Global Logistics Disruptions and Polyurethane Raw Material Supply Chain.

⚑ EXECUTIVE SUMMARY

European polyurethane flexible foam producers face the most severe supply chain crisis in the industry's modern history. Nine weeks into the US–Israeli war on Iran, the Strait of Hormuz remains effectively closed — transits have fallen to approximately 5% of pre-war average, with only a handful of vessels crossing daily. A ceasefire agreed on 8 April has not reopened the strait; Iran's IRGC continues to seize and fire upon commercial vessels. A parallel US naval blockade of Iranian ports since 13 April has created a "dual blockade" with no historical precedent. Brent crude hit an intraday high of $126/bbl on 30 April — up more than 70% since the war began. The World Bank describes this as the largest oil supply shock on record. For polyol, TDI and MDI buyers in Europe, the combined impact of feedstock cost inflation, shipping disruption, force majeure declarations across APAC, and near-total insurance withdrawal has fundamentally altered cost and availability. The raw material supply for the industry in the wider Europe is drifting towards a critical phase. Fundamentally, there is no global shortage of production capacity — **BUT** the ability to obtain and transport raw materials and manufacture Polyols, TDI & MDI is severely impacted. The current most critical product are Polyether polyols due to shortages in Propylene Oxide supply but also compounded by European plant closures in 2025 and outages in USA.

1. The Global Product Flows — How PU Raw Materials Move

Over the past 30+ years production of polyurethane raw materials have moved with their end customers towards the APAC manufacturing hub. We have now reached the situation where 30%+ of the needed raw materials in Europe are now imported from APAC. The raw materials that feed flexible foam production — polyether polyols, toluene diisocyanate (TDI), and methylene diphenyl diisocyanate (MDI) — are manufactured predominantly in Asia and, to a lesser extent, the United States. These products travel to Europe along well-established deep-sea containers and chemical tanker routes. The normal trade flows that supply European PU producers are severely disrupted due to the situation.

1.1 Supply Flows

The uncertainty of base raw material supplies to manufacturer Isocyanates and Polyols and the inability for the suppliers to ship out the finished product has caused many suppliers to declare Force Majeure

1.2 Asian Supply Flows to Europe

Currently APAC now has around 60% of the global production of Polyurethane raw materials with China, South Korea, Japan, and Taiwan collectively account for the majority of MDI and TDI supply available to the global merchant market. China alone, through producers such as Wanhua Chemical, operates MDI & TDI capacities that exceed domestic demand, creating an export surplus that has historically provided cost-competitive supply to European converters. TDI from Asian producers similarly moves westward in significant volumes.

As to Polyether polyols, these need Propylene oxide (PO) as a base raw material and most of the new PO capacity which has been built in the last 15 years has been in APAC, mainly in China.

Crude Oil shipments from the Middle East (70%) are mainly shipped to China, India, South Korea and Singapore hence it is these countries where Force Majeures are initially being announced.

The standard routing for this cargo has historically been via the Suez Canal — entering the Red Sea from the south through the Bab-el-Mandeb Strait and transiting northward through the canal into the Mediterranean. This route connects East Asian production hubs to North European and Southern European ports with transit times typically in the range of 25 to 32 days from Chinese ports to Rotterdam or Antwerp.

Figure 1: Increase in transit times

Trade Lane	Standard Route	Normal Transit	Current Transit (Cape)
China → NW Europe	Suez Canal	28–32 days	38–45 days
South Korea → NW Europe	Suez Canal	26–30 days	36–44 days
USA Gulf → NW Europe	Direct Atlantic	14–18 days	16–21 days

1.3 US Supply Flows to Europe

The United States is also a supplier of polyols to Europe, with Gulf Coast-based producers such as Dow, Covestro, and Huntsman shipping bulk quantities across the North Atlantic. Unlike Asian trade, this lane does not traverse conflict zones and has not experienced the same acute rerouting. However, as we discuss below, the wider disruption to global container equipment distribution has reverberated into Atlantic trade as well. This extra transit time has effectively reduced the global shipping capacity by 15-20%. The Polyol availability situation in the USA is currently seriously impacted by the Propylene Oxide (PO) plant outage of Lyondell Basel (LYB) in Texas.

1.4 Global Strait “Pinch” Points

The listed “pinch points” are where either port blockages or geopolitical tensions can affect the European polyurethane supply chain.

2. The Red Sea Crisis and the Cape of Good Hope Diversion

The security situation in the Red Sea, stemming from Houthi militant attacks on commercial shipping beginning in late 2023 and intensifying through 2024 and 2025, has fundamentally altered the economics and timelines of Asia-to-Europe cargo movements. The practical consequence is that a large and growing proportion of container ships and tankers are refusing to transit the Bab-el-Mandeb Strait entirely, choosing instead to sail around the southern tip of Africa via the Cape of Good Hope.

