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Briefing Note

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UN International Legally Binding Instrument to End Plastic Pollution: Considerations for the Final Round of Negotiations

- *Markets for the core feedstocks of virgin plastics are currently oversupplied, creating market instability and decreased profits.*
- *Petrochemical producers, the linchpin of plastics production, risk credit rating scrutiny due to their failure to prepare for market and policy changes.*
- *Trade should be considered an inherent element in establishing these global and national targets and a key element in supporting both the instrument's efficacy and market stabilization.*
- *Implementing a production cap could smooth out current and structural market imbalances.*

Introduction

In August 2025, the final round of negotiations for an international legally binding instrument (ILBI) to end plastic pollution will take place. This document presents an economic analysis of plastic market trends with a view to inform the negotiations.

The briefing note considers the structural decline in the petrochemical industry, its stressed financials, and reduced confidence of credit rating agencies in the industry. Based on this market analysis it identifies the value of primary plastic polymers and the need for a production cap. It also suggests that the global nature of the polymers will require trade provisions to ensure that the ILBI is fit for purpose.

Recent Trends in the Petrochemical Industry Belie Existing Overcapacity

In November 2024, Bloomberg New Energy Finance (BNEF) projected that global ethylene is expected to see record growth in this decade.[1] It is expected that as many as 61 million metric tonnes (MMT) per year will be added between 2024 and 2030. Even more growth is anticipated for propylene, which is largely driven by China. BNEF also estimated that about 70% of planned capacity was to be operational by 2024, with 30% to be added between 2024 and 2030. However, a shortfall in demand that began in 2020 continues unabated and is only increasing.

The industry has been aware of the falling operating rates of the petrochemical refineries. In 2023, ICIS reported, "Global ethylene operating rates are forecast to average 80% in 2022-2030 and propylene 72%. This would compare with ethylene at 88% in 2000-2021 and propylene at 81%."[2] BNEF estimates that ethylene production capacity will exceed demand by 20.7% by 2030, and propylene production capacity will exceed demand by 26.6% by 2030.[3]

Dramatically lower feedstock prices for natural gas since 2007 have created a U.S. cost advantage for new ethylene crackers and new plastics production. China's expansion of crackers followed a similar path. Today, new construction plans for ethylene, polyethylene and polypropylene will exacerbate the existing oversupply and overcapacity conditions. For example, operating rates for some polypropylene precursor facilities (PDH) in China are as low as 50%,[4] which increases operational costs and reduces profit margins.

Overcapacity and Financial Unviability of Current and Future Petrochemical infrastructure[5]

The petrochemical sector is beginning to show unmistakable signs of long-term structural decline. A convergence of economic, demographic, environmental, and geopolitical forces is reshaping the industry's future in a way that increasingly resembles the long, secular decline experienced by the U.S. coal industry. What was once viewed as a fallback growth strategy for fossil fuel companies is now facing considerable headwinds.

Global economic growth, a key demand driver for petrochemicals, has slowed significantly. As one of the largest consumers and producers, China's economic deceleration is particularly pronounced. In 2015, global GDP growth was expected to average 3.3%, but by 2023, that outlook had fallen to 2.6%.[6] China's long-term GDP forecast dropped from 5% to 3% over the same period.[7] Since petrochemical demand historically grows at roughly twice the rate of GDP, this declaration has significant implications for future volumes and pricing. At the same time, overcapacity in Chinese production continues to exert downward pressure on global pricing.

Demographics further compound the demand problem. China's population is aging and projected to shrink,[8] with a rising share of elderly citizens and a decline in younger, consumption-driven age groups. By contrast, competitors like India have a younger and faster-growing population. Aging societies tend to consume fewer plastics, which is a fundamental challenge for long-term demand growth in China, the world's largest petrochemical market.

Sustainability trends are rapidly gaining momentum, introducing a new competitive paradigm. The share of bio-based feedstocks, recycled materials, and renewably powered production

processes is increasing. In methanol markets, for example, 12% of capacity is expected to be renewable by 2030.[9] These emerging supply sources, backed by capital markets and policy support, are starting to eat into the fossil fuel-based petrochemical model.

Financial viability is also deteriorating. The shift by oil majors into petrochemicals has not generated the anticipated returns. In its first decade, the U.S. fracking sector succeeded in boosting oil and gas output but failed dismally in producing cash. This left many companies badly overleveraged and ultimately led to widespread bankruptcies, write-offs and impairments. As capital has flowed into petrochemicals as a new growth avenue, similar dynamics have emerged: oversupply, margin compression, and a poor investment track record. Several large projects have been cancelled, delayed, or financially underperformed.

