Petrochemical Employment as a Percentage of Total Pennsylvania Employment	15
Figure 5: Chemical Manufacturing (NAICS 325) as Percentage of Total Pennsylvania GDP, 2000 Through 2024	17
Table 1: Petrochemical Plants in Pennsylvania With Existing or Projected Capacities in Thousand Metric Tons Per Year for 2017 (Shell Plant Construction Commencement), 2022 (Shell Plant Operations Commencement), and Beyond	11
Table 2: Refining and Fuel-Processing Facilities in Pennsylvania With Current or Projected Capacities in Thousand Metric Tons Per Year for 2017 (Shell Plant Construction Commencement), 2022 (Shell Plant Operations Commencement), and Beyond	13

Key Findings

The petrochemical renaissance in Pennsylvania has not delivered on its promises—the scale of public attention, subsidies, and economic development efforts directed toward petrochemicals is not commensurate with the sector's actual contribution to the state's economy.

Pennsylvania's subsidies of the Shell Polymers Monaca plant have not spurred private investment in substantial industry expansion—nearly all other plants in the state pre-date the Shell plant and are not part of a wave of integrated development.

Despite promises from state authorities and fossil fuel companies, the refining and petrochemical-related industrial sector in Pennsylvania has shed jobs, not generated them.

Pollution problems at the Shell plant—including 62 notices of violations since 2017—highlight the need to assess risks and the compliance records of sponsors who seek public incentives for petrochemical projects.



Executive Summary

Pennsylvania invested substantial government funding and tax credits in a Dutch-based international corporation's petrochemical project—the Shell Polymers Monaca plant—in an attempt to help launch a “petrochemical renaissance” in the state.

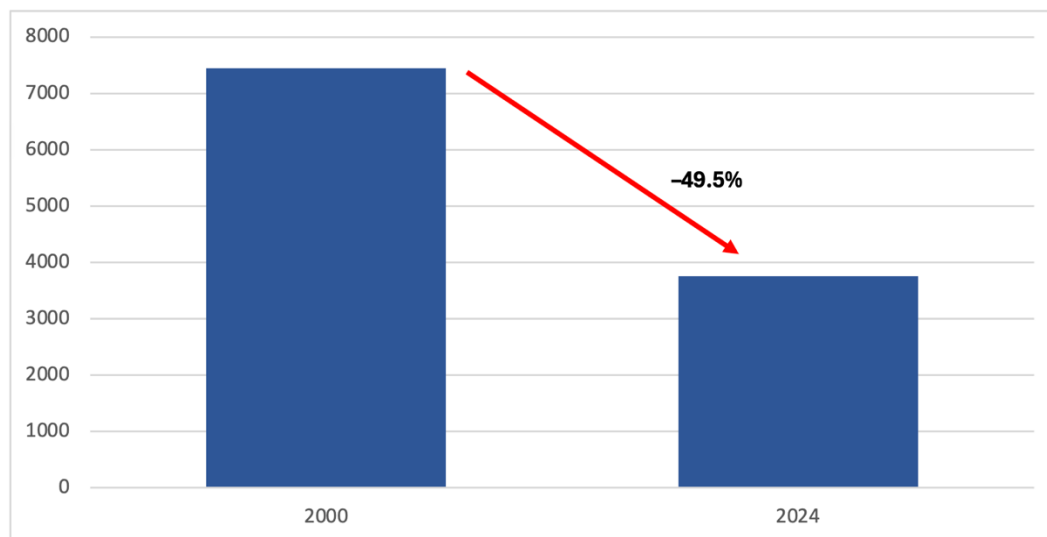
It didn't work.

The failure of Pennsylvania's economic development initiatives to spur more private investment in major petrochemical developments—despite the ready access to natural gas liquids as feedstock—is a red flag.

The Institute for Energy Economics and Financial Analysis (IEEFA) examined the limited role of the petrochemical industry in Pennsylvania's economic growth and jobs generation profile. The results make it hard to justify any more public incentives for the industry. IEEFA's report finds:

- Pennsylvania's large subsidies of the Shell Polymers Monaca petrochemical plant have not spurred private investment in substantial expansion of the industry in the state. Other facilities in the state are modest in scale, mostly pre-date the Shell plant, and do not represent a wave of new, integrated development.
- The petrochemical, plastic materials, and resin industrial sector in Pennsylvania has shed jobs over the past two decades, declining from 7,449 jobs in 2000 to 3,762 in 2024—a 49.5% decrease.

Figure 1: Number of Jobs in Petrochemical, Plastic Materials, and Resin Manufacturing, Pennsylvania, in 2000 Compared With 2024



Source: U.S. Bureau of Labor Statistics – QCEW NAICS-Based data files.

The entire refining and petrochemical-related sector's share of total employment in Pennsylvania has eroded over the same period, from roughly 0.2% to 0.09% today.

- The chemical manufacturing sector's proportionate contribution to Pennsylvania's GDP has declined by 55%, dropping from a peak of 5.7% in 2001 to hover at 3.1 to 3.2% in recent years.
- Pollution incidents at the Shell Polymers Monaca plant—including 62 notices of environmental violations since 2017, during construction and operation—highlight the need to assess the risks of proposed projects and the compliance track records of project sponsors who seek public financial incentives.

The state should reform its approach to economic development incentives. In particular, it should adopt a much more rigorous review of development plans before committing public funds or tax incentives to private projects. That review should include robust independent market analysis, objective analysis of potential community impacts, vigorous public outreach, and meaningful opportunities for public comments.

