

The End of Just-in-Time

Why Chemical Procurement is
Rebuilding for Resilience, Not
Efficiency

Logistics disruption. Geopolitical risk. The CO² trade-off.
Nearshoring limits. Cascade effects. Stability outlook.

Supply Chain Strategy

Chemical Procurement

Resilience vs. Efficiency

Geopolitics & Trade

KEY FIGURES

+500%

War risk insurance reported premium
increase since 2023

5x

Asia-Europe freight rate surge
at 2024 peak

100%

surveyed Chem/pharma firms reporting
financial supply chain impact

30%

~30% YoY decline in US chemical
imports from China (Q2 2025)

1 Executive Summary

For three decades, just-in-time procurement was not merely a logistics strategy — it was a foundational principle of industrial operations. Lean inventory, single-source suppliers, optimised freight lanes, and zero buffer stock delivered measurable efficiency gains and compressed working capital across global manufacturing. The chemical industry, as the upstream provider to virtually every sector of the modern economy, was both architect and beneficiary of this system.

That system is now being systematically dismantled. Not by choice, but by the compound pressure of simultaneous and non-resolving disruptions: the Red Sea crisis entering its third year, tariff regimes that restructure entire trade flows overnight, geopolitical fractures that eliminate trusted supply relationships, Rhine and Panama Canal constraints that close the inland logistics alternatives, and a climate-driven increase in extreme weather events that attacks physical infrastructure. The result is an industry rebuilding its supply chain logic from first principles — and a downstream cascade that reaches every sector chemistry serves.

\$6.2T

Global chemical industry market value, 2024 — the upstream foundation for all manufacturing

100%

Share of surveyed chemical and pharma firms reporting tangible financial supply chain impact (Xeneta survey, 2025)

2.1%

Projected chemical production growth 2025 — down from 3.4% in 2024, falling further to 1.5% in 2026

5x

Asia-Europe container freight rate surge at 2024 peak — structural, not cyclical

The Central Argument

The question is no longer whether to move from JIT to resilience-first procurement. That decision has been made by events. The questions now are: how fast, at what cost, what must be sacrificed to get there, and what happens to the industries that depend on chemical supply when the transition is incomplete. This paper addresses all four.

“Figures in this paper combine point-in-time observations, survey data, and directional estimates in a highly volatile environment. Ranges and qualifiers are used where appropriate.”

2 The Disruption Landscape: Three Years That Changed the Calculus

The chemical supply chain is navigating a convergence of disruptions that is unprecedented in both severity and simultaneity. No single event would have forced structural change. The coincidence of all of them has made it unavoidable.

2.1 The Red Sea — The Route That Stopped Being Reliable

The Houthi campaign against commercial shipping began in November 2023. By early 2025, container traffic through the Suez Canal had fallen by up to ~90% at peak disruption. The Cape of Good Hope has become the de facto standard for Asia-Europe container traffic — a rerouting that adds 10–14 days to transit times, 4,000 miles to each voyage, and up to 40% to fuel consumption per voyage.

Metric	Figure	Context
Pre-crisis container rate (China–Europe, 40ft)	~\$1,148	November 2023 baseline
Peak 2024 container rate (China–Europe, 40ft)	~\$6,000	+523% — 5x increase
Current spot rates (2025, post-peak)	+39–68% above pre-crisis	Xeneta analysts, sustained premium
Extra fuel cost per Cape rerouting	~\$500,000–\$1M	Per voyage, per carrier, depending on vessel
War risk insurance (pre-crisis)	<0.1% of vessel value	Pre-November 2023
War risk insurance (mid-2025)	0.4–1.0% of vessel value	+400–600% increase
Suez transit reduction	peak ~90% vs March 23	Maritime analytics, Sino Shipping
J.P. Morgan inflation estimate (H1 2024)	+0.7pp core goods CPI	+0.3pp overall core inflation
Port congestion increase (Rotterdam, Singapore)	+20–30% waiting times	Knock-on from rerouting

Sources: Xeneta; Sino Shipping; J.P. Morgan Research; DocShipper 2025; FreightAmigo; Alinvest.

2.2 The Rhine, the Panama Canal, and the Inland Alternatives

When the maritime route failed, companies looked for inland alternatives. They found them stressed too. The Rhine — Europe's chemical artery, carrying a critical share of Germany's chemical inland transport (estimates up to ~80% for specific corridors) — has experienced repeated low-water events driven by climate-related drought, restricting barge capacity and forcing expensive road and rail substitution. The Panama Canal imposed vessel restrictions from late 2023 through 2024 due to historically low water levels, reducing daily transits from 36 to as few as 24 vessels and adding weeks to Asia-US East Coast shipping. There is no redundant global logistics layer waiting to absorb simultaneous failures across maritime, river, and canal systems.

