



Institute for Energy Economics
and Financial Analysis

Risky business

*Petrochemicals industry faces overcapacity,
disappointing growth*

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Key findings

The global petrochemicals industry has entered an extended period of financial underperformance driven by too much supply and not enough demand.

Overbuilding of production capacity and a disappointing long-term outlook for demand growth cloud the industry's outlook.

Lower profit margins, poor stock market performance, and stiff competition are steering the industry off course while geopolitical realignments and emerging alternatives gain ground.

Institutional investors should take note of these trends. A range of options is available to protect portfolios from further losses of value from the petrochemicals industry.



Executive summary

The global petrochemicals industry appears to have entered an extended period of financial underperformance driven by its deeply lopsided fundamentals. Overbuilding of production capacity and a disappointing long-term outlook for demand growth cloud the industry's outlook. Long-term investors should take note.

The problems facing the industry abound. Prices for basic chemicals, intermediates, and polymers have fallen from highs seen over the last decade. Compressed margins impair the economics of production facilities. Credit analysts call for the closure of factories on the higher end of the cost curve. Major players like Shell are now seeking to divest almost-new production facilities that only a few years ago were portrayed as flagship assets. In the case of Shell, prolonged construction paired with a troubled start-up delivered an over-schedule and over-budget facility that faced a vastly weakened market.

Industry analysts are sounding a clarion call to alleviate the overbuilding. When S&P Global Energy convenes the World Petrochemical Conference in 2027, it will be under the unambiguous theme of "Build resilience, not capacity."¹ Investor confidence now hinges on whether the industry can move with purpose and speed to correct its missteps.

The petrochemicals industry is no stranger to cyclicalities, as efforts to balance supply and demand have long proven elusive in a crowded, competitive landscape. The growth drivers of the late 2000s and 2010s—particularly the boom of construction and industrial production in China—appear unlikely to be repeated. In the meantime, the industry faces rising risks from geopolitical fragmentation, disruptions to global trade, rising competition from bio-based polymers and recycling, and the legal exposure as inquiries into the impacts of microplastics continue.

The industry's headwinds have weighed on its equity performance, with stock prices posting disappointing gains for several years. One must look back to the 2000s and early 2010s to find the last time that the petrochemicals industry outperformed world equity markets for a sustained period. Financial returns at the time were significant, with *Forbes* describing a 2007 merger of petrochemical producers as the "greatest deal in Wall Street history."² We are now in a different era where the industry's future is unlikely to resemble its past. Investors must decide whether the potential rewards outweigh the risks.

This report begins with a microcosm of the industry's trouble: the story of Shell's Monaca ethylene and polyethylene complex in western Pennsylvania. The next section reviews the equity market performance of petrochemical companies. The following section describes the industry's investment

¹ S&P Global. [World Petrochemical Conference 2027](#). Last accessed September 30, 2026.

² This was the combination of Lyondell and Basell, as referenced below. The combined company filed bankruptcy in 2009, so the "deal" in question includes the equity owners' financial returns thereafter. *Forbes*. [How One Billionaire's Bet on LyondellBasell Turned Into the Greatest Deal In Wall St. History](#). July 30, 2014.

cycles, the growth drivers of the 2000s and 2010s, and the capacity additions that followed. Next, it presents key risks facing the industry. Institutional investors should exercise discretion and perform conservative underwriting of any potential investments in the petrochemicals industry. It concludes with a review of investors' options for limiting exposure to the industry across a portfolio's asset classes.

Introduction

The Wall Street Journal reported in early 2025 that Shell was seeking bidders for its North American and European petrochemical production facilities.³ *The Financial Times* reported in August 2026 that Shell had received bids for the assets. It quoted unnamed sources estimating that, although a deal is not certain, a sales price could reach \$8 billion.⁴ Out of context, the figure may slip past casual readers, but those familiar with Shell's history of investments into its petrochemical plants should shudder.

In 2016, Shell announced a significant investment in Shell Polymers Monaca, an ethylene and polyethylene complex in western Pennsylvania.⁵ Throughout development and construction, the company kept details of its capital costs under wraps. Analysts commissioned by Shell estimated a construction figure of \$6 billion, which was widely cited,⁶ although Shell did not publicly confirm it.⁷ The company revealed the true figure in early 2024, after the plant had been commissioned: \$14 billion, more than twice the original estimate.⁸

Monaca added 1.6 million tons of polyethylene pellet production capacity to Shell's portfolio, but has proven a cautionary tale. After being delivered years over-schedule and presumably over-budget, the company's CEO foreswore large additional investments in its chemicals segment, promising that "we will make sure that we do less of what we would call the 'mega' projects," and declaring that "[s]mall and replicable is beautiful ... and only in exceptional cases where we truly see value add will we go for the bigger projects."⁹

It is significant news for the petrochemicals sector as a whole and major investors in the industry that the Monaca facility is now up for sale, bundled with other major petrochemicals facilities,¹⁰ with reasonable expectations to command a price of just over half of the cost of its construction.

³ Wall Street Journal. [Shell Explores Sale of Chemicals Assets in U.S. and Europe](#). March 2, 2025.

⁴ Financial Times. [Shell draws Exxon interest in \\$8bn US chemical assets sale](#). August 24, 2026. Also posted in [Yahoo Finance](#).

⁵ Shell. [Shell Polymers Monaca](#). Last accessed September 29, 2026.

⁶ See, e.g., Reuters.com. [Trump promises more big energy projects at Pennsylvania plant](#). August 13, 2019.

⁷ IEEFA and IHS estimated the project might cost approximately \$10 billion. IEEFA. [Shell's Pennsylvania Petrochemical Complex: Financial Risks and a Weak Outlook](#). June 4, 2020.

⁸ IEEFA. [Shell acknowledges \\$14 billion price tag for petrochemical plant, more than double street estimates](#). February 8, 2024.

⁹ Yahoo Finance. [Shell plc \(NYSE:SHEL\) Q4 2023 Earnings Call Transcript](#). February 2, 2024.

¹⁰ Shell. [Annual Report and Accounts](#). December 31, 2025, p. 62.

If a sale materializes at such a steep discount, it will be a troubling sign for petrochemical companies. For investors, it illuminates the deep trouble the industry faces, as production capacity has surged, product prices have fallen, and demand growth has slowed.

Institutional investors have recently focused on a troubling pattern of underperformance in the fossil fuel sector. Poor results from much-vaunted acquisitions, as well as efforts to curb fossil fuel emissions, have complicated the investment rationale. Major institutional investors, including the New York State Common Retirement Fund,¹¹ the California State Teachers Retirement System,¹² and the Church of England,¹³ have validated the financial arguments advanced by stakeholders, finding that the pattern of poor financial returns and a challenged long-term outlook merit a financial response: underweighting or excluding fossil fuel companies from the investment portfolio.¹⁴ These institutions have made a wide variety of adjustments to investment policies across asset classes. The result has been a meaningful reduction in investor exposure to fossil fuels, with further efforts being considered.

The stage is set for a similar inquiry and exercise of investor diligence regarding portfolio holdings in the chemicals industry.

¹¹ New York State Common Retirement Fund. [2025 Climate Action Report: Update and Progress Report](#). December 2025.

¹² IEEFA. [CalSTRS trims fossil fuel holdings to mitigate climate risk](#). August 2, 2026.

¹³ The Church of England. [Church of England Pensions Board disinvests from Shell and remaining oil and gas holdings](#). June 22, 2023.

¹⁴ IEEFA. [Passive investing in a warming world](#). February 8, 2024.