Background

Over the past several years, Pennsylvania authorities have turned to the U.S. petrochemical industry, which generates chemicals and plastics primarily from natural gas liquids, as a potential source of new development and revenue.

The U.S. Department of Energy (DOE) released a report in June 2020—*The Appalachian Energy and Petrochemical Renaissance*—that projected a petrochemical upswing and promised significant economic growth and opportunity to both residents and investors.¹ The DOE report cited an American Chemistry Council (ACC) estimate that more than 100,000 permanent jobs could be created in Ohio, Kentucky, Pennsylvania, and West Virginia if the petrochemical industry expanded in the Appalachian region.² The report argued that Pennsylvania could become a hub for petrochemical and plastic manufacturing, benefitting both investors and taxpayers.³

The report claimed the Appalachian petrochemical renaissance would make Pennsylvania “more competitive in the national and global marketplace, create jobs and sustain a higher quality of life.”⁴

This report finds that a petrochemical renaissance has not materialized. Rather, the proportionate role of petrochemicals in Pennsylvania’s employment economy has been declining. The facts underscore a clear structural mismatch. The scale of public attention, subsidies, and economic development efforts directed toward petrochemicals is not commensurate with the sector’s actual contribution to the economy.

Yet Pennsylvania continues to align petrochemical production from natural gas with the state’s budgetary and energy goals. The state’s 2026-27 budget document, in its overview statement, declares, “the rapid increase in the state’s production of natural gas liquids provides the basis for gains in production of chemicals and plastics.”⁵ The Pennsylvania Economic Development for a Growing Economy (PA EDGE) initiative, included in the 2026-27 budget under the theme of “Leading the Way on Reliable, Affordable Energy,” is an example. PA EDGE is a set of tax credit programs intended to attract new business investment in certain manufacturing sectors, including petrochemicals.⁶ The 2026-27 budget proposes several changes to spur participation in the program, which the budget document notes has not been used by any business since its establishment in 2022.⁷

¹ U.S. Department of Energy. [The Appalachian Energy and Petrochemical Renaissance: An examination of economic progress and opportunities](#). June 2020.

² *Ibid.*, p. 30. See American Chemistry Council. [The Potential Economic Benefits of an Appalachian Petrochemical Industry](#). May 2017.

³ U.S. Department of Energy, *op cit.*, pp. 29-34.

⁴ *Ibid.*, p. 1.

⁵ Office of the Pennsylvania Governor. [Governor’s Executive Budget 2026-2027](#). Released February 3, 2026. p. J-2.

⁶ Pennsylvania Department of Community and Economic Development. [Pennsylvania Economic Development for a Growing Economy \(PA EDGE\) Tax Credit Program](#). Accessed June 4, 2026.

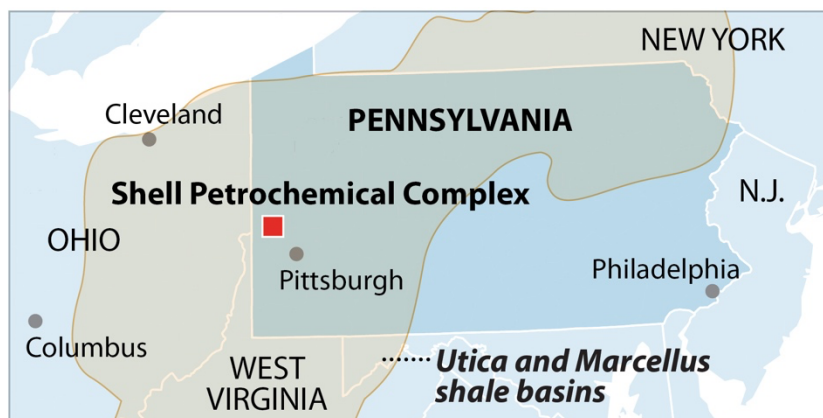
⁷ *Ibid.*, pp. A1-21 to A1-22.

If Pennsylvania directs more support to the petrochemical industry, it is likely to waste taxpayer dollars and useful land, and put the health of its communities at further risk.

Pennsylvania's Heavy Investment in a Project by a Dutch-Based International Corporation Yielded One Petrochemical Complex With Unimpressive Financial Results

Recent petrochemical development in Pennsylvania has been dominated by a single large-scale investment, illustrating the sector's economic limitations. The Shell petrochemical complex known as Shell Polymers Monaca began operations in Beaver County's Potter Township in late 2022, with a nameplate production capacity of approximately 1.5 million metric tons per year of ethylene and 1.6 million metric tons of polyethylene.⁸ Shell announced that it planned to market the polyethylene pellets to manufacturers of common household goods; consumer and food packaging (which are primarily single-use plastics); and industrial and utility products.⁹

Figure 2: Location of Shell Polymers Monaca in Pennsylvania



Source: IEEFA.

⁸ PR Newswire (from Shell). [Shell begins operations at polymers plant in Pennsylvania](#). November 15, 2022.

⁹ *Ibid.* Also see: Shell. [Projects and Locations: Shell Polymers Monaca](#). Accessed June 4, 2026.

Figure 3: Shell Polymers Monaca plant, Potters Township, Beaver County, Penn.



Source: [Shell.us](https://www.shell.us)

The Shell complex became the centerpiece of Pennsylvania's petrochemical strategy. Pennsylvania was generous in providing subsidies and tax incentives to the international corporation.