2.3 Tariff Regimes as Supply Chain Restructuring Events

Freight disruptions add cost. Tariff restructuring changes the entire sourcing logic. US chemical imports from China dropped nearly 30% year-on-year in Q2 2025 — not a gradual shift but a structural rupture. US chemical imports overall are projected to hit their lowest level since 2020. Supply chains built around Chinese intermediates are being rebuilt around Southeast Asian and Indian alternatives that are not yet at scale. In 2019, less than 20% of exclusion requests from chemical tariffs were granted — the 2025 environment is not more permissive.

The Compounding Problem

These disruptions do not occur sequentially, allowing for recovery. They are simultaneous and reinforcing. A chemical company managing Red Sea rerouting, Rhine low-water restrictions, and a tariff restructuring simultaneously cannot optimise for any of them individually. The traditional supply chain management toolkit — buffer stock, dual sourcing, spot purchasing — becomes both necessary and prohibitively expensive at the same time.

3 What JIT Actually Cost When It Broke

The efficiency gains of just-in-time procurement were real and well-documented. The cost of its failure has been less systematically quantified — but the data is now available. Zero buffer stock means zero protection. The moment the supply chain pauses, so does production.

Category	Observation	Source / Context
Pharmaceutical: 35% of chemical/pharma firms	Reported production delays due to API or intermediate shortages in 2024	Directly traceable to logistics disruption and Chinese import restrictions
Automotive: European plant shutdowns	Reported disruptions and temporary production adjustments	JIT automotive supply chains had zero tolerance for 10–14 day transit additions
Chemicals: 2022 revenue peak → 2023 collapse	Revenue decreased 8% YoY by end-2023; operating margins fell to lowest since 2008	Destocking by customers and supply shock combined; Deloitte 2025 Chemical Outlook
Chemical procurement cost increase	Transport costs increased substantially across all modes in 2024–2025	Container shipping, trucking, and rail simultaneously elevated
Inventory carrying costs	+15–20% capacity tied up in extended voyages vs 2022	Ships rerouted via Cape = effectively removed from available capacity pool
Insurance: war risk premium	Added \$360,000 per voyage for a \$90M vessel by mid-2025	400% increase from pre-crisis levels
100% of chemical/pharma respondents	Reported tangible financial impact from supply chain disruption in past 12 months	Xeneta survey of 450 procurement leaders, 2025 — not a single zero-impact firm

The structural conclusion: JIT was not merely inefficient under stress. It was fragile by design — optimised for a world of predictable logistics, stable geopolitics, and single-source relationships that offered the lowest unit cost. That world has not returned, and the evidence suggests it will not return on any timeline relevant to current capital planning.

4 The CO² Trade-Off: When Green Goals Meet Operational Reality

This is the question that procurement leaders, CFOs, and sustainability officers are privately wrestling with and publicly not yet articulating clearly: when does operational survival require temporarily abandoning the environmental commitments the business has made?

The answer is already in the data. Deloitte's 2025 Chemical Industry Outlook noted 'a slowdown in decarbonisation investment announcements in 2024, likely in part due to high interest rates, uncertainty in global markets, and a hesitancy to increase investments before better understanding the return.' European policymakers have adjusted implementation timelines and scope. The EU's Corporate Sustainability Reporting Directive has been delayed. In the US, key regulations are being altered or rescinded. The alignment between what companies committed to and what the operational and policy environment now requires is breaking down — and chemical procurement is at the centre of the fracture.

4.1 Where the Conflict Is Real

Where Resilience Increases Emissions	The Data on How Companies Are Responding
<ul style="list-style-type: none"> • Rerouting via Cape of Good Hope adds 40% to fuel consumption per voyage. Every ship avoiding the Suez is emitting significantly more CO² than its original route — as a direct consequence of the security crisis, not any internal company decision 	<ul style="list-style-type: none"> • Gartner (2025): '54% of CSCOs say it would take longer than 12 months to shift 25% of their supply to regional sources.' The transition period is precisely when CO² intensity rises — before the regional supply chains are optimised
<ul style="list-style-type: none"> • Nearshoring and dual-sourcing increase the number of suppliers and transport legs, often adding CO² per tonne of chemical delivered. The efficiency of long-haul single-source supply from the lowest-cost producer is simultaneously the efficiency of lowest-emission delivery 	<ul style="list-style-type: none"> • Schneider Electric research: shifting production in response to cost or geopolitical risk 'may add complexity or even increase emissions, while prioritising lower-carbon suppliers can mean higher costs or longer lead times.' The trade-off is not hypothetical — it is operational
<ul style="list-style-type: none"> • Air freight as emergency backup — used when maritime failures create production-stopping shortages — carries a carbon cost commonly cited as 20–50x higher depending on methodology 	<ul style="list-style-type: none"> • Only 15% of companies are considering moving supply to the US to mitigate tariff impacts — in part because domestic production in many chemical categories is simply more energy-intensive than imports from optimised Asian facilities
<ul style="list-style-type: none"> • Safety stock means warehouses. Warehouses mean energy, heating, cooling, emissions. The entire transition from lean to resilient procurement has a carbon cost embedded in the infrastructure change 	<ul style="list-style-type: none"> • The honest assessment: for many chemical companies in 2025–2026, decarbonisation investment is being deferred, not abandoned. But deferral has a compounding cost when net-zero timelines do not move

