

Sulfur at a Chokepoint: Why Fertilizer and Metal Producers Face a New Cost Shock

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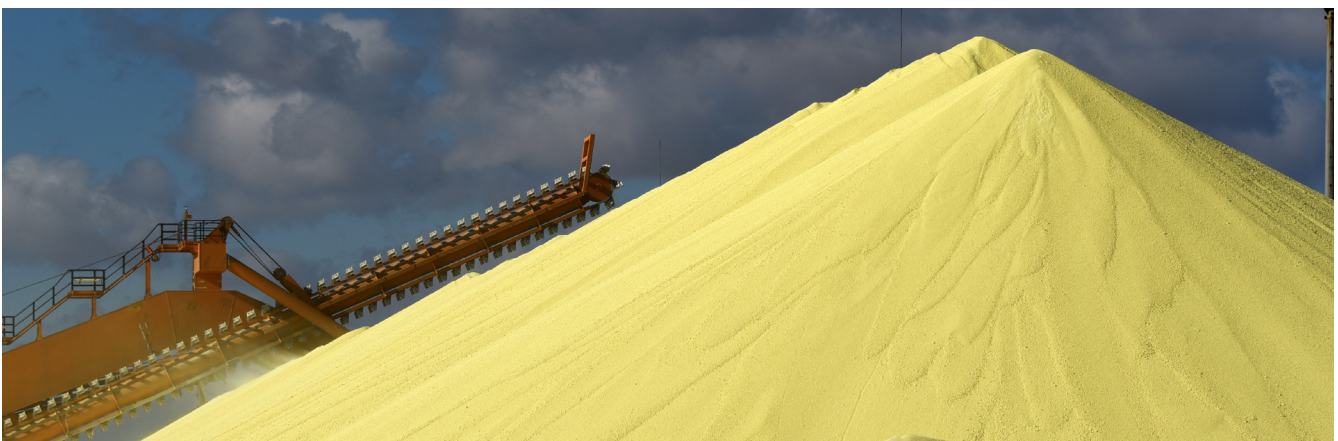
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Key Implications

The sulfur shock has revealed a structural vulnerability in global supply chains: a commodity produced largely as an energy by-product now underpins both food security and energy-transition metals. With supply concentrated around the Strait of Hormuz and prices at record highs, sulfur is moving from a commercial input to a strategic constraint for governments, fertilizer producers and metals markets.

- **Inelastic supply dynamics:** As 95% of sulfur is produced as a by-product of oil refining and natural gas processing, supply is driven by energy production rather than by sulfur demand itself.
- **Strait of Hormuz disruptions:** The Strait of Hormuz remains the single most important maritime chokepoint for the global sulfur market. The Persian Gulf accounts for around 47% of global seaborne sulfur exports, with Qatar, Saudi Arabia, UAE, Kuwait and Iran serving as key suppliers. The war led to an unprecedented sulfur supply shock in 2026.
- **Price consequence:** The Hormuz disruption pushed sulfur prices to record highs, with FOB benchmarks above \$1,000/t and CFR levels near \$1,200–\$1,300/t by July 2026. But the price rally had already begun before the war, as strong demand followed by export restrictions in, for example, Russia, Turkey and China tightened the tradable market and reduced alternative supply options. Prices are now up 98% from January 2026, 245% above the 2025 average and 440% above the 10-year average.
- **Strategic buyer divide:** The sulfur market is increasingly being pulled between two strategic buyers: energy-transition metals and food-security-linked fertilizers. Metals producers may be able to pay more, especially where sulfuric acid is critical to nickel HPAL or copper leaching economics. But fertilizer producers are more likely to receive policy support because phosphate supply affects farmer affordability, crop yields and food security. This creates a new allocation risk: scarce sulfur may flow not simply to the highest bidder, but to the buyer with the strongest combination of commercial margin, logistics capability and political backing.
- **Government response:** Protectionism is gaining momentum. Governments are likely to treat sulfur and phosphate fertilizers as strategic inputs rather than purely commercial commodities.
- **Critical metals vs food security:** If the conflict persists and phosphate fertilizer affordability worsens, planted area could contract, especially on newly converted land that requires higher fertilizer application rates to deliver commercially viable yields. This has the potential to impact crop prices. Metals producers also remain exposed to cost-push inflation from elevated sulfur and sulfuric acid prices. Nickel is the most vulnerable, particularly Indonesia's HPAL industry, where sulfuric acid is a major operating cost and supply disruptions can directly affect production economics.