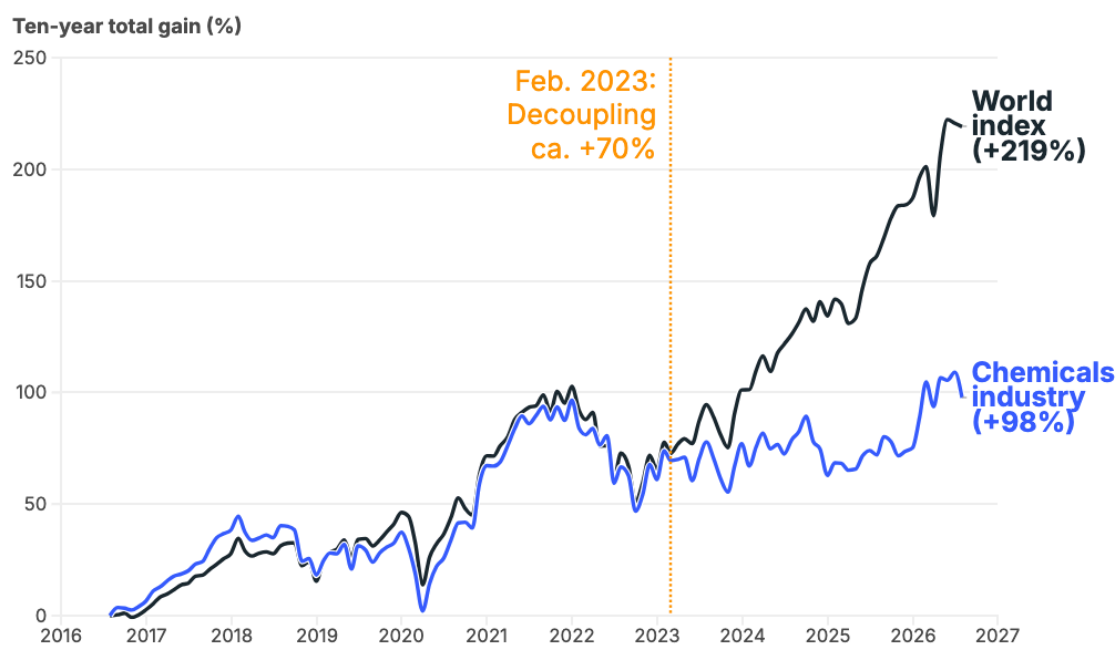
The chemical industry's poor equity performance

Like its siblings in the fossil fuel sector, the petrochemicals industry has seen its financial returns dramatically depart from the trajectory of broad equity markets.

Looking back a decade, the petrochemicals industry largely followed the growth of global stocks from 2016 through 2022. A troubling pattern, however, emerged in early 2023: The industry began decoupling from the broader equity market and began a multi-year stretch of relatively flat performance.

Figure 1

Chemicals sector decoupled from broad equity market in 2023



Monthly returns from July 31, 2016, to July 31, 2026. • "World index" is Bloomberg World Large, Mid & Small Total Return Index (WLST). "Chemicals industry" index is Bloomberg World Chemicals Large, Mid & Small Total Return Index (WCHMLST). Index values rebased to 100 at July 31, 2016, and reset to 0.

Source: Bloomberg, IEEFA calculations

IEEFA

The results are stark: From July 2016 to July 2026, global equities grew by 219% while petrochemical stocks grew by only 98%.

Almost all of the gain in petrochemical stocks since industry shares decoupled from the broader market has occurred since March 2026, following the start of the war in Iran. The industry's shares

have since surrendered some gains. Indeed, a Moody's analysis concludes that petrochemicals are the "most vulnerable" industry to the conflict globally.¹⁵

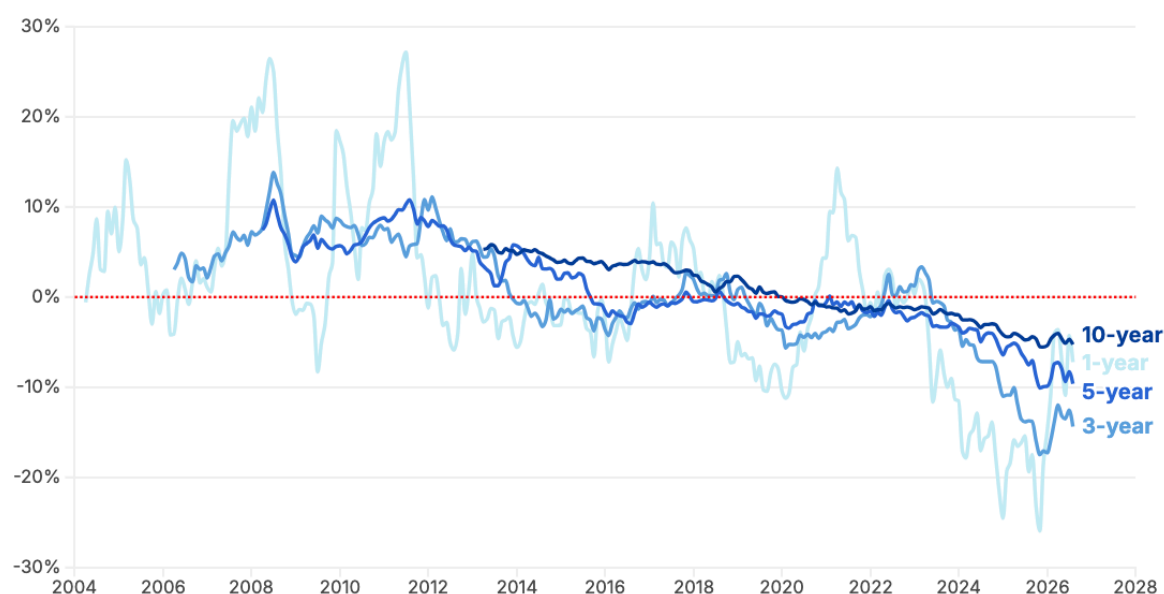
In total, the broad equity market produced a 12.30% annualized rate of return for the decade from 2016 to 2026, compared to a disappointing 7.05% for the petrochemicals industry.

Another way to evaluate relative equity performance is to compare the spread between financial returns on a rolling basis, such as the monthly returns for the preceding one-, three-, five-, and 10-year periods shown below in Figure 2.

Figure 2

Chemicals industry stocks underperform the broad market

Spread between annualized returns of chemicals industry equities and Bloomberg World all-cap index
Positive values indicate chemicals sector outperforms benchmark for preceding 1, 3, 5, or 10 years, negative values indicate underperformance.



Spreads calculated between returns of Bloomberg World Chemicals Large, Mid & Small Total Return Index (ticker: WCHMLST) and Bloomberg World Large, Mid & Small Total Return Index (ticker: WLST).

Source: Bloomberg, IEEFA calculations

IEEFA

The lines in Figure 2 are composed of one point per calendar month. Each point measures the difference, or spread, between the percentage returns of the two indexes during the period of measurement (i.e., the preceding one, three, five, or 10 years). Positive values indicate that

¹⁵ E.g., higher fuel prices raise production costs, supply chain constraints, elevated prices for oil-derived basic chemicals, and supply disruptions, among others. Moody's. Prolonged Strait of Hormuz disruption poses greatest risk for chemicals and airlines. May 27, 2026. Proprietary.

petrochemicals outperformed the benchmark, while negative values indicate that the petrochemicals sector underperformed for the trailing period of years.¹⁶

The chart reveals a pronounced slide in the petrochemical industry's relative equity performance over the last two decades. The industry began by outperforming the broad equity market from the mid-2000s until the early 2010s, but steadily declined into steep underperformance across all periods by the mid-2020s.

The petrochemicals industry is undergoing a period of transformation, touching supply, demand, prices, margins, and trade flows. The decline in petrochemical stocks suggests an extended downward trend. The underlying structural factors behind this trend merit sober evaluation.

Demand, capacity, and investment cycles

To understand the petrochemical industry's decoupling from equity markets, it helps to consider the historical context of its investment cycles.

The chemicals sector has generally been extremely cyclical over the years, with long periods of low prices and compressed margins punctuated by intermittent price spikes and outsize returns.¹⁷

The available productive capacity for chemicals outstrips demand during low-price troughs. As prevailing prices fall, they narrow the gap between the product's market value and its production costs, suppressing margins and investments in new capacity. As demand grows, it catches up to available supply, tightening the market, raising prices, and increasing plant utilization rates. Rising prices and higher utilization rates lift profits, incentivizing the generally large investments required to add more productive capacity. Once adequate new capacity is added, the cycle restarts and prices tend to slump again until demand catches up. These cycles play out over years in the tension between demand growth and capacity growth.¹⁸

Several factors are causing these self-correcting mechanisms to break down, raising the possibility that the industry's present struggles may be the beginning of a longer-term story. Overbuilding capacity or the availability of new low-cost sources of feedstock can disrupt the cycle and prolong downturns. Both have challenged the petrochemical industry in the past decade, following an earlier

¹⁶ For example, the first point on the 3-year line is for March 31, 2006. Its value, 3.0%, represents the annualized return of the Bloomberg World Large, Mid & Small Total Return Index over the previous three years (i.e., from March 31, 2003), which was 26.7%, subtracted from the annualized return of the petrochemicals segment of that index over the same three-year period, which was 29.7%. Positive numbers reflect that the chemicals industry posted greater financial returns than the broad market did for the given period (1, 3, 5, or 10 years), while negative numbers indicate that the chemicals industry's returns were less than the broad market's.

¹⁷ Scott Andre, et al. "An approach to determining the long-term attractiveness of commodity chemicals businesses." In ["Value Creation: Strategies for the Chemical Industry"](#) (2nd ed.), edited by F. Budde, et al. Wiley-VCH Verlag GmbH & Co. 2006, pp. 63–76.

