



**Institute for Energy Economics
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Formosa Petrochemical Project Faces Difficult Market and Financial Risk

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Key Findings

The Formosa proposal to locate a large petrochemical complex in the heart of Cancer Alley is looking increasingly ill-advised.

Several economic headwinds weigh against investment in the risky Formosa petrochemical project.

The polyethylene market is oversupplied, placing downward pressure on potential prices and profits for Formosa.

State and federal proceedings, as well as a recent presidential executive order, have cast the future of the petrochemical complex into doubt.



Executive Summary

Formosa's proposal to locate a large petrochemical complex in the St. James Parish of Louisiana—in an area commonly called “Cancer Alley” because it is plagued by toxic air pollution—appears increasingly ill-advised. The combined effects of rising macroeconomic headwinds, worsening polyethylene (PE) market fundamentals, and Formosa's recent revenue declines weigh against investment in the risky petrochemical project.

Background

A macroeconomic headwind is a situation that both acts as a barrier to and puts downward pressure on overall economic growth. It can be caused by a variety of factors, such as high inflation, increased interest rates, lower consumer demand, rising unemployment rates, government regulations, and international trade barriers. For example, high inflation can cause a macroeconomic headwind because it makes it more difficult for consumers to afford goods and services. Similarly, high interest rates can make it more expensive for businesses to borrow money to invest in growth, which can also act as a headwind. In general, macroeconomic headwinds can slow down economic growth and make it more challenging for businesses and individuals to achieve their goals. When combined with significant market issues for a particular product or set of products, macroeconomic headwinds are cause for concern.

A 2021 IEEFA analysis found Formosa's petrochemical project posed significant financial and market risks arising from problems of market oversupply, low petrochemical prices, strong competition for market share, restrictive trade policies, rising construction costs and a weakened bond rating.¹ Later in 2021, S&P Global advised that delays in construction of the complex had actually benefitted Formosa's credit rating.² When IEEFA revisited its analysis in 2022, it found the commodity price environment had improved somewhat, but construction prices had risen; regulatory scrutiny had intensified; credit agency support had withered; and community opposition had heightened questions among stakeholders.³ The proposed project remained troubled. Today, worsening market conditions and a relative decline in company financials provide warning flags that the company should heed.

¹ IEEFA. [Formosa's Louisiana Project: Wrong Products, Wrong Time, Wrong Place, Wrong Finances](#). March 2021.

² S&P Global. [Ratings on Formosa Plastics Corp. and Three Associated Companies Affirmed at 'BBB+' On Low Debt Leverage: Outlook Stable](#). October 2021.

³ IEEFA. [Formosa's Louisiana Project Update: Supply and Demand Dynamics, Legal Challenges Bode Ill](#). March 2022.

Formosa's Project Faces a Tough Market

Formosa's proposed petrochemical complex—including two ethane crackers and processing capacity to produce high-density polyethylene (HDPE), low-linear density polypropylene (LLDPE), polypropylene (PP) resins, ethylene glycol (EG), and propane dehydrogenation (PDH) production—would have to contend with a troubled market.

Although the project plans to take advantage of the relatively low price of natural gas in the United States, a complex set of factors have evolved to undermine this benefit. The market for the polyethylene (PE) sector is challenging. Prices and margins narrowed in 2022 as sluggish economic growth adversely affected overall consumption. Although PE contract prices rose 7 cents per pound between January and May, prices fell by 12 cents per pound during the second half of the year, finishing down by 5 cents per pound for 2022.

Also, margins for PE producers came under pressure as the volume-weighted average costs of producing ethylene rose 57 percent to 24.9 cents per pound during the year. Spreads between PP and propylene monomer, meanwhile, fell by 18 cents per pound in 2022 and were down 27 cents per pound from the June 2021 peak.⁴

Early 2023 has been marred by concerns stemming from the Silicon Valley Bank failure and generalized recession fears—making further dents in any hopes for growth scenarios favorable to new investment in the Formosa project. Margins are anticipated to remain pressured as a result of increasing supply and slowing demand in 2023.⁵ The petrochemical industry's growth pattern is highly correlated to gross domestic product. The petrochemical industry typically grows 1 percent to 1.5 percent faster than GDP. As GDP declines, so will the demand for plastics—making the investment environment weaker. According to the latest World Economic Outlook from the International Monetary Fund (IMF), global economic growth is projected to slow from 3.2 percent in 2022 to 2.7 percent in 2023. Economic growth in advanced economies is anticipated to slide from 2.4 percent in 2022 to 1.1 percent.