A tax incentive called The Pennsylvania Resource Manufacturing Tax Credit (created by statute in 2012), awarded Shell a \$2.10-per-barrel credit on ethane used as feedstock in its processes. Shell was awarded \$4.9 million in 2023, \$27.3 million in 2024, and \$56.9 million in 2025 under this program, for a total of more than \$89 million.¹⁰ The credit, awarded annually, does not expire until 2042.¹¹

Shell was also granted Keystone Opportunity Expansion Zone (KOEZ) program benefits covering about 324.5 of the roughly 800 acres of the project site. Generally, such status exempts owners from state corporate income tax, local real estate property taxes, state and local sales taxes, and occupancy tax.¹² Shell's benefits will last until Dec. 31, 2044, pursuant to a seven-year extension

¹⁰ Pennsylvania Department of Revenue (PA Dept. of Revenue). [Pennsylvania Resource Manufacturing Tax Credit Report, Award Year 2025](#). Also see PA Dept. of Revenue. [Pennsylvania Resource Manufacturing Tax Credit Report, Award Year 2024](#). See Pa. Unconsol. Stat., [Art. XVII-G, § 1703-G\(a\)](#).

¹¹ PA Dept. of Revenue. [Pennsylvania Resource Manufacturing Tax Credit \(PRM\)](#). Accessed June 4, 2026.

¹² See Pennsylvania Department of Economic Development. [Keystone Opportunity Zones](#). Accessed June 4, 2026. The statute on which the program is founded is the Keystone Opportunity Zone, Keystone Opportunity Expansion Zone and Keystone Opportunity Improvement Zone Act – Omnibus Amendments, Act of February 14, 2012, P.L. 183, No. 16, C1.72, SB. 1237, codified at 73 P.S. § 820.101, *et seq.* (also known as [Act 16 of 2012](#)).

approved with the original 15-year KOEZ designation.¹³ Beaver County, Potter Township, and the Central Valley School District obtained a Payment-in-Lieu-of-Taxes (PILOT) agreement with Shell, providing them with some revenue from the KOEZ property.¹⁴ The PILOT payments, however, do not account for the value of the subsequently built Shell Polymers Monaca complex. They are based only on the parcel's value as assessed for the tax year prior to the year in which the KOEZ designation was granted.¹⁵

Despite such generous incentives, the hoped-for positive return on Pennsylvania's public investment has not materialized. The plant has simply failed to deliver on its economic promises for the surrounding areas.

The plant cost \$14 billion to construct, which was twice the early estimate of \$6 billion.¹⁶ But that was just the beginning of its troubles. Due to operational and start-up challenges, the facility did not ramp up operations until the first quarter of 2024.¹⁷ Shell's 2025 annual report further disclosed that as a result of an "additional defect," the Monaca plant "experienced intermittent utilisation during 2025." The company asserted it has addressed the problem and expects "improved utilization" in 2026.¹⁸

An IEEFA analysis conducted in October 2025 found that Shell Polymers Monaca has underperformed financially since beginning operations:

- Despite initial projections by Shell of between \$1 billion and \$1.5 billion annual earnings before interest, taxes, depreciation, and amortization (EBITDA), IEEFA found the Shell Polymers Monaca plant may only generate between \$416 million and \$987 million annually.¹⁹
- Even with a temporary improvement in ethylene pricing, the chemicals division had continued to generate losses. The division's revenue dropped by 43% from 2021 to 2024, and it is now a drag on group performance rather than a growth driver.²⁰

IEEFA's 2025 report concluded that conditions were unlikely to improve significantly, noting the plant faces bleak market prospects due to oversupply, low demand, weak operating rates, and declining margins.²¹

¹³ See letter from Frederick Sigr, Acting Secretary, Dept. of Community & Economic Development, to Raymond Kerkvliet, Shell Chemical Appalachia, LLC. February 15, 2023. Obtained by Open Records request.

¹⁴ Agreement by and between Shell Chemical Appalachia LLC, and Potter Township, Beaver County and the Central Valley School District. September 25, 2013 (2013 PILOT Agreement"). Obtained by Open Records Request.

¹⁵ See 73 Pa. Code [§ 820.310](#) (Trade and Commerce). The percentage in the 2013 PILOT agreement is consistent with the cap on PILOT agreements for KOEZ parcels set forth in Pennsylvania's statute. See: 2013 PILOT Agreement.

¹⁶ Shell. [Q4 2023 Earnings Call](#). February 1, 2024. Also see: IEEFA. [Shell acknowledges \\$14 billion price tag for petrochemical plant, more than double street estimates](#). February 8, 2024.

¹⁷ Shell Plc. [Annual Report and Accounts for the year ended December 31, 2024](#). March 25, 2025, p. 62.

¹⁸ Shell Plc. [Annual Report and Accounts for the year ended December 31, 2025](#). March 12, 2026 (hereafter, [Shell 2025 Annual Report](#)), pp. 59 and 61.

¹⁹ IEEFA. [Shell's Petrochemical Problem in Pennsylvania: Lessons To Learn From Shell's Petrochemical Investment in Monaca, Pennsylvania](#). September 2025.

²⁰ *Ibid.*

²¹ *Ibid.*, pp. 5-6.