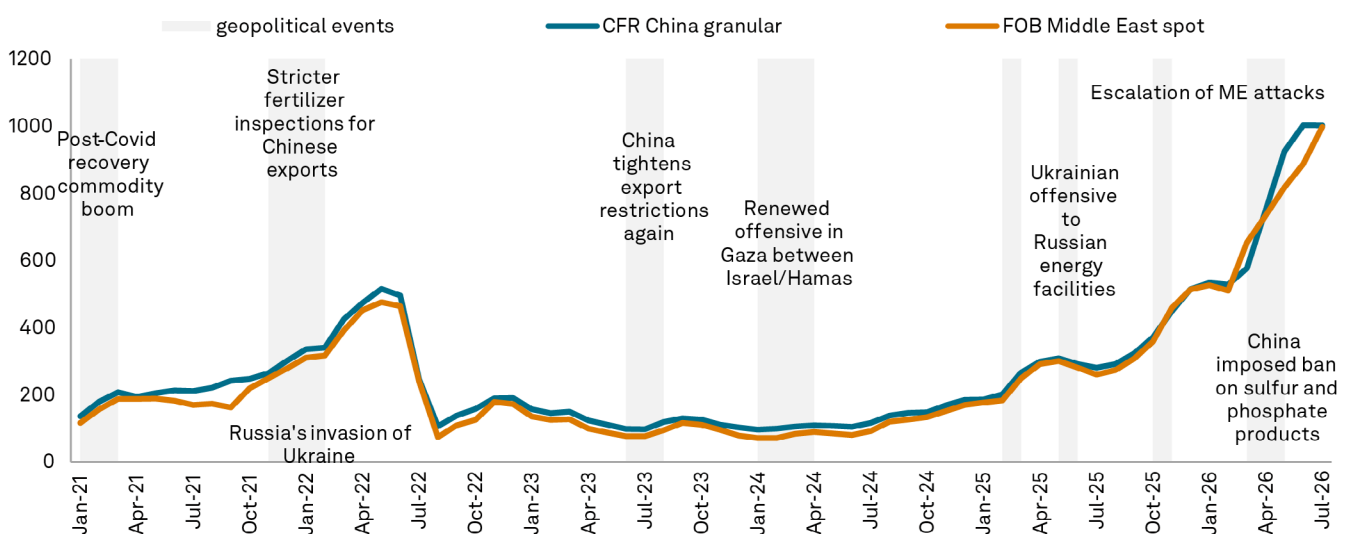


Why sulfur matters?

Sulfur sits at the center of several essential supply chains. It is a critical input for phosphate fertilizers, sulfuric acid, copper, nickel, battery materials and chemical production, linking food security directly to energy-transition metals. More than 90% of sulfur is converted into sulfuric acid, often cited as the world's most widely used chemical by volume.

The Middle East conflict has turned sulfur from a low-profile by-product into a chokepoint commodity. Buyers can no longer assume steady Gulf supply, predictable freight or normal insurance coverage. Access now depends on who can secure vessels, absorb war-risk premiums, finance longer voyages and manage delivery uncertainty. As a result, the market is shifting from simple price competition to allocation based on logistics strength, credit quality and strategic need.

Sulfur price surge pushes downstream demand into uneconomic territory(US\$/t)



As of July 21, 2026
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How global supply became concentrated in the Middle East

Global sulfur supply has become increasingly concentrated in the Middle East. In the early 2010s, seaborne trade was spread more evenly across North America, the Middle East and Eurasia. That balance has weakened as Canadian sour-gas output declined, and Russian exports became constrained after the start of the Russia-Ukraine war. Middle Eastern sour-gas projects filled the gap and made the Gulf the central production and export hub.