4.2 The Long-Term Answer: They Are Not Opposites

The most sophisticated analysis of this question — from Schneider Electric, Accenture, and the journal Nature — converges on a counter-intuitive finding: resilient supply chains and low-carbon supply chains are, over a 5–10 year horizon, structurally aligned. Geographically diversified, regionally anchored supply chains reduce both single-point-of-failure risk and long-haul transport emissions. Green hydrogen and renewable energy integration into chemical production reduces both carbon footprint and energy cost volatility. The firms that are building resilience by investing in European production infrastructure and renewable energy on-site are simultaneously reducing their exposure to both supply shocks and carbon pricing.

The short-term conflict is real and must be acknowledged. In the medium term, the companies that treat resilience and decarbonisation as a joint investment rather than competing priorities will be structurally better positioned than those who treat sustainability as a cost to be deferred when operational pressure mounts.

The Pragmatic Position for 2026

No procurement leader should be forced to choose between keeping the plant running and meeting an emissions target set in 2021 for a supply chain that existed in 2021. The honest conversation within companies is: which emissions increases are forced by circumstances beyond control (rerouting, emergency freight), which are choices that should be justified by timeline and cost, and which are deferrals that need a credible catch-up plan. The CBAM (Carbon Border Adjustment Mechanism) makes this conversation financially material starting in 2026 — the carbon content of imports is now a procurement cost, not just a reporting obligation.

5 Long-Term Planning: Is It Still Possible?

The Global Economic Policy Uncertainty Index reached a record high in April 2025, following the US reciprocal tariff announcement. Supply chain leaders operating with 5-year capital plans designed for a world that no longer exists are not planning — they are projecting a past that cannot be assumed.

98% of surveyed leaders reported planning changes to their supply chain strategy in response to US trade and immigration policy alone (Gartner, 2025). This is not a planning problem — it is a planning paradigm shift.

5.1 What Has Changed in Strategic Planning

What Is Being Replaced	What Is Being Built
<ul style="list-style-type: none"> • Planning horizon compression: 3-year plans are replacing 5-year plans in procurement strategy. The variables that can be forecast with confidence over 5 years have narrowed to demand curves and process chemistry. Freight costs, tariff levels, and geopolitical access cannot be modelled with pre-2022 assumptions 	<ul style="list-style-type: none"> • Capital investment sequencing: chemical plant investments of \$1–10 billion require 5–10 year payback horizons. The decision to invest in European or North American production capacity is being made now for facilities that will operate in 2030–2035. Uncertainty does not stop these decisions — it changes which facilities get built
<ul style="list-style-type: none"> • Scenario planning adoption: companies that used to build single-path supply chain forecasts are now running 3–4 scenario models simultaneously, with different sourcing configurations activated at different trigger points 	<ul style="list-style-type: none"> • Consolidation pause: only 243 M&A; deals in H1 2025 — the lowest for any half since pre-COVID (Deloitte 2026 Chemical Outlook). Thin margins and uncertainty are freezing deals that would normally consolidate fragmented supply chains. Consolidation expected post-2026 once stability returns
<ul style="list-style-type: none"> • Supplier relationship architecture: from 'cheapest single source' to 'qualified dual source with acceptable premium.' The premium for resilience is now a deliberate line in the budget, not a failure of procurement efficiency 	<ul style="list-style-type: none"> • Digital investment acceleration: AI-driven demand forecasting, digital twin supply chain modelling, and real-time logistics monitoring are receiving increased investment — the one category of supply chain spending that is growing under pressure
<ul style="list-style-type: none"> • Inventory strategy: from days-of-supply optimised to a theoretical minimum to weeks-of-supply calibrated against realistic disruption frequency and recovery time 	<ul style="list-style-type: none"> • Geopolitical intelligence as a procurement function: companies are embedding geopolitical risk assessment into procurement decisions that previously required only cost and quality analysis

The Answer on Long-Term Planning

Long-term planning is not dead — but the object of the plan has changed. Companies are not planning for a stable world with specific supply chain configurations. They are planning for a range of worlds, building optionality into their supply chain architecture, and investing in the ability to switch faster than they could before. The competitive advantage in 2030 will not be the lowest-cost supply chain — it will be the most adaptable one.