Shell's 2025 annual report, released in March 2026, shows its chemicals sales volumes inched upwards by 3.1% in the Americas but plummeted globally by 18%,²² apparently driven by the sale of a Shell facility in Singapore.²³ Although the Monaca plant comprises 22% of Shell's global ethylene production and 38% of its ethylene production in the United States,²⁴ Shell reported that "Refining and Chemicals availability exceeded the plan, mainly due to strong performance at Deer Park and Rheinland Refinery, offsetting a shortfall at Monaca."²⁵

A Moody's Ratings September 2025 credit opinion on Shell noted the company's profits for Chemicals "remain weak, despite turning positive in 2024," citing the sector's sensitivity to the business cycle, additional modern vertically-integrated capacity in China, and subdued demand and high energy costs in Europe.²⁶ Shell's 2025 annual report disclosed:

*In 2025, Chemicals margins remained under pressure in a tough macro environment leading to continued losses in the business. Products earnings weakened due to lower contributions from trading and supply, despite improvements in refining margins.*²⁷

After spending twice the expected amount to build the Monaca plant, Shell was discussing the possibility of selling or finding a partner for the plant fewer than three years later.²⁸ In its 2026 first-quarter earnings call, Shell's Chief Financial Officer (CFO) and Executive Director Sinead Gorman noted that the company is focused on making its chemical business "free cash flow positive," but acknowledged that chemical margins remain depressed.²⁹ Shell's first-quarter 2026 report disclosed that even though chemicals margins increased and operating expenses decreased, the division still had negative adjusted earnings of \$117 million.³⁰

The CFO emphasized that Shell seeks to "progress either the sale or some form of capital market transaction in particular of our U.S. chemicals business," if it sees that such action would result in long-term value creation for its shareholders.³¹

As discussed in detail below, promises of substantial jobs-generating development arising from the plant's construction have not materialized.

²² [Shell 2025 Annual Report](#), p. 61.

²³ See *ibid.*, p. 59.

²⁴ *ibid.*, p. 62.

²⁵ *ibid.*, p. 185.

²⁶ Moody's Ratings. Credit Opinion: Shell Plc. September 9, 2025, p. 7. Proprietary.

²⁷ *ibid.*, p. 57.

²⁸ See: Wall Street Journal. [Shell explores sale of chemicals assets in U.S. and Europe: Energy company is trying to focus on its most profitable operations](#). March 2, 2025. Also see: Penn Capital-Star. [Pennsylvania lured Shell with a \\$1.65 billion tax break. Now the company wants to sell its plant](#). August 22, 2025. Also see: Ohio River Valley Institute. [Pennsylvania's Bad Bet: Why Shell Didn't Save Appalachia With Plastics](#). January 25, 2024.

²⁹ Yahoo Finance. [Shell PLC Q1 FY2026 earnings call transcript](#). May 7, 2026. Company CEO Wael Sawan noted that the company has sold its Singapore chemical and refining footprint.

³⁰ In Q1 of 2026, Shell reported an increase of \$211 million in Chemical margins and a decrease in operating expenses of \$197 million. Shell Plc. [1st Quarter 2026 Unaudited Results](#). May 7, 2026.

³¹ [Shell PLC Q1 FY2026 earnings call transcript](#).

The Plan Didn't Work: Pennsylvania's Subsidies of the Petrochemical Sector Did Not Spur Substantial Expansion of the Industry in the State

Pennsylvania's investment in the Shell Polymers Monaca facility in Potter Township has not spurred private investment to establish a broader expansion of petrochemical manufacturing. The Shell complex still accounts for the vast majority of polyethylene and related output in the state.

Other petrochemical activity in Pennsylvania remains limited to smaller downstream and specialty operations, including polyethylene terephthalate (PET) resins, polyester polymers, and plasticizers. These facilities are modest in scale, and all but one represent incremental or legacy capacity rather than a wave of new, integrated development.

Table 1 provides a list of petrochemical plants currently located in Pennsylvania. The only facility listed that did not exist well before 2022 is Circularix, a producer of food grade post-consumer PET (rPET), whose primary feedstock is recycled PET bottles.³² Although the Circularix and Shell facilities opened in the same year, with the Circularix plant located roughly 260 miles away in eastern Pennsylvania,³³ their operations appear to be unrelated.

Table 1: Petrochemical Plants in Pennsylvania With Existing or Projected Capacities in Thousand Metric Tons Per Year for 2017 (Shell Plant Construction Commencement), 2022 (Shell Plant Operations Commencement), and Beyond

Company	Site	Product	2017	2022	2024	2026	2028	2030
Advansix	Frankfort	Acetone	316	316	316	316	316	316
	Frankfort	Phenol	510	510	510	510	510	510
Alta Performance Materials	Neville Island	UPE Resins	43	43	43	43	43	43
	Philadelphia	UPE Resins	54	54	54	54	54	54
BASF Corp.	Monaca	SB Latices	50	50	50	50	50	50
Braskem	Marcus Hook	Polypropylene	414	414	207	207	207	207
Circularix	Hatfield	Pet Resins		2	25	25	25	25

³² See Circularix. [Circularity within reach: A nationwide recycling platform](#). Accessed June 4, 2026. The company sources its feedstock from Republic Services materials recovery facilities and other waste recycling companies. See Resource Recycling. [RPET supplier Circularix gears up for expansion](#). February 5, 2025. Circularix was launched as a joint venture between HPC Industries LLC, Los Angeles,, and Australia-based Macquarie Group's Commodities and Global Markets group. See, Recycling Today. [Macquarie invests in PET recycler](#). July 1, 2022.