¹⁸ *Ibid.*

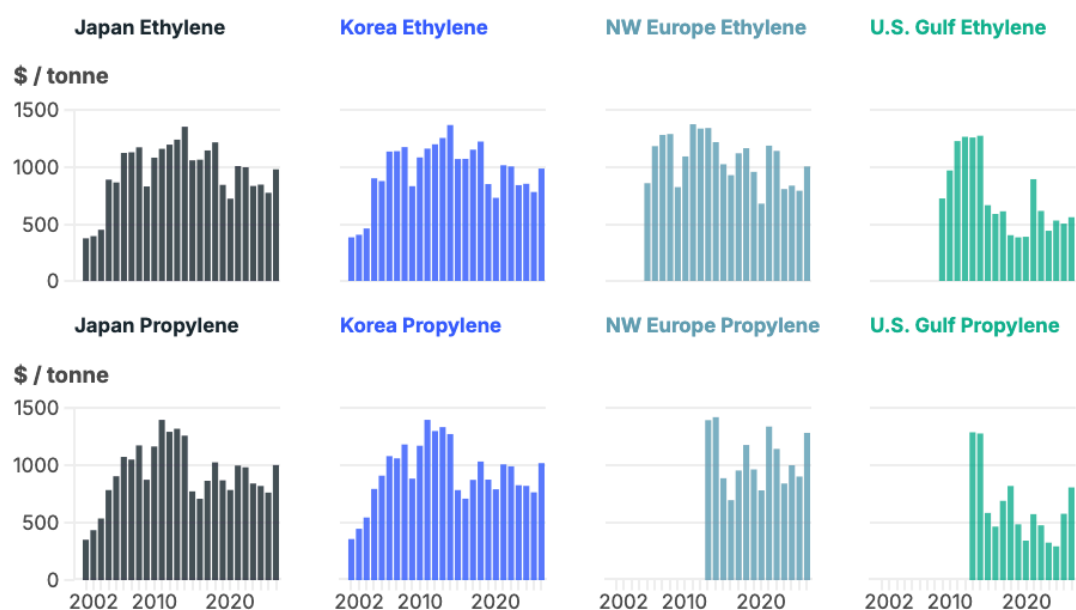
upturn in the mid-2000s. Figures 3 through 5 illustrate the rise and fall of prices, margins, and utilization rates.

After an extended trough in the early 2000s, demand began to rise, lifting the global petrochemicals market. From 2000 to 2004, the total annual production of ethylene rose by more than 10%, to 105 million metric tons; faster growth was expected through 2010.¹⁹ As demand rose, prices for ethylene and propylene monomers climbed. Prices for the chemicals in Korea and Japan peaked in the early 2010s at roughly three times their levels in the 2000s, as shown in Figure 3. Available data for northwest Europe and the U.S. Gulf Coast reflect a similar trajectory for the period.

Figure 3

Chemicals prices climbed in early 2000s, fell after 2014

Annual average nominal prices for ethylene and propylene monomers (as available).



2026 is year-to-date. U.S. prices adjusted from cents/lb to dollars/metric tonne.
Source: Bloomberg, PolymerUpdate

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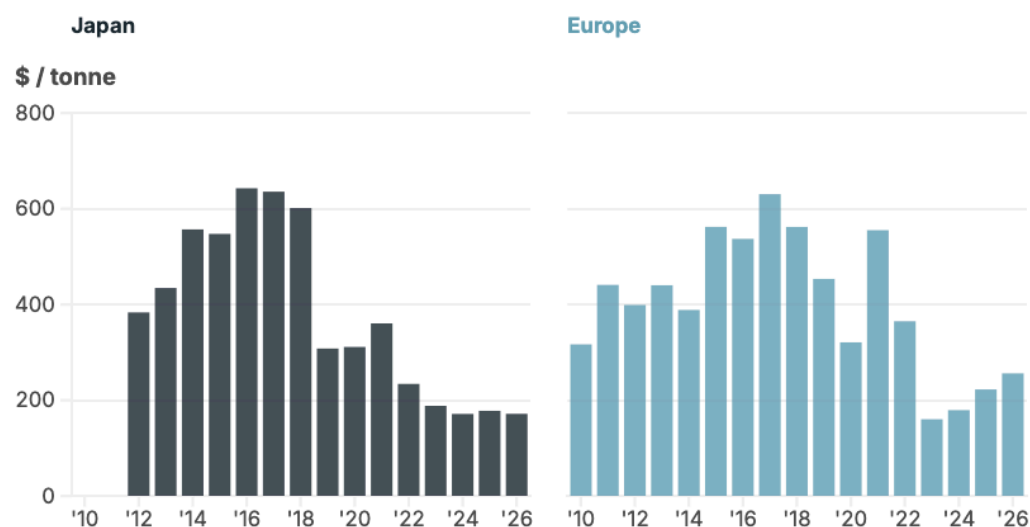
The higher prices fattened producers' cash margins. The product-feedstock spread for ethylene made from naphtha doubled in Europe from 2010 to 2017 and rose by two-thirds in Japan from 2012 to 2016, as seen in Figure 4.

¹⁹ *Ibid.*

Figure 4

Ethylene margins climbed until 2016-17, then fell

Annual average spread between ethylene and naphtha prices (as available).



2026 is year-to-date.

Source: Bloomberg, IEEFA calculations

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With stronger demand, utilization rates of petrochemical production facilities rose from 2010 to 2017, as seen in Figure 5. Ethylene and polyethylene facilities posted an increase from about 85% to about 90%. Propylene and polypropylene facilities rose more than 95% from a similar starting level.

In 2017, McKinsey consultants reflected on the recent period's upward trajectory with glowing terms, highlighting how companies had been riding high in a "golden era."²⁰ Writing a few years earlier, *Forbes* recounted the late-2000s merger of chemicals makers Lyondell and Basell, claiming the extraordinary equity returns in the early 2010s made the combination the greatest deal in Wall Street history.²¹ Equity markets reflected the narrative, with the industry's stocks outperforming the broad market from about 2004 to 2012, as seen in Figure 2.

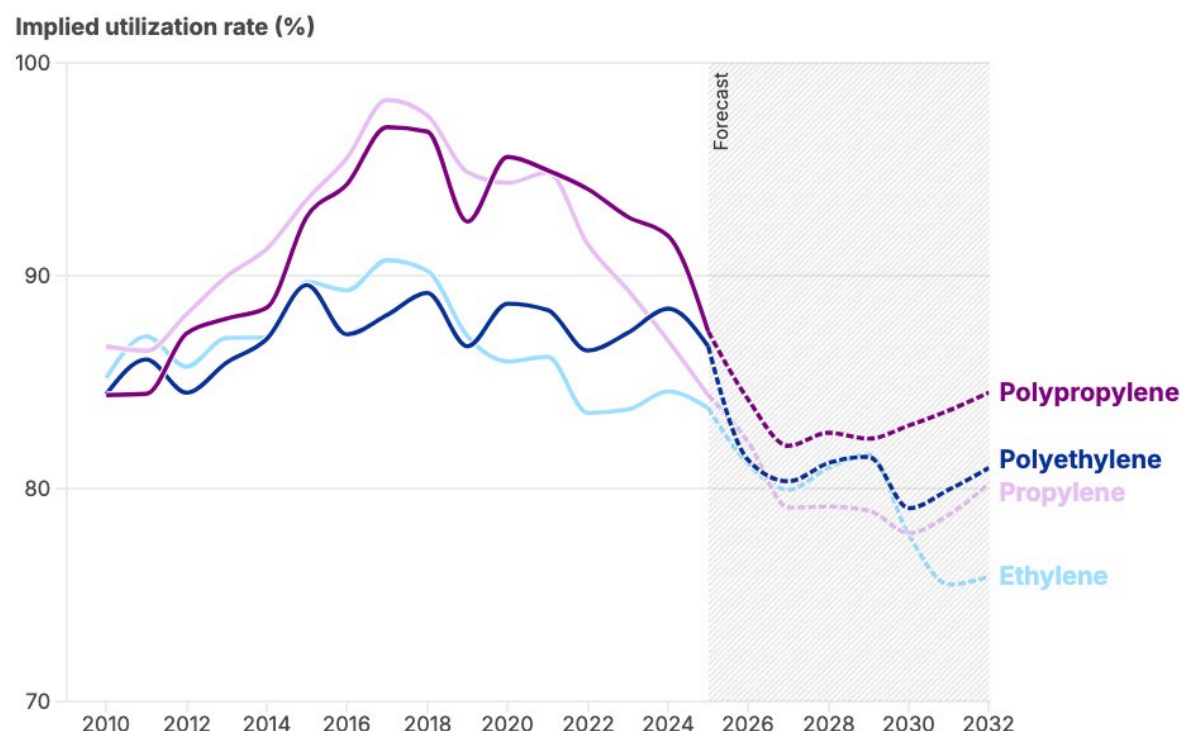
Yet, as the rest of McKinsey's 2017 review foreshadowed, prices, margins, and utilization rates began plunging in the mid-2010s as new production capacity was added worldwide.