The distance implications of Cape routing are substantial and largely underappreciated by buyers who do not operate in logistics. The additional nautical miles added to a voyage from East Asia to Northern Europe via the Cape of Good Hope range from approximately 3,500 to 4,500 nautical miles depending on the precise origin and destination ports. This translates directly into additional at-sea time.

KEY DISTANCE & TIME METRICS

Shanghai to Rotterdam via Suez: ~11,500 nautical miles / ~28 days at sea Shanghai to Rotterdam via Cape of Good Hope: ~15,200 nautical miles / ~40 days at sea Extra distance: approximately 3,700 nautical miles — equivalent to adding a second voyage of Shanghai to Singapore Extra time in transit: 10 to 14 days per voyage leg

For European PU raw material buyers, this means that the goods they order today from Asian suppliers will arrive, at least, two weeks later than pre-crisis norms would suggest. Where flexible foam manufacturers have historically run supply chains with 4 to 6 week forward cover, this single change demands at least 6 to 8 weeks of stockholding to maintain operational continuity — a significant working capital and warehousing capacity increase, where this is possible due to local hazard chemical storage regulations. This is compounded by containers being “off loaded” in non-planned transit ports, whilst shipping companies attempt to manage short term freight capacities.

2.2 Impact on Fuel Costs and Operating Costs

Cape routing does not simply delay shipments — it also materially increases the fuel burn of each voyage. A container vessel of 14,000 Twenty-foot equivalent (TEU) capacity consuming approximately 90 to 110 tonnes of very low Sulphur fuel oil (VLSFO) per day will burn an additional 1,000 to 1,400 tonnes of fuel on a single Asia-to-Europe leg when rerouting around Africa. At prevailing bunker prices, this adds several hundred thousand dollars to the operating cost of a single voyage. Carriers have universally passed these costs on to shippers through Emergency Bunker Surcharges (EBS), Peak Season Surcharges (PSS), and Red Sea-specific surcharges that have become a standard line item on freight invoices from all major carriers.

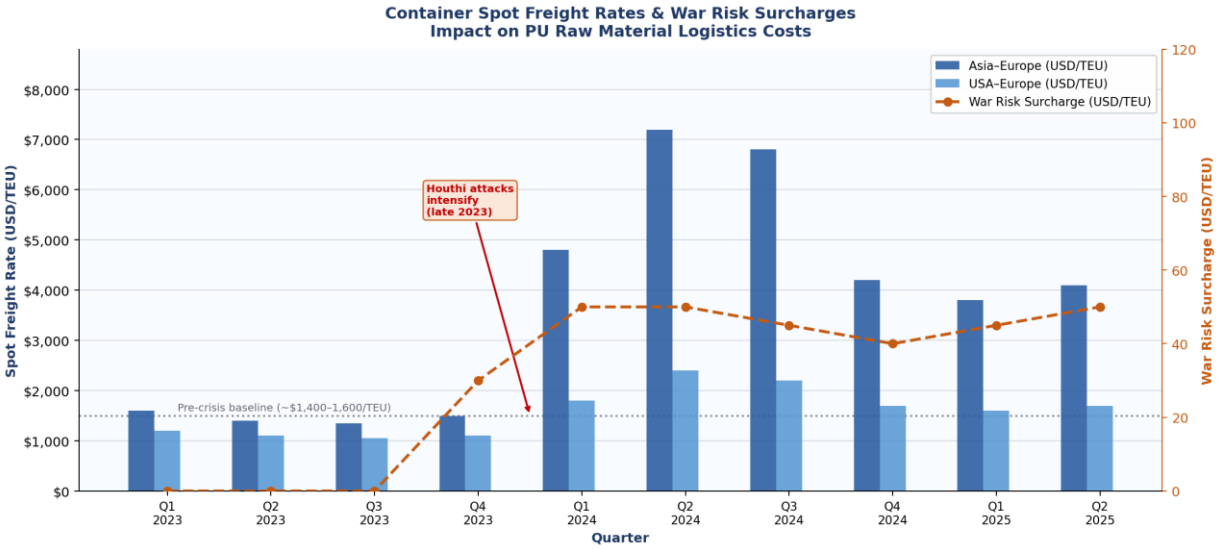

Figure 2: Asia–Europe and USA–Europe spot container freight rates (USD/TEU) and war risk surcharges, Q1 2023–Q2 2025

2.3 War Risk Insurance: A Hidden but Significant Cost Layer

Beyond fuel and freight, the insurance picture has deteriorated dramatically. All major P&I clubs — Gard, Skuld, NorthStandard, the London P&I Club, and the American Club — withdrew war risk cover for the Persian Gulf from 5 March 2026. Even if the strait formally reopens, war risk cover could cost 20 times more than pre-war levels. The US military has advised mine-clearance could take up to six months even after hostilities end. Iran's IRGC has published its own "alternative routes" through Iranian territorial waters, charging transit tolls reported to exceed $1 million per vessel. On 22 April, the IRGC seized two container ships — the MSC Francesca and the Epaminondas — further deterring any commercial traffic from using the strait.

