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Petrochemicals: Rising Signs of a Secular Decline?

- *Petrochemical market conditions are reminiscent of the coal industry's decline.*
- *A confluence of factors today—slowing economy, aging population in China, sustainability growth and a realigned geopolitical landscape—are reshaping the petrochemical market outlook.*
- *The pivot to petrochemicals reflected an industry recognition of the current and future decline of the upstream and downstream oil and gas sector.*
- *There are many options that companies, countries and the industry can choose to reduce plastics pollution and the petrochemical industry's carbon footprint.*

A confluence of factors today—slowing economy, aging population, sustainability growth and a realigned geopolitical landscape—are reshaping the petrochemical market outlook. These factors play out against China's historical dominance of the petrochemical markets. Many of the trends are reminiscent of the coal sector's decline in the United States.

From 2008–12, some of IEEFA's staff attended U.S. and international coal industry conferences. We thought it best to supplement our education with observations from the horse's mouth. The timing of our attendance during this period was fortuitous.

Industry leaders were initially upbeat: They offered sure-handed, surgical claims to mine rich coal veins in Appalachia. And when that didn't work, they could cut down the mountain and extract coal with dynamite. Other strategies included leasing coal in the Powder River Basin to serve the 150 new coal plants blessed by the Bush-Cheney administration and/or build new terminals off the West and East Coast, and out of Louisiana and Alabama. The export options seemed limitless; in part, it was to feed China's seemingly insatiable coal appetite. The international front was also abuzz over a new Australian coal mine. One of the most vocal proponents, then-CEO Greg Boyce of Peabody Coal, hailed this growth as a new super cycle for coal.



Increasingly, though, the industry leaders were being warned, first by utility executives who came with messages of smaller annual procurement budgets. Then, good friends of the industry came in with horror stories of creeping regulatory incursions. Still others came complaining about environmentalists.

A few recognized the environmental factor was more than a nuisance. They said the environmental movement had meaningful staying power capable of identifying targets and market shifts to show that new coal plant plans were ill-advised. One observer summed it up: Markets empower the environmentalists and environmentalists empower the markets. The 150 new coal plants were ultimately defeated. Eventually, some of coal's stalwarts in the banking and finance sector came in with stronger communications: The dumb money is in coal.

Finally, in a 2015 investor presentation, Arch Coal called it what it was: A secular decline.

It started in Appalachia, as thinning coal seams led to a disastrous plan to blow up mountains. The ballooned price of high energy content coal just wasn't able to compete in the domestic energy market. And the public opposition to "mountain-top removal" was vociferous.

Then, circa 2008, came fracking and the death knell of Appalachian thermal coal. The secular decline was now firmly embedded in coal's forward trajectory: Any one factor could be considered cyclical, but most of the risks had staying power. Low competitive prices from fracked natural gas; growing competition from wind and solar energy; lower prices for coal in response to the competition; rising costs of coal production (including construction costs driven in [part by energy demand in China](#)); [failed export plans](#); and a broadly determined network of environmental and climate voices, the confluence was overwhelming. These were increasingly [long-term forces](#) tamping down the coal industry.

Natural gas prices, as well as successful wind and solar power generation, were taking the U.S. coal industry by storm. In 2005, coal use peaked at 1.1 billion tons per year, dropping to just under [600 million tons](#) per year in 2023. The term "troubled" and "coal market" now started and ended most sentences about coal's outlook. Countries without a strong indigenous gas market saw coal's loss of market share to [low cost wind and solar](#) happen precipitously. A new chapter of [wind and solar vs. natural gas](#) was ushered in at the same time was being displaced.

The rise of natural gas and public opposition to coal supported new solar and wind investments and the firm secular decline of coal set in across the industry.



We now examine the case for petrochemicals as a sector in secular decline. The petrochemical secular decline we see is being driven largely by four factors: Slower global growth; an aging Chinese population that is also growing poorer; sustainable markets chipping away at fossil fuel market share; and a geopolitical realignment that is interjecting new forms of uncertainty into trade relations.

1. Slower Global Growth

The first factor, slower economic growth, is felt in the United States as a scattered array of [nine U.S. local communities](#). Once buoyed by optimistic corporate announcements of new projects, they now face disappointing news of project cancellations, delays and poor financial performance upon opening.

What connects these little U.S. stories is the big China story. Simply summarized, China controls a large portion of the global petrochemical market—and growth is slowing down.