²⁰ McKinsey. [Chemicals 2025: Will the industry be dancing to a very different tune?](#) March 14, 2017.

²¹ The much-vaunted returns accrued to the combined company's new owners following its bankruptcy in 2009. *Forbes*, *supra* at footnote 2.

Figure 5

Utilization rates for basic chemical plants rose, then fell, as global capacity was added



Implied utilization rate is global demand divided by global production capacity.
Source: BloombergNEF, Nexant

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Demand from China drove the market upturn

Credit analysts recognized in 1996 that China's size and fast economic growth would provide tantalizing market opportunities for the industry.²² Petrochemical production capacity in China was not keeping pace with the country's rising demand for chemicals because project approvals by officials came slowly. The slow additions to supply led the country to become the world's largest chemical importer by the late 1990s, with a widening deficit between domestic demand and domestic supply.²³

²² Moody's Investors Service. China's Growing Impact on Volatility in the Global Chemical Markets. February 1996. Proprietary.

²³ Moody's Investors Service. Growth in Chemical Capacity in Asia: Expect Trade Shifts and Risks in Certain Global Commodity Markets. March 1997. Proprietary.

Two developments drove the rising demand. First, the country's transition to export-led economic growth established China as the proverbial workshop of the world. Its growing exports of consumer goods required significant imports of resins and other chemical products.²⁴

Second, Chinese authorities eased credit conditions after the 2007-09 global financial crisis, fueling a boom in the country's economy, particularly in its real estate sector.²⁵ Domestic consumption of petrochemicals rose in response to increased demand for construction materials. The resulting wealth effect of escalating values of real estate investments in the portfolios of Chinese retail investors likely also boosted consumption of petrochemical products.²⁶

The result: Between 1990 and 2022, Chinese per capita consumption of base chemicals like polypropylene soared five times faster than the rest of the developing world.²⁷ For petrochemical companies, these developments provided a significant uplift to the market and created great optimism.

²⁴ ICIS. [Why China's 1990-2022 PP consumption could have been 300m tonnes lower without the benefit of "one-off" historical trends](#). March 3, 2023.

²⁵ *Ibid.*

²⁶ ICIS. [What global petchems demand would have been like without the China property bubble warns us about the future](#). September 24, 2021.

²⁷ ICIS. [Why China's 1990-2022 PP consumption could have been 300m tonnes lower without the benefit of "one-off" historical trends](#). March 3, 2023.

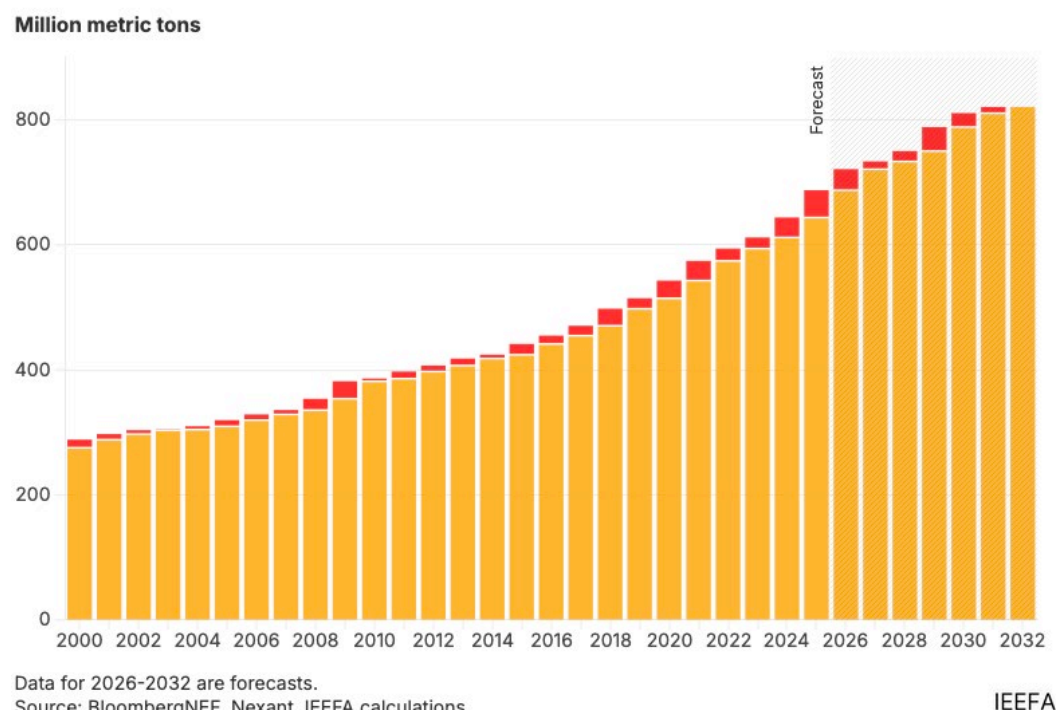
Capacity expansions followed the upturn

The industry responded to the boom by announcing substantial capacity expansions to capitalize on the strong market. Capacity additions for basic chemicals and polymers, including ethylene, propylene, polyethylene, and polypropylene, have accelerated worldwide since 2000 (Figure 6).

Figure 6

Basic chemicals have seen significant capacity growth this century

Annual additions to and **total capacity** of global ethylene, polyethylene, propylene, and polypropylene production



With feedstock costs comprising up to three-quarters of the production cost of various petrochemicals,²⁸ much of this new capacity was located near sources of cheap and reliable feedstocks. One option was to integrate with oil refineries that naturally produce quantities of ethylene and propylene during the refining process. Another was to locate near low-cost sources of hydrocarbon gas liquids. Countries in the Middle East, for example, commissioned large new facilities to produce ethylene, propylene, and their polymers in 2009 and 2010.²⁹

²⁸ Moody's Investors Service. Petrochemicals: Structural Changes Increase Competitiveness; The Future Belongs to Those with Feedstocks, Global Reach and Process Technology. January 1999. Proprietary.

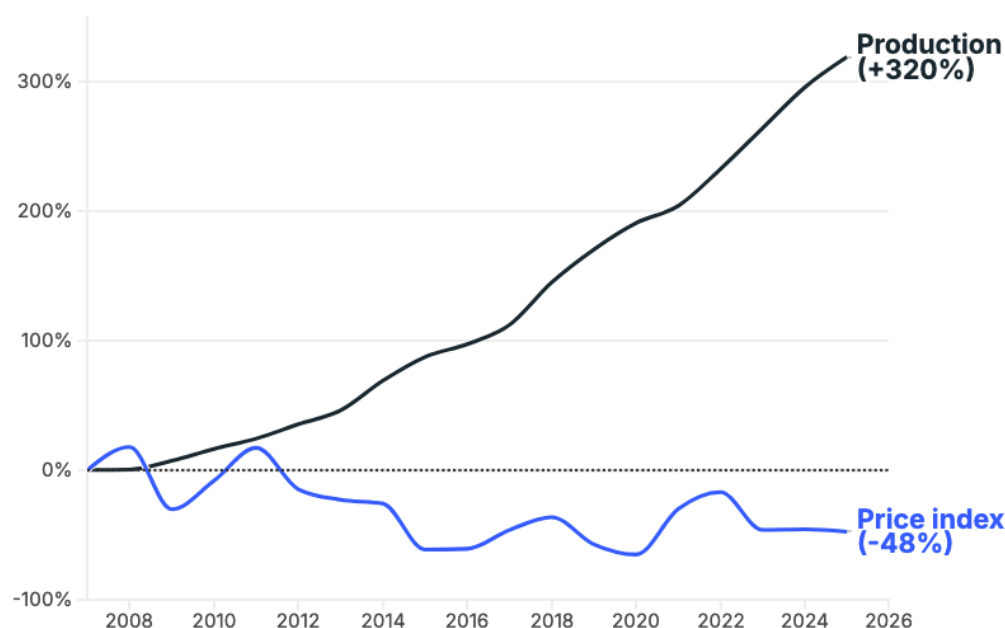
²⁹ BloombergNEF. Petrochemical Assets Database 3.0. Accessed September 18, 2026. Proprietary.

The addition of capacity in the U.S., China, and the greater Asia-Pacific region had a particularly profound impact.