2.4 Shipping Implications

As of late April 2026, the situation has worsened materially. Non-Iran-linked VLCC transits have largely ceased since 22 April attacks: only a single Japanese-owned vessel completed a crossing on 28 April. Attack count stands at 34 confirmed incidents with 6 near-misses. Iran's Asia-bound crude export pace has fallen to 1.3 million barrels per day in April, down from 1.9 million bpd in March. Approximately 890 vessels remain tracked in the Persian Gulf, of which 122 carry high-risk exposure ratings. No Iran-laden VLCCs have transited the Strait of Malacca eastbound since 24 April. The Freightos Global Freight Outlook (April 2026) reports containers to the UAE have risen 4x since the war started, from $2,000 to $8,000 per FEU, and Gulf export cargo faces severe delays even on alternative routes via Jeddah, Sohar and Khor Fakkan.

Also, around 2000 vessels are impacted as they are unable to move, offload, delayed or awaiting clearance. This means that about 2% of the global fleet is "stuck" with another 3-4% affected.

WAR RISK INSURANCE — COST IMPACT ON BUYERS

Carriers including Hapag-Lloyd, MSC, CMA CGM, and Maersk began applying explicit War Risk Surcharges (WRS) of USD 15–50 per TEU for shipments from Asia from early 2024. For chemical tankers navigating or originating near the Persian Gulf or Gulf of Aden, Additional War Risk premiums (AWR) have added an estimated 0.1%–0.5% of cargo value per voyage to effective freight costs. These charges are passed directly through into CIF and CFR quotes to European buyers. Spot quotes from suppliers are now frequently valid for only 12 - 24 hours due to insurance cost volatility.

3. Container Equipment Shortages and Port Congestion

The diversion of vessels to the Cape route has created a cascade of secondary logistics problems. The global container shipping system is finely balanced to maintain competitiveness — ships, containers, and port handling capacity are sized and scheduled around normal trade patterns. When those patterns change suddenly, imbalances emerge that take many months to resolve after normalization.

3.1 Equipment Dislocation and Container Shortages

Container imbalances arise because vessels making longer voyages remain at sea for longer before returning to Asian load ports. A box that would normally complete a round trip between Shanghai and Rotterdam in approximately 65 to 70 days under Suez routing now takes 85 to 95 days under Cape routing. This means that, at any given moment, the same fleet of containers is supporting fewer completed trips per year, effectively reducing the functional availability of equipment.

For chemical cargos (here mainly isocyanates) including the ISO tank containers and flexi-tanks used to move liquid polyols and some specialty isocyanates — the shortage is acute. Asian chemical exporters are competing for a reduced pool of available equipment, leading to booking lead times that have stretched from the historical 2 to 4 weeks to 4 to 8 weeks or longer in the current environment. Reports of 12-16 weeks have been recently reported.

3.2 Port Congestion and Turnaround Delays

Cape routing changes the arrival pattern at European ports. Rather than vessels arriving at relatively spread intervals, the Cape routing creates clustering effects — multiple vessels that departed from Asia around the same time arrive within a compressed window, overwhelming berth availability and yard capacity at major transhipment hubs. Major European ports e.g. Rotterdam, Antwerp, and Hamburg, have all reported significant vessel waiting times during peak congestion periods.

Disruption Factor	Mechanism	Impact on Delivery Time	Impact on Cost
Cape of Good Hope rerouting	Red Sea security	+10–14 days	High
Container equipment shortage	Longer equipment cycles	+5–10 days booking delay	Medium–High
Port congestion (NW Europe)	Vessel clustering	+2–7 days	Medium
War risk insurance surcharges	Carrier pass-through	No delay but direct cost	USD 15–50/TEU

Disruption Factor	Mechanism	Impact on Delivery Time	Impact on Cost
Spot freight rate increases	Capacity/demand imbalance	None directly	High
Short-validity quotes (24–48hr)	Insurance volatility	Planning disruption	High uncertainty

4. Upstream Feedstock Supplies: APAC's Crude Oil and Naphtha Position

The wider Europe area is now importing over 30% of its polyurethane raw material from APAC, mainly China. This is a mixture of major players balancing their supply chains as well as straight importers to the region. APAC supply of TDI, MDI, and polyols is tighter than capacity figures suggest. The key inputs are crude oil and naphtha, and the dynamics affecting their supply to APAC & China have added an additional layer of complexity to the global PU supply chain.