6 Nearshoring and Reshoring: Where It Works, Where It Hits a Wall

The political and strategic case for nearshoring chemical production is clear. The industrial and economic reality is considerably more complex. The chemical industry is not a product assembly operation that can be relocated by moving machines and people. It is a science-intensive, capital-intensive, regulation-intensive, and infrastructure-intensive sector with geographic constraints that no policy framework can quickly override.

6.1 Where Nearshoring Is Feasible

- Formulation and blending — the final stage of converting bulk chemicals into application-ready products — can often be relocated without moving the upstream synthesis. Paints, adhesives, crop protection formulations, and personal care products are examples. The raw material still travels globally; the final value-add happens regionally
- Specialty chemicals with high margin and low volume — where the logistics cost is a small fraction of the product value and where technical service proximity is competitively important. Catalyst specialties, high-purity electronic chemicals, and advanced polymer additives in this category
- Fermentation-based products including certain APIs, vitamins, and amino acids where European fermentation capacity exists or is being built as part of pharma supply security initiatives
- Fertiliser and base agrochemical production in regions with access to natural gas as feedstock — North America and the Gulf are competitive; Europe is not except where renewable feedstocks are available

6.2 Where It Hits a Wall

Chemical Category	Nearshoring Reality	Assessment
Petrochemicals and base chemicals	Require co-location with refinery infrastructure. You cannot nearshore a steam cracker without a refinery. Capital costs \$1–5 billion. Construction timeline 5–8 years minimum. Europe's high energy costs make European production structurally uncompetitive against Middle East and US Gulf	Significant barrier
Rare earth-dependent catalysts	Rare earth processing is 85–90% concentrated in China. Processing is not simply a facility — it is accumulated metallurgical expertise, environmental permitting, and infrastructure that took decades to build. EU Critical Raw Materials Act addresses this but on a 2030+ timeline	Significant barrier
Lithium-based chemicals and battery materials	Lithium processing capacity does not exist at scale in Europe. EU-Australia FTA (March 2026) opens lithium supply — but processing infrastructure is a 5–10 year build. In the interim, dependency on China-processed materials continues	Medium-term wall
Amino acids (methionine, lysine, threonine)	Production dominated by Chinese and German producers. Chinese overcapacity has structurally suppressed global prices. New European capacity is economically unviable at current price levels without substantial subsidy or tariff protection	Economic wall
Fine chemicals and pharmaceutical intermediates	India has built significant capacity and is the viable alternative to China for many APIs. But Indian capacity is not unlimited, and the industry is simultaneously being pulled toward US investment commitments under pharmaceutical tariff pressure	Manageable — with 2–3 year lead time
Semiconductor fabrication chemicals	McKinsey estimates 60% of chemicals needed for chip fabrication lack sufficient US domestic supply. Building new capacity requires regulatory permitting for hazardous materials, specialist workforce, and capital costs that make 5-year timelines optimistic	Significant barrier in short term

The Critical Limitation

The most strategically important chemical supply chains — the ones that feed semiconductors, batteries, pharmaceuticals, and agriculture — are precisely the ones where nearshoring hits the hardest walls. These are not soft constraints of cost and convenience. They are geological, technical, and time-based constraints that policy cannot override in the time frames relevant to current disruption. This structural limitation is now being addressed at policy level, most notably through the EU Critical Raw Materials Act (CRMA):

The EU Critical Raw Materials Act

The EU Critical Raw Materials Act (CRMA), in force since May 2024, establishes a framework to secure a sustainable, diversified, and stable supply of critical minerals. It addresses EU dependencies by fostering domestic extraction (10%), processing (40%), and recycling (25%) of strategic raw materials by 2030.

Key Components of the CRMA:

Strategic Targets (by 2030): To reduce dependence on single third-country suppliers (no more than 65% for any single strategic raw material), the EU aims to meet:

- 10% of its consumption via extraction within the EU.
- 40% of its consumption via processing within the EU.
- 25% of its consumption via recycling within the EU.

Strategic Projects: The Act fast-tracks permitting procedures (24 months for extraction; 12 months for processing/recycling) for selected projects and provides easier access to finance.

