

INEOS Proposed Cracker Plant for Antwerp

Project Background

The INEOS Project ONE ethane cracker is being proposed at a time when the European Union has adopted aggressive long-term goals to decrease the use of single-use plastics and to lower the amount of fossil fuels used to produce the plastics that remain in production. The project, if approved and constructed, is likely to contribute to an already well supplied market.

The proposed plant would produce ethylene at a rate of 1.45 million metric tons annually. It would also produce propane, C₄ and C₅ hydrocarbons and pyrolysis oil as byproducts. Sixty percent of Europe's ethylene is used in the production of polyethylene, a principal feedstock in the production of single-use plastics. The plant will consume 1.9 million tons of ethane per year.

The technological model of Project ONE is designed to curtail CO₂ emissions by using ethane as the principal feedstock and adopting some circular economic techniques,¹ including the use of renewable power. It also identifies an "open access" carbon capture and sequestration project as a future resource, and would incorporate blue as well as green hydrogen.²

The reduced carbon ("decarbonized") ethylene will be marketed within the EU to resin manufacturers who can use such ethylene inputs as carbon credits in the production of high-density polyethylene (HDPE), low-linear density polyethylene (LLDPE) and low-density polyethylene (LDPE).³

The project assumes the continued availability of inexpensive ethane from the United States. INEOS already supports some of its existing ethylene capacity with U.S.-sourced ethane in Europe.

The company is the No. 1 producer of ethylene and polyethylene in Europe. It is also moving forward with various chemical projects in the Middle East, China, and the United States, and upgrading its existing European manufacturing capacity.

¹ European Crackers rely principally on naphtha (oil based) feedstock. Ethane feedstock emits less carbon.

² INEOS, Environmental Impact Assessment, (date), Section 1 Concise Description, pp. 36-40. (INEOS EIA) (English Translation Proprietary)

³ INEOS EIA, Section 14.5.3.2 Carbon footprint, life cycle plastics. Also see Section 14.5.4 Conclusion: test against European and Flemish Policy.

Market Analysis

Is the INEOS Project ONE required for smooth market functioning in Europe? If it were not built, would market conditions deteriorate and result in a dangerously low supply of ethylene in Europe, creating both scarcity and high prices?

Several critical factors, taken together, create a series of risks that raise serious questions about the project's viability. This note examines significant broad market factors that are contributing to a weak financial outlook for the INEOS Project ONE ethane cracker.

Figure I: Factors Weakening Rationale for Project ONE

Factors	Implications
Slow Economic Growth	Reduces consumer spending, decreases demand for plastics
Weak Margins	Profits will fail to compete with other large regional producers
Increased Recycling	Decreased demand for virgin plastics from new ethylene cracker
Importing Plastics	Global oversupply, price pressure from foreign competitors
Investment in Existing Capacity	Slow retirements of old capacity, weakens need for new crackers

Slow Economic Growth and New Policy Mandates Weaken Need for Expanded Ethylene Supply

1. As the COVID-19 pandemic becomes more manageable and the economy returns to normal in the post-2022 period, the European growth rate will fall back into similar historical patterns. Europe's GDP growth will be slower than the world economy.⁴ The current European GDP growth rate is more than 5 percent in 2021. Worldwide GDP growth is at 5.6 percent. The European GDP growth rate is likely to level off and become roughly half the rate of worldwide GDP growth.⁵
2. The plastics economy will return to a state of oversupply. Prior to the pandemic, the industry added new cracker capacity across the globe.⁶ Producers faced a future of low margins and low capacity. Coming out of the pandemic, those basic trends are expected to reappear.⁷ A slower economy will further reduce the amount of spending, and that typically impairs growth in plastics markets. One impact will be intensified competition among United States and Middle East suppliers to increase both ethylene and polyethylene sales into Europe.

⁴ S&P Global Ratings. [Economic Outlook Q4 2021: Global Growth Is Steady As Delta Spurs Wide Regional Swings](#). September 28, 2021.

⁵ IHS Markit. [Economy](#). August 2021, p. 4. (Proprietary)

⁶ Argus Media. [Viewpoint: 1H 2020 US ethylene oversupplied](#). January 3, 2020.

⁷ ICIS. [EPCA '21: Petchems could suffer oversupply in 2022 after healthy demand, supply tightness – president](#). 6 October 2021. Also see: Global Data. [Oil and Gas Production News](#). [Global ethylene growth aiming towards pre-pandemic recovery](#): June 9, 2021.

3. EU policy is to decrease consumption of single-use plastics.⁸ The effort is designed to reduce demand over time. Single-use plastics are broadly defined as short-lived products that are not designed for re-use or cost-effective recycling. Under the EU directive, member states should adopt ambitious reduction targets that do not compromise public health and take action to incentivize alternatives to plastics consumption. The directive places a ban on polystyrene and proposes specific restrictions on bottles, caps, fishing gear and oxo-degradable plastics.
4. Project ONE's commercial start date in 2026 is an inopportune moment to commence production.⁹ The plant is adding ethylene capacity to a market that is already well supplied. Operating rates,¹⁰ an important industry metric used as an indicator of supply and demand balance, will be pushed downward by the addition of Project ONE and move the market toward oversupply.
5. Prior to the pandemic, polyethylene producer operating rates were in the low 80 percent range. Margins were also low.¹¹ Operating rates will be in the middle 80 percent range by 2025. Profit margins are expected to improve but lag the U.S., China, Southeast Asia and Middle Eastern producers.¹² Project ONE would add 1.45 million metric tons per year to Europe's ethylene capacity.¹³ This would push the operating rate down into the low 80 percent range. If the EU's anticipated plastics demand remains relatively flat at pre-pandemic levels, then the added capacity provided by Project ONE would push down operating rates further and could contribute to industry-wide declining margins.
6. Operating rates are used by the industry as a metric to gauge supply and demand balance. The rate is calculated using actual production divided by maximum capacity. Generally, an increase in operating rates is an indicator of a need for new capacity. New plants add to total available capacity and bring down the operating rate. Then, when economic growth is sufficient to increase demand, operating rates rise again. Specifically, when operating rates are in the high 80 percent or low 90 percent range, the markets respond with new projects like Project ONE.¹⁴ Below 80 percent, the market usually has little need for new capacity. If the economy returns to normal and European plastics policy initiatives succeed, then by 2030 the addition