³³ Straight line calculation. By road, the distance is over 300 miles. See Online Compass. [Distance calculator](#).

	Hatfield	Polyester Polymer		2	25	25	25	25
Multi-Plastics Extrusions	Hazleton	Polystyrene	23	23	23	23	23	23
Roscom	Croydon	Plasticizers	20	20	20	20	20	20
Shell Chemicals	Potter Township	LLDPE		70	1100	1100	1100	1100
	Potter Township	Propylene		6	45	45	45	45
United Refining Co.	Warren	Polymerization	41	41	41	41	41	41

Source: [ICIS database](#).

The structure of the sector has direct economic implications. The concentration of capacity within the Shell Monaca Polymers plant, a single major facility, limits the distribution of industrial activity across the state and reduces the extent to which petrochemical production supports broader economic linkages. Also, the capital-intensive nature of the sector constrains its employment impact. The smaller facilities function largely as standalone units in a fragmented industrial footprint rather than as part of an integrated production system.

At the same time, overall sector performance is closely tied to the operating conditions and financial outcomes of the Shell Monaca Polymers plant. This concentration of output, activity, and risk within one facility creates a structurally narrow system, where variability in performance can have an outsized effect on the entire sector. The surrounding industrial base, composed primarily of smaller and stable operations, does not materially offset this concentration.

Pennsylvania's ethylene-linked petrochemical sector remains concentrated in structure and limited in its broader economic impact.

Pennsylvania's broader energy-related industrial base is largely defined by refining and fuel-processing infrastructure. As presented in Table 2, facilities across Trainer, Warren, and Bradford support operations such as catalytic cracking, hydrocracking, reforming, and desulfurization, all of which are primarily oriented toward transportation fuels rather than chemical manufacturing.

Capacity across these units has remained relatively stable over time and is expected to remain so, reflecting a mature asset base with limited expansion. While these operations contribute to the state's industrial footprint, they do not represent new growth areas or diversified manufacturing activity.³⁴

³⁴ The most recently launched facility listed in Table 2 opened in 2003. The largest expansion, which was seen at the Monroe Energy light distillates desulfurization facility in Trainer, PA, occurred back in 2018. [ICIS database](#).

Table 2: Refining and Fuel-Processing Facilities in Pennsylvania With Current or Projected Capacities in Thousand Metric Tons Per Year for 2017 (Shell Plant Construction Commencement), 2022 (Shell Plant Operations Commencement), and Beyond

Company	Site	Product	2017	2022	2024	2026	2028	2030
American Refining Group	Bradford	Deasphalting	120	120	120	120	120	120
		Isomerization-Naphtha	39	39	39	39	39	39
		Light Distillates Desulf	130	130	130	130	130	130
		Lube	157	157	157	157	157	157
		Reforming	87	87	87	87	87	87
Monroe Energy	Trainer	Alkylation	486	486	486	486	486	486
		Catalytic Cracking	2761	2761	2761	2761	2761	2761
		Heavy Distillates Desulf	2018	2018	2018	2018	2018	2018
		Hydrofracking	1168	1168	1168	1168	1168	1168
		Light Distillates Desulf	3689	5859	5859	5859	5859	5859
		Middle Distillates Desulf	2445	2445	2445	2445	2445	2445
United Refining Co.	Warren	Reforming	1953	1953	1953	1953	1953	1953
		Alkylation	203	203	203	203	203	203
		Asphalt	1266	1266	1266	1266	1266	1266
		Catalytic Cracking	1274	1274	1274	1274	1274	1274
		Isomerization-Naphtha	310	310	310	310	310	310
		Light Distillates Desulf	1215	1215	1215	1215	1215	1215
		Middle Distillates Desulf	978	978	978	978	978	978
Reforming	564	564	564	564	564	564		

Source: [ICIS database](#).

Pennsylvania's energy-related industrial profile reflects legacy refining infrastructure alongside a narrow petrochemical segment, with both operating at limited scale in terms of broader economic impact.

Although the state's investment in the Shell plant added significant capacity within a single complex, it has not led to substantial petrochemical-related industrial expansion in Pennsylvania.

The Petrochemical Sector's Proportionate Contribution to Employment in Pennsylvania Has Declined

Employment data illustrate the limited economic significance of the petrochemical sector within Pennsylvania's broader economy. Public investment in private petrochemical development has been based on promises of job creation and regional economic revitalization, but the data suggest that such investments have not translated into meaningful or sustained employment gains.

Shell's website reports approximately 600 on-site employees at the complex,³⁵ which is consistent with the company's original expectations for permanent jobs at the facility as derived from a 2021 report prepared for the company by Robert Morris University faculty.³⁶

Shell cites the 2021 report for the projection that each of those direct jobs is associated with 11 indirect and seven induced jobs, for a total of 18 additional jobs in the surrounding community per employee.³⁷ Although the report also predicted the project would generate 11,197 new direct, indirect, and induced local jobs,³⁸ a review of economic conditions in Beaver County found the area has fewer jobs and fewer residents than when the project was first announced in 2012.³⁹

And on a statewide bases, the news for the sector is not good. According to Bureau of Labor Statistics data, the petrochemical, plastics and resin manufacturing sectors in Pennsylvania has shed jobs over the past two decades, declining from 7,449 jobs in 2000 to 3762 jobs in 2024—a 49.5% decrease. During this same period, the number of jobs in the overall refining and petrochemical-related industrial sector in Pennsylvania—including petroleum refineries, petrochemical