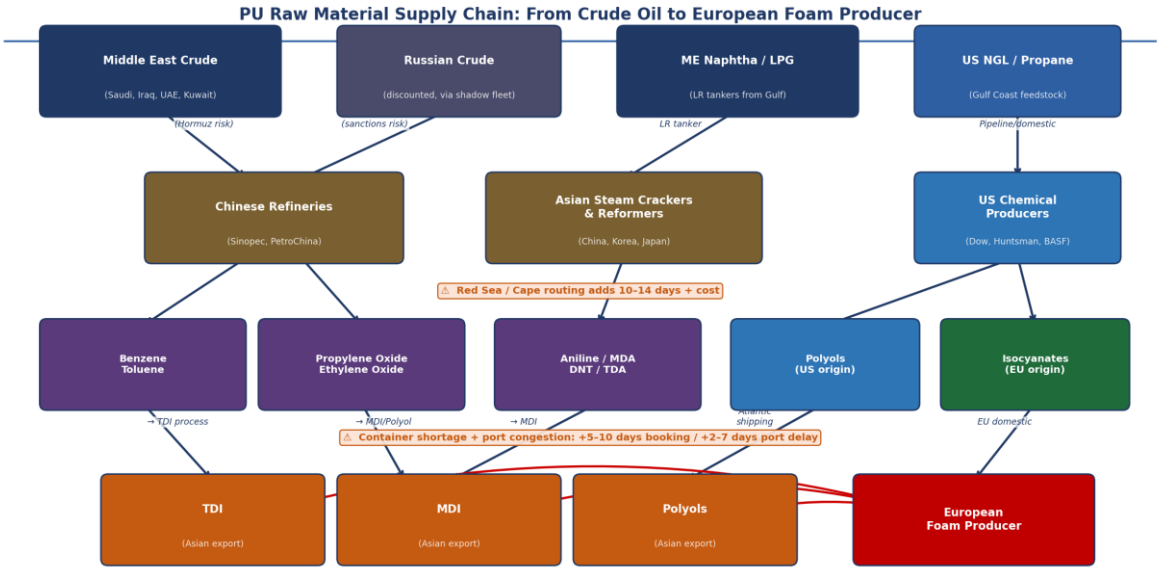

Figure 3: Rough PU raw material supply chain — from Middle East crude oil to European flexible foam producer

4.1 China's Crude Oil Import Dependencies

China is the world's largest crude oil importer. Saudi Arabia, Iraq, the UAE, and Kuwait collectively supply the majority of China's crude imports. The Strait of Hormuz is the critical chokepoint — approximately 20 to 21 million barrels per day of oil flows through the strait under normal conditions. Disruption or the threat of disruption to Hormuz transit has immediate consequences for crude delivery to Chinese refineries and has induced elevated VLCC (Very Large Crude Oil Carrier) rates and insurance premiums on Gulf transits.

CRUDE OIL TO CHEMICALS — THE VALUE CHAIN CONNECTION

Middle East crude → Chinese refineries (via Hormuz Strait, VLCCs) → Naphtha and LPG production → Steam crackers and reformers → Benzene, toluene, propylene oxide, and ethylene glycol → TDI (via toluene → DNT → TDA → TDI), MDI (via benzene → aniline → MDA → MDI), Polyether polyols (via propylene oxide). Each link in this chain carries the cost pressures from upstream logistics. When crude costs rise or delivery becomes uncertain, the effects transmit downstream into PU raw material pricing.