⁴ Plastics Today. [PE, PE resin prices remain under pressure in 2023](#). January 3, 2023.

⁵ Independent Commodity Intelligence Services (ICIS). [New capacities and weak demand to cause global supply glut of PE/PP in 2023](#). Accessed April 20, 2023.

Ongoing Capacity Additions Create Significant Competition for New Petrochemical Plant Proposals

The U.S. PE industry is struggling with capacity expansion issues that aggravate the problem. Several companies have brought new projects online recently that have contributed to declining prices. Shell brought its Monaca plant online in 2022. In early 2023, Bayport Polymers is expected to begin operations at its new plant in Bayport, Texas. The startup of Nova's Advanced SCLAIRTECH 2 unit in Sarnia, Ontario, is likely to follow. According to Independent Commodity Intelligence Services (ICIS), North America's PE and PP production capacities are expected to rise by about 17.4 percent and 22.4 percent, respectively, between 2020 and 2024.⁶ Another new plant in the pipeline is the new cracker (ethylene/PE) project by the Golden Triangle Polymers Company in Orange, Texas, a 51%-49% partnership between Chevron Phillips Chemical and Qatar Energy. The plant is expected to start in 2027, and has a capacity of 4 million tons.⁷

Formosa Is Experiencing a Relative Decline in Company Financials and the Proposed Petrochemical Complex Presents Risks

Formosa reported revenue declines in the last two quarters.⁸ Formosa's third quarter revenues in 2022 were \$7.53 billion (NT\$229.06 billion), down 4 percent from the previous quarter.⁹ Its fourth quarter revenues slid another 15 percent to \$6.38 billion (NT\$194.15 billion).

Moody's expects Formosa's revenues to decline by 7.3 percent in 2023, mainly driven by lower contributions from Formosa Petrochemical Corp., given weaker demand for the group's petrochemical, chemical and plastics products in a weak global economy. The rating agency also expects the company's adjusted earnings before interest, taxes, depreciation and amortization (EBITDA) margin to decrease over the next 12 to 18 months because of tightening product spreads, including petrochemical, chemical and plastics products. Moody's-adjusted debt/EBITDA for Formosa is expected to increase by 1.8 times over the next 12-18 months from 1.4 times for the year that ended June 30, 2022, because of lower earnings amid weaker demand.¹⁰

The ratings agency has also cautioned Formosa's rating could suffer if the group's adjusted EBITDA or operating cash flow weakens significantly on a sustained basis. Moody's warns that a sustained adjusted debt/EBITDA ratio above 2.5 to 3.0 times could trigger a rate reduction.¹¹ Although IEEFA does not anticipate such an extreme scenario, the warning suggests the need to temper debt-funded

⁶ Plastics Today, *op. cit.*

⁷ IHS Markit. [Formosa-S&P Global View](#). March 2023 (subscription, available upon request).

⁸ Formosa Petrochemical Corporation., [Financial Information](#) 2023.

⁹ XE. [Convert Taiwan New Dollars to US Dollars](#) 2023.

¹⁰ Moody's, [Formosa Plastics Corporation](#), November 2022 (subscription, available upon request).

¹¹ *Ibid.*

business expansion and to carefully monitor deterioration in operations. Even S&P Global noted in October 2021 that delays in construction of the complex had benefited Formosa's credit rating.¹² Formosa would be better off terminating its plan to move forward with the Louisiana project, given these market conditions.