Technological innovation in the U.S. gas and oilfields opened the possibility of new low-cost petrochemical production facilities in North America. Widespread deployment of horizontal drilling and hydraulic fracturing, or “fracking,” allowed oil and gas producers to extract hydrocarbons from previously untapped reservoirs. Starting around 2008, gas drillers began extracting growing quantities of natural gas liquids (NGLs) such as ethane, propane, butane, and natural gasoline from shale and other sedimentary rocks (see Figure 7).³⁰

Figure 7

Sharp growth in US natural gas liquids production significantly lowered prices



Annual total NGL production from EIA's Natural Gas Plant Field Production series. Price index is EIA's U.S. Natural Gas Liquid Composite Price. Values rebased to 100 in 2007 and reset to 0. Source: EIA, IEEFA calculations

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Extraction of NGLs grew so much that the U.S. switched from being a net importer to a net exporter of key liquids such as natural gasoline in 2008, and propane and butane in 2011.³¹

³⁰ U.S. Energy Information Administration (EIA). [Hydrocarbon Gas Liquids \(HGL\): Recent Market Trends and Issues](#). November 25, 2014. P. 4. Natural gasoline is a natural gas liquid made up of five- and six-carbon chains.

³¹ EIA, *op. cit.*, p. 26.

Although propane had more end uses than ethane and fed established markets for home heating, cooking fuel, warming livestock, and drying harvested crops, shale wells were producing more ethane than propane.³² Early on, ethane production from liquids-rich shale gas wells was so voluminous that perhaps one-third of ethane was rejected during distillation, finding its way into natural gas pipelines rather than being separated and marketed like propane and other NGLs.³³

Great volumes of ethane were effectively stranded until sufficient infrastructure to handle the gas was built. That infrastructure promised abundant and inexpensive petrochemical feedstock to eager chemical producers.

Companies began developing new ethylene production in the Ohio River Valley near the “wet” shale gas from the southwestern Marcellus formation, which lies under western Pennsylvania, Ohio, and West Virginia. In addition to Shell’s Monaca, which touted cheap ethane in its announcement of the final investment decision for the plant,³⁴ PTT Global Chemical proposed an ethane cracker and associated production facilities for Belmont County, Ohio,³⁵ while Braskem proposed a large facility near Parkersburg, W.Va.³⁶

The excess supply of ethane from Permian Basin shale wells in West Texas and New Mexico likewise fed an even larger build-out of ethane cracking capacity along the U.S. Gulf Coast, including in Texas’s Golden Triangle, Houston Ship Channel, Coastal Bend region, and Louisiana’s “Cancer Alley” between Baton Rouge and New Orleans.³⁷

Given the strong market in the early 2010s, petrochemicals must have seemed a promising long-term prospect, especially for integrated oil and gas companies that were looking for a new profit center during the heavy annual capital expenditures of the shale boom’s loss-making first decade.³⁸ But problems arose soon after projects were announced. Unfortunately for the U.S. industry and its investors, industry leaders in other countries were also making large capacity additions.

China has played a leading role, accounting for 48% of all net capacity additions for ethylene, polyethylene, and propylene since 2000. China’s petrochemical plants have been increasingly located within large refinery complexes.³⁹ Their integration with oil refineries and proximity to growing end markets across Asia provide cost advantages that U.S. plants cannot replicate. The result is a substantial shrinking of the available petrochemicals market in Asia, which has been an important target of U.S. production expansion projects.

³² See Figure 5, “Figure 5. HGL production from U.S. gas processors, 2000–2014,” in EIA, *op. cit.*, p. 8.

³³ EIA, *op. cit.*, p. 8.

³⁴ Shell. [Shell takes final investment decision to build a new petrochemicals complex in Pennsylvania, US](#). June 7, 2016.

³⁵ IEEFA. [Proposed PTTGC Petrochemical Complex in Ohio Faces Significant Risks](#). March 1, 2020.

³⁶ Wall Street Journal. [West Virginia Natural-Gas Complex Is Put on Hold](#). April 22, 2015.

³⁷ IEEFA. [Texas petrochemical expansion lacks rewards for host cities](#). September 3, 2026.

³⁸ Wall Street Journal. [Big Oil Flashes the Plastic](#). July 28, 2019. See also: IEEFA. [In a tumultuous 2020, shale firms slashed capex to generate cash](#). March 25, 2021.

³⁹ ICIS. [China’s permanently bigger foothold in global PP markets](#). May 27, 2026.

The other regions that made meaningful contributions to global net capacity additions were the Middle East (20%), Asia-Pacific excluding China (14%), and the U.S. (10%). Europe saw only a 1% net increase (see Figure 8).⁴⁰

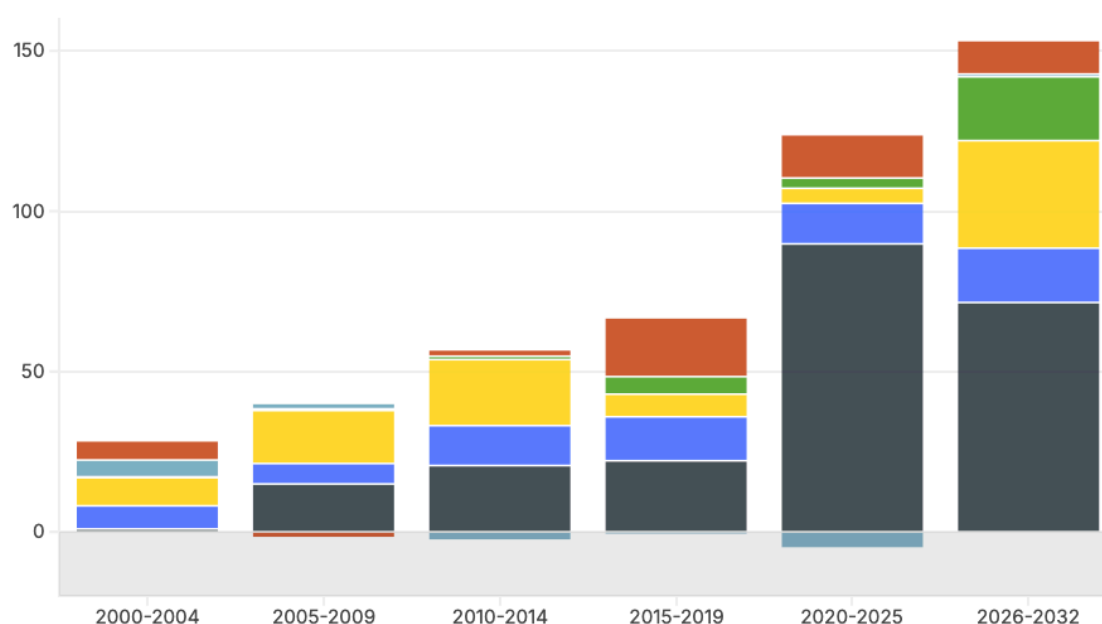
Figure 8

Basic chemicals see mounting capacity additions globally

Combined capacity additions for ethylene, polyethylene, and propylene by region

■ China ■ Asia-Pacific excl China ■ Middle East ■ Eurasia ■ Europe ■ North America

Million metric tons



Data is forecast for 2026-2032.
Source: BloombergNEF

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In addition to pressuring prices, the capacity additions have reconfigured global trade flows. Credit analysts at Moody's point out that China, long a major global importer of petrochemicals, became a net exporter in 2022.⁴¹

The downward pressure from the global capacity additions is visible in the industry's prices, margins, and utilization rates, as seen previously in Figures 3 through 5:

⁴⁰ BloombergNEF, *op. cit.*

⁴¹ Moody's. Oversupply, muted demand and low margins signal continuing credit stress. April 29, 2025. (Proprietary)

- Prices for basic chemicals have fallen from their highs, with ethylene and propylene down by one-quarter to one-half from their highs in the 2010s (Figure 3).
- Ethylene-naphtha spreads have fallen two-thirds in Europe and three-quarters in Japan from their highs last decade (Figure 4).
- Plant utilization rates have fallen from the low-mid 90s to the mid-high 80s, with forecasts putting them into the mid-70s to low 80s (Figure 5).

And the capacity additions are not yet complete. Forecasts from BloombergNEF suggest polyethylene will see peak additions in 2026, with propylene following in 2027, and ethylene in 2030.

For now, supply additions have swamped demand, resulting in a prolonged trough. As explained below, a poor demand outlook, combined with significant overcapacity, will continue to create headwinds for the industry and its investors.

Long-term investment risks

The industry continues to struggle with the balance between adding new plants and adding new supply outpacing demand growth. Slowing global economic growth and compounding overcapacity dominate the industry's short-term outlook.