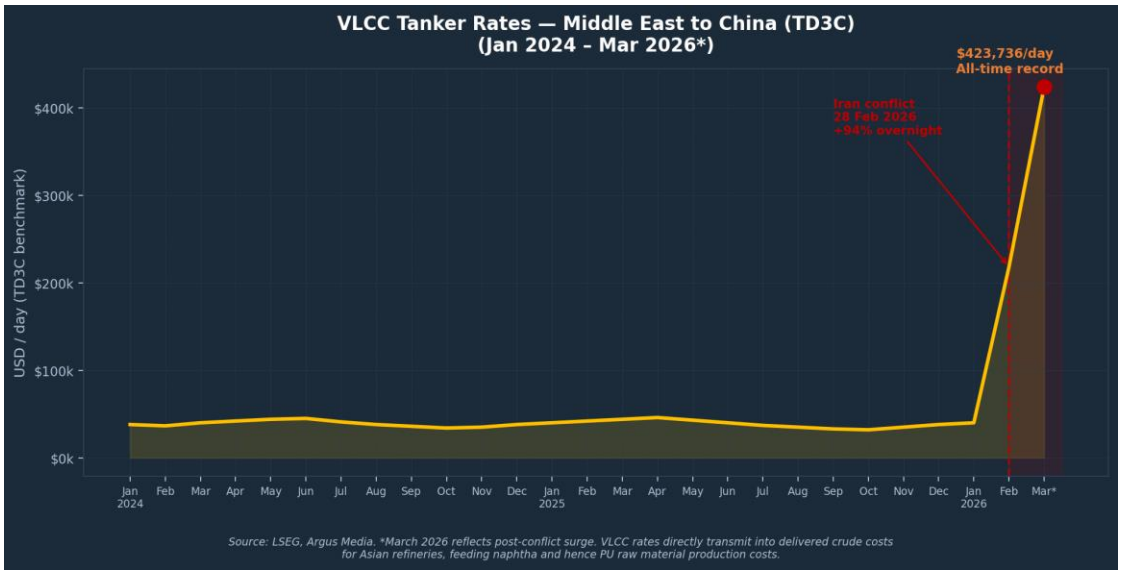

Figure 5: VLCC tanker benchmark rates (TD3C, Middle East to China), Jan 2024 – Mar 2026. The all-time high of $423,736/day on 3 March 2026 directly transmits into delivered crude costs to Asian refineries and hence PU feedstock pricing.

4.2 Naphtha Supply Chains

Naphtha is the critical intermediate between crude oil and the aromatics and olefins that feed isocyanate and polyol production chains in Asia. The current geopolitical environment has affected naphtha supply in two ways: first, any disruption to Hormuz tanker traffic immediately tightens naphtha availability to Asian crackers; second, route risk premiums and insurance surcharges on tankers operating in the Persian Gulf have elevated delivered naphtha costs to Asian ports. This feedstock cost pressure flows directly into the production cost and export price of TDI and MDI — a reliable leading indicator of price pressure on isocyanate supply.

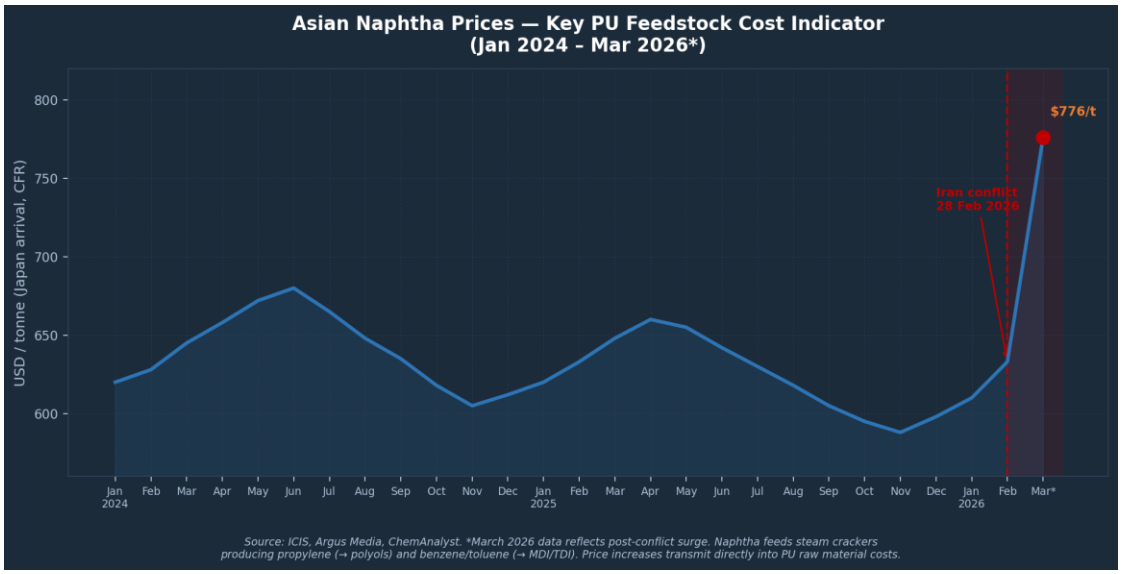

Figure 6: Asian naphtha spot prices (CFR Japan arrival), Jan 2024 – Mar 2026. Naphtha feeds steam crackers producing propylene (→ polyols) and benzene/toluene (→ MDI/TDI); the post-conflict surge to $776/t in early March 2026 represents a key leading cost indicator for PU raw materials.