³⁵ Shell Polymers Monaca. [Frequently Asked Questions](#). Accessed June 4, 2026. Shell spokesperson Krista Edwards reported in a statement to Inside Climate News in 2025 that the plant had 500 employees and averages about 400 contractors on site. Penn Capital-Star, *op. cit.*

³⁶ S. Clinton, *et al.* [Updated Economic Impact Analysis: Petrochemical Facility in Beaver County, Pennsylvania](#) (prepared for Shell Chemical Appalachia, LLC). April 2021, p. 13. The original analysis was produced in 2014. The assumptions and approaches of the study are critiqued in Ohio River Valley Institute. [Pennsylvania's Bad Bet: Why Shell didn't save Appalachia with plastics](#). January 2023, pp. 16-26.

³⁷ Shell Polymers Monaca. [Frequently Asked Questions](#).

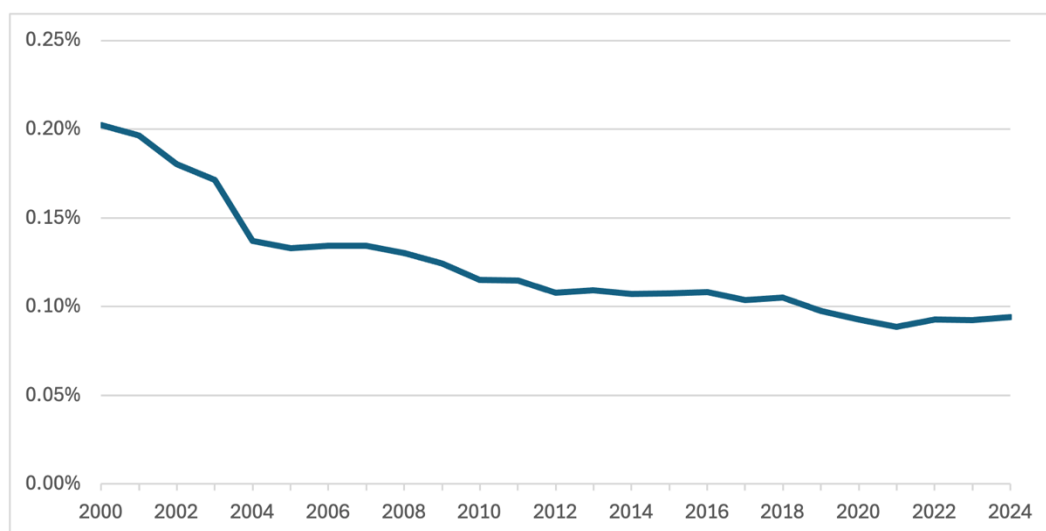
³⁸ S. Clinton, *op. cit.* Allegheny Conference on Community Development CEO Stefani Pashman, lauding the opening of the Shell plant in 2022, was quoted as saying the Monaca plant would “support job growth up to 11,000 indirect and induced jobs.” Trib Live. [Shell cracker plant begins operation in Beaver County](#). November 16, 2022.

³⁹ See: Ohio River Valley Institute. [Beaver County Data Analysis: 2025 Update](#). February 7, 2025. The report found economic decline in Beaver County has continued through construction and operation of the Shell Polymers Monaca plant, even though Pennsylvania and the U.S. have seen continued growth.

manufacturing, plastics material and resin manufacturing, and petroleum lubricating oil and grease manufacturing—has dropped from 11,225 jobs in 2000 to 5,651 in 2024—a 49.7% decrease.

Even with the addition of jobs from the Shell plant's operations, the sector's share of total state employment has eroded, falling from roughly 0.2% at the start of the period to approximately 0.09% today.

Figure 4: Petrochemical Employment as a Percentage of Total Pennsylvania Employment⁴⁰



Source: Bureau of Labor Statistics, IEEFA analysis.

This represents a structural decline of 55% in relative contribution, underscoring that the sector has not kept pace with overall economic and labor market growth. The persistently low proportionate contribution from the sector to overall employment in Pennsylvania over the past decade highlights the limited scalability of petrochemicals as a source of job growth in the state.

The evidence indicates that, contrary to common narratives, the petrochemical industry is not a major employment engine in Pennsylvania, and it raises important questions about the economic rationale for continued policy prioritization of the sector.

⁴⁰ U.S. Bureau of Labor Statistics. [Quarterly Census of Employment and Wages \(QCEW\)](#).

The Chemical Manufacturing Sector's Relative Contribution to Pennsylvania's GDP Has Declined

Pennsylvania's economy has expanded over the past couple of decades. The state's real GDP (adjusted for inflation) rose from approximately \$409 billion in 2000 to about \$1,008 billion in 2024, an increase of about 146%.⁴¹ At the same time, the role of chemical manufacturing—an industrial category of which petrochemical manufacturing is a part—in Pennsylvania's economy has shrunk. In the North American Industry Classification System (NAICS), the chemical manufacturing code includes not only petrochemical industries but also pesticides, chemical fertilizers, pharmaceuticals, paints, adhesives manufacturing, and other chemical product and preparations manufacturing.⁴² Although GDP figures regarding chemical manufacturing industries have increased in absolute terms, from roughly \$20 billion to nearly \$32 billion between 2000 and 2024 (a 60% increase),⁴³ their relative contribution to the state's economy has declined significantly.