In the longer term, these risks are joined by geopolitical dislocations that disrupt trade and investment, increased regulatory risk as new multilateral agreements emerge, technological development of bio-based feedstocks and recycling that may substitute for virgin petrochemicals, and the potential for costly litigation regarding microplastics.

Slower global economic growth impairs chemical demand growth outlook

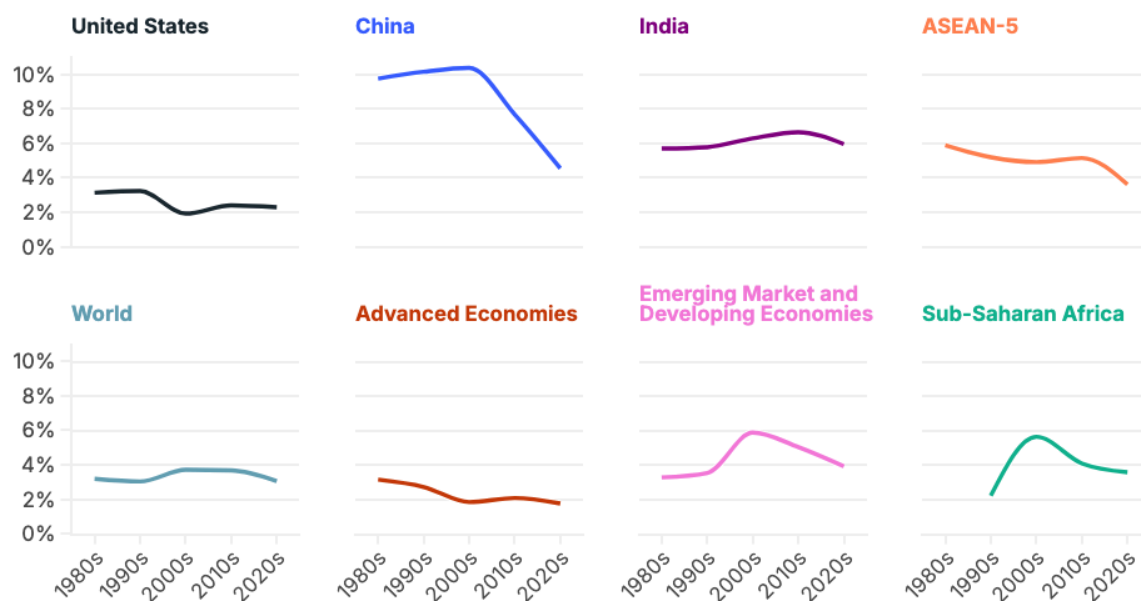
Forecasters have long estimated demand growth for key chemicals like ethylene by multiplying the growth rate for gross domestic product or industrial production.⁴² The assumption is that chemical demand grows faster than economic growth since petrochemicals are upstream inputs into so many products and materials.

⁴² Multiple sources indicate a multiple around 1.3x. Moody's analysts cited a multiple of 1.2 - 1.4x GDP growth to forecast demand growth for ethylene and derivatives. Moody's. Industry Outlook: Chemicals and Related Industries. December 2004. Proprietary. Consultants with McKinsey cited a multiple of 1.3x GDP growth in China and Malaysia to forecast growth for 2003-2010. K. Hoffman and F. Budde (2006). "Today's Chemicals Industry: Which way is up?" In *"Value Creation: Strategies for the Chemical Industry"* (2nd ed.), *op. cit.*, pp. 3. An executive with IHS cited a figure of 1.3x GDP to estimate global polyethylene demand growth. IHS. [North American Resin Markets Trends](#). January 7, 2014. Slide 7. ExxonMobil has previously cited a figure of about 1.2x. ExxonMobil. [2022 Investor Day Presentation](#). March 2, 2022. Slide 38.

Figure 9

Economic growth has moderated around the world

Average annual GDP growth rates by decade for selected countries and world regions



2020s = actual 2020-2025 growth plus IMF forecasts 2026-2029. ASEAN-5 includes Indonesia, Malaysia, the Philippines, Singapore, and Thailand.

Source: International Monetary Fund, IEEFA calculations

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Although global economic growth is a crucial driver of chemical demand, growth rates are slowing, as seen in Figure 9. In the United States, other advanced economies, and China, average annual economic growth rates have fallen since the 1980s. The pattern is projected to continue through the 2020s. Many emerging markets and developing economies saw peak growth rates in the 2000s and 2010s that have since moderated.

Demand growth is essential to the chemicals industry because it diminishes overcapacity and tightens the market. Slowing demand growth would be expected to prolong the dampening impact of today's overcapacity—reducing plant utilization rates, revenues, and profits for an extended period.

Closer examination of the changing composition of gross domestic product (GDP) growth reveals that the risk extends further. Key drivers of today's growth are the service sectors, including digital services, rather than goods-producing sectors.⁴³ Although the construction of massive data centers may generate demand for discrete chemical products used in specialty materials for semiconductors and electronics, cabling, server cabinets, flooring, cooling for computer servers, and other applications, prominent industry analysts estimate that digital and services growth drivers exhibit

⁴³ Epoch AI. [The AI boom has doubled computing infrastructure's share of US GDP](#). June 5, 2026.

near-zero correlation to petrochemical demand in the aggregate.⁴⁴ Instead, the major end markets of automobile manufacturing and housing are flashing red warning lights. Global light-vehicle production has been flat,⁴⁵ and elevated mortgage loan rates and home prices have led to fewer U.S. housing starts for the second consecutive year.⁴⁶

Falling economic growth rates also pose financial risks for new facilities during the years between a final investment decision for a new plant and its start of commercial operations. Even small decreases in actual growth rates compared to projections can mean the difference between success and failure in meeting profit targets.

Demographic and economic transitions in China drive a slowdown in a key demand center

After decades of growth, China is the largest petrochemical market on the planet. The country accounted for 26% of global polyethylene demand from 2000-25 and is forecast to command 37% of demand between 2025 and 2030.⁴⁷ Yet it is undergoing transitions that threaten petrochemical demand.

First, the country's population is aging quickly. Older populations tend to be poorer and buy less.⁴⁸ Moreover, the population has been shrinking since 2022. Deaths outnumber births, which have fallen to the lowest number since 1949.⁴⁹ The United Nations predicts China's population will fall by more than 55% by 2100, as seen in Figure 10. A larger proportion of consumers who are beyond their prime earning and spending years will weigh on GDP growth and demand.

Second, changes in China's economic policies may indicate a permanent halt to overbuilding in the property sector.⁵⁰ The country's growth model has been driven by investment rather than consumption, with elevated lending following the global financial crisis of 2007-09. Current policies seek to address significant leverage among companies and local and regional governments and prevent a resumption of non-productive lending while maintaining GDP growth and economic stability.⁵¹ More modest lending that is directed toward today's leading industries rather than new factories and excess housing is likely to reduce domestic demand growth for petrochemicals, which benefited from the country's construction boom.⁵²

⁴⁴ ICIS. [Busting the Myth of a Petrochemicals Demand Rebound: The Demand Revolution](#). November 5, 2025.

⁴⁵ Moody's. Automotive Manufacturing – Global: Outlook remains negative as economic growth slows, tariff uncertainty persists. June 1, 2026. Proprietary.

⁴⁶ Moody's. Building Materials – US: Infrastructure and data centers anchor demand despite housing volatility. April 15, 2026. Proprietary.

⁴⁷ BloombergNEF. Petrochemical Supply and Demand Database 1.0.

⁴⁸ IEEFA. [Petrochemicals: Rising signs of a secular decline?](#) September 30, 2024.

⁴⁹ Financial Times. [China registers lowest number of births since records began](#). January 18, 2026.