Monitoring and Risk Mitigation: The Act includes measures for monitoring supply chains and requires large companies to audit their supply chains.

Sustainability and Circularity: It promotes the reduction of demand through recycling, substituting, and increasing resource efficiency.

International Cooperation: The EU is building strategic partnerships with third countries to diversify supply chains.

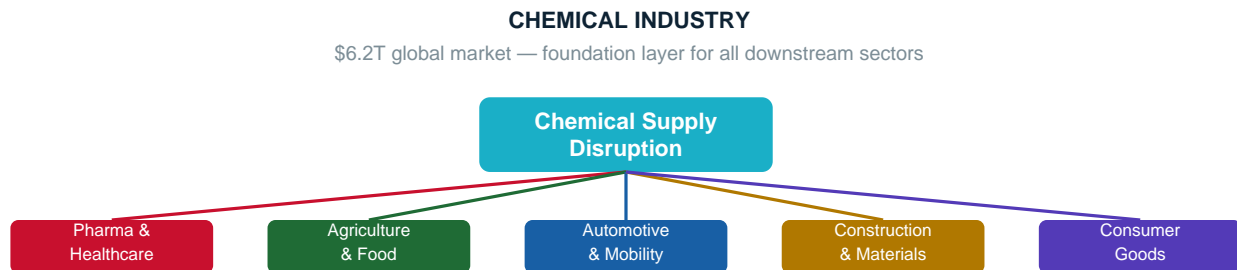
Raw Materials Definition:

The CRMA identifies a list of 34 critical raw materials, of which 17 are considered 'strategic' (e.g., lithium, cobalt, nickel, rare earth elements) due to their high importance in strategic sectors like renewable energy, defense, and space.

The Act was introduced to prevent supply disruptions and ensure the EU's strategic autonomy during green and digital transitions.

7 When Supply Chains Stop: Scenarios for Standstill

The chemical supply chain is not designed to stop gracefully. Unlike a factory that can pause assembly, a continuous-process chemical plant that halts production faces: catalyst deactivation, intermediate degradation, safety system stress, and restart costs that can equal weeks of lost production. The downstream consequences of a chemical supply standstill — even a partial one — cascade faster and wider than most risk models assume.



Scenario	Downstream Consequence	Time to Visible Impact
Chlorine supply disruption	Affects water treatment (drinking water safety), PVC production (construction and medical devices), and pharmaceutical synthesis. A 2-week chlorine supply halt has consequences across 12+ downstream sectors	potential impact within days depending on system buffering
Phosphate fertiliser shortage	Directly limits crop production in the following planting season. Each 10% reduction in fertiliser availability can reduce yields 5–8% depending on soil and crop type. Food price inflation follows with a 6–12 month lag	1 planting season — structural, not recoverable in-year
Ethylene/propylene shortage	Base feedstock for plastics, packaging, automotive parts, medical devices, adhesives. A sustained shortage creates allocation cascades through virtually every manufacturing sector simultaneously	4–6 weeks before downstream production halts; inventory buffers thin
Rare earth catalyst supply disruption	Petroleum refining requires rare earth catalysts. A China-sourced rare earth restriction would affect fuel production within weeks. No Western substitute at comparable scale today	12–16 weeks — the length of catalyst inventory typical in refineries
API (active pharmaceutical ingredient) shortage	60–80% of API supply for European and US branded medicines is manufactured in China or India. A sustained supply halt affects medicine availability on a 3–6 month timeline based on finished goods inventory	3–6 months for most common drugs; critical medicines faster

The scenarios above are not theoretical. Every one has occurred in partial form in the 2020–2025 period. None have resolved to zero — they have moderated without returning to pre-disruption stability.

8 The Cascade: What Happens to the Industries Chemistry Serves

The chemical industry is unusual among industries in that it has no meaningful final consumer — it only has industrial customers. Everything it produces becomes something else. This means every disruption in chemical supply is simultaneously a disruption in every industry that uses chemistry. The cascade is not a metaphor. It is a structural feature of how the modern economy is built.