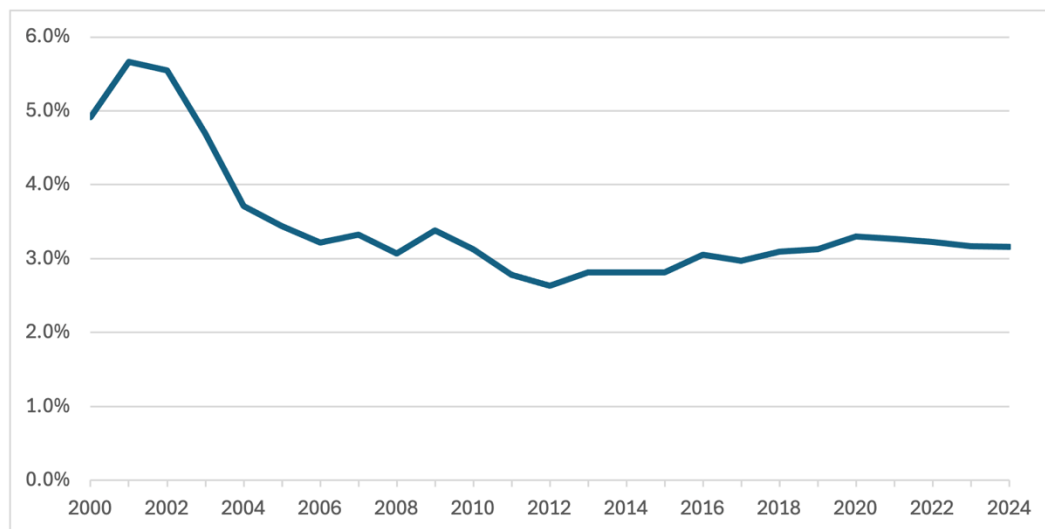
Chemical manufacturing accounted for more than 5% of Pennsylvania's GDP in the late 1990s and peaked at roughly 5.7% in 2001, but this was followed by a precipitous decline between 2002 and 2006 to 3.2%, an almost 44% decrease (see Figure 5). Only moderate variations have occurred over the ensuing two decades, and, as Figure 5 reveals, the contribution of chemical manufacturing to Pennsylvania's GDP has remained at approximately 3.1–3.2% in recent years.

⁴¹ U.S. Department of Commerce. [Bureau of Economic Analysis](#). Pennsylvania's nominal GDP (which is unadjusted for inflation) surpassed \$1.0 trillion. Also see: Federal Reserve Bank of St. Louis, [Real Gross Domestic Product: All Industry Total in Pennsylvania](#). Pennsylvania's GDP growth, however, has been relatively modest compared to the national GDP, which rose from \$13.43 trillion in 2000 to \$23.59 trillion in 2024—a 75.7% increase. U.S. Department of Commerce. [Bureau of Economic Analysis](#). Also see Multpl.com. [U.S. Real GDP](#).

⁴² NAICS. [NAICS Code 325 for Chemical Manufacturing](#). Accessed June 4, 2026.

⁴³ U.S. Department of Commerce. [Bureau of Economic Analysis](#).

Figure 5: Chemical Manufacturing (NAICS 325) as Percentage of Total Pennsylvania GDP, 2000 Through 2024⁴⁴



Source: U.S. Department of Commerce, IEEFA analysis.

Chemical manufacturing is becoming increasingly peripheral to Pennsylvania's economic base, even as the state's GDP continues to expand. The long-term decline underscores a significant change in the state: Pennsylvania has experienced a structural shift in the composition of its economic activity.

Pollution Problems at Shell Polymers Monaca Highlight the Need to Assess the Risks of Projects and the Compliance Records of Sponsors Who Seek Public Financial Incentives

The Shell petrochemical plant in Pennsylvania has posed a continuing risk to the quality of life for community residents through repeated violations of environmental requirements. Since its construction began, the Shell Polymers Monaca petrochemical project has received 62 notices of environmental violation from the Pennsylvania Department of Environmental Protection (PA DEP) since 2017, including 19 in 2025 and five between January and April 2026. Fifty-three of the violations were related to air emission requirements.⁴⁵

Shell's monthly emission reports to the state environmental agency indicate repeated problems with control of nitrogen oxides emissions.⁴⁶ Exposure to elevated levels of nitrogen oxides can aggravate

⁴⁴ Source of data: U.S. Department of Commerce. [Bureau of Economic Analysis](#). Analysis by IEEFA.

⁴⁵ PA DEP. [Facility Information: Shell petrochemical complex](#) (last updated May 15, 2026). Accessed June 4, 2026.

⁴⁶ See, e.g., Letter from Nathan Levin, Operations Manager, Shell Chemical Appalachia, to Mark Gorog, Regional Manager Air Quality Program, Pennsylvania Department of Environmental Protection, re [Shell Chemical Appalachia LLC Submittal of Monthly Emissions Report due March 2025](#). March 19, 2026.

respiratory diseases, particularly asthma, and long-term exposure can potentially increase susceptibility to respiratory infections. Children, the elderly, and people with asthma are generally at greater risk from such exposure.⁴⁷

The facility still does not have a proper Title V air quality permit under the Clean Air Act. Instead, it operates under an air quality plan approval that allows temporary operation, for which the PA DEP has granted Shell seven 180-day extensions, from 2022 to 2026.⁴⁸ The most recent extension, granted April 9, expires Oct. 28, 2026.⁴⁹

The disproportionate burden on the community saddled with the petrochemical plant, the inadequate agency oversight, and the lack of robust business and jobs creation activity stemming from the large financial incentives awarded to the Shell Polymers Monaca facility speak to a failed state economic development policy.

