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Beyond Securing Supply

Chokepoint risk for oil and gas importers

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ABOUT E3G

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We drive systemic action on climate by identifying barriers and constructing coalitions to advance the solutions needed. We create spaces for honest dialogue, and help guide governments, businesses and the public on how to deliver change at the pace the planet demands.

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Summary

The central paradox of today's energy system is that plenty has not delivered security. The inescapable geographical reality is that importers accounting for over two-thirds of seaborne oil and gas demand are dependent on supplies transiting a small number of maritime and domestic chokepoints. Disruptions at these chokepoints cause price shocks, shipping disruptions, insurance withdrawal and physical supply constraints that can cascade rapidly across the system. More supply does not remove this systemic vulnerability. The most durable route to resilience for importers is to reduce dependence on oil and LNG through electrification, efficiency, grids, storage and domestic clean energy.

Global oil and gas markets may look increasingly well supplied over the coming decade, but abundant supply does not eliminate energy insecurity. New LNG export capacity, growing oil production in the Americas, and slowing fossil fuel demand growth are likely to keep markets relatively loose in normal times. Yet recent crises, from Russia's 2022 invasion of Ukraine to the escalation around the Strait of Hormuz in 2026 show that even in an era of "plenty", import-dependent economies remain structurally exposed to disruption.

That exposure stems from the way fossil fuels move, not just how much is available. The Strait of Hormuz is a mere 55 km wide at its narrowest point, yet it carries 26% of the world's maritime oil trade and 22% of LNG transits.[1] The Strait of Malacca is of similar significance, while LNG transports in particular are regionally important through routes such as the Red Sea–Suez Canal corridor and the Panama Canal.

Plausible disruption pathways exist for each of these maritime chokepoints, as well as for the EU's domestic chokepoint in the shape of its import infrastructure. We show in our analysis that all major oil and LNG importers remain exposed to sudden volatility when disruptions hit these chokepoints. The most vulnerable are those with high structural dependence on oil and gas, and whose economies have low ability to absorb price shocks – most notably Pakistan and Bangladesh. However, no importers are immune, and even the least vulnerable would face substantial economic and fiscal pressures.[2]

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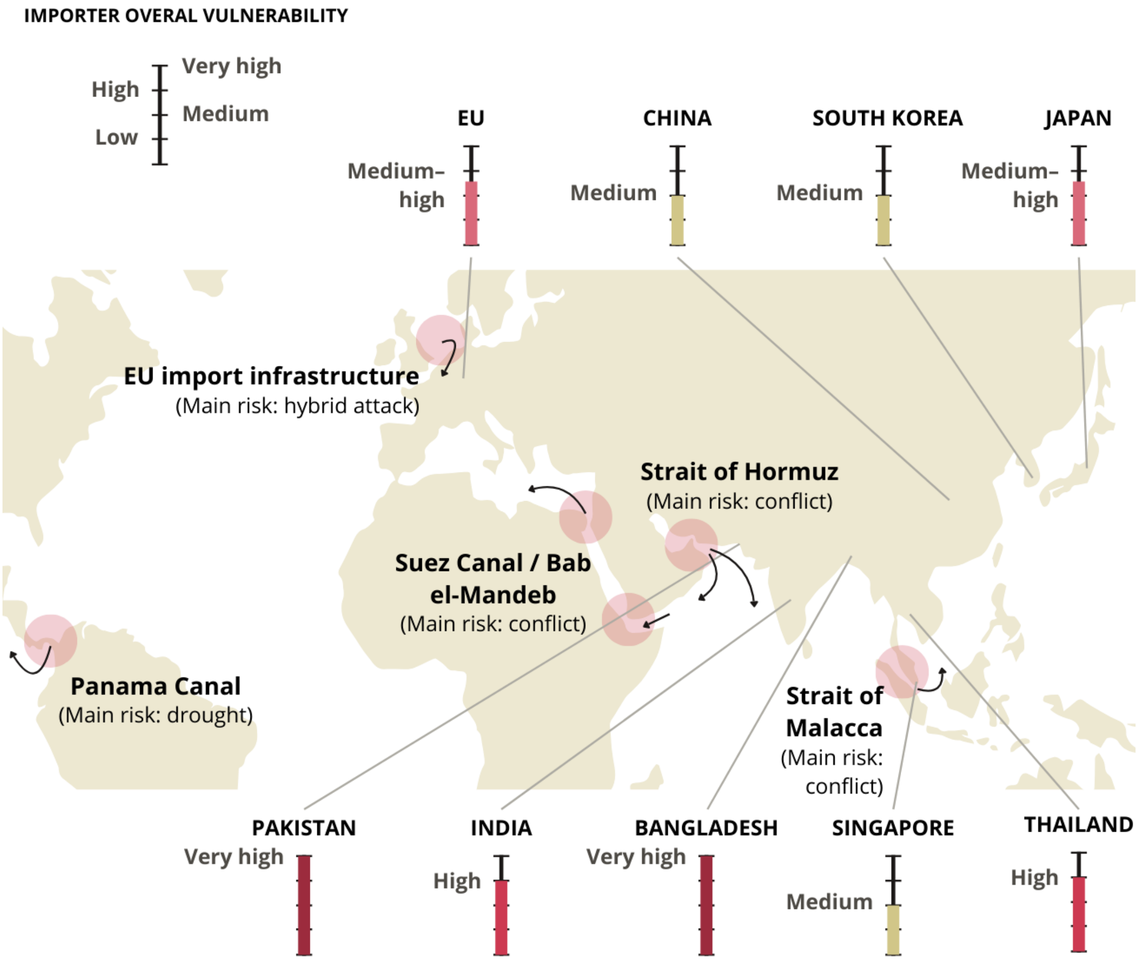
[1] US Energy Information Administration, **World Oil Transit Chokepoints** (3 March 2026 update)
[2] These can be severe. For example, E3G analysis shows energy price shocks over 2021–2025 cost the United Kingdom £183bn (E3G, November 2025, **Cost of the Fossil Fuel Crisis in the UK**), almost double the investment

Abundance has not delivered security: Oil and LNG importers are vulnerable to disruption at chokepoints

In this report, we assess the vulnerability of nine major oil and LNG importers to four maritime chokepoints and one domestic chokepoint in the form of the EU's import infrastructure.

The vulnerability assessments combine assessments across qualitative categories:

- **Oil exposure**: chokepoint reliance; price exposure; oil intensity of the economy
- **Gas exposure**: chokepoint reliance and availability risk; availability of alternatives for transport and end-use
- **Resilience**: fiscal space; foreign reserves; system capability; fuel reserves and contractual supply flexibility



that would be required to achieve the UK's transition to net zero by 2025 (Climate Change Committee, March 2026, Cost of net zero by 2050 less than a single fossil fuel price shock) – demonstrating the cost-effectiveness of reducing exposure to fossil fuel price shocks.

Importers' exposure to disruption through these transport routes stems firstly from the physical interruptions to supply both directly and by reducing shipping capacity. But these physical chokepoints are increasingly overlaid by what we term "paper chokepoints", including insurance withdrawal, sanctions, freight bottlenecks, contract rigidities and infrastructure constraints, that can make rerouting difficult even when alternative sea lanes exist. Climate impacts are compounding these risks by reducing capacity in critical corridors such as Panama and increasing the likelihood of overlapping disruptions.

Oil and LNG transmit chokepoint risks in different ways. Oil shocks are primarily global and macroeconomic: because oil is traded in highly integrated global markets, disruptions in one corridor rapidly feed into benchmark prices everywhere. LNG shocks are both physical and financial: because LNG trade depends on specialised liquefaction, shipping, regasification and pipeline infrastructure, disruptions can create both regional price spikes and outright delivery constraints.

In both markets, the strategic implication is similar: more supply may diversify the supplier mix, but it does not remove systemic vulnerability. Even substituting imported fossil fuels with new domestic supply, though it may reduce some physical supply risk, leaves importers exposed to global price volatility, fiscal subsidy pressures, and infrastructure vulnerability.

A policy toolkit to mitigate chokepoint exposure

Securing enough fuel is not sufficient to reduce exposure to a system in which price contagion, maritime concentration, infrastructure fragility and geopolitical coercion remain embedded. The most durable route to resilience for importers is to shrink the role of imported fossil fuels in the energy system. Electrification, efficiency, grid investment, storage and domestic clean energy are core tools for oil and gas importers to reduce exposure to global fossil commodity markets, insulating economies from price volatility and the macroeconomic shocks that accompany energy disruptions.

Governments have a range of tools available to address energy security risks posed by chokepoints. These tools differ fundamentally in what risks they address and how long-term their effects are. Short-term interventions such as releases of strategic oil reserves, diversification of oil and LNG fuel suppliers and maritime protection using the military can help stabilise markets or manage temporary shortages, but they do not remove exposure to globally transmitted fossil fuel price shocks.

We therefore offer a five-track policy toolkit, that combines such measures with longer-term strategies to improve structural resilience by reducing underlying dependence on fossil fuels, thereby lowering a country's exposure to chokepoints and global oil and gas price volatility altogether.

Track 1: Immediate crisis stabilisation

Impact: Weeks to months

- **Stabilise markets fast:** Use coordinated oil and gas stock releases to inject liquidity, prevent panic bidding and stop short-term disruptions evolving into economic crises.
- **Implement emergency demand cuts:** Deploy rapid demand reduction and fuel-switching measures to shrink import needs and ease reliance on oil and LNG imports.
- **Unlock ready-to-go clean energy:** Fast-track grid connections and maximise output from existing clean and nuclear assets to cut oil and gas demand and help rebalance markets.

Track 2: Manage short-term exposure without locking it in long-term

Impact: 0–3 years

- **Use diversification tactically, not structurally:** Diversifying suppliers can reduce bilateral dependence during disruptions, but it does not eliminate exposure to chokepoints or global price shocks. Avoid new long-lived gas infrastructure or contracts that extend structural dependence on imported fossil fuels.
- **Increase contract flexibility:** Encourage destination-flexible LNG contracts and transparent force majeure provisions so cargoes can be redirected during disruptions.
- **Strengthen strategic buffers:** Improve coordination between IEA and major non-IEA importers, expand product-stock preparedness, and develop faster crisis-response mechanisms for coordinated reserve releases.
- **Treat diversification as a bridge measure:** Use short-term supply diversification to stabilise markets while structural measures reduce fossil fuel demand and import exposure.