Figure 1: China’s Estimated Global Production Market Share of Selected Petrochemicals: 2025

	World	China	% China
PRODUCT	2025	2025	2025
ETHYLENE	191952	48614	25%
HDPE	61125	15917	26%
LLDPE	46077	12191	26%
METHANOL	128596	76000	59%
POLYPROPYLENE	97616	38985	40%
PTA	88612	63500	72%
Total Production	613978	255207	42%

Source: ICIS

Historically robust markets in petrochemicals grew along with China’s double-digit annual economic growth from the 1990s through the early 2020s.

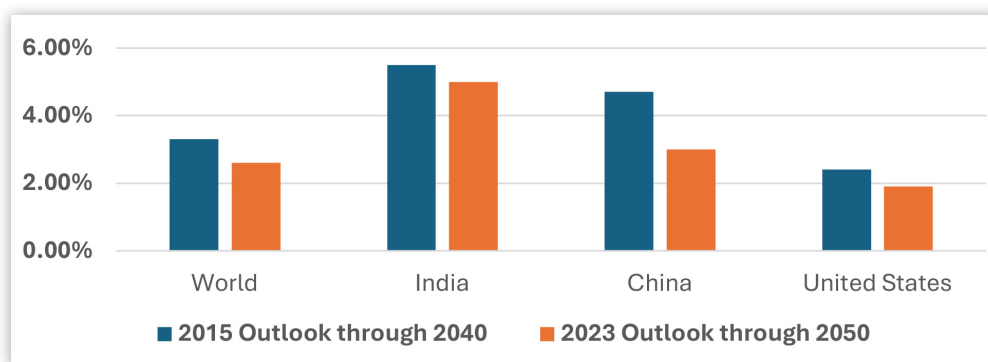


Today, China’s double-digit economic growth has faded, but investment plans for new petrochemicals remain and existing petrochemical buildouts in China continue. While the country seeks self-sufficiency, it also pursues [market outlets to foreign consumers](#).

The approach has limits. China’s overcapacity drives down prices, making the products more desirable in the short term. Other countries, particularly those in China’s immediate geographical orbit, are now off-takers. The story is complicated, however, by the development needs of many of those other countries. China’s plan to dump large amounts of cheap plastics abroad may conflict with the petrochemical and economic development plans of other countries.

Slower GDP growth has significant effects on petrochemical markets. Petrochemical growth is highly correlated to economic growth. ExxonMobil and most petrochemical producers typically link GDP growth and revenue strategies to petrochemicals, moving at 2x or more of GDP.

Figure 2: Comparative GDP Outlooks 2015 and 2023



As growth slows, so do petrochemical volume sales, pressing down utilization rates and prices. These factors all become part of the market signals that support or raise red flags to capacity additions in the petrochemical market.

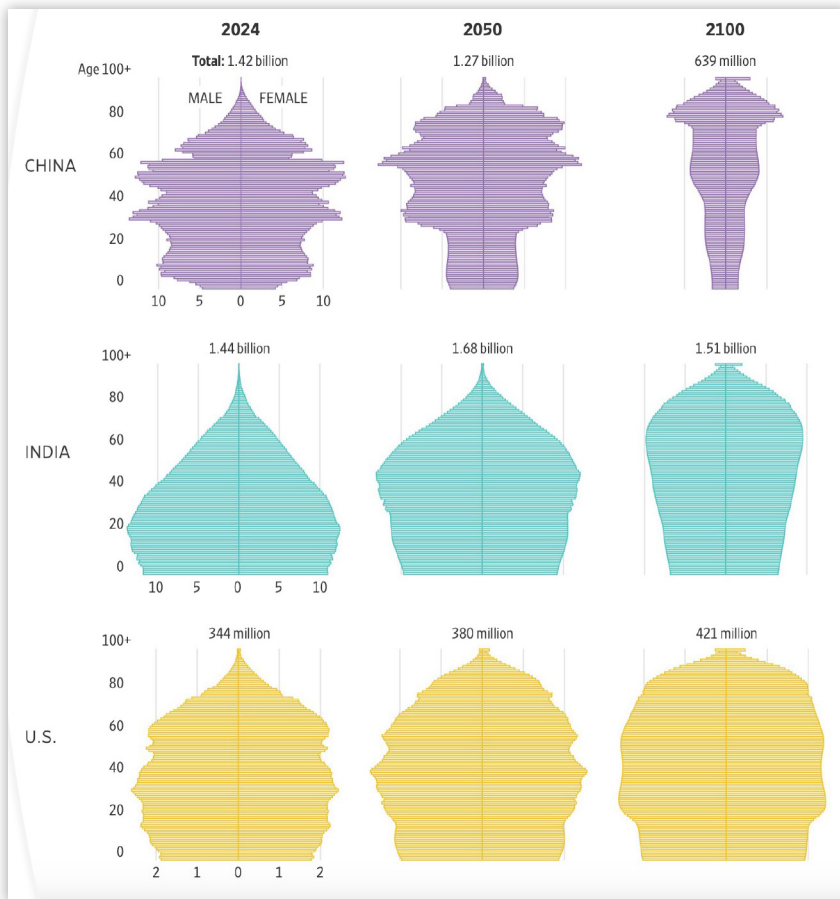
The chart above shows anticipated GDP outlooks, one view from the 2015 United States Annual Energy Outlook and another one eight years later. In the 2015 scenario, the global outlook was for GDP to rise to 3.3%. Today, the outlook has dropped to 2.6%. The markets were far more optimistic in 2015 than they are now. Similarly, China’s long-term GDP drop is more pronounced—from 5% in 2015 to 3%.