Around half of global seaborne sulfur trade is now linked to the Middle East and the Strait of Hormuz corridor. That makes the region critical to fertilizer, chemicals and metals leaching supply chains. The 2026 Hormuz disruption showed how fragile this structure has become. An effective closure can remove roughly 1–1.5 million tons per month from the global market, leaving importers with few immediate replacement options.

Alternative supply remains limited. Export controls in Russia, Kazakhstan and Turkey have removed volumes from the tradable pool, while China's ban on sulfuric acid exports narrows options for consumers that might otherwise switch away from imported sulfur. With shipping already constrained, delayed Middle Eastern cargoes cannot be quickly replaced by other origins. Regional imbalances are now more pronounced. FOB prices above \$1,000/t and CFR levels near \$1,200–\$1,300/t are pushing more downstream producers into uneconomic territory. The key issue is not only the absolute price level but the lack of reliable alternatives.

Strait of Hormuz disruption

The Strait of Hormuz is the most important maritime chokepoint for the sulfur market. The Arabian Gulf accounts for roughly 47% of global seaborne sulfur exports, led by Qatar, Saudi Arabia, the UAE and Kuwait. S&P Global Commodities at Sea analysis indicates that an effective closure could disrupt around half of global seaborne sulfur trade.

The impact extends well beyond sulfur. Phosphate fertilizers, sulfuric acid, copper heap leaching, nickel HPAL operations and battery materials all depend on secure sulfur or acid supply. Morocco, Indonesia, China and Brazil are among the most exposed importers. Around 1.0 million tons per month of sulfur cargoes are directly exposed to Hormuz disruption, creating immediate shortages and strong upward pressure on delivered prices.

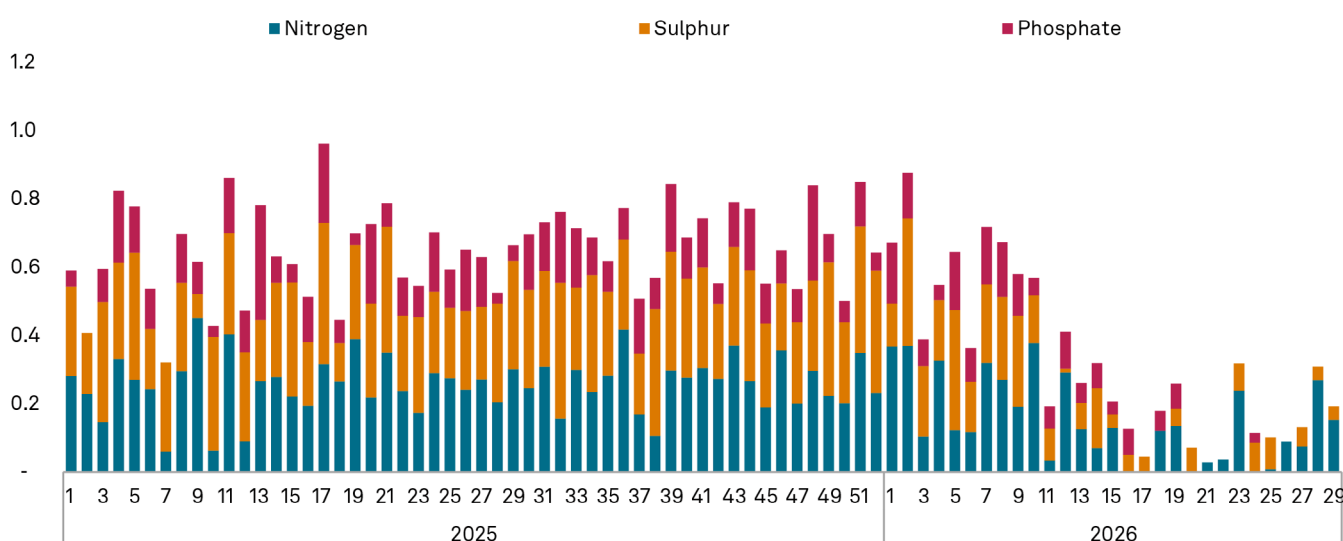
War-risk pays: How insurance and demurrage shock the sulfur market

A Hormuz disruption does not need to halt sulfur production to damage the market; it only needs to disrupt logistics. Vessel access, insurance cover and route security become the binding constraints. As a result, sulfur trade is shifting from a commodity-flow system to a risk-allocation system, where freight availability, insurance and contract terms determine who receives supply.