Downstream Sector	Dependency and Current Stress	Sensitivity Assessment
Automotive	Paints and varnishes demand fell directly as US tariffs hit German car exports. Coatings additives, engineering plastics, adhesives, and lubricants all track automotive production volumes. European auto weakness in 2025 directly suppressed demand for 6–8 chemical sub-segments simultaneously. EV transition adds new chemical demand (battery materials, thermal management) but at different supply chain logic than ICE chemicals.	High sensitivity — bidirectional. Auto weakness hurts chemistry; chemistry supply disruption halts auto production
Pharmaceuticals	APIs, excipients, packaging materials, and sterilisation chemicals are all sourced globally. The COVID-19 pandemic exposed the structural dependency. The Red Sea crisis compounded it. EU pharma producers have initiated API reshoring programmes but face a 5–10 year build timeline. In the interim: dual sourcing at cost, stockpiling, and accepting margin compression.	Existential dependency. Medicine availability is directly linked to chemical supply chain integrity — no chemical, no medicine
Agriculture and food	Fertilisers, crop protection chemicals, and food additive chemistry are all exposed. Fertiliser prices spiked dramatically after Russian export restrictions in 2022 — European food producers are still managing the cost base that resulted. Each new disruption to nitrogen or phosphate supply is a food price event with a 12–18 month lag.	Structural dependency with long consequence tail. Food inflation from a chemical supply disruption is not visible until long after the original event
Construction and infrastructure	Concrete admixtures, insulation materials, waterproofing chemicals, and structural adhesives. Construction is already facing headwinds from high interest rates and energy costs. Chemical supply disruption creates a material availability constraint on top of a cost constraint.	Moderate sensitivity. Construction has more ability to delay projects than to substitute materials
Consumer goods	Detergents, personal care products, packaging, and textile chemistry are all downstream. Chinese goods diversion into European markets is increasing competition for European chemical manufacturers serving these sectors — a second-order effect of US tariff policy.	Mixed — consumer goods companies can reformulate over 12–24 months but face immediate cost pass-through pressure
Semiconductors and electronics	Ultra-high-purity chemicals, photoresists, and specialty gases. The most concentrated dependency: a handful of global suppliers for materials with no substitutes. A disruption here does not reduce semiconductor production — it stops it.	Binary dependency. No substitute, no delay possible, no workaround available

9 How Stable Is the Chemical Industry Right Now — and Long-Term?

The honest answer requires separating the financial stability question from the strategic stability question. Financially, the industry is stressed but not in crisis. Strategically, it is in the most consequential restructuring since the post-war petrochemical build-out.

9.1 The Current Financial Picture

Indicator	Reading	Context
Global chemical production growth 2023	+0.3%	Near-stagnation. Post-COVID destocking trough.
Global chemical production growth 2024	+3.4%	Recovery. Destocking cycle ended.
Projected growth 2025	+2.1%	Decelerating. Tariff and demand headwinds.
Projected growth 2026	+1.5%	Atradius projection. US contracting -0.2%.
US chemical imports Q2 2025	Lowest since 2020	Deloitte 2026 Chemical Outlook.
Operating margins 2023	Lowest since 2008 financial crisis	Revenue -8% YoY. Deloitte.
M&A; activity H1 2025	243 deals	Lowest half since pre-COVID. Consolidation frozen.
Decarbonisation investment pace	Slowing in 2024	Deferred, not abandoned. Deloitte.
Capital cycle position (2026)	Near the bottom	Deloitte 2026 — with cautious recovery expected post-2026.
Global chemical market value 2024	\$6.2 trillion	Stable at scale — the industry is not shrinking, it is stressed.

9.2 The Long-Term Structural View

The chemical industry will not shrink in absolute terms over the next decade. The demand for its products — in batteries, biologics, specialty materials, food production, water treatment, and electronics — is structurally growing. What will change is where production happens, at what cost, and under what supply chain architecture.

Structural Challenges	Structural Opportunities
<ul style="list-style-type: none"> • Asia-Pacific remains the primary growth engine. China's shift to self-sufficiency in base chemicals means European and US producers lose the Chinese market for bulk chemistry while retaining specialty access 	<ul style="list-style-type: none"> • Battery materials, green hydrogen chemistry, and circular economy chemistry are the high-growth segments within the next decade. Companies positioned in these areas have a structural demand tailwind that partially offsets weakness in traditional end markets
<ul style="list-style-type: none"> • European chemical competitiveness depends critically on energy costs. High energy costs are causing plant closures — BASF's Ludwigshafen restructuring is the clearest signal. This is not cyclical. It is structural, driven by the energy transition timeline 	<ul style="list-style-type: none"> • The regulatory environment is bifurcating: REACH, PFAS restrictions, and CBAM in Europe create compliance costs and market access requirements that are simultaneously a barrier to entry and a cost disadvantage
<ul style="list-style-type: none"> • Overcapacity in basic chemicals is a persistent problem, particularly for Chinese capacity built for an export market that tariffs are now restricting. This pushes Chinese product into European markets at below-cost pricing 	<ul style="list-style-type: none"> • AI and digital transformation are delivering real efficiency gains in chemical production — predictive maintenance (documented cases report up to -45%), digital twins (up to +30% plant efficiency). These are structural, not cyclical improvements
<ul style="list-style-type: none"> • The specialty-commodity split is accelerating: specialty chemicals with IP protection, regulatory moats, and service differentiation will sustain margins. Commodity chemicals face Chinese overcapacity pressure and energy cost disadvantage in Europe 	<ul style="list-style-type: none"> • The industry is near the bottom of a capital cycle, which historically precedes a period of consolidation and recovery. The companies that survive the current trough with intact balance sheets will be positioned to acquire assets at distressed valuations