Track 3: Reduce long-term structural exposure to chokepoints

Impact: 0–10 years

- **Shrink structural fossil fuel demand:** The most effective durable way to mitigate chokepoint risk and the resulting price transmission risk for oil and gas is fossil fuel demand reduction, which provides long-lived, locally generated resilience that neither imported nor domestic fossil fuels can match.
- **Don't mistake long-term LNG contracts for security:** Long-term deals may smooth volatility, but they can't prevent global price shocks or guarantee delivery when physical disruptions hit, leaving structural exposure unchanged.

- **Build structural resilience, not new dependencies:** Accelerate grids, electrification, storage and efficiency to permanently shrink exposure to volatile fossil markets.

Track 4: Improve security to counter immediate chokepoint risks

Impact: 0–5 years (but only implementable short-term)

- **Use defence capabilities to buy time, but accept they don't boost resilience:** Naval patrols, mine countermeasures and subsea monitoring can limit short-term chokepoint disruptions, but they're costly, temporary and pull resources from other priorities.

Track 5: Strengthen energy systems resilience

Impact: 0–10 years

- **Future-proof the clean energy base:** Diversifying critical minerals and cleantech supply chains can help manage clean supply risks.
- **Harden the system, not just the supply:** Chokepoint stress-tests, stronger cyber and subsea security, and smarter reserves can expose vulnerabilities early and prevent domestic infrastructure bottlenecks from replacing maritime ones.
- **Coordinate importers to reduce systemic vulnerability.** Joint crisis playbooks, transparency on storage and shipping, and cooperation on grid resilience and cleantech supply chains can help limit price spikes and strengthen collective resilience to chokepoint disruptions.

Introduction: Abundant global oil and gas markets don't bring energy security

Energy abundance changes the balance of supply and demand, but it does not change the geography of energy trade.

Global oil and gas markets are entering a period of relative supply abundance. Large volumes of new LNG export capacity are expected to come online this decade, particularly in the United States and Qatar, while oil supply continues to expand in the Americas alongside sustained production from major OPEC producers. At the same time, demand growth in many advanced economies is slowing as electrification, efficiency improvements and renewable deployment begin to reshape energy systems.

At first glance, this combination of slower demand growth and expanding supply might suggest a more secure energy system. If global supply is ample, temporary disruptions should in principle be easier to absorb. In practice, however, energy security risks persist, and in some cases may intensify, even in a well-supplied market.

Chokepoints matter even in an oversupplied market

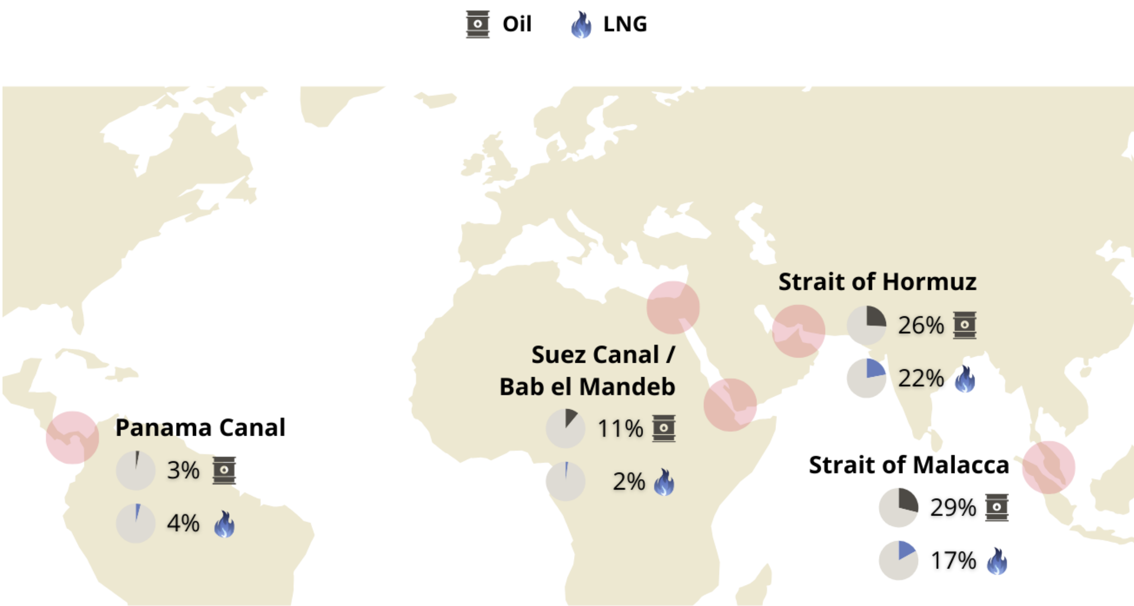
Although production of oil and gas occurs in many countries, a relatively small number of major suppliers produce a large share of exports, while consumption is widely distributed across importing economies. As a result, global energy trade depends heavily on long-distance maritime transport, shipping oil and LNG from producing regions to consumer economies.

A limited set of maritime corridors – or chokepoints – carry a large share of global oil and LNG shipments (Figure 1). The Strait of Hormuz and Strait of Malacca are particularly vital to transport to major consumers. The Bab el-Mandeb and Suez Canal, and the Panama Canal, carry a smaller proportion of trade, but these flows are significant to certain regions.

Disruptions to trade through these chokepoints can cascade quickly through global systems, as events such as the escalation around the Strait of Hormuz in 2026 illustrate clearly. Markets can rapidly tighten due to shipping constraints, insurance withdrawal, rerouting delays and risk premiums. In highly interconnected commodity markets, these effects can transmit quickly across regions, driving price volatility and competition for available cargoes. High exposure to chokepoints combined with limited short-term demand flexibility therefore creates systemic macroeconomic risk even in a period of apparent market abundance.

Global oil and LNG chokepoints

PERCENTAGE OF MARITIME TRADE TRANSITING MAJOR CHOKEPOINTS (2025 H1 DATA)



Source: US Energy Information Administration, World Oil Transit Chokepoints (3 March 2026 update)

Figure 1: Significant proportions of the world's oil and LNG trade pass through narrow geographical corridors. The risks to energy security from disruption at these chokepoints extend far beyond the immediate regions.

Similar to any other globally traded commodity including food,[3] energy security risk in this system depends less on the theoretical volume of supply available globally than on three structural factors:

- Probability and length of disruption (conflicts, cyberattacks, climate events, regulatory or sanctions actions).
- Degree of concentration of oil and gas trade flows as they pass through vulnerable chokepoints.
- Capacity of import-dependent economies to absorb shocks (via fiscal space, fuel switching, social protection, strategic reserves, storage).

Understanding the structure of these transit vulnerabilities is therefore essential for assessing the energy security risks facing import-dependent economies. In the following chapters, we examine the key chokepoints in the global oil and LNG system and assess the exposure of major importing regions to disruptions affecting these routes.

[3] Chatham House, 2017, Chokepoints and Vulnerabilities in Global Food Trade

Chapter 1: Three layers of chokepoint risk

Global oil and LNG markets are projected to remain well supplied for much of this decade, which in normal conditions could place downward pressure on prices for importing economies. However, abundant supply does not eliminate the security risks faced by import-dependent countries.[4] Even in structurally well-supplied markets, geopolitical tensions, transport disruptions and chokepoint vulnerabilities can rapidly translate into price volatility and supply uncertainty.

Importers therefore face three layers of risk:

1. Risks to physical supply.
2. "Paper chokepoints", or non-physical limitations that restrict options for rerouting.
3. Climate change.

Layer 1: Physical supply risks

The immediate risk to countries' supply of oil or LNG depends on the extent to which their imports rely on transport through chokepoints. Roughly one-fifth of global LNG and a quarter of seaborne oil transits the Strait of Hormuz,[5] while 43% of seaborne oil moves through the South China Sea, including the Straits of Taiwan, Sunda, Lombok and Malacca.[6] The Red Sea corridor was until recently a key channel for flows into Europe, and the Panama Canal is critical for US cargoes heading towards Asian buyers. For import-dependent economies, chokepoints also exist onshore. LNG terminals and offshore pipelines are effectively domestic chokepoints: everything must pass through a limited number of physical entry nodes before reaching consumers.

Table 1 provides an overview of major fossil-fuel importers' dependence on key chokepoints; see **Annex 1** for the methodology used to arrive at these estimates.

[4] The report focuses on a set of major fossil-fuel importing economies whose energy systems depend heavily on seaborne oil and LNG trade and whose supply routes pass through key maritime chokepoints. These countries (the EU, Japan, South Korea, China, India, Pakistan, Bangladesh, Thailand and Singapore) together account for the majority of global seaborne fossil-fuel demand. This group accounts for around two-thirds of seaborne oil imports, and roughly 80–85% of global LNG demand. The EU, China, Japan and South Korea alone represent around 70% of global LNG imports. The selection reflects different categories of systemically important importers: advanced industrial economies with high import dependence (EU, Japan, South Korea); large emerging demand centres shaping global energy markets (China, India); rapidly growing LNG-importing economies in South and Southeast Asia (Pakistan, Bangladesh, Thailand); and a key regional trading and refining hub (Singapore).
[5] IEA, February 2026, **Strait of Hormuz Factsheet**
[6] EIA, March 2024, **South China Sea**

Table 1: Major importers' dependence on chokepoints. These importers were chosen as a representative sample of major importers covering different geographies and economic development levels.