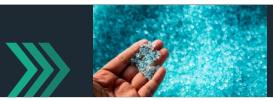
Credit rating agencies have responded accordingly. Moody's and S&P have tightened their outlooks on petrochemical projects, citing persistent market weakness, regulatory risk, construction cost inflation, and community opposition. Notably, S&P warned Formosa that building its Louisiana petrochemical complex or other aggressive capacity additions, given China's slowing demand growth, could lead to a downgrade, but forecast its electronics materials business would grow.[10] Because of the downturn in petrochemical markets and subsequent pinched cash flows,[11] S&P and Fitch have downgraded the rating of Braskem, one of the largest petrochemical companies in the Americas and the sixth-largest petrochemical company in the world.[12]

Geopolitics has added another layer of uncertainty. Global trade realignments and supply chain disruptions have weakened the sector's historical stability, and efforts to combat plastic pollution are intensifying. These structural forces—slowing demand, demographic shifts, sustainability-led disruption, financial underperformance, and policy pressure—point to a long-term weakening of the petrochemical sector's outlook. The industry is no longer a reliable growth engine for fossil fuel producers and faces a future defined by transition, not expansion.

Polymer Trade Analysis Supports the Inclusion of Trade Provisions in the ILBI[13]

According to a recent study, 436.66 million tonnes (Mt) of polymers and plastics, including feedstocks, were traded in 2022, with final plastic products amounting to 111Mt.[14] Trade measures—in particular, non-party trade measures, which are trade restrictions or regulations imposed by countries which are parties to a treaty with countries who are not—ensure that countries that are not parties to an agreement do not subvert its provisions and objectives.

An assessment of the existing laws to regulate plastic pollution demonstrates an inadequate legal regime to phase out primary plastic polymers. The Plastics Pollution Coalition and key partners have mapped 1,434 plastic laws globally across nine phases of the plastics lifecycle. 'Reduction'—which covers laws aimed at reducing single-use plastic (SUP) and materials—has the largest number of laws at 1,246. 'Production and Reduction'—which includes laws aimed at regulating the production of virgin plastics (aka polymers)—has the second-lowest number of regulatory laws, amounting to 17. Most are national laws; a few are regional in nature, but none are implemented globally.



It is important to note that while several countries have identified and attempted to regulate the consumption of SUPs, there is no comparable regulation for the production of primary plastic polymers. As a result, and despite a multiplication of regulations trying to limit plastic pollution by limiting consumption, both plastic production and plastic pollution continue to expand, demonstrating the limit of attempting to reduce plastic pollution via demand control measures only.

Ethylene, propylene, styrene and their derivatives are commonly used to make plastics. Ethylene derivatives such as polypropene (PP), low-density polyethylene (LDPE), linear low-density polyethylene (LLDPE), high-density polyethylene (HDPE) and polyethylene terephthalate (PET) comprise the largest portion of downstream petrochemicals used to make plastic packaging. Polypropylene and polystyrene are the other common downstream petrochemicals used to make plastic packaging.

Trade data from TradeMap.com for the nine monomers and polymers mentioned above was analyzed. The analysis shows that the Asian region dominates global trade in primary plastic polymers, with 11 exporting and 18 importing countries. In North America, the United States is the largest exporter of these primary plastic polymers, while several European countries serve as both importers and exporters. Trade volumes in Africa and South America remain negligible.

Petrostates Lead Polyethylene Trade

Polymers of ethylene are the single largest contributor to plastic packaging and single-use plastics. The United States is a global leader in ethylene polymer exports, with China, Mexico, Canada and Vietnam being top recipients of these polymers. Saudi Arabia is the next-largest exporter, with significant flows to China, India and Egypt. Both the United States (with natural gas) and Saudi Arabia (with oil) are rich in fossil fuels, positioning them as leading producers and exporters of ethylene. Their strategic locations, with access to major global shipping routes, further strengthen their roles in international trade.

Predominant Intra-regional Trade Patterns

Trade in polymers of propylene and styrene demonstrates distinct regional patterns. For polymers of propylene, the U.S. exports primarily to Mexico and Canada. In Europe, Belgium and Germany are major exporters and importers, highlighting their central roles in European and global trade. South Korea and Saudi Arabia export mainly to China, India, and other Asian markets. Polystyrene trade shows similar sub-regional dynamics: Taiwan exports mainly to China and Vietnam, while Belgium exports significant volumes to Germany, France, Poland, and Italy. The United States, also active in both exporting and importing polymers of styrene, primarily exporting to Mexico and Canada.

Presence of Global Petrochemical Hubs: Value Addition, Re-Processing and Re-Exporting

Vietnam imports low-viscosity PET, reprocesses it, and exports a higher-viscosity version, suggesting that the country is engaged in value addition and not necessarily consumption. Belgium is both a major exporter and importer of polymers of ethylene, serving as a key

hub within the EU. Similarly, Singapore's dual role as an export and import shipping center, indicates that it is used as a transhipment hub. Germany is a top exporter of polypropylene and a major importer, highlighting its role as both a processor and redistributor in the global supply chain. Similarly, Belgium is an importer and exporter, indicating that the country is involved in value-added processing or re-exporting.