The shock also reduces effective shipping capacity. Vessel strandings, longer waiting times and congestion outside the Gulf lower fleet utilization. Shipowners demand higher compensation for Hormuz exposure, insurers apply war-risk premiums, and some owners may reject Gulf voyages or require stricter charter terms. The result is higher freight costs, greater demurrage risk and heavier working-capital needs for traders and end-users. Non-Gulf sulfur cargoes therefore command premiums as buyers seek lower-risk supply.

The shipping network becomes less efficient as well. Longer voyages, rerouting, AIS disruptions and naval-security requirements reduce vessel productivity and remove transport capacity from the market. Even after restrictions ease, fleet normalization usually lags production recovery.

Sulfur price surge pushes downstream demand into uneconomic territory(US\$/t)



Global seaborne supply shifts

Tight supply is redistributing global sulfur trade. Canada is well placed to gain share because it has a large production base tied to gas processing, reliable export infrastructure on both coasts and lower geopolitical risk. Asian and Latin American buyers increasingly see Canadian supply as a practical alternative to Middle Eastern cargoes.

Russia remains constrained after extending sulfur export restrictions through the end of 2026. These measures protect domestic fertilizer production but remove a traditional swing supplier from international markets. Because Russia has historically exported around 1.2–1.5 million tons annually, the restrictions reduce the market's ability to absorb any Gulf supply shock.

The sulfur squeeze: a new cost frontier for battery metals and copper

Indonesia's HPAL sector is one of the most exposed industrial consumers of sulfur. HPAL plants need large volumes of sulfuric acid to convert laterite ores into mixed hydroxide precipitate, a key battery-material intermediate. Sulfur availability has become a direct constraint on production economics and investment decisions.

Middle Eastern disruption and freight dislocation have sharply raised sulfur and sulfuric acid costs. Under elevated-price scenarios, sulfuric acid can exceed 60% of HPAL operating costs, compared with roughly 30% previously. Because HPAL requires about 10 tons of sulfur per ton of nickel in MHP form, these plants are highly sensitive to sulfur price volatility.

Indonesia's lowest-cost producers remain resilient, but margin pressure is rising across the sector. Higher acid costs can delay ramp-ups, reduce utilization and curtail output. Sulfur availability, not nickel demand, may become the main constraint on battery-material supply growth. Sustained disruption would tighten MHP and nickel sulfate markets and support higher premiums for battery-grade material.

Copper is also exposed. Disrupted sulfur flows from the Middle East and China's export restrictions on sulfuric acid have tightened regional markets. Because sulfuric acid is hazardous and costly to ship, international acid markets are fragmented. Even small export curbs can therefore create sharp local shortages.

Heap-leaching and solvent extraction-electrowinning (SX-EW) operations face the greatest pressure because sulfuric acid is essential to extraction. Higher acid costs raise production expenses and may force operators to cut throughput. Miners dependent on spot acid are most at risk, while integrated smelters that produce acid as a byproduct are better protected.

The Democratic Republic of Congo is highly vulnerable because many producers rely on imported acid for oxide-ore leaching. Prolonged shortages could reduce cathode output, lift costs and tighten refined copper supply. Producers are already targeting higher-grade oxide ore to reduce acid consumption, while some small and mid-sized operations have cut production.

Buyers are diversifying procurement toward Canada, the US and South Korea and are favoring long-term contracts over spot purchases. Pyrite is also gaining attention as an alternative feedstock. PT Merdeka Battery Materials has increased pyrite residue use from the Wetar Copper mine to produce sulfuric acid at its AIM facility, reducing import dependence. Pyrite will not fully replace conventional sulfur, but it is one of the clearest mitigation options for HPAL operators.

The conclusion is direct: sulfur has moved from a secondary input to a strategic cost driver for nickel and copper. It now affects production costs, project timing and supply-chain resilience across key energy-transition metals.