Estimated share of importing countries' oil / LNG imports dependent on each chokepoint

Importer	Strait of Hormuz	Strait of Malacca	Suez Canal / Bab el-Mandeb	EU import infrastructure	Panama Canal
EU	7–14% / 11%	—	14% / 10%	**100%** / **100%**	—
Japan	**95%** / 6%	**95%** / 13%	—	—	— / 10%
South Korea	**72%** / 20%	**73%** / 34%	—	—	— / 12%
China	37% / 25%	**44%** / 30%	—	—	— / 7%
India	**45%** / **53%**	**50%** / —	—	—	—
Pakistan	**100%** / **89%**	—	—	—	—
Bangladesh	**100%** / **71%**	—	—	—	—
Thailand	**90%** / 21%	**90%** / 40%	—	—	— / 19%
Singapore	**53%** / 31%	**53%** / **49%**	—	—	— / 21%

Sources: *E3G analysis using a supplier proxy share methodology to estimate structural exposure, using data on crude oil and LNG imports by partner country, and typical shipping routes. Primary datasets: oil – UN Comtrade / WITS trade database; IEA Oil Market Statistics; Eurostat; LNG – UN Comtrade / WITS trade database; GIIGNL Trade Matrix; routing – US EIA analysis; International Energy Agency analysis; industry shipping route maps. See* ***Annex 1*** *for source links and methodology.*

Layer 2: "Paper chokepoints" that make rerouting shipments complicated or impossible

A set of non-physical "paper chokepoints" stack on top of the physical chokepoints, reducing flexibility and amplifying the impacts of physical disruptions. Long-term charter agreements and force majeure clauses can lock vessels into specific routes, while successful implementation of sanctions to limit availability of compliant ships make payments to alternative suppliers more difficult and restricted access to insurance forces exporters like Russia and Iran onto longer, riskier paths. In some cases, if a planned chokepoint is blocked, rerouting is therefore impossible.

Perceived risk alone is a major source of "paper chokepoints" through rising insurance premiums.[7] Separately, import standards such as the EU Methane Regulation (important for driving up standards and reducing inefficiency in fossil fuel production globally) or water quality rules (which protect local residents' health and fisheries) may in some instances shrink the pool of acceptable cargoes and vessels, while immigration rules for crews can further restrict port flexibility.

Layer 3: Climate change: a structural multiplier of chokepoint risk

The Panama Canal shows clearly how climate impacts are becoming an amplifier of chokepoint risk. Climate-change-driven drought in 2023–24 forced major cuts to ship transits and draft limits, reducing LNG throughput by over 50%[8] and pushing LNG and oil carriers to reroute via Suez or around Africa, increasing voyage times, freight rates, and global ship demand.[9] Climate variability can restrict capacity in critical corridors, reducing system slack and magnifying unrelated geopolitical shocks.

Panama is not an isolated case. Rising sea levels, extreme weather, and heat stress threaten port infrastructure,[10] terminals, coastal energy infrastructure (including offshore oil and gas production[11]), and narrow maritime passages worldwide.[12] Climate impacts can also affect inland transport routes that connect ports, refineries and industrial centres.[13]

[7] Discovery Alert, 5 December 2025, **Geopolitical Risk Premium: How Global Tensions Shape Oil Markets**
[8] Jack Sharples, 2024, **LNG Shipping Chokepoints: The Impact of Red Sea and Panama Canal Disruption**
[9] IEA, 2024, **Global Gas Security Review 2024**
[10] IPPC, 2022, **WGII Sixth Assessment Report Press Release**
[11] Hurricane Harvey forced shutdown of 25% of US refining capacity and 20% of US crude production temporarily – IEA, 2017, **Oil Market Report - November 2017**; Hurricane Ida forced shutdown of around 94.5% of Gulf of Mexico oil production, 93.5% of gas production, and disrupted key offshore energy logistics hub which services 90% of Gulf offshore platforms; S&P Global, 30 August 2021, **Factbox: Tropical Storm Ida cuts US Gulf Coast oil production, refining operations**
[12] IEA, 2022, **Climate Resilience for Energy Security**
[13] Hinkel, J., Aerts, J.C.J.H., Brown, S. et al., 2018 **The ability of societies to adapt to twenty-first-century sea-level rise**, *Nature Clim Change* 8, pages 570–578

Drought-driven low water levels on major rivers such as the Rhine[14] have already disrupted fuel and commodity transport in Europe, demonstrating how climate variability can constrain critical energy logistics even far from maritime chokepoints.

Shrinking sea ice due to climate change is sometimes expected to open new maritime routes through the Arctic, such as the Northern Sea Route along Russia's northern coast or the Northwest Passage through the Canadian Arctic. However, these routes remain highly constrained by unpredictable ice conditions, limited port and rescue infrastructure, shallow passages and restricted insurance coverage.[15] In addition, the Northern Sea Route is effectively controlled by Russia, introducing new geopolitical risks for energy shipments.[16] As a result, Arctic routes are unlikely to provide a reliable large-scale alternative to established energy corridors such as the Suez–Bab el-Mandeb or Malacca routes.

Climate change, therefore, compounds geopolitical risk, leaving the global energy transport system with less redundancy, lower shock absorption capacity, and greater sensitivity to simultaneous disruptions. Climate impacts also threaten domestic political stability and erode government stability, further endangering exporters' ability to maintain a stable operating environment.

Chokepoints compound and cascade risk

Chokepoint shocks rarely stay local. A disruption in one corridor can push up insurance costs globally, extend voyage times, and effectively remove tankers from the available fleet. Even without a full closure, rerouting and risk premiums can tighten markets. When physical chokepoints interact with regulatory constraints, sanctions, insurance limits or contract rigidities ("paper chokepoints"), localised shocks can escalate into broader market tightening. Climate change-induced droughts, storms and extreme weather events raise the likelihood of simultaneous disruptions across multiple corridors.

The risk is not just individual closures. It is the growing probability of overlapping disruptions in an increasingly congested and geopolitically contested system.

[14] Umweltbundesamt, 2023, **2023 Monitoring Report on the German Strategy for Adaptation to Climate Change**

[15] Arctic Council, **Arctic Shipping Status Report** (webpage, accessed 13 March 2026); Arctic Council, **Arctic Marine Shipping Assessment** (AMSA) (Webpage, accessed 13 March 2026); Sarrabezoles, A., Lasserre, F., & Hagouagn'rin, Z., 2016, **Arctic shipping insurance: towards a harmonisation of practices and costs?**

[16] Aunina, E., Gosnell, R., Hildenbrand, A., 2018, **Emerging Challenges in Arctic Security and Recommendations for the Future: Perspectives from the European Security Seminar- North**

These global interconnections behave differently for oil and LNG during a crisis

Oil shocks, once they manifest, are global and immediate. Oil is traded on highly integrated global markets, where benchmark (e.g. WTI, Brent) prices transmit shocks rapidly across regions. A disruption affecting a major transport corridor such as the Strait of Hormuz therefore raises prices globally, even for buyers whose physical oil imports don't pass through the affected route. Oil vulnerability is primarily macroeconomic: higher oil prices feed directly into inflation, trade balances and fiscal pressures in import-dependent economies. However, transport disruptions can still affect shipping availability, freight costs and refined product markets, meaning regional shortages may emerge even in an integrated market.

LNG markets operate differently. The global LNG market is smaller, and less liquid compared to the global oil market, and supply chains involve complex infrastructure for liquefaction, shipping and regasification. A country's vulnerability to LNG supply disruption depends on where supply comes from, which sea lanes it uses, and how concentrated import infrastructure is. As a result, supply shocks often produce regionally differentiated impacts.

- South Asia (Pakistan, Bangladesh) is highly exposed because it relies on Gulf LNG via the Strait of Hormuz with few alternatives and thin buffers (storage/fiscal space) that turn even brief disruptions or price spikes into shortages.
- Japan and South Korea face layered exposure as Gulf LNG must pass both the Strait of Hormuz and typically the Strait of Malacca, while imports from the US and Southeast Asia add further chokepoint exposure and shipping capacity sensitivity. Asia-bound US LNG faces chokepoint risk from Panama Canal capacity constraints, exacerbated by climate impacts, forcing longer rerouting via Suez or the Cape.
- The EU relies on a small number of regasification terminals and entry points, creating domestic single points of failure.

Price differences between regional benchmarks such as TTF in Europe and JKM in Asia can widen during disruptions as shipping constraints, terminal capacity and contractual commitments limit the ability of cargoes to move freely between markets. LNG vulnerability therefore reflects both price risk and physical access risk. In addition, in electricity systems where gas-fired generation frequently sets the marginal power price, LNG price spikes can propagate rapidly into wholesale electricity markets, amplifying the economic impact of supply shock.

Fossil fuels are more vulnerable to chokepoints than clean energy systems

The chokepoint risks to fossil fuel supply chains are fundamentally different to those for many other maritime traded goods, including those in clean energy supply chains. While the risks to the latter are real, especially for critical minerals and manufacturing concentration, the key difference is that fossil fuel systems are exposed to continuous, large-scale and immediate chokepoint risks that are repeatedly transmitted through the global economy. That makes fossil fuel dependence structurally more destabilising for energy security than the slower-moving risks associated with clean energy, which moreover become smaller over time as more capacity is built.

The most important distinction is what is actually moving through chokepoints. Fossil fuel systems rely on continuous shipments of oil, gas and coal because the fuel itself is the energy supply. If shipments are disrupted, energy availability is affected almost immediately. Clean energy systems work differently. What moves through supply chains are equipment and materials (solar panels, wind turbines, batteries and components, critical minerals), not energy itself. Once installed, these assets produce energy domestically for decades. A disruption, therefore, does not shut down supply, but only slows down future expansion.

The impact of disruptions therefore differs significantly, including in terms of macroeconomic impact. Fossil fuel disruptions can affect prices and availability within days or weeks, and spread quickly through the economy because oil and gas are core inputs into transport, electricity and industry. This affects inflation, trade balances, fiscal spending and economic growth simultaneously.

By contrast, clean energy disruptions tend to unfold over months or years, primarily affecting investment and deployment, rather than day-to-day energy supply. The macroeconomic effects are more indirect, for example through higher infrastructure costs or delayed electrification, rather than immediate price shocks. The slower impact gives governments and companies time to respond by switching suppliers, using inventories, or adjusting project pipelines, without triggering immediate system-wide crises.

The difference is also visible in the scale of physical flows. Fossil fuels move in extremely large, continuous volumes. In 2024, global seaborne trade included roughly:

- 80 million barrels of oil/day (or 10.5–11 million tonnes/day)[17]
- 1.1 million tonnes of LNG/day[18]
- 3.8 million tonnes of coal/day.[19]

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[17] In 2024: UNCTAD, 10 March 2026, **Hormuz shipping disruptions raise risks for energy, fertilizers and vulnerable economies**
[18] IGU, 2025, **2025 World LNG Report**
[19] IEA, 2025, **Coal 2025**

Taken together, this amounts to over 15 million tonnes per day moving through maritime routes. By comparison, clean energy supply chains are much smaller in physical terms. Even when counting all transport modes (not just maritime), solar, wind, and critical minerals together amount to tens of thousands of tonnes per day, more than an order of magnitude lower.

Crucially, the direction of risk is also different. Each shipment of fossil fuel creates new exposure, while each shipment of clean energy equipment reduces it by displacing future fuel imports.

Another key difference is how these materials are transported. Fossil fuels depend on highly specialised infrastructure including oil tankers, LNG carriers, pipelines and regasification terminals.[20] This infrastructure cannot easily be substituted or scaled in the short term. This makes disruptions difficult to absorb and quickly creates bottlenecks. Clean energy equipment and materials, by contrast, are mostly transported via standard bulk and container shipping, which is more flexible and easier to reroute. While there are some constraints (e.g. for large offshore wind components), these are not system-wide in the same way as tanker capacity constraints.

Clean energy supply chains do face concentration risks, particularly in the mining and processing of critical minerals. These markets are often geographically concentrated, creating exposure to export restrictions or geopolitical pressure. However, these materials have characteristics that make them more manageable than fossil fuels. They are non-combustible and can be stockpiled,[21] and many countries already do so as part of their energy security strategy. Unlike fuels, they do not need to be consumed continuously and can often be substituted, recycled or used more efficiently over time.

[20] UNCTAD, 2024, **Review of maritime transport 2024**

[21] IEA, 27 January 2026, **Designing an effective strategic stockpiling system for critical minerals**

Chapter 2: Four plausible chokepoint disruptions pose the most risk

To illustrate the risks that chokepoint disruptions pose to global oil and LNG supply, we examine four major chokepoints and the most plausible drivers that could disrupt flows through them. These drivers include:

- geopolitical conflict
- military escalation
- congestion or operational incidents
- climate-related constraints.

In several cases, such disruptions are not hypothetical: at the time of writing, shipping is in effect halted through the Strait of Hormuz and severely restricted through the Bab el-Mandeb/Red Sea corridor. For each chokepoint, we examine how such disruptions could unfold and assess their implications for major importing economies.

Critically, chokepoint disruptions rarely occur in isolation. Multiple disruptions can interact and compound one another. For example, the existing disruption to Red Sea chokepoints prevented the Red Sea from being a viable alternative route to avoid disruption to the Strait of Hormuz in early 2026. When alternative routes are constrained, shocks propagate more widely across the global fossil fuel transport system, increasing freight costs, tightening tanker availability and amplifying price volatility. In such circumstances, shipping is forced to reroute through other corridors, transferring pressure to alternative chokepoints (e.g. the Panama Canal) that may themselves be constrained by congestion, climate impacts or operational limits.

Strait of Hormuz: Disruption pathways

At the time of writing, military conflict between Iran, the US, Israel and the wider region in 2026 has led to closure of the Strait of Hormuz, the export route for all Kuwait's oil, all Qatari LNG (except that heading to Kuwait), almost all Iraqi oil, all Bahrain's refined petroleum products, plus most Saudi and about half of UAE oil exports. Iran's core oil export hub (Khar island) is under attack, which threatens about 90% of Iran's oil export capacity. In parallel, attacks on gas production and export infrastructure across the Gulf, including strikes affecting Qatar's Ras Laffan complex and associated LNG facilities, have disrupted a significant share of globally traded LNG supply, temporarily removing close to one-fifth of global LNG exports from the market.[22]

The closure of the Strait has not only caused regional disruption but also already triggered systemic macroeconomic effects through higher energy prices, financial market volatility and inflationary pressures.

Aside from the physical blockage to shipping, attacks on commercial vessels sharply raised insurance premiums, in some cases halting insurance coverage entirely, illustrating how "paper chokepoints" magnify physical risks. At the beginning of March 2026, risk premiums rose from ~0.25% towards as high as 1% of vessel value ($880k per ten-year-old Very Large Crude Carrier, or "VLCC"),[23] and VLCC spot rates on Arabian Gulf to Far East routes (AG/FE) jumped 342% after US–Israeli and Iranian strikes, from $133,000 per day as the average in 2025 to $445,200 per day.[24]

This conflict triggered oil and LNG price spikes in March when European and Asian gas prices rose 76% and 40% and oil hit over $100/barrel (for the first time since July 2024)[25] on risk premium alone. A longer or more severe conflict – prolonging the risk of extended closure of the strait – would prolong and intensify volatility. Additionally, unlike in the wake of the bombings on Iran in June 2025, the backlogs from a prolonged blockage would take months to resolve.

Spare capacity outside the Strait is insufficient to offset prolonged disruption and can offer only limited relief. Over 90% of quickly available oil supply is in the Middle East[26] and 20m barrels per day moved through the Strait in 2025. Saudi Arabia and UAE have pipelines that can bypass the Strait, but these can add only ~2.6m barrels/day to global suppply.[27] Iraq and Kuwait, the other major producers in the region, have extremely limited options beyond the Strait. LNG flexibility is even lower, with Qatar (aside from marginal flows to Kuwait) and the UAE fully reliant on routes transiting the Strait.

As a result, a sustained blockage of the Strait would likely lead to a prolonged period of very tight global oil and LNG markets, with a consequent economic hit and inflation because of high energy prices. Asian importers are most exposed: in 2024, 84% of oil and 83% of LNG passing through Hormuz went to Asia, especially China, India, Japan and South Korea.[28] Price surges intensified global competition, forcing Europe, Japan and South Korea to pay the financial cost of securing high-priced LNG, and risking pricing developing

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[22] Bloomberg, 18 March 2026, **World's Largest LNG Plant Suffers Extensive Damage, Qatar Says**

[23] Calculated combining 1% risk premium figure (S&P, 03 March 2026, **Marine war insurance for Hormuz dries up as Middle East war intensifies**) and 10-year old VLCCs average value of $88m (Lloyd's List, 04 December 2025, **Fleet supply and freight rates drive crude tanker values higher)**

[24] Seatrade Maritime News, March 4 2026, **VLCC rates skyrocket to hit never done before highs**

[25] CNBC, 3 March 2026, **Middle East war sends natural gas prices soaring, raising growth shock risk for Europe and Asia**; BBC, 3 March 2026, **Gas and oil prices soar and shares tumble on fears conflict could escalate**

[26] IEA, 6 February 2026, **Strait of Hormuz Factsheet**

[27] CRS, 11 March 2026, **Iran Conflict and the Strait of Hormuz: Impacts on Oil, Gas, and Other Commodities**

[28] EIA, 16 June 2025, **Amid regional conflict, the Strait of Hormuz remains critical oil chokepoint**

economies out of the market, triggering possible severe energy shortages, as Bangladesh and Pakistan already experienced in the 2022 gas crisis.

The Hormuz crisis demonstrates that global fossil fuel markets can appear adequately supplied and stable until a chokepoint disruption exposes the system's underlying fragility immediately visible through shipping disruptions, insurance withdrawal and global price transmission. Importantly, the events in Hormuz do not eliminate risks in other corridors. Instead, they reduce system slack, increasing vulnerability to additional disruptions elsewhere.

While this analysis focuses on crude oil and LNG flows, chokepoint disruptions also propagate through a wider set of associated products and upstream derivatives linked to hydrocarbon production. In the Gulf, LNG and oil production are tied to the supply of helium, sulphur, and key petrochemical feedstocks such as naphtha and LPG, for which the region is a major global supplier. Disruptions in the Strait of Hormuz would therefore not only constrain energy markets, but also the availability of critical industrial and agricultural inputs used in sectors ranging from semiconductors and medical technologies to fertilisers and chemicals.

These commodities are structurally distinct from most traded goods, as they sit upstream in supply chains and can trigger cascading disruptions across multiple downstream industries. Unlike fossil fuels themselves, however, their impacts tend to be more sector-specific rather than system-wide, reflecting their role as inputs rather than continuous energy flows.

Strait of Malacca: Disruption pathways

The Strait of Malacca is one of the world's busiest maritime corridors and a critical artery for global energy and trade flows. Its importance is matched by its vulnerability: less than 3 km wide at its narrowest point, it is a congested route linking the Indian and Pacific Oceans. Even short-term disruption in this chokepoint would have global consequences.

The risk stems from the combination of strategic concentration, limited substitute routes, and the fact that multiple forms of disruption can all reduce effective capacity in one of the most important maritime corridors in the global energy system. Those potential forms of disruption include:

- Regional military tensions and spillovers from wider instability in the Indo-Pacific, where territorial disputes mean collisions, stand-offs or other maritime incidents could quickly escalate into broader security disruptions.
- Shipping congestion and accidents in the Strait's narrow deepwater channels, which could limit the ability of deeper ships to transit the Strait.

- Piracy and terrorism, an ongoing threat with piracy incidents in the Strait in 2025 at an all-time high since records began in 2007.[29] While piracy incidents are unlikely to directly close the Strait, they force ships to increase speed or perform unusual manoeuvres, significantly increasing the risk of collision or grounding.
- Adverse weather and/or environmental conditions, which raise navigational risk in and around the Strait, adding to congestion and accidental risk in an already crowded corridor.

The risk associated with the Strait is therefore not limited to any one geopolitical flashpoint: major disruption could occur without any single actor deliberately seeking the Strait's closure. Alternatives are sparse: the narrow, shallow Sunda Strait is unsuitable for large tankers, while the Lombok–Makassar route adds roughly eight days per round trip – effectively removing around one-sixth of global tanker capacity.[30] This would tighten global oil and LNG markets and drive significant price spikes.

The countries most exposed would be those most dependent on uninterrupted flows through Malacca and adjacent sea lanes. Japan and South Korea would be hardest hit, as over 80% of Japan's oil[31] and major shares of both countries' LNG transit the Malacca Strait. Global oil and spot LNG prices would surge, and Europe could again compete directly with Japan and Korea for LNG, risking a repeat of the 2026 gas crunch. Many developing countries would be priced out entirely.

European LNG and oil import infrastructure: Disruption pathways

Since the 2022 full-scale invasion of Ukraine, Russia has stepped up its attacks on European infrastructure. Suspected Russian interference with European energy infrastructure is growing, including a thwarted cyberattack in Poland in December 2025 that is suspected to be linked to Russia[32] and unidentified military drone activity around LNG terminals in Germany.[33] In an attempt to test NATO red lines through deniable operations rather than overt attacks, Russia may target European LNG and oil import systems.

While Russian activity poses less risk to oil imports, the nature of LNG imports requiring specialised port infrastructure makes receiving ports physical chokepoints that Russia could seek to close. Europe's LNG and oil import capacities depend heavily on a limited number of terminals with single points of failure: in 2024, over 30% of Europe's LNG imports came through just three terminals: Rotterdam, Dunkirk and Zeebrugge.[34] Given the

[29] ReCAAP ISC, 2026, **Annual Report: Piracy and Armed Robbery against Ships in Asia 2025**
[30] MOL Solutions, 7 May 2022, **Let's see the Routes and Speed of Cargo Ship**
[31] The Nippon Foundation, **Safety in the Straits of Malacca and Singapore** (webpage, accessed 13 March 2026)
[32] Reuters, 13 January 2026, **Massive cyberattack on Polish power system in December failed, minister says**
[33] Euronews, 10 September 2025, **Russian spy drones over Germany turn into an even greater threat**
[34] BSSC, 13 July 2025, **European Union LNG imports increased in the first half of 2025. LNG supplies from the US are growing**

complex equipment needed for LNG regasification, even minor damage to equipment could take weeks to repair, posing a particular risk in winter when capacity utilisation is highest. Offshore and subsea infrastructure is especially exposed, notably pipelines serving offshore Floating Storage and Regasification Units (FSRUs), which are difficult to monitor and slow to repair.

Bab el-Mandeb: Disruption pathways

Houthi attacks in the Red Sea and Gulf of Aden are highly likely to continue through 2026 and have become a structural feature of transiting the Bab el-Mandeb. What began as a sharp escalation in late 2023 has evolved into a fragile but persistent "normalised" risk environment. Most Western-linked shipping has already rerouted via the Cape of Good Hope, drastically reducing traffic through both Bab el-Mandeb and the Suez Canal.

While this reduces the likelihood of a sudden physical chokepoint closure, it creates a new structural vulnerability. Longer voyages raise freight and insurance costs, extend delivery times, and effectively reduce global tanker and LNG carrier availability. Even without further escalation, this permanently tightens shipping markets and limits the system's ability to absorb new shocks. The economic impact is already visible: Egypt's Suez Canal revenues have reportedly almost halved.[35]

Bab el-Mandeb demonstrates that a chokepoint need not be formally closed to undermine energy security: sustained instability alone can force rerouting that increases costs and reduces shipping capacity, leaving global markets with less buffer for the next shock.

[35] Reuters, 17 March 2025, **Egypt Suez Canal monthly revenue losses at around $800 million, Sisi says**

Chapter 3: Measuring countries' structural exposure to chokepoint risk

An importer's vulnerability to chokepoint disruption is not just a matter of whether a corridor is at risk, but also of how strongly its economy is structurally tied into that risk, and how much buffer it has when disruption occurs.

We have assessed major importers' structural vulnerability using an exposure–resilience matrix, using qualitative categories that reflect these long-term structural conditions. Figure 2 summarises the assessments, and the methodology is described in more detail in **Annex 2**.

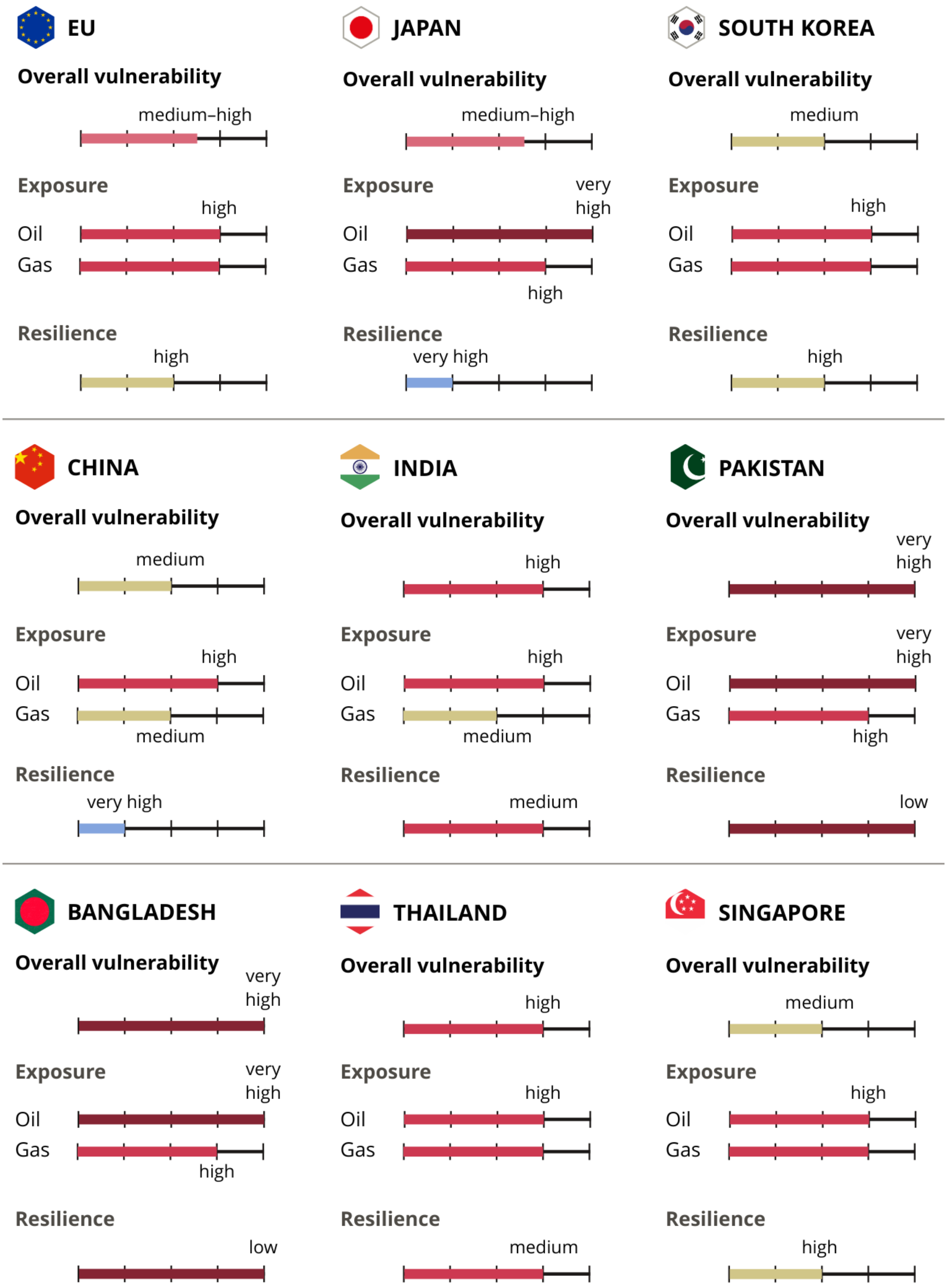
Oil exposure

Oil exposure is structurally high for most importers because oil is globally fungible and priced through integrated benchmark markets. Even if a country's physical cargoes do not transit a disrupted chokepoint, it will still experience the global price transmission.

Oil exposure in the matrix reflects three linked drivers:

1. **Import dependence and chokepoint reliance (physical exposure):** The share of domestic oil demand that is imported, and the degree to which these imports transit systemic chokepoints (directly, through routing, or indirectly, through tight shipping markets and insurance constraints).
2. **Benchmark price exposure (financial exposure):** Sensitivity to global oil price spikes transmitted through Brent/WTI-linked markets, including the role of refined product markets where relevant.
3. **Oil intensity of the economy (macro exposure):** The extent to which oil price changes translate into inflation, trade balance pressure and broader economic stress, shaped by the amount of transport that uses oil (as opposed to electric vehicles, for example), industrial structure, efficiency and the ability to substitute away from oil in the short term.

Structural exposure of major oil and LNG importers



Source: *E3G assessments as described in this chapter; further detail provided in* ***Annex 2****.*

Figure 2: Major importers' overall vulnerability to chokepoint disruption is a function of their economic exposure to oil and gas, and ability to absorb shocks in price or supply.

Gas exposure

Gas (LNG) exposure varies more between importers than oil exposure because global price trends impact different regional markets to different extents, and the lower availability of LNG infrastructure means physical constraints are much more important than for oil. In other words, LNG dependence creates chokepoint risk not only through prices, but through whether the LNG can physically be delivered, or substituted.

Gas exposure in the matrix reflects four factors:

1. **Physical availability risk during disruption:** Whether supply can still reach importers when a corridor is blocked or becomes uninsurable, including exposure to LNG tanker availability constraints and longer voyage times from rerouting.
2. **LNG import dependence and route concentration:** The share of an importer's domestic gas demand that comes from LNG imports (rather than domestic production or pipeline supply), the concentration of import routes through specific chokepoints vs diversified supplier geographies, and the LNG import terminal capacity.
3. **Pipeline alternatives and interconnection:** Access to pipeline supply and the degree of network connectivity that enables substitution across regions or neighbouring systems during stress.
4. **Non-gas alternatives in end-use sectors:** The ability to reduce gas demand through fuel switching or electrification in heating and industry, as well as operational demand-response tools such as interruptible industrial gas contracts, electricity demand-response programs, and managed heating and cooling reductions, alongside load shedding capability in extreme scenarios.

Resilience

Resilience captures whether a country can absorb a shock in price (common in oil and LNG) or deliverability (common in LNG) without triggering a broader macroeconomic or social crisis.

In our matrix, resilience reflects:

1. **Fiscal space to stabilise markets and protect vulnerable groups:** Capacity to cushion shocks for key utilities and consumers (targeted subsidies, financial safety nets, support for utilities and critical sectors), without triggering a fiscal or debt crisis.
2. **Foreign exchange reserves and access to finance:** Ability to sustain higher import bills during spikes, manage balance-of-payments pressures and maintain access to credit.

3. **System and institutional capability:** Crisis governance, demand-management tools, emergency procurement, and the robustness/security of import infrastructure (including cyber and physical protection).
4. **Strategic reserves and storage buffers:** Strategic petroleum reserves and refined product stockpiles; gas storage where available; and operational flexibility to release stocks quickly.
5. **Flexibility of supply:** Contractual flexibility, such as destination-flexible LNG contracts and clear force majeure provisions, can also improve the ability to redirect cargoes and manage shortages during crises.

Overall vulnerability

Overall vulnerability reflects the balance between exposure and resilience.

Current market conditions show that **no importer is insulated from oil and LNG shocks**. Even economies with significant resilience (large reserves, storage capacity and fiscal space) remain structurally vulnerable because global price transmission and chokepoint dependence continue to bind the system together. Supply buffers can soften shocks, but they cannot remove vulnerability while fossil import dependence remains high.

While importers cannot fully control the underlying environment and cannot endlessly build out buffers (especially if they are fiscally constrained), they can reduce structural exposure by lowering import dependence and increasing end-use flexibility.

Chapter 4: Short-term crisis response and sustainable risk mitigation strategies

Chokepoint risks can never be removed, but their impacts can be mitigated

Chokepoint risk is inherent to globally traded fossil fuels. Even cargoes that avoid a particular chokepoint remain exposed to the broader system: oil prices transmit globally regardless of routing, while LNG deliveries depend on limited tanker fleets, insurance markets and specialised import infrastructure. In other words, there is no fully chokepoint-insulated fossil supply option in an interconnected global market..

Diplomacy and military protection therefore cannot remove the underlying vulnerability of systems that depend on continuous fossil fuel imports, even if they can reduce the likelihood or duration of specific disruptions. Importing governments face a strategic choice: manage recurring shocks within a structurally exposed system or reduce the structural dependence that makes those shocks destabilising.

We propose a five-track policy toolkit (Table 2) that combines short-term stabilisation measures with longer-term resilience strategies. The former mitigate impact; the latter reshape exposure.

Track 1 (impact within weeks–months): Immediate market stabilisation and crisis cushioning

When chokepoint disruptions occur, governments must first stabilise markets and prevent price spikes from translating into shortages, financial instability or social disruption. These measures operate on timescales of weeks to months and aim to cushion the immediate impact of supply shocks on citizens and industry while longer-term adjustments take effect.

Experience from recent energy crises shows that even limited short-term interventions can significantly reduce market stress, particularly when coordinated across major importing economies.

Table 2: A policy toolkit to address both the immediate impact of chokepoint disruption, and long-term structural exposure

Track	Main instruments	Short-term risk reduction	Long-term structural exposure reduction	Time horizon for impact
Track 1: Immediate crisis stabilisation	Stock release & storage management; demand reduction & fuel switching; clean energy deployment	✓ Medium	✓ Medium	Weeks–months
Track 2: Fossil fuel supplier diversification	Supplier diversification, storage	✓ Medium	✕ Low	0–3 yrs
Track 3: Demand reduction & clean buildout	Electrification, renewables, efficiency	✕ Low	✓✓ High	0–10 yrs
Track 4: Crisis-time maritime security	Naval patrols, escorts, mine countermeasures, monitoring	✓✓ High	✕✕ Very low	0–5 yrs (but only implementable short-term)
Track 5: Infrastructure protection and system resilience	Grids, cyber, infrastructure, supply chains, importer co-operation	✓ Medium	✓ Medium	0–10 yrs

Recommendations: strategic stock management, demand reduction and near-term system flexibility

Strategic stock releases and coordinated storage management

Strategic petroleum reserves (SPR) and gas storage systems are designed to stabilise markets during supply disruptions. Their primary function is not to permanently lower prices, but to inject liquidity, prevent panic bidding and buy time for supply chains and shipping routes to adjust. For example, the average member of the International Energy

Agency (IEA) has 140 days of oil supply stored;[36] this number is typically far less for emerging markets and developing economies (EMDEs).

Recent events illustrate both the importance and the limits of this tool. The coordinated release of roughly 400 million barrels of strategic oil stocks on March 11 2026[37], one of the largest emergency releases in history, helped reassure markets and increase available supply, but had only a limited effect on global benchmark prices. This reflects the reality that oil prices are set on globally integrated markets: when disruption risks remain high, strategic stock releases alone cannot eliminate price volatility.

Strategic reserves are therefore best understood as shock management tools rather than price-control instruments. Their value lies in stabilising expectations, ensuring physical availability of crude and refined products, and preventing short-term disruptions from cascading into broader economic crises.

- **Coordinate releases among major importing economies.** Coordination among IEA members remains critical, but the global oil market has evolved since the emergency stock system was designed. Large non-IEA importers such as China and India now hold significant strategic reserves; greater consultation and transparency would improve the effectiveness of coordinated releases.

- **Act faster to match market dynamics.** Oil markets react to geopolitical developments within hours. Pre-agreed crisis procedures and faster operational release mechanisms can help inject liquidity before panic behaviour develops in trading and shipping markets.

- **Prepare for refined product disruptions as well as crude shortages.** Recent crises have shown that bottlenecks often appear first in diesel, jet fuel or gasoline markets due to refinery outages or logistics constraints. Strategic product stocks can therefore play an important role alongside crude reserves.

- **Integrate SPR policy with broader crisis management tools.** Strategic releases are most effective when combined with temporary demand-reduction measures, fuel switching and clear communication to markets about the scale and duration of intervention.

- **Optimise gas storage withdrawals and injection strategies.** Gas storage can temporarily replace LNG imports during supply disruptions, reducing the need for emergency purchases in tight spot markets and helping prevent physical shortages while markets rebalance. Governments should ensure that regulatory frameworks enable the effective use of storage during crises. This includes enabling coordinated withdrawals during major supply shocks, introducing flexibility in storage refill targets to

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[36] IEA, **Oil Stocks of IEA Countries** (webpage, accessed 10 March 2026)
[37] IEA, March 2026: **IEA Member countries to carry out largest ever oil stock release amid market disruptions from Middle East conflict**

avoid forced purchases during price spikes, and improving regional coordination and transparency on storage levels and withdrawal strategies.

Crucially, deploying these measures does not tie countries into greater structural fossil fuel dependence. While they do nothing to eliminate structural dependence on imports, they can buy time for markets to rebalance and prevent short-term supply disruptions from escalating into macroeconomic crises.

Rapid demand reduction and fuel switching

Reducing demand during crisis periods immediately lowers the number of cargoes an importer requires to transit vulnerable chokepoints in order to maintain its energy security and mitigate chokepoint disruption impact on consumer prices and wider economic stability. Even small reductions in demand can significantly ease market pressure. In acute situations, governments may also need to prioritise system stability by maximising demand-side measures and the use of available non-gas generation to reduce peak gas demand. While demand-side measures can often be deployed at relatively low cost, reliance on alternative generation sources may be costly and, in some cases, emissions-intensive, and should therefore be treated as a temporary last-resort measure.

Governments can implement rapid demand-reduction programmes through:

- Emergency demand-response schemes in electricity markets to reduce the need to turn on the oldest and most inefficient gas-fired generation during peak periods, as used in the UK in 2022–23.[38]
- Industrial demand-reduction agreements with large energy users.
- Public-sector energy saving programmes (for example as implemented in Europe in the 2022–23 energy crisis[39]), including building temperature limits, operational efficiency measures and information campaigns for households on how to reduce energy waste.

For oil demand, immediate measures include:

- Temporary efficiency and demand-management measures in transport (e.g. speed limits, freight efficiency measures).
- Remote work or mobility reduction policies during acute supply shocks.
- Public transport incentives and shared mobility programmes.

[38] NESO, 2023, **Demand Flexibility Service: Winter 2022/23 Review**

[39] Odyssee-Mure, 2025, **Energy efficiency in time of crisis at EU level**; MRS, 2022, **Emergency intervention to address high energy prices in the EU**; European Commission, 2023, **Report on the review of emergency interventions to address high energy prices in accordance with Council Regulation (EU) 2022/1854**

Coal is not a dependable fallback when oil and gas supplies are disrupted.

Coal suffers from its own logistical vulnerabilities: 90% of coal trade is seaborne, exposing it to the same chokepoint risks as we have described for oil and gas. Coal prices also track global fossil-fuel market shocks. The Newcastle benchmark price increased almost 9% within three days of the first US–Israeli strikes on Iran,[40] and has risen 17% as of 25 March.[41] Far from being a way to insulate from price shocks, increasing coal imports therefore increases chokepoint exposure and crisis-time price competition.

Recent examples of the weakness of coal as an answer to price shocks include the EU's experience in 2022, when Russia's invasion of Ukraine prompted the EU to ban imports of Russian energy. Speculation of a crisis-induced coal renaissance[42] did not materialise.[43] The opposite happened: isolated and short-lived increases in coal use then gave way to record-breaking declines in European coal consumption (–23%) and production (–21%) between 2022 and 2023,[44] and coal continued its inexorable decline in Europe in 2024 and 2025.[45]

Rapid deployment of already available clean energy capacity

Clean energy deployment can also play a role in crisis response when projects are already built but awaiting grid connection or permitting.

Governments can reduce fossil demand quickly by:

- Fast-tracking grid connection of completed renewable projects awaiting interconnection approvals. Some countries have renewable projects that are already built or in advanced development but remain delayed by grid-connection procedures or administrative approvals. Governments should prioritise "first-ready-first-served" connection rules so that completed projects can be brought online rapidly during supply crises.
- Prioritising maintenance and uptime of existing nuclear, hydro and renewable assets to maximise non-fossil generation.
- Accelerating grid flexibility measures, including storage dispatch and demand-response programmes.

[40] Energy Terminal, 14 March 2026, **Oil, gas and coal surge over two weeks of US–Israel attacks on Iran**
[41] Investing.com, **Newcastle Coal Futures**
[42] Polytechnique Insights, May 2022, **Climate: goodbye Russian gas, hello coal**
[43] Factcheck.bg, February 2023, **Was there a 'coal renaissance' in Europe in 2022**
[44] Eurostat, 3 July 2025, **EU coal production and consumption reach historical low**
[45] IEA, December 2025, Coal 2025 – **Analysis and forecast to 2030**

Because additional non-fossil generation directly reduces gas-fired power at the margin in many electricity markets, these measures can lower import requirements within weeks to months, helping stabilise markets during crises.

Track 2 (0–3 years): Manage unavoidable fossil fuel exposure without lock-in

In the short term, diversification of fossil fuel suppliers can reduce bilateral dependence and help manage disruptions affecting individual producers. However, it cannot eliminate structural exposure to global fossil fuel markets. Oil and LNG are traded through globally connected systems in which price shocks, shipping constraints and geopolitical risks propagate rapidly across suppliers and routes. Diversification, therefore, spreads exposure across suppliers but does not remove systemic vulnerability.

No LNG supplier is risk-free:

- The **US** has become a central LNG supplier for both Europe and Asia, but global LNG markets still transmit shocks instantly, raising prices and competition for US cargoes. US capacity cannot scale in a crisis,[46] and domestic politics could trigger export restrictions during price spikes.[47]
- **Norway** is a reliable medium-term partner, but its mature fields will limit long-term volumes, and its offshore pipeline system is a concentrated vulnerability exposed to sabotage and hybrid attacks, in the face of globally scarce deep-water repair capacity.
- **Qatari** LNG remains highly exposed to Hormuz and the Red Sea (as well as risks to production capacity, such as the major interruption to LNG production caused by Iranian missile attacks on Qatari LNG infrastructure in March 2026).
- **Russian** supply offers no energy security alternative to Asian buyers, given Moscow's demonstrated willingness to use energy trade coercively.
- **Australian** LNG supplies are limited by ageing infrastructure, domestic demand pressures and political debate over export limits.
- Smaller suppliers aid diversification for Europe and Asia, but face constraints from political instability and governance risks (**Algeria**) or rising domestic consumption (**Malaysia** and **Indonesia**).

Diversification options for oil are broader, including increased flows from the **US**, **Brazil**, **Guyana** and other **Atlantic Basin producers**. However, oil's global fungibility means that

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[46] EnergyNow.com, 4 March 2026, **There is Little US LNG Producers Can do to Immediately Replace Lost Qatari Cargoes**

[47] Public Citizen, 2 May 2026, **The Impact of LNG Exports on U.S. Energy Bills and Inflation**

physical diversification does not shield importers from benchmark-driven price spikes. A disruption in one region raises prices everywhere, regardless of routing.

Fossil fuel supplier diversification can therefore smooth bilateral dependency and buy time in the face of disruption. It cannot eliminate systemic exposure to globally traded fossil fuels.

Another tool to manage exposure spillovers is coordinated market response, primarily via strategic reserves and emergency response coordination. Coordinated stock releases can inject liquidity into tight markets, reduce panic bidding and prevent temporary disruptions from escalating into broader economic shocks. However, the global import landscape has changed significantly since the emergency stock system was designed, creating opportunities to strengthen coordination and crisis response mechanisms. IEA member countries that already have an SPR release system established should therefore improve coordination with major non-IEA importers such as China, India and several Asian economies which now hold large strategic reserves, and their inclusion will help strengthen crisis response.

Expanding preparedness for product market disruptions, including the coordination of refined product stocks where relevant, would further improve system resilience as recent crises have demonstrated that shortages often emerge first in refined products such as diesel or jet fuel due to refinery disruptions or product trade bottlenecks. Improving the operational speed of reserve releases to match the speed with which markers react to geopolitical events could help stabilise expectations before panic behaviour emerges in shipping and trading markets.

These measures cannot eliminate exposure to global oil price shocks, but they can cushion short-term disruptions while markets rebalance.

Recommendations: diversification of fossil fuel suppliers

Governments should treat diversification primarily as a short-term risk-management tool, while avoiding decisions that deepen long-term fossil-fuel dependence.

Contract design and flexibility

- Governments should encourage contractual flexibility in LNG procurement, including destination flexibility, transparent force majeure provisions and clear allocation of shipping and insurance risks. Where possible, existing contracts should be reviewed to improve flexibility during disruptions.
- Diversification should rely on existing infrastructure and flexible supply arrangements wherever possible, to avoid extending structural dependence on volatile fossil fuel markets through new LNG terminals, pipelines or long-term contracts.

OECD gas importers

- Diversify short-term gas supplies but be wary of longer-term contracts or major infrastructure build-out, which risk locking in exposure to unreliable suppliers.
- Provide realistic demand signals to smaller suppliers so they can diversify their economies ahead of falling long-term gas imports.

EMDE gas importers

- Avoid investing in new gas import infrastructure, which creates dependency, heightens vulnerability to geopolitical coercion, and risks being locked out from the market during crises – as experienced by Bangladesh and Pakistan in 2022. Such investments should be carefully stress-tested against price volatility and crisis scenarios before approval.

Oil importers

- Strengthen and coordinate strategic petroleum reserves and emergency response mechanisms to cushion supply disruptions.

Treat diversification as a bridge measure

- Supplier diversification can stabilise supply in the near term, but it should primarily be used to buy time while structural measures reduce fossil fuel demand and import dependence.

Long-term LNG contracts don't enhance structural resilience

Long-term LNG contracts are often presented as protection against volatility, but in practice provide limited insulation. Most oil-indexed LNG contracts track oil benchmarks with a time lag. This delays the impact of price spikes but does not prevent pass-through. Gas-on-gas indexed contracts reference hub prices and adjust in line with market movements, often more quickly. In addition, shipping and insurance costs are typically passed through to buyers. Force majeure provisions can allow non-delivery during disruptions, while price review and hardship clauses allow renegotiation under extreme market conditions. Physical disruption at export terminals or chokepoints can prevent delivery regardless of contract structure. Long-term contracts can smooth volatility over time. They cannot eliminate systemic exposure to global price shocks or guarantee physical delivery during instability.

Domestic oil and gas production does not enhance structural resilience

Expanding domestic oil and gas production can reduce reliance on specific import routes, but it does not remove the structural vulnerabilities of fossil fuel systems. Because oil is priced globally and LNG increasingly links gas markets across regions, even self-sufficient producers face price and resultant inflation shocks during geopolitical crises – as shown by the surge in US gasoline prices in March 2026[48] despite it being the world's biggest oil producer.

Moreover, shifting supply domestically simply relocates chokepoint exposure to concentrated infrastructure such as offshore platforms, subsea pipelines and processing hubs, all of which act as single points of failure. In Europe, deeper dependence on North Sea assets heightens exposure to sabotage and hybrid threats flagged in Norwegian and NATO-linked assessments.

In any case, domestic production cannot provide rapid resilience: bringing new production online takes years or often decades, making it irrelevant for acute chokepoint disruptions. Many countries also struggle to scale production due to resource depletion, high development costs, or political and safety constraints, illustrated by Germany's negligible domestic output (2% of domestic demand) and the Netherlands' shutdown of the Groningen field following protests about production-linked earthquakes.

Even where oil and gas are produced domestically, production relies on highly concentrated, non-substitutable global supply chains for specialised equipment, from LNG compressors to subsea systems, which are typically supplied by only a handful of firms with long lead times. Unlike clean energy technologies, which are modular and manufactured at scale across multiple regions (including China, Southeast Asia, Europe and the US), fossil upstream and LNG projects depend on project-specific, high-spec components that cannot be easily substituted, stockpiled, or rapidly replenished. Domestic systems thereby remain vulnerable to bottlenecks and disruption – including from chokepoints.

[48] Time, 7 March 2026, **Gas prices surge in US as Iran war chokes global oil supply. What you need to know**

Track 3 (3–10 years): Reduce structural exposure

The most durable way to reduce chokepoint vulnerability is to shrink the seaborne fossil fuel requirement. Domestic electrification and non-fossil generation can improve resilience because, once built, they reduce recurrent exposure to imported fuel, maritime transport risk, and benchmark-driven price volatility. A solar or wind asset, once installed, generates local power for 25–30 years regardless of events elsewhere in the world – renewables are effectively a one-time purchase rather than a "subscription" exposed to global supply chains. Because generation is local, it is immune to maritime blockades and distant geopolitical shocks, creating a baseline of "embedded resilience" that imported gas can never match. Electrification compounds this effect by reducing oil demand in transport and LNG demand in power and heating simultaneously, lowering exposure across multiple chokepoints.

Clean energy assets are also geographically dispersed, making them harder to disable. Ukraine's experience has shown that a decentralised renewables base is more difficult to disable through physical attack than centralised thermal generation.

Reducing structural exposure requires accelerated grid build-out and interconnection; mass electrification of transport and heating; industrial electrification and efficiency upgrades; storage deployment to stabilise domestic supply; and structural demand reduction through long-term efficiency policy.

For OECD economies, embedding electrification targets within energy security strategies reframes climate policy as a tool for strategic autonomy. For emerging importers, leapfrogging new fossil infrastructure avoids locking in future vulnerability.

Recommendations: clean energy buildout and structural demand reduction

OECD importers

- Integrate electrification targets into national energy security planning, linking oil and LNG import reduction directly to strategic risk reduction.
- Accelerate grid expansion and interconnection as strategic infrastructure investments.
- Prioritise electrification of transport and heating to reduce oil and LNG exposure.
- Accelerate expansion of storage and flexibility resources to stabilise a more highly electrified system.
- Accelerate rollout of energy efficiency measures, embedding efficiency as a "first fuel" before approving new import capacity.

EMDE importers

- Avoid new LNG import infrastructure unless accompanied by robust stress-testing of price shock exposure.
- Prioritise grid investment, distributed renewables and storage where feasible to reduce seaborne fossil requirements.
- Integrate energy shock scenarios into IMF/MDB engagement and fiscal planning.
- Accelerate electrification where it reduces import exposure.

Track 4 (0–5 years): Security steps to counter immediate chokepoint risks

Military deployment can help mitigate chokepoint risks, but it is a very resource-intensive option that is difficult to sustain indefinitely, and may compete with national defence priorities. Naval patrols, maritime domain awareness, mine countermeasure capacity and infrastructure monitoring already operate in high-risk corridors such as the Strait of Hormuz and the Red Sea. These efforts can reduce the probability and duration of disruption, but they come at an immense financial cost that is often significantly out of balance with the costs to those seeking to attack chokepoints. For example, in March 2026, the US routinely used Tomahawk missiles costing $3.6 million to counter Iranian drones costing only $30,000.[49]

Unlike structural actions, military deployment is only impactful for as long as it is underway. It also reduces military capabilities in the event of military assets being needed elsewhere, in which case a choice must be made on the relative importance of energy security.

Recommendations: security to counter immediate chokepoint risks

Importers with sufficient naval capacity

- Maintain maritime domain awareness in key corridors.
- Invest in mine countermeasure readiness.
- Expand subsea monitoring capabilities.
- Develop crisis-time insurance backstops.

[49] Financial Times, 12 March 2026, US has burned through 'years' of munitions since start of Iran war

Importers without sufficient naval capacity

- Participate in intelligence sharing and crisis coordination.
- Develop crisis-time demand management protocols to avoid panic bidding.
- Work through regional platforms to coordinate procurement where possible.

Track 5 (0–10 yrs): Strengthen systems resilience

Track 5a: Boost security around energy infrastructure

Even in a lower-fossil system, fragile infrastructure can create domestic bottlenecks, so resilience depends not only on supply origin but on overall system robustness.

In the short term, governments should incorporate chokepoint stress-testing into energy security planning. Scenario modelling (such as a seven-day Hormuz closure, a three-month insurance shock or a temporary LNG terminal outage) can reveal fiscal and infrastructure fragility before crisis strikes. Cybersecurity, subsea monitoring and strategic reserve reform can be strengthened within a few years.

Over the medium term, grid expansion and cross-border interconnection reduce single points of failure and prevent domestic bottlenecks from replacing maritime chokepoints.

NATO member governments should use budget allocated to the 1.5% infrastructure target spending to finance critical energy-security investments.[50] However, governments should be wary about using this for costly assets that will likely sit idle much of the time or be unused in the long term, such as new LNG import infrastructure or gas storage expansion.

Resilience also has an international dimension. Consumer–producer diplomacy and fiscal transition partnerships to deal with declining fossil fuel demand can reduce fragility in exporting states, lowering the risk of coercive leverage or instability over time.

In terms of mitigating growing climate impacts on chokepoint security, import infrastructure can be strengthened to make it more resilient to extreme weather events, while countries bordering critical maritime straits can increase investment in dredging equipment to remove silt that builds up following storm events.

[50] eurolectric, 2 December 2025, **Powering security: the NATO spending and energy resilience nexus**; E3G, 19 January 2026, **NATO security spending can turn offshore wind into European security assets, new report urges**

Recommendations: strengthening system resilience

OECD importers

- Strengthen foresight capabilities such as annual chokepoint stress tests embedded in fiscal and macroeconomic planning.
- Cybersecurity reinforcement of critical energy infrastructure.
- Greater security for LNG terminals, ports and subsea infrastructure.
- Strategic reserve reform, including refined products where gaps exist.
- Expanded grid redundancy to avoid domestic single points of failure.

EMDE importers

- Reduce technical and commercial grid losses.
- Enforce fuel efficiency standards.
- Build limited but strategic fuel stock capacity where feasible.
- Improve demand-response capability in power systems.
- Strengthen cyber and port security standards in proportion to risk.

Track 5b: Diversify clean energy supply chains

Supply risks for clean energy unfold on a much longer timescale than gas shocks: a disruption in minerals or components slows future deployment rather than shutting off existing power, making it a "slow-motion" crisis rather than an immediate blackout risk.

Tensions with China could heighten these risks, but their long lead times make them more manageable through advance policy. Expanding domestic refining of critical raw materials (CRMs), building strategic stockpiles, and diversifying trade partners can future-proof supply chains – an approach reflected in EU initiatives such as RESourceEU and the Critical Raw Materials Act. Unlike gas, which cannot be stockpiled beyond a few months, clean-energy inputs can be stored more easily and in larger volumes.

Over the long term, resilience depends on removing both the short-timescale dependencies of LNG and the slower structural dependencies within clean-energy supply chains. Sustained clean-energy deployment, combined with diversified technology suppliers, enables importers to escape the fossil-fuel "crisis-to-crisis" cycle and build a system that is physically and geopolitically autonomous – whereas continued investment in gas prolongs dependence on a system in which deep resilience is structurally unattainable.

Recommendations: diversifying clean energy supply chains

All importers reliant on international supply chains

- Accelerate diversification of CRM supply chains, using RESourceEU, Global Gateway.
- Develop new clean manufacturing supply chains with partner countries, e.g. pan-Mediterranean clean supply chains as part of the EU New Pact for the Mediterranean.

Track 5c: Importer–importer cooperation

Importer vulnerability is systemic, and crisis dynamics often worsen it. When shocks hit, importers compete for scarce cargoes, driving price spikes and crowding out weaker economies. Alongside national measures, importers can reduce shared exposure through pragmatic coordination including joint stress-testing, aligned demand-response protocols, shared crisis playbooks, and greater transparency on storage and shipping. Cooperation is also relevant beyond emergencies: coordinated strategies on grid resilience, cybersecurity standards, and cleantech supply chain diversification can reduce vulnerability over the medium term. This is not a substitute for demand reduction, but it can reduce the severity of shocks while structural exposure is being reduced.

However, tactical security measures do not eliminate structural exposure. They can manage disruption risk; they cannot prevent global oil price contagion or remove dependence on seaborne fossil fuels.

Annex 1: Importer exposure to maritime chokepoints

This annex describes the methodology used to estimate the share of a country's oil and LNG imports that are structurally dependent on major maritime chokepoints. The outcomes of this analysis are presented in Table 1 in Chapter 1.

We used a supplier proxy share methodology to estimate structural exposure. Because comprehensive public data on individual tanker routes and cargo origins are not globally available, the precise volume of shipments passing through chokepoints in a specific year cannot be determined. Our approach combines import partner data with standard maritime route assumptions to approximate the proportion of imports that normally transit key chokepoints.

Full data sets underpinning the estimates in Table 1 are available from **https://www.e3g.org/publications/chokepoints-systemic-threat-energy-security-oil-gas-importers/**

Data sources

Oil imports

- **Main metric:** crude oil imports by partner country (HS code 270900)
- **Primary datasets:** UN Comtrade / **World Bank WITS** trade database; **IEA Oil Market Statistics**; **Eurostat**. These sources provide the share of crude imports sourced from each supplier country for the importing economies analysed.

LNG imports

- **Main metric:** LNG imports by partner country (HS code 271111)
- **Primary datasets:** **UN Comtrade/WITS trade** database on LNG; **GIIGNL Trade Matrix** on physical LNG flows between countries.

Global chokepoint routing

We identified the typical shipping routes between exporting regions and importing markets using: **U.S. Energy Information Administration (EIA) analysis of global oil transit chokepoints**; International Energy Agency maritime trade analysis; industry shipping-route maps.

Supplier proxy share calculation

For each importing economy, chokepoint exposure is calculated in three steps.

Step 1: Import shares

The share of crude oil imports from each supplier country is identified using the partner-country trade data.

Example:

Importer	Supplier	Import share
Japan	Saudi Arabia	40%
Japan	UAE	35%
Japan	Kuwait	8%

Step 2: Route assignment

Each supplier country is mapped to the maritime route typically used to supply the importing market.

Example:

Supplier	Destination	Typical route
Saudi Arabia → Japan	Japan	Hormuz → Malacca
Saudi Arabia → EU	EU	Hormuz → Bab el-Mandeb → Suez
Norway → EU	EU	North Sea

Step 3: Chokepoint aggregation

An importer's total exposure to a chokepoint – expressed as a percentage of its total imports – is the sum of supplier shares whose routes pass through that chokepoint.

Example:

Japan imports 40% of its crude oil from Saudi Arabia; the route passes through the Strait of Hormuz and the Strait of Malacca.

- Hormuz exposure +40%
- Malacca exposure +40%

And so on for Japan's other suppliers to give its total exposure to these chokepoints.

Trading hub adjustment

International trade statistics record the partner country, which may represent the last port of consignment rather than the true country of production. Major oil trading hubs can therefore appear as exporters even when the crude originated elsewhere.

Important hubs include:

Trading hub	Role
Netherlands	Global storage and trading hub (Rotterdam)
Singapore	Refining and trading hub
Malaysia	Ship-to-ship transfer hub
UAE (Fujairah)	Export terminal hub

To avoid misrepresenting supply origins, a trading hub adjustment is applied.

Adjustment rule: where imports are reported from major trading hubs, the crude is classified as "hub origin" and assigned to a neutral route unless the underlying production origin can be reliably identified.

Unlike crude trade, LNG trade was recorded as originating from trading hubs rather than producing countries as LNG market is much more affected by hub trade.

Example:

Sri Lanka importing crude oil from the Netherlands (as a resale originating in the Middle East). Without adjustment a direct route from Netherlands to Sri Lanka is assumed and no chokepoint exposure implied. With adjustment, Netherlands is treated as trading hub origin, not true source of supply. This prevents the dataset from incorrectly reducing Hormuz exposure.

Special cases and adjustments

Several additional adjustments are applied to reflect real shipping patterns.

- **Saudi Red Sea exports**: Saudi Arabia exports crude through both Persian Gulf terminals (via Hormuz) and Red Sea terminals (via Yanbu pipeline). Exports to Europe may therefore bypass the Strait of Hormuz. To reflect this uncertainty, two exposure estimates are calculated: the central estimate assumes Red Sea exports serve European markets while the upper-bound estimate assumes Persian Gulf export terminals.
- **Malaysia transhipment flows:** Malaysia is a major ship-to-ship transfer hub used in some crude trades. Partner-country data showing Malaysian origin may therefore

represent crude originating elsewhere. These volumes are treated cautiously and classified as hub-origin trade.

- **Refining and trading hubs:** Some economies function primarily as hubs for oil trading or refining rather than as final consumers (e.g. Singapore, Netherlands). Import statistics for these economies may therefore include volumes that are later re-exported. These are treated as gross import structures rather than domestic demand exposure.

Limitations of the supplier proxy method

The supplier proxy methodology provides a transparent estimate of chokepoint exposure but has several limitations.

1. **Partner-country data do not always reflect production origin**

Trade statistics record the country of consignment rather than the original producing country. This is particularly relevant for crude traded through global hubs.

2. **Actual tanker routes may vary**

Shipping routes can change due to geopolitics, insurance conditions, canal congestion, and freight rates. For example, during Red Sea security disruptions, some cargoes