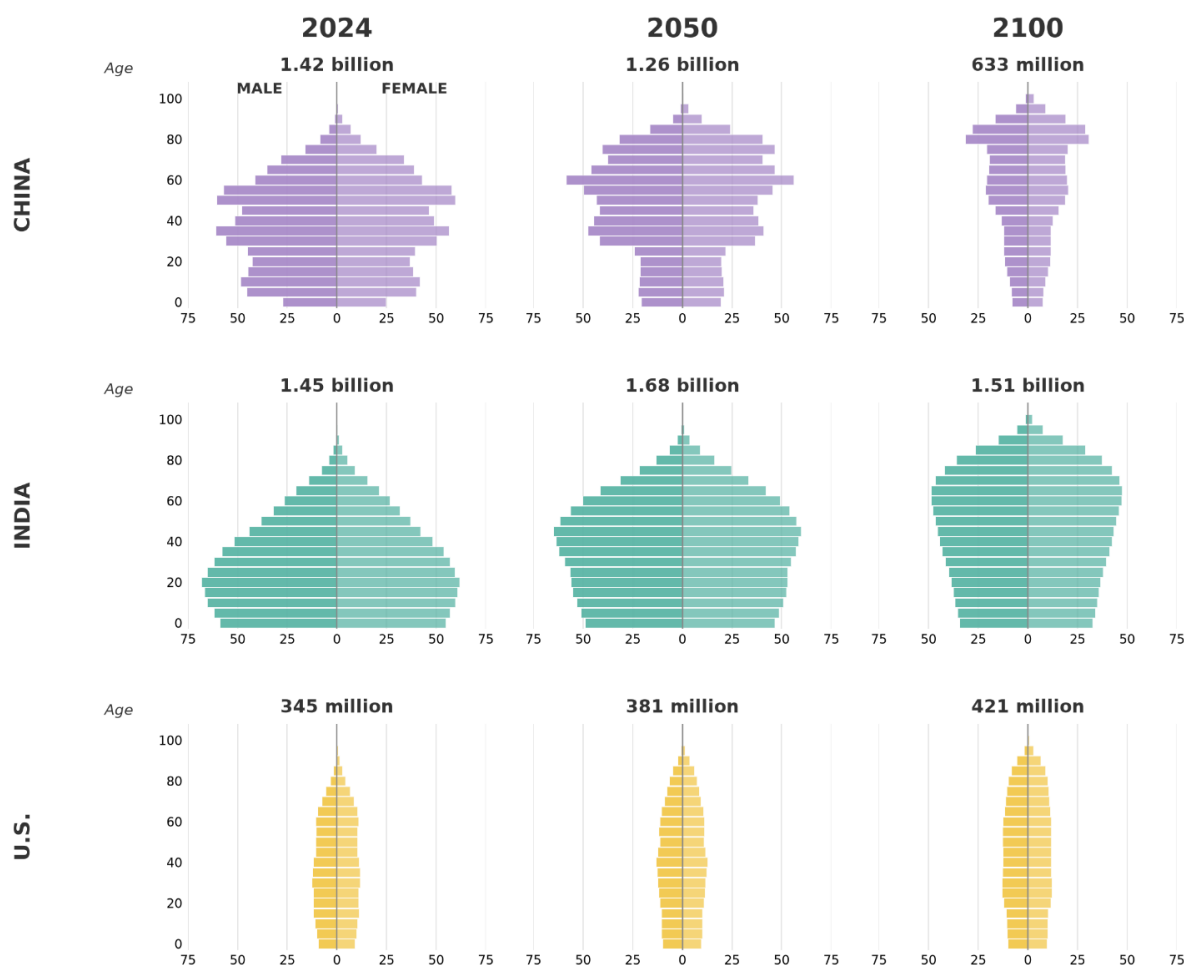
⁵⁰ ICIS. [With Common Prosperity set to dominate 2022, here is some essential history](#). January 5, 2022.

⁵¹ Moody's. Credit Opinion: Government of China – A1 Stable. April 29, 2026. Proprietary.

⁵² ICIS. [Why China's 1990-2022 PP consumption could have been 300m tonnes lower without the benefit of "one-off" historical trends](#). March 3, 2023.

Figure 10

Population projections to 2100 for China, India, and the U.S.



Source: United Nations, World Population Prospects 2024. Inspired by R.Viacenslav on LinkedIn.

Further capacity additions prolong overcapacity

Despite significant existing overcapacity, a large amount of additional production capacity is currently under construction or in development worldwide, as seen in Figure 11.⁵³

Capacity additions have accelerated since 2018. For ethylene, propylene, and polyethylene, plants under construction between 2026 and 2032 are expected to add capacity equivalent to 48%-55% of plant capacity commissioned since 2018.⁵⁴ Another wave of plants has not yet entered construction

⁵³ BloombergNEF. Petrochemical Assets Database 3.0. Proprietary.

⁵⁴ Includes capacity ramping up to commissioning in 2026.

but is under active planning and engineering, equivalent to another 18%-34% of capacity additions since 2018.

Continued overbuilding is also evident in the aromatics value chain. Benzene facilities under construction account for 29% of capacity additions since 2018, with another 6% in planning and engineering. Paraxylene projects have added 15% of capacity since 2018, with an additional 16% increase from plants undergoing planning and engineering.

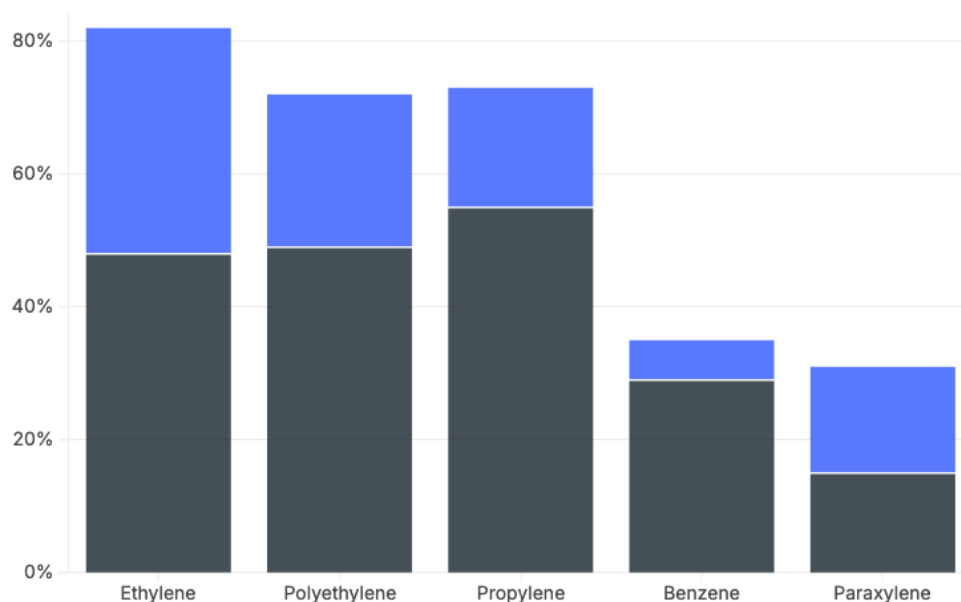
Figure 11

Significant additional capacity is under construction and in development

Global capacity under construction or undergoing planning/engineering for key chemicals, 2026-2032; values are normalized to amount of capacity added between 2018-2025

■ Under Construction ■ Planning & Engineering

% of total capacity additions, 2018-2025



Source: BloombergNEF, IEEFA calculations

IEEFA

The number and size of plants under construction all but ensure that overcapacity will worsen in key chemical value chains. Not every plant that is under development will necessarily be constructed and commissioned, and there is good reason for delay, given market conditions and supply chain strains. The amount of additional capacity in planning and engineering is likely to further compound the industry's troubles.

Without a wave of project cancellations, the outlook is for deepening market stress. Increasing overcapacity will prolong the low-margin recovery period before prices tighten, threatening profit targets and the economic viability of marginal plants for longer durations. If newly commissioned plants use advantaged feedstocks or new technology that lowers production costs, existing higher-cost producers will face even greater financial pressure. This outlook is reflected in a January 2026 S&P Global Ratings warning of “prolonged weak demand and global oversupply across many chemical value chains.”⁵⁵

Geopolitical realignments may raise costs and complicate the industry’s investment plans

Trade uncertainty erodes economic sentiment, crimping consumer spending and business investment as firms are left unable to plan with confidence. Chemicals industry customers slowed orders and curtailed spending following the imposition of U.S. tariffs in April 2025.⁵⁶ U.S. chemical exporters were subject to escalating tit-for-tat tariffs between the U.S. and China in 2025, with Chinese retaliatory measures temporarily raising the average tariff on all U.S. imports, including chemicals such as polyethylene, to almost 148%.⁵⁷ Approximately \$3 billion of U.S. plastics were also caught up in Canadian retaliatory tariffs following the imposition of U.S. tariffs in August 2026.⁵⁸

Further trade policy dislocations and uncertainty greatly increase the risks facing industry executives and investors looking to allocate capital and threaten to pour cold water on the growth prospects of all cyclical industries, including chemicals. As the Plastics Industry Association concluded soberly in a September 2026 report, uncertainty over U.S. trade and tariff policy is expected to continue for several years, “weighing on prospects for stronger production and shipments growth.”⁵⁹

Additionally, the United Nations treaty to end plastic pollution is poised to resume formal negotiations in 2027. The substantive terms of a final internationally binding instrument are not yet determined, but could limit growth and long-term prospects for the industry. Proposals such as a production cap on single-use or short-lived plastic products could benefit the industry by smoothing price shocks, providing a framework for integrating new technologies and polymers, and rationalizing the supply imbalances that plague the industry’s profitability.⁶⁰ Related proposals, such as applying the “essential use” concept from the 1987 Montreal Protocol, offer a structured decision-making process to broadly reduce plastic production except for those deemed essential to health, safety, or society.⁶¹

⁵⁵ S&P Global Ratings. [Industry Credit Outlook 2026: Chemicals](#). January 14, 2026.