4.3 Russian Crude and the Sanction-Driven Realignment

Since the imposition of G7 price caps and EU import bans on Russian crude in 2022, China has become the dominant buyer of Russian Urals crude, purchasing discounted barrels that would previously have moved to European refineries. Chinese refineries receive cheaper feedstock input, supporting competitive Asian chemical production costs and export pricing. However, the 'shadow fleet' of tankers operating outside Western insurance frameworks represents its own source of maritime risk — and any tightening of Russian crude flows to China would remove a significant cost subsidy from Chinese chemical producers.

4.4 Polyether Polyols

Around two thirds of the global Propylene Oxide (PO) capacity is now based in APAC of which 70% of the Asian capacity sits in China. This leads to 60% of the global polyol production being in Asia, of which 40% is in China, 20-25% in North America, 20% in Europe and ROW 5%. Supply has tightened globally recently, compounded by the LYB PO plant outage in Texas.

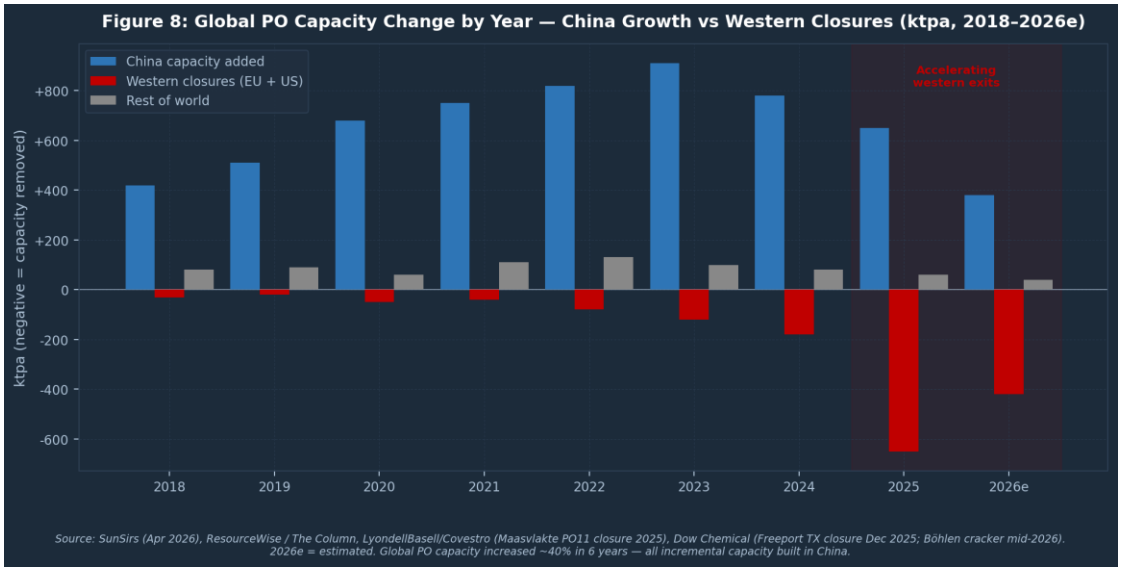

Figure 8: Annual change in global propylene oxide capacity by region (ktpa), 2018–2026e. All incremental capacity since 2018 was built in China; Europe and the US removed over 1 million ktpa in 2025–2026 alone, making China the dominant swing supplier at exactly the moment the Iran conflict disrupted logistics.