The evidence of the decline in contribution by Pennsylvania's petrochemical sector with regard to jobs generation points to a growing misalignment between Pennsylvania's evolving economic structure and plans to invest more public subsidies in petrochemical infrastructure. Despite significant capital deployment and policy support, the sector's shrinking share of employment in the state suggests diminishing economic relevance.

The Ohio River Valley Institute points out that the billions of dollars in state and local financial incentives for the Shell Polymers Monaca facility carried an "opportunity cost" for taxpayers. The organization noted:

[T]he funds could have been used to grow the regional economy in more direct ways, such as to support small businesses, improve workforce development, or develop projects within industries that already have a strong history, complete with supply chains, in the region.⁵⁰

As growth increasingly shifts toward services, technology, and lower-carbon industries, reliance on petrochemicals as a driver of jobs and economic development appears structurally challenged and economically inefficient.

⁴⁷ U.S. Environmental Protection Agency, [Basic information about NO₂](#). Last updated July 10, 2025. Accessed June 4, 2026.

⁴⁸ See PA DEP, [Facility Information: Shell petrochemical complex](#), *op. cit.* Also see: Pittsburgh's Public Source, [How Shell's cracker has polluted more than permitted with no new fines for three years](#), March 19, 2026.

⁴⁹ See [Letter from Alexander Sandy, Air Quality Program, PA DEP, to Laura Sabolyk, Senior Regulatory Advisor](#), regarding Plan Approval PA-04-00740A. April 9, 2026.

⁵⁰ Ohio River Valley Institute, [Pennsylvania's Bad Bet: Why Shell didn't save Appalachia with plastics](#), p. 4.

Conclusion

The fate of the Shell Polymers Monaca plant and the Pennsylvania government's unrealized expectations of economic development should serve as a cautionary tale for state and local governments pressured by businesses for financial incentives. The "wow" factor of big projects can feel overwhelming, but the warning signs for the petrochemical project were there early in the process. Ultimately, state financial incentives for economic development should target business sectors with strong track records of generating local jobs, robust markets for their products, and proven commitments to community safety and quality of life.

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

About the Authors

Abhishek Sinha

Abhishek Sinha is an energy finance analyst at IEEFA. He analyzes petrochemical industry trends, regulations, and company data.

Abhishek has extensive experience analyzing key performance indicators, including revenue drivers, operating costs, and capital expenditures, as well as competitive dynamics, leading and lagging indicators, and benchmarking analysis.

Prior to his work at IEEFA, Abhishek covered the energy and chemicals sectors at Thrivent Asset Management for five years. He has a mechanical engineering degree from Bangalore University, a master's in management information systems from Texas Tech University, and an MBA from Columbia University.

Trey Cowan

Trey Cowan is an oil and gas energy analyst focused on U.S. upstream and global energy markets with a keen interest in Texas activities. At IEEFA, Trey contributes research, commentary, and independent analyses assessing the energy industry's transition to cleaner, more affordable and sustainable solutions.

As a finance professional for over 20 years, he is skilled at presenting thought-provoking data in formats that are persuasive and easily grasped. His work and insights have been featured by Reuters, NPR, Forbes, and Investor's Business Daily as well as national, broadcast, and local news outlets.

Trey holds a bachelor of science in accounting from University of Houston-Clear Lake, an MBA from Vanderbilt University, and is a Texas-licensed certified public accountant.

Suzanne Mattei

Suzanne Mattei, an attorney (Yale Law School) and consultant with Lookout Hill Public Policy Associates, has over 30 years' experience in environmental policy. As Regional Director for the NYS Department of Environmental Conservation for four years, she led permitting and enforcement in New York City. Her widely cited recent report on a proposed fracked gas pipeline in New York found flaws in proponents' arguments. As NYC Executive for the Sierra Club, her research exposed federal

mismanagement of the 9/11 response; her testimony to Congress helped lead to passage of the James Zadroga Act, providing healthcare to Ground Zero workers.

Cecelia Opatken-Ringdal

Cecelia Opatken-Ringdal is an editor and content strategist at IEEFA. She edits and writes materials for the North America research team and ensures that IEEFA's mission remains accessible to diverse audiences. Cecelia holds a master's degree in history of science from the University of Toronto, where she researched and wrote about the history of public and environmental health.

This report is for information and educational purposes only. The Institute for Energy Economics and Financial Analysis ("IEEFA") does not provide tax, legal, investment, financial product or accounting advice. This report is not intended to provide, and should not be relied on for, tax, legal, investment, financial product or accounting advice. Nothing in this report is intended as investment or financial product advice, as an offer or solicitation of an offer to buy or sell, or as a recommendation, opinion, endorsement, or sponsorship of any financial product, class of financial products, security, company, or fund. IEEFA is not responsible for any investment or other decision made by you. You are responsible for your own investment research and investment decisions. This report is not meant as a general guide to investing, nor as a source of any specific or general recommendation or opinion in relation to any financial products. Unless attributed to others, any opinions expressed are our current opinions only. Certain information presented may have been provided by third parties. IEEFA believes that such third-party information is reliable, and has checked public records to verify it where possible, but does not guarantee its accuracy, timeliness or completeness; and it is subject to change without notice.