⁵⁶ Moody’s. Trade policy poses risk to chemicals demand and polyethylene export. April 15, 2025. Proprietary.

⁵⁷ Financial Times. [China increases retaliatory tariffs on US imports to 125%](#). April 11, 2025.

⁵⁸ Plastics News. [Wood: Tariffs a ‘net negative’ for U.S. plastics industry](#). August 26, 2026.

⁵⁹ Plastics Industry Association. [Size and Impact 2026](#). September 16, 2026. Quoted in Plastics News, *op. cit.*

⁶⁰ IEEFA. [Why a production cap on plastics makes financial sense](#). September 19, 2024.

⁶¹ IEEFA. [Why a global plastics treaty is an economic imperative, not just an environmental one](#). September 22, 2025.

Separately, countries seeking greater ambition from international climate and environmental forums are moving to establish parallel multilateral agreements that support escalating regulatory interventions. Chief among these was the April 2026 international conference in Santa Marta, Colombia, on transitioning away from fossil fuels. Motivated by the slow progress of the UN Framework Convention on Climate Change process, the conference drew on the precedent of previous international conferences that addressed landmines, cluster munitions, and nuclear weapons. The Santa Marta conference was designed to accelerate actions by willing nations and subnational actors to reduce fossil fuel consumption and support a transition to a low-carbon economy. Petrochemicals fell within the scope of discussions in Santa Marta, signaling that policies to reduce petrochemical production and consumption are seen as consistent with climate action and are likely to remain on the agenda of future conferences.⁶²

Scientific and medical research pursues link between microplastics and health harms

Medical literature on the presence and effects of microplastics in the human body continues to expand, and scientific investigations continue to discover microplastic contamination in all corners of the globe.⁶³ These topics resonate with the public, and lawsuits on these subjects have already been filed by parties as diverse as U.S. state attorneys general, environmental advocacy groups, and private individuals.⁶⁴ The cases and causes of action echo recent litigation over per- and polyfluoroalkyl substances (PFAS) and the product liability claims around asbestos, lead paint, and other substances that drove some industrial companies to file for bankruptcy protection in the early 2000s.⁶⁵ Although existing plaintiffs have brought claims of a relatively limited scope,⁶⁶ the risk remains that emerging scientific and medical evidence will link microplastics to a range of harms to health and the environment, with plaintiffs seeking damage awards from courts.

Bio-based feedstocks and recycling raise further risks

Petrochemical producers and academics continue to research and develop bio-based feedstocks that use carbon of biological rather than fossil origin. Researchers have cast a wide net across plant materials, including corn, silage, molasses, palm oil, canola, soy, sugarcane, and more. The variety of approaches under development suggests that early-stage investors successfully distinguish and fund technologies that find a commercial outlet, with competitive implications for producers of

⁶² Santa Marta Process. [2026 Final Report: 1st International Conference on Transitioning Away from Fossil Fuels](#). June 2026.

⁶³ Zhang, *et al.* [Microplastics and human health: unraveling the toxicological pathways and implications for public health](#). *Frontiers in Public Health* 13:1567200. June 18, 2025.

⁶⁴ Arnold & Porter. [Microplastics – The Future of Toxic Tort Litigation?](#) November 5, 2025.

⁶⁵ Moody's. Chemical industry outlook. December 2002. Proprietary.

⁶⁶ Arnold & Porter, *op. cit.*

hydrocarbon-derived chemicals. Against a backdrop of slowing demand growth, even modest volumes of bio-based feedstocks could further pressure prices and margins.

Recycling presents a similar scenario. Established chemical producers continue research and development, combining significant human capital, technical capacity, and intellectual property.⁶⁷ Major markets are tightening regulations, leading to forecasts of increased recycling rates of plastic waste: BloombergNEF projects a rise in plastics recycling from 12% in 2024 to 21% in 2040.⁶⁸ Increased recycling in a low-demand growth environment portends narrower margins for chemical producers. The overhang of existing capacity provides time to improve the efficacy and economics of recycling technologies before new capacity is needed.

⁶⁷ E.g., Röhm's efforts to develop recycled methyl methacrylate. Röhm. [Europe-wide alliance for PMMA recycling](#). Accessed September 25, 2026.

⁶⁸ BloombergNEF. Recycled Plastics Supply Outlook: China and Europe lead the way. September 2, 2026.

Conclusion

In 2021, analysts at S&P Global Ratings warned the Formosa group of companies that undertaking a large ethane cracker and petrochemical complex in St. James Parish, La., would be credit-negative for the company. The same trends identified by S&P then—softening prices and margins—continue to play out today.⁶⁹

The global petrochemicals industry appears to be undergoing a long-term structural decline driven by overbuilding of production capacity and a disappointing long-term demand outlook. Investors have noticed that the industry's stock prices have decoupled from global equity growth since 2023. The industry's long-term outlook is further clouded by geopolitical fragmentation and realignments, disruptions to global trade, developments in bio-based polymers and recycling, and scientific and medical inquiry into the health impacts of physically degraded plastics in the human body and the environment.

The trends highlighted here have particular significance for oil and gas companies, both private integrated majors and national oil companies, who have been expanding their petrochemical production in an apparent effort at greater vertical integration. Petrochemical production was intended to be a new profit center, but it has become a drag on profits. Shell's experience with its Monaca facility and its subsequent pledge to limit further capital employed in its chemicals segment is only the most prominent example.⁷⁰

Against this negative outlook, institutional investors have a variety of options to defend their portfolios against further underperformance in the petrochemical industry.

For passively managed equity portfolios, shares held directly in separately managed accounts may be sold directly. Index providers have sophisticated capabilities to produce customized indexes to provide a fair benchmark to a newly composed portfolio. Investment managers of active equity portfolios can generally incorporate asset owners' restrictions on the investment universe.

In fixed-income portfolios, managers can stop purchases of the petrochemical industry's new bond issues. Some portfolio managers may already be restricted from purchasing new positions in many petrochemical companies, as credit quality has declined.⁷¹

Extending the exclusions beyond public markets to private equity, infrastructure, real assets, and other options is entirely possible. The task is only slightly complicated by the illiquidity of current holdings of private limited partnership interests. Although secondary transactions to sell such interests to another party are possible and could be pursued if deemed prudent, a separate approach exists. To avoid the time, effort, and cost of secondary transactions, institutional investors

⁶⁹ IEEFA, [S&P pushes Louisiana project cancellation as credit boost for Formosa](#). February 24, 2022.

⁷⁰ Yahoo Finance, *supra* at footnote 6.

⁷¹ Moody's, *supra* at footnote 38.

can and do negotiate side letters with general partners about the terms of their investment management relationship. Individual limited partners may seek to avoid ownership of portfolio companies operating in the petrochemicals industry.⁷²

Shifts in portfolio composition can be made through a prudent and deliberate process. Such a process begins by defining the boundaries of the industry in question and evaluating its past financial performance. The next step would be to evaluate the industry's forward-looking value proposition and risk outlook, consider a spectrum of potential restrictions on the fund's investment universe, and assess the options available to implement them.

If a fund's fiduciaries decide to limit exposure to the industry through a well-informed deliberative process, the investment staff or consultants can draw up a plan to implement the chosen path. Restrictions on new securities purchases can be communicated to managers immediately. For internally managed portfolios guided by a strategic asset allocation, periodic rebalancing provides an opportunity to preferentially sell securities issued by petrochemical companies to achieve the goals of the rebalance while minimizing additional transaction costs.

Today, some institutional investors are moving away from strategic asset allocation to implement an emerging portfolio management paradigm often called the total portfolio approach.⁷³ Such an approach would pose few barriers to incorporating the considerations identified in this report and may even facilitate them in the actively managed portion of a total portfolio. Exposures in any residual passively managed or balancing portfolio could also be addressed as described above.

Many globally significant institutional investors have already taken a combination of these steps with respect to the fossil fuel sector. Institutions seeking to actively mitigate financial risks in an industry like petrochemicals, which faces long-term macroeconomic headwinds, have precedent and a clear path to accomplish this goal.

⁷² Seward & Kissel. Private Equity Side Letters Post-ILPA 3.0. September 7, 2022. Available upon request.

⁷³ CFA Institute Research & Policy Center. [The Total Portfolio Approach \(TPA\): A Practical Guide for Navigating the Transition to TPA](#). July 28, 2026.

About IEEFA

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