2. An Aging, Poorer Population in China

China’s population is growing older and poorer, and total population is expected to shrink. Older, poorer populations tend to buy less, resulting in lower demand for various types of plastics. In contrast, as shown below, China’s principal competitors—the United States and India—face a future of growing populations at all age levels.

Figure 3



Source: R.Viactenslav – LinkedIn Database, UN Population Division

3. Sustainable Products Chipping Away at Market Share

Sustainable replacements are making inroads in major petrochemical commodity markets. Forward-looking [cost curves are promising more of the same](#).

Recycling, bio-feedstock and increased use of renewable electricity are eroding the demand for fossil fuels—the linchpin of current Chinese petrochemical supply calculations. [The Methanol Institute estimates that by 2030, 12% of all methanol capacity - about 28 million tons - will be renewable menthol](#). The remainder, 202 million tons, will be derived from fossil fuels, according to ICIS estimates. Electric cars are expected to be the only new cars on the market after 2040. China currently has control of 59% of global methanol and its outlook is negative.



The competitive trends are the result of new investment in companies with growth-oriented agendas and a new community of entrepreneurs looking to make a name for themselves. Complex questions of production design and production and market integration remain, but capital markets are betting on these alternatives.

IEEFA's own analysis is taken from and builds upon the work of other knowledgeable market watchers.

For several years, John Richardson, the Asia petrochemical specialist for ICIS, has mapped the secular decline scenario as a way of explaining changes in the world's petrochemical markets. His analysis, much like Arch Coal's in 2015, argues that the current decline in the sector is not a temporary trough, but rather a trend. The petrochemical markets are faltering, and the source of some of the decline is sustainable market development.

When IEEFA began to look at the industry, several other points became clear to us that support the secular decline thesis.

First, the [Wall Street Journal's coverage](#) of U.S. fracking in 2017 consistently stressed that the new natural gas bonanza was not resulting in revenues sufficient to cover expenses. Rather than a river of green, fracking produced an ocean of red ink. Significant oversupply and plummeting prices destroyed investor value. The problem identified by the Wall Street Journal was later crystallized in Daniel Yergin's book, *The New Map*. The first few chapters summarize the birth of fracking and then the history of fracking operations. While this massive technological achievement was seminal in the history of extraction, Yergin also had to admit the business model never developed.

The next pivot that the Wall Street Journal covered was the move by the oil majors to greater amounts of investment into petrochemicals. The Journal was pretty much a lone voice in mainstream media carrying the message that petrochemicals had historically produced lower, not higher yields—[and that the economics of oil](#) would probably end up raising the costs of petrochemicals, rather than lowering them.

The press coverage was raising critical points but not connecting dots. ICIS and Richardson covered how low natural gas prices were resulting in oversupplied markets. This took care of the small dots within the petrochemical sector. The Journal and others were seeing the financial deterioration of fracking and with it covering the dots within the upstream sector. The pivot from oil and gas upstream investment to petrochemicals was structurally driven, and the problems within petrochemicals showed that the new shiny object to grow the oil and gas sector was unraveling.