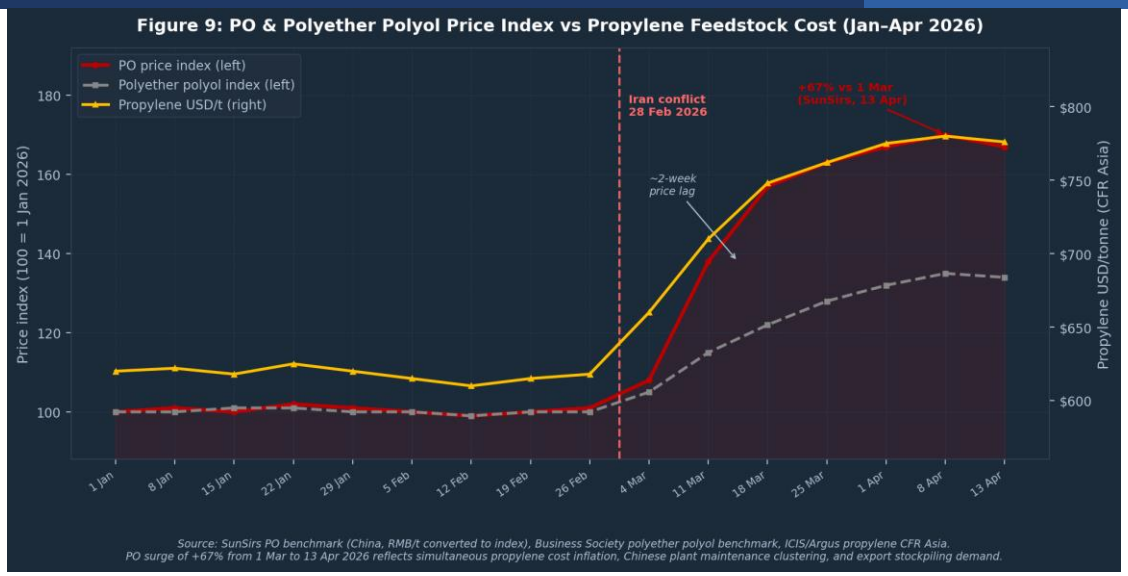

Figure 9: PO and polyether polyol price indices vs propylene feedstock cost (Jan–Apr 2026; index 100 = 1 Jan 2026). PO surged +67% from 1 March to 13 April 2026 (SunSirs benchmark). The ~2-week lag between propylene cost inflation and PO price transmission reflects production cycle time; polyol prices then lagged PO by a further week as producers initially absorbed margin.

Both Charts show and explain why the Polyol supply chain is affected faster than others.

5. The Current Effect on PU Raw Material Costs

The factors described interact and compound in ways that are more than the sum of their individual parts. European PU flexible foam producers are absorbing the combined impact of elevated spot freight rates, war risk surcharges, longer financing requirements on in-transit inventory, more frequent and steeper price adjustments from suppliers, and reduced predictability across the entire supply chain.

5.1 Freight Rate Dynamics

As of 30 April 2026, Freightos Baltic Index data shows Asia–North Europe spot rates at approximately $2,900/FEU — up around 20% versus pre-conflict levels — while Asia–Mediterranean has risen to $3,800/FEU. Transpacific US West Coast rates have climbed roughly 40% to over $2,400/FEU. The Drewry World Container Index (23 April) registered $2,232 per 40ft container overall, though this masks significant variation by lane and cargo type. Bunker fuel (VLSFO) has risen approximately 55% since the start of the war and remains highly volatile. Emergency fuel surcharges, GRIs and war risk surcharges have been layered on top of base rates by all major carriers. Crucially, freight rates on Asia–Europe lanes have been partially restrained by weak seasonal demand and overcapacity; market participants warn that peak season demand from June onwards, colliding with continued fuel cost pressure and possible further Hormuz escalation, could trigger a much sharper second wave of rate increases. For MDI and TDI buyers, SeaVantage estimates total landed cost increases (base rate plus all surcharges) significantly exceed the headline rate moves: freight budget reviews set before the conflict are now materially understated.

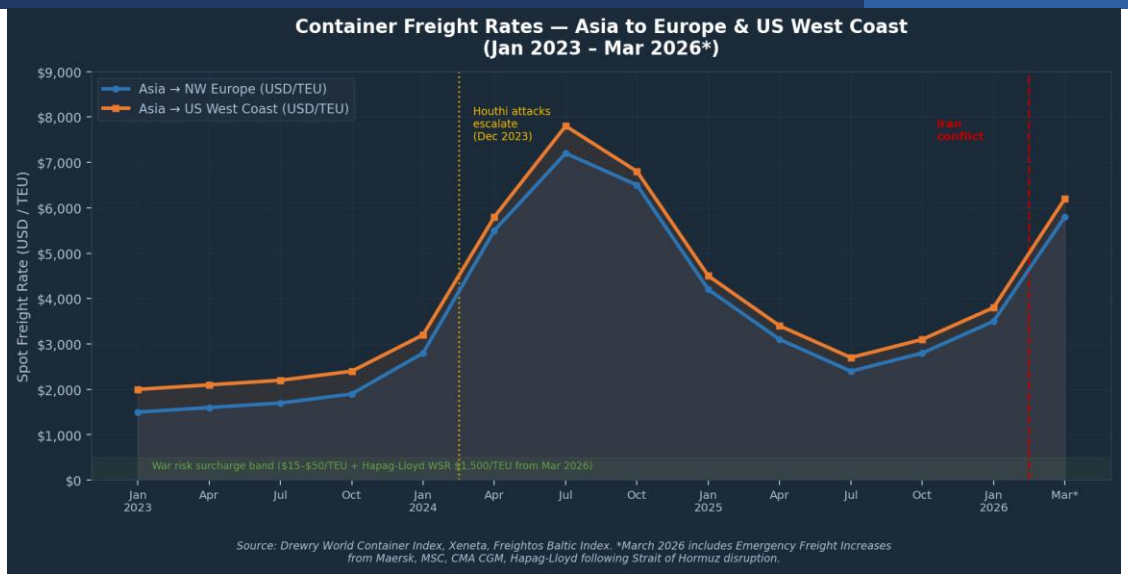

Figure 7: Asia–Europe and Asia–US West Coast spot container freight rates (USD/TEU), Jan 2023 – Mar 2026. War risk surcharge bands and key escalation events are annotated. For MDI and TDI, each $1,000/TEU increase adds approximately USD 50–100/tonne to delivered cost.