The acid behind the harvest: Sulfur, phosphates and the food-security challenge

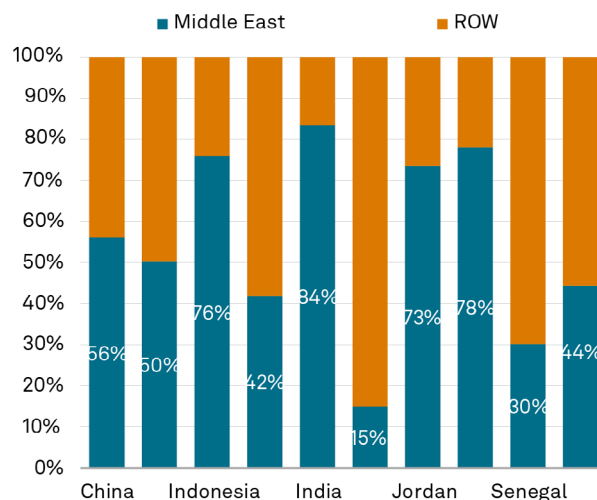
A sulfur shock would hit phosphate fertilizer production hard. Sulfur is needed to process phosphate rock into phosphoric acid and downstream fertilizers. When sulfur availability tightens or prices surge, phosphate producers face immediate cost pressure. Many operate with limited margin flexibility, so sharp feedstock inflation can cut operating rates, delay production or force higher costs through to farmers.

This matters because phosphate fertilizers sit directly in the food-security chain. A severe sulfur shock can force phosphate production cuts even when phosphate rock remains available. Lower phosphate output tightens fertilizer supply, raises prices, reduces farmer affordability and can eventually lower application rates. The risk is greatest in import-dependent agricultural markets and regions with nutrient-deficient soils, where farmers have little room to cut fertilizer use without hurting yields.

The pressure is acute at the current time. Generally strong global harvests in 2025 have meant that key cereal and oilseed prices have trended down over the last 12 months, whilst fertilizer prices, led by high sulfur and phosphate costs, have trended upward. This has steadily increased the pressure on the affordability of fertilizer for farmers, resulting in progressive demand destruction, especially for phosphates, in 2026.

Brazil is especially exposed. Farmers already face tight margins on existing cropland and negative returns on pastureland expansion ahead of the September–November soybean planting window. That is likely to limit planted-area growth and could reduce fertilizer application. Brazil's soils are generally nutrient-deficient and require significant fertilizer input, so any pullback raises downside risk to 2027 soybean yields. Weather risk adds to the pressure because El Niño conditions often bring below-normal precipitation to central and northern Brazil. Planted-area growth is now expected to

MiddleEast sulfur dependences among major importing countries



As of July 22, 2026
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be the slowest in about two decades, at roughly 300,000 hectares. If fertilizer affordability worsens, planted area could contract, especially on newly converted land that requires higher application rates.

Governments are likely to treat sulfur and phosphate fertilizers as strategic inputs. In tight markets, they may use export bans, allocation rules, subsidies or price controls to protect domestic fertilizer supply and limit inflation for farmers. China, Russia and India have all used policy tools in recent years to manage fertilizer availability or affordability. More intervention would fragment the market further.

In this environment, sulfur demand will be governed less by price alone and more by strategic priority. Fertilizer producers may not always outbid metals or chemical consumers, but they have stronger political protection because of their link to food security. If sulfur prices stay high, governments may intervene to secure affordable sulfur or sulfuric acid for domestic phosphate producers.



After Hormuz: Sulfur shipping recovery, risk premiums and metals cost pressure

Even after the Strait of Hormuz reopens, sulfur trade will not normalize immediately. Vessel backlogs, stranded cargoes, insurance approvals and shipowner risk assessments will delay recovery. The main problem is not sulfur production but logistics reactivation and vessel repositioning. Freight normalization should therefore lag production recovery. Vessel availability, insurer participation and policy stability will determine how quickly shipments return toward pre-disruption levels.