Formosa's Permitting Efforts Face a Judicial Setback, an Agency Determination Requiring More Analysis, and a New Presidential Executive Order Calling for Closer Scrutiny of Cumulative Pollution Impacts

A state court vacated the air permits issued for the projects in September 2022, based on the federal Clean Air Act and the state's air regulations. The court also relied on Article IX of the Louisiana Constitution, which mandates environmental protections consistent with the health, safety and welfare of the people. The court found the permits would have allowed Formosa to emit more than 800 tons per year of toxic pollution into the air.¹³ Formosa and the state agency have taken the first step to appeal the court's decision, while community organizations remain determined to oppose the project.¹⁴

At the federal level, the U.S. Army Corps of Engineers decided in 2021 to require an environmental impact statement that would analyze the impacts of the project on public health and environmental quality.¹⁵

Both the state and federal proceedings are still pending. Meanwhile, the project's toxic pollution risks and its unsuitability for location within a community of color already facing heavy industrial pollution remain unacceptable to the community residents who have challenged the project. A presidential executive order, issued April 21, 2023, effectively bolsters the importance of the community's concerns by instructing all federal agencies to consider measures to address and prevent disproportionate and adverse environmental and health impacts on communities, including the cumulative impacts of pollution and other burdens like climate change.¹⁶

¹² S&P Global, *op. cit.*

¹³ *Rise St. James, et.al. v. Louisiana Department of Environmental Quality*, 19th Judicial District Court Parish of East Baton Rouge, no. 694,029, September 8, 2022.

¹⁴ FG LA LLC's Motion for Suspensive Appeal in *Rise St. James, et.al. v. Louisiana Department of Environmental Quality*, 19th Judicial District Court Parish of East Baton Rouge, no. 694,029, September 27, 2022. Also see: The Advocate. [Louisiana appeals judge's ruling blocking massive plastics complex; here are the stakes](#). September 28, 2022.

¹⁵ U.S. Army Corps of Engineers. [Memorandum to Commanding General, U.S. Army Corps of Engineers re Formosa Group Chemical Plant Environmental Impact Statement \(EIS\) and Referral for decision](#). August 18, 2021.

¹⁶ The White House. [Executive Order on Revitalizing Our Nation's Commitment to Environmental Justice for All](#). April 21, 2023.

The Proposed Petrochemical Complex Does Not Help Formosa's Already Negative ESG Credit Impact Score

The Formosa group's environmental, social and governance (ESG) credit impact score (CIS), according to Moody's, ranks at a moderately negative level (**CIS-3**). Moody's reports the company's score has had "limited impact" on credit access to date, but the group's very high environmental risk and high social risk have the potential to cause its credit profile to decline.^{17, 18} The Formosa group's environmental issuer profile score (IPS)—relevant to the "E" factor in the ESG metric—is very highly negative (E-5), as assigned by Moody's, mainly driven by waste and pollution risk as a result of its use of toxic and hazardous materials and products during the production process.¹⁹

Construction of the Louisiana plant would only have a negative impact on Formosa's already low ESG credit score, in our view. Strong public opposition to ubiquitous plastics waste and pollution emissions from the petrochemical production industry would be detrimental to Formosa's ESG rating. In S&P's October 2021 rating, it warned of increasing industry-wide risks from local opposition to large petrochemical hubs.²⁰

Conclusion

Slow economic growth, an oversupply of capacity, an unfavorable price environment and growing public opposition to petrochemical hubs are offsetting the cost advantage of long-term lower natural gas prices in North America. The changing conditions, more prominent now than when the project was first conceived, have weakened the project's viability. Formosa's products are commodity petrochemicals, which are exposed to strong industry competition and high cyclicity. The market is oversupplied, placing downward pressure on prices and profits.

The underlying issues facing the project remain and the company's plan to move forward with the project is misguided.

¹⁷ Moody's, *op. cit.*

¹⁸ S&P Global, *op. cit.*

¹⁹ Moody's, *op. cit.*

²⁰ S&P Global, *op. cit.*

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

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Abhishek Sinha is a petrochemicals analyst, US. At IEEFA, he conducts in-depth research for our petrochemicals group analysing industry trends, regulations and company data. He identifies research topics for exploration and examines issues relevant to IEEFA's mission.

Abhishek covered the energy and chemicals sectors at Thrivent Asset Management (buy side) for five years and made significant positive contributions in all fund areas. He has wide experience in analyzing key performance indicators including, revenue drivers, operating costs and capital expenditures; along with competitive trends, leading/lagging indicators, and benchmarking analysis.

Abhishek holds a mechanical engineering degree from Bangalore University, an MS in M.I.S. from Texas Tech University and an MBA from Columbia University.

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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.

Tom Sanzillo

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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