CBAM Calculation

Estimated Cost Comparison (Per Tonne)

Due to higher reliance on coal-fired power and less mature decarbonization technologies, APIs from India and China will have higher embedded emissions than EU-produced APIs.

Indian/Chinese API: Assume a high carbon intensity of 3 tonnes CO₂e per tonne of API (this varies heavily, but high-energy-intensive chemicals often exceed this, with some Indian steel at 2.1 tCO₂e/t).

EU-produced API: Assumed lower intensity due to stricter environmental regulations and cleaner energy grids (e.g., 1 tonne CO₂e per tonne of API).

Assumed Carbon Price: €80/tonne CO₂e.

Feature	Chinese/Indian API	EU-Produced API
Emission Intensity	~3.0 tCO ₂ e / tonne API	~1.0 tCO ₂ e / tonne API
CBAM Charge (2026)	€80 * 3 * 0.975 = ~€234/tonne	~€0 (Already pay ETS)
Potential Penalty	Up to +30% for missing data	N/A

10 What Procurement Leaders Should Do: A Practical Framework

The shift from JIT to resilience-first procurement is not a single decision. It is a sequence of decisions, investments, and trade-offs that need to be made in a specific order, with clear accountability and a realistic view of what each step costs and delivers.

Timeframe	Action	Investment / Effort
Now — Immediate	Map single-source dependencies by category. Every raw material, intermediate, and process chemical with a single supplier or single country of origin is a priority risk. The mapping exercise itself creates the vocabulary for board-level conversation.	2–4 weeks. No capital required.
Now — Immediate	Calculate the true cost of disruption. What did the last supply shortage actually cost — in lost production, emergency freight, spot purchasing premium, and customer penalties? The number is almost always larger than procurement believes and smaller than operations fears. It needs to be a number.	4–8 weeks. Finance and procurement collaboration.
Short-term (3–6 months)	Set category-specific resilience targets. Not every category needs 12 weeks of safety stock. Hazardous materials with storage constraints, perishable intermediates, and commodity chemicals with liquid spot markets need different strategies than specialty chemicals with 90-day lead times and no spot market.	Strategic investment. The premium for resilience is now a budget line.
Short-term (3–6 months)	Qualify second sources before you need them. Second source qualification takes 3–18 months in chemicals, depending on application testing and regulatory requirements. Starting this when the supply chain is under pressure is too late — it must be done in the periods between crises.	Moderate cost. Significant lead time requirement.
Medium-term (6–18 months)	Build geopolitical scenario planning into procurement strategy. Three scenarios — baseline, adverse tariff escalation, and supply standstill — with different sourcing configurations for each. The COO who has no answer when tariffs double overnight is not the victim of bad luck; they lacked preparation.	Process investment. Requires cross-functional capability.
Medium-term (6–18 months)	Address the CO ₂ accounting honestly. Identify which emission increases are operationally forced and document the reasoning. Prepare the catch-up investment plan for when stability returns. The CBAM makes this a financial obligation from 2026 — not just a reporting one.	Regulatory compliance. CBAM exposure is now a cost item.
Long-term (2–5 years)	Invest in regional supply chain infrastructure where the business case closes. Formulation localisation, strategic warehousing, and qualifying regional chemical producers that are not yet at scale. This is where the 54% of CSCOs who say supply shift takes >12 months need to start now.	Capital investment. 5-year payback horizon required.

11 Closing: The Industry at a Crossroads

The chemical industry has navigated disruption before. The 1973 oil shock, the 2008 financial crisis, the COVID-19 supply collapse — each required adaptation and each was eventually absorbed. The current environment is different not because any single disruption is historically unprecedented, but because the disruptions are simultaneous, reinforcing, and showing no clear resolution timeline.

The industries that depend on chemical supply — pharmaceuticals, agriculture, automotive, electronics, construction, consumer goods — are not waiting for the chemical supply chain to stabilise before making their own strategic decisions. They are already adjusting sourcing, reformulating products, building inventory, and paying the premium for supply security. The chemical industry that serves them most effectively in this environment will not be the most efficient — it will be the most reliable.