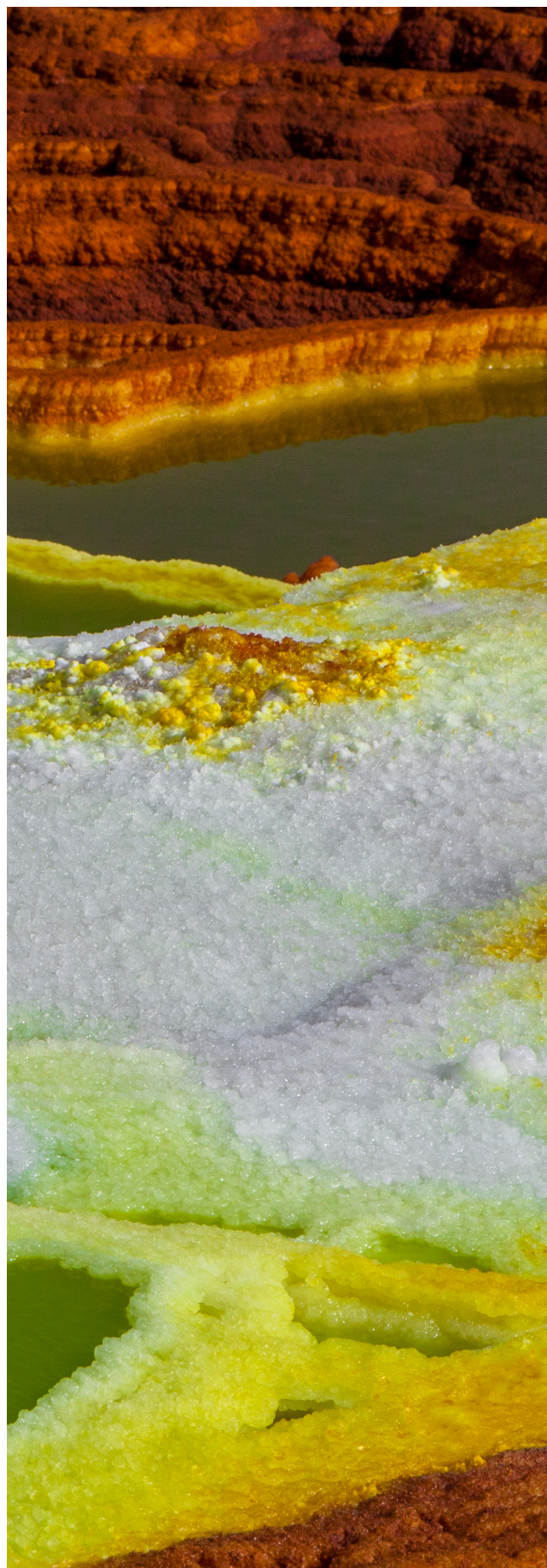
The crisis has also changed commodity shipping behavior. Geopolitical risk is now priced directly into freight contracts. War-risk premiums, selective voyage acceptance and tighter charter-party protections have increased delivered sulfur costs. Buyers and traders are responding with longer-term freight agreements, diversified sourcing and contract clauses that address conflict-related disruption. Gulf-origin cargoes are likely to retain a risk premium even after flows improve.

Metals producers remain exposed to cost-push inflation from elevated sulfur and sulfuric acid prices. Nickel is the most exposed through Indonesia's HPAL industry. Copper producers using heap leaching and SX-EW face similar pressure as acid shortages and Chinese export restrictions tighten availability. Producers with integrated acid supply should outperform, while unintegrated operations remain vulnerable to further cost escalation.

Sulfur prices: elevated but growing more fragile

Global granular sulfur benchmarks are likely to stay elevated through most of H2 2026. Physical tightness, geopolitical risk and limited export availability still support prices. Current price levels show the strain clearly: the market is physically short, but many CFR buyers can no longer afford the delivered price. Spot liquidity is thinner, trade is slower and the active buyer base is narrowing to the highest-margin or policy-backed consumers.

Demand destruction is already visible and should intensify through H2 2026 as consumers cut rates, delay purchases, draw inventories or switch to alternatives where possible. Prices could correct once Hormuz flows stabilize, but the correction is likely to be gradual rather than sharp. Export restrictions from Russia, Kazakhstan, Turkey and China, together with supply-project delays, should maintain a higher price floor through 2027–2028.



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