5.2 Extended Payment and Financing Exposure

Longer transit times create extended financing of in-transit inventory. When goods take 40 to 45 days to cross the water rather than 28 to 32 days, buying firms have capital tied up in paid-for goods not yet in their warehouse for an extra 10 to 15 days. At prevailing European interest rates following the post-2022 tightening cycle, this additional carry cost is not trivial for firms purchasing large volumes on letter of credit or prepayment terms.

5.3 The Spot Quote Problem

Perhaps the most operationally disruptive aspect for procurement teams is the collapse in quote validity periods. Pre-crisis, a supplier would typically offer price indications valid for 7 to 14 days. In the current environment — where prices, war risk premiums, and container spot rates can shift significantly within 12 - 24 hours.

6. Secondary Supply Chains: USA Polyol Flows to Europe

While the Asian logistics disruption is the primary driver of supply chain stress, US Gulf Coast supply of polyols has not been immune to the wider market dynamics. US chemical producers are experiencing input cost pressures from elevated prices — the primary feedstock for propylene oxide and polyether polyols — as well as elevated domestic logistics costs and full order books. This is also compounded by the outage at Lyondell Basel's Bayport Choate site in Texas where 620KT of PO (around 4% of global supply) is down, causing supply concerns in the US flex foam market.

7. Outlook scenarios

7.1 Ceasefire agreed 8 April 2026 – Strait remains effectively closed (Status: 30 April 2026)

A ceasefire was agreed on 8 April 2026. However, it has not resulted in reopening of the Strait of Hormuz. Iran's parliament speaker stated on 22 April that reopening "is impossible" as long as the US naval blockade of Iranian ports remains in place. The IRGC has continued to attack and seize vessels, including the MSC Francesca on 22 April. Iran is now demanding toll payments exceeding $1 million per vessel for transit through a newly designated route through Iranian territorial waters. The "dual blockade" — Iran controlling the strait, the US Navy blockading Iranian ports — creates a stalemate with no clear resolution mechanism. Brent crude touched $126/bbl intraday on 30 April, the highest level since 2022. The Hormuz Tracking live feed shows near-zero non-Iranian transit. US-Iran negotiations in Islamabad on 11 April failed to yield results.

7.2 Near-term reopening scenario (May–June 2026)

Even if a diplomatic breakthrough were reached and the strait formally declared open in May 2026, multiple structural barriers to recovery remain. Rystad Energy estimates it would take until July for oil flows to reach 90% of pre-war levels and a further two months for those barrels to reach refineries for processing — meaning naphtha and petrochemical feedstock relief for PU raw material producers would not be felt before Q4 2026 at the earliest. The US Pentagon has advised Congress that mine-clearance operations in the strait could take six months even after the war ends — and that comprehensive sweeping may not be possible until hostilities fully cease. War risk insurance, even on a reopened strait, is projected by Al Jazeera-cited analysts to cost 20 times pre-war levels for the foreseeable future. Container and tanker repositioning following two months of diversion would require a minimum 12–16 weeks. The Red Sea / Suez Canal route meanwhile remains compromised by ongoing Houthi activity. In short: a May ceasefire reopening would be welcome but would not translate into normalised PU raw material supply or pricing before late 2026 at best.

7.3 Current Conclusion

As of 30 April 2026 — nine weeks into the conflict — the situation has materially worsened since this article was first published on 9 April. The ceasefire has not reopened the Strait of Hormuz. Brent crude is at a four-year high of $126/bbl. The dual blockade shows no sign of resolution. IRGC vessel seizures are continuing. Naphtha prices, VLCC rates and PU raw material costs remain acutely elevated. The World Bank projects energy prices will average 24% higher across 2026 as a whole, with Brent potentially reaching $115/bbl under its baseline scenario. For European polyurethane producers, the key near-term risks are: (1) a peak-season container freight rate spike from June onwards as weak seasonal demand is replaced by summer volume; (2) further force majeure declarations from Asian PU feedstock producers if naphtha availability remains constrained; (3) prolonged working capital stress from extended transit times, high inventory carry costs, and volatile spot pricing; and (4) any military escalation reinvolving Iran's energy infrastructure or Gulf state facilities that could send crude prices through $130–$140/bbl. This briefing will be updated as the situation develops. Procurement teams are strongly advised to seek longer-term supply agreements where possible, review stockholding policies, and model freight cost assumptions under at least a "disruption persists through Q3" scenario.