A solid explanation for the decades of decline of the energy sector could now be offered. The company's powerful stock performance in the 1980s raised its performance to 28% of the market. Today, the energy sector claims 3.5% of the market. It has been a long decline, littered with bad deals and an even larger failure of vision.



The trajectory of industry leader ExxonMobil makes the case. Before the 2022 invasion of Ukraine, ExxonMobil had lost its position in the top 10 of the stock market and a 9-year run as part of the [Dow Jones Industrial Average](#). The number of bad deals were punctuation points for the larger sector decline.

Tar sands [investments lost money](#), [XTO missteps](#) forced more write-offs, uncertain Permian Basin strategies has prompted [securities litigation](#) and two Russian [loser deals](#) found their way into this downward mix. Two of these debacles led to class-action suits in [Canada](#) and the [Permian Basin due to questions](#) about the accuracy of its reserve numbers.

The outlook is weak—enterprise-wide for ExxonMobil and sector-wide for energy.

Second, credit raters made clear that the [era of coal was over, and the natural gas and oil evolution was facing serious pitfalls](#). In September 2020, Moody's published its own pivot statement. It concluded that after eight major oil and gas infrastructure projects fell apart, the agency needed to tighten its credit reviews of oil and gas projects. Moody's concluded that regulators and communities were raising questions about these projects that exposed fault lines, resulting in project delays and capital disruptions that were turning into losses for the companies involved.

Standard and Poor's drew the issue more tightly regarding the declining creditworthiness of petrochemical facility build-outs in October 2021 (and again in late 2023). S&P used the occasion of a credit opinion on Taiwan-based Formosa Plastics to describe the constellation of risks facing these projects. A confluence of market factors—rising construction prices, flat market prices for commodities and labor cost problems—were making it impossible to move petrochemical projects forward. On top of those market factors, community opposition was causing the project the same delays identified by Moody's. Standard and Poor's went a step further, making it clear that the market and community forces it identified were global in scale and likely long-term in duration.

Since S&P issued its warnings, IEEFA has identified [nine projects](#) facing cancellations, delays and poor financial performance. Those projects were linked to market weaknesses identified initially by the credit agencies. S&P even took the somewhat unprecedented step of informing Formosa that if it proceeded with the Louisiana project, it faced a downgrade, and strongly hinted that an investment in electronics that supported the growth of electric vehicles might increase its credit standing.

Since then, both [Fitch](#) and [Moody's](#) have offered net-zero assessment instruments that are unprecedented in their scope of questions about company reliance on fossil fuels—be they consumers or producers of fossil fuels. The credit program goes to the root of Richardson's claim that sustainability is now a cornerstone of the secular changes afoot.



Conclusion

The pivot to petrochemicals reflected industry recognition of the current and future decline of the upstream and downstream oil and gas sector. The pivot is reminiscent of the trends experienced by the United States coal sector as it managed a decline now going on 20 years. The petrochemical sector is facing long-term structural factors that will transform the production and use of plastics, particularly single use plastics. Those factors include a long-term economic decline, an aging population in China (the dominant petrochemical producer in the world), an increase in sustainable competitors and an increasingly unstable geopolitical landscape that is creating disruption and bottlenecks.

There are many options that companies, countries and the industry can choose to reduce plastics pollution and the petrochemical industry's carbon footprint. Market signals are showing signs of considerable oversupply of petrochemicals. One concept under consideration by the United Nations Treaty on Plastics is a plastics cap. With recent support from the [United States](#) and United Kingdom this initiative has a chance of being adopted at the next round of negotiations in November.



About IEEFA

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

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Tom Sanzillo, director of financial analysis for IEEFA, is the author of numerous studies on the oil, gas, petrochemical and coal sectors in the U.S. and internationally, including company and credit analyses, facility development, oil and gas reserves, stock and commodity market analysis and public and private financial structures. Sanzillo has experience in public policy and has testified as an expert witness, taught energy industry finance and is quoted frequently in the media. He has 17 years of experience with the City and the State of New York in senior financial and policy management positions. As the first deputy comptroller for the State of New York Sanzillo oversaw the finances of 1,300 units of local government, the annual management of 44,000 government contracts, and over \$200 billion in state and local municipal bond programs as well as a \$156 billion global pension fund.

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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.

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