The Three Questions That Define the Next Five Years

1. Which supply chain dependencies are structural — requiring 5–10 year investment to change — and which are tactical, solvable in 12–24 months with capital and attention? 2. What is the organisation's genuine tolerance for supply disruption — measured in days of lost production and euros of cost — and is the resilience investment calibrated to that tolerance? 3. Can the CO₂ commitments made in the previous era be maintained, modified with documented justification, or do they need to be fundamentally renegotiated — and with whom, and by when?

The chemical industry will not return to the just-in-time model it built over the past three decades. The disruptions of 2020–2026 have permanently altered the risk calculus. What replaces JIT will be more expensive, more complex, and more regionally anchored. It will also be more durable — because it will be built for the world that exists, not the world that existed before 2020.

About IMP InterMediaPartners

IMP InterMediaPartners specialises in B2B marketing and strategic market intelligence for complex industrial and technology markets. This paper is the first in the IMP Intelligence Series — a programme of 52 annual papers organised around six thematic series covering supply chain, chemical segments, AI and technology, geopolitics, adjacent industries, and scenario analysis.

www.intermediapartners.de | April 2026

Sources and References

1. Xeneta (2025). 'The Price of Uncertainty: How Trade Volatility Is Breaking Chemical Supply Chains.' Survey of 450 procurement and supply chain leaders. Key finding: 100% of chemical/pharma respondents reported financial impact. US chemical imports from China down 30% YoY Q2 2025.
2. Deloitte (2025). '2025 Chemical Industry Outlook.' Global chemical production +3.4% 2024, +3.5% projected 2025. Decarbonisation investment slowdown in 2024. Supply chain resilience as central theme.
3. Deloitte (2026). '2026 Chemical Industry Outlook.' Industry near bottom of capital cycle. US chemical imports lowest since 2020. Only 243 M&A; deals H1 2025. Production growth slowing to 1.5% in 2026.
4. Atradius (October 2025). 'Industry Trends Chemicals.' Chemical production growth projected 2.1% 2025. Higher input costs for downstream industries. Automotive sector tariff impacts on paints and varnishes.
5. DocShipper (December 2025 / January 2026). 'Red Sea Crisis Update: Route Alternatives and Cost Impacts.' 90% reduction in Red Sea transits. +10–14 day transit additions. 25–35% sustained freight premiums. Third year of crisis.
6. J.P. Morgan Research (2024). 'The Impacts of the Red Sea Shipping Crisis.' +0.7pp global core goods inflation estimate. Asia-Europe freight rates surged nearly five-fold. 30% of global container trade affected.
7. LogisticsOutlook / Xeneta (December 2025). 'Red Sea Crisis: How Fast Will Lines Return?' War risk insurance 0.7–1.0% of vessel value by mid-2025 (+500%). SCFI averaging 149% above 2023. Spot rates 39–68% above pre-crisis.
8. Gartner (2025). Supply Chain Network Impacts Due to Tariff Volatility. 98% of supply chain leaders planning changes. 54% say shifting 25% of supply to regional sources takes >12 months. Only 15% considering US reshoring.
9. Schneider Electric Perspectives (November 2025). 'Resilient Supply Chains Will Be Low-Carbon Supply Chains.' Sustainability vs. resilience trade-offs. Shifting production may increase emissions. Balancing tariffs, cost, and carbon.
10. Sourceability (April 2025). 'Reshoring and Mineral Security Reshape the US Semiconductor Supply Chain.' McKinsey estimate: 60% of chemicals for chip fabrication lack sufficient domestic US supply. 5–10 year build timelines.
11. Sino Shipping / FreightAmigo (2025). Container traffic through Suez Canal down 90% vs March 2023. Cape rerouting adds 40% fuel consumption. Asia-Europe transits extended from 25 days to nearly two months.
12. Elchemy (September 2025). 'Global Chemical Demand Trends 2025.' Chemical industry \$6.182 trillion (2024), \$6.324 trillion projected 2025. Just-in-time inventory challenges. Transportation cost increases across all modes.
13. American Chemistry Council (ACC) (2025). 'Looking for Stability Amid an Uncertain Economic Landscape.' Global chemical production +3.5% 2025 projection. End-market demand uneven.
14. Accenture (March 2026). 'Powered for Change 2025: Actions for Chemical Companies.' Circular carbon economy ~\$330B by 2030 at 11% CAGR. Collaboration across value chain for sustainability.
15. Nature Communications Sustainability (February 2026). 'Market Solutions for Decarbonising Supply Chains in the Chemical Industry.' Implementation of decarbonisation in chemicals lags behind expectations due to complex supply chains and fossil feedstock dependency.