⁸ European Union. [Directive \(EU\) 2019/904 of the EUROPEAN Parliament and of the Council on the Reduction of the Impact of Certain Plastic Products on the Environment](#). June 5, 2019. Also see: [European Commission. A European Strategy for Plastics in a Circular Economy](#). January 2018.

⁹ INEOS EIA, Carbon balance, Section 14.3.1.3.2.

¹⁰ The operating rate is calculated by dividing actual production by maximum capacity. For example, if a company owns and operates a 100 metric tons per annum ethylene cracker. Assuming it produces 75 mt in a given year. The operating rate is 75%.

¹¹ ICIS. [European cracker margins plummet as ethylene contract prices drop and feedstock costs edge up](#). April 6, 2020.

¹² IHS Markit. Ethylene CCMA, Operating Rates and Margins, 2021 Q2 (Proprietary)

¹³ INEOS EIA, Ethane Cracker – General, 3.3.1.1 Ethane Cracker General.

¹⁴ See, e.g., IHS Markit. [North American Resin Markets](#), North America Capacity Expanding. January 2014, slide 11.

of Project ONE could lead to operating rates in the high 70 percent range. The addition of this new capacity therefore would likely put downward pressure on margins on a European industry-wide basis.¹⁵

7. One method used to control the market from oversupply is to close older, less efficient plants. There has been one ethylene cracker slated for closing in 2022.¹⁶ At the same time INEOS and other firms are investing in existing infrastructure. INEOS has taken steps to shore up its existing European manufacturing petrochemical facilities in France and Belgium. Other companies are likewise both expanding existing facilities and building new technology that supports the goals of the circular economy.¹⁷ INEOS is also expanding its capacity in Grangemouth, U.K.¹⁸

Recycling and Imports Absorb EU Plastics Growth

8. On the demand side, polyethylene (PE) virgin plastics are likely to see market share curtailed under Europe's circular economy recycling initiatives.¹⁹ According to one estimate, recycling is expected to reduce polyethylene demand by 4.3 million tons per year by 2031, or 26 percent.²⁰ The European PE market is expected to grow by less than 1 million tons per year over the 10-year period from 2021 to 2031. This amounts to 0.4 percent per year; worldwide PE growth is 3.4 percent. Plastics producers in the Middle East will be placing price pressure on European plastics producers as they seek to increase the 4 million ton import market into Western Europe.²¹

With a constrained domestic market, INEOS Project ONE has suggested that its particular brand could provide it with an advantage in the export market. Competition for new customers, however, will be fierce. Furthermore, the ethylene market—which is restricted by difficult logistics—is likely to see a slowdown in worldwide export growth as new production is likely to support domestic uses.²²

9. Also, by 2031, 54 percent of Europe's polyethylene demand will be supplied by recycling and imports. The recycling results in a direct reduction in need for virgin plastics made from ethylene from new crackers. A greater reliance

¹⁵ The INEOS EIA also points out that existing cracker facilities will have to increase investments in plants to meet compliance standards. See: EIA INEOS, Test against EU ETS product benchmark, 14.4.2.1.4.2. More investment typically drives down margins at such plants.

¹⁶ CHEManager, [Petchem Age at Porto Maghera may really end](#), March 19, 2021.

¹⁷ Agro & Chemistry. [European plastics producers to invest €7-2 billion in chemical recycling](#). 31 May 2021.

¹⁸ Reuters. [INEOS to switch Grangemouth to hydrogen in \\$1.4 bln pursuit of net zero](#). 21 September 2021.

¹⁹ IHS Markit. [Industry seeks mandatory 30% by 2030 EU recycled plastics packaging content target](#). September 13, 2021.

²⁰ IHS Markit. Supply and Demand, Fall 2021, Polyethylene, Supply and Demand/Western Europe. (Proprietary)

²¹ IHS Markit. World Analysis - Polyethylene Report 2022. November 2021, p. 31. (Proprietary)

²² IHS Markit. Supply and Demand Worldwide, Q3 2021. (Proprietary)

on polyethylene imports further diminishes the need for European-based cracker capacity.²³

Conclusion: Questionable Viability

The cumulative impact of low GDP growth, strong competition from oversupplied international markets, weak European margins, increased recycling and implementation of circular economy mandates means that the INEOS Project ONE in Antwerp is a risky venture. Project ONE would increase the company's ethylene capacity from 2.9 million tons per year to 4.3 million tons per year, or 18 percent of regional capacity. With the very high likelihood of decreasing domestic demand and rising recycling numbers, the absorption of Project ONE into the global economy would be slow at a time when margins are likely to be depressed. Its financial viability is questionable.

²³ IHS Markit. Ethylene Supply and Demand, West Europe, Imports and Recycled Demand. Spring 2021, Q3. (Proprietary)

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About the Authors

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.

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.

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