Economic Implications of Trade in Primary Plastic Polymers

Ten countries make up the top five exporters of the three main monomers. Among them, the United States, Saudi Arabia and Kuwait are fossil fuel-rich countries, while the UK has significant fossil fuel reserves. The remaining six countries all rely on imported fossil fuels to meet their energy and industry needs. For example, the Netherlands imports its oil and has been reliant on imported natural gas since 2018 due to a declining domestic supply.[15] Belgium is entirely dependent upon imports for all its fossil fuel consumption.[16] According to the International Energy Agency (IEA), South Korea imported 98.9% of its total crude oil supply in 2023.[17] Japan imports almost all the fossil fuel it consumes.[18] Germany is heavily dependent on imports for its oil and gas needs.[19]

Fossil fuel-importing countries are vulnerable to erratic prices of these feedstocks in the upstream and rely heavily on robust derivatives market downstream. In contrast, polymer trade has a broader base, with 20 countries comprising the top five exporters and importers. Of these, only the United States, Saudi Arabia and Malaysia are fossil fuel-rich and have access to cheap feedstocks. All the other countries either refine imported crude oil to monomers and then produce the polymers, or they import monomers directly and process them into polymers. They depend on the healthy demand for plastic products in the destination countries.

With shrinking markets and a pile-up of polymers and their feedstock, developing countries dependent on petrochemical trade are exposing themselves to a looming financial risk.

Recommendations for an Effective ILBI

Production cap for an effective ILBI[20]

In its September 2024 briefing note, IEEFA proposed a production cap as a response to the overcapacity and financial risks currently facing the petrochemical industry, due to the production mechanisms that produce the world's primary plastic polymers. To be effective, the implementation goals for the production cap should be introduced at a rate at which markets can properly adjust. The production cap can serve to modulate and stabilize growing supply and demand imbalances, while also easing the integration of more sustainable products and business models across regional and global markets. Although some market analysts project steady growth of plastics volumes through at least 2050, the broader market outlook for the industry is troubling. A slower global economic outlook, emerging sustainable alternatives, new geopolitics and trade patterns, as well as opposition to plastics growth on environmental, health and climate grounds, suggest that the next 10 to 20 years are likely to be financially very different from the previous two decades.

The production cap is a management tool consistent with decreasing demand from slower economic growth. It is integral to reducing the environmentally dangerous, wasteful and unprofitable tendency of an unfettered market to overproduce. In the current market context, a production cap should turn the current disruptive trend of new plant delays and cancellations, and other rationalization steps taken by market actors to bring supply and demand into balance.[21]

To date, the petrochemical industry has opposed most forms of oversight and regulation. This is no longer a practical path if industry leaders seek a stable investment rationale. The current state of affairs—substantial petrochemical oversupply with clear downward pressure on demand for virgin plastics—requires an agreement to turn what is currently a problem into an opportunity for achieving market stability and ending plastics pollution.

Why Strong Measures on the Trade of Primary Plastic Polymers are an Essential Provision for the Success of the ILBI

With the petrochemical industry facing an outlook of a secular decline, the sector is likely to pursue new products and markets aggressively, to help boost its prospects. History has demonstrated as much.[22] If the production and consumption of primary plastic polymers, including its trade, are not regulated and the proposed ILBI only focuses on product design and waste management, it will result in only changing the nature of the beast rather than eliminating it.

The Stockholm Resilience Centre first proposed the concept of planetary boundaries to define the safe operating space for humanity. The boundaries identify nine critical Earth system processes that must remain within scientifically defined limits to preserve a stable and livable planet. One of these boundaries is referred to as novel entities, described as "entities that are novel in a geological sense and that could have large-scale impacts that threaten the integrity of Earth system processes."[23] Examples of novel entities include synthetic organic pollutants, radioactive materials, genetically modified organisms, nanomaterials, and/or micro-plastics.[24] In 2022, studies concluded that plastic pollution is a key element in the novel entities of planetary boundaries and that the safe operating space for this boundary has been exceeded.[25]

Analyzing economic and climate implications for just nine polymers has demonstrated the need to regulate their trade. We believe that the proposed ILBI is an opportunity to transform our current levels of plastic production and mandate more sustainable consumption systems.

Towards this end, we urge that:

- The proposed ILBI should establish global and national targets for the production and consumption of primary plastic polymers; and
- Trade should be considered an inherent element in establishing these global and national targets and a key element to support both the instrument's efficacy and market stabilization.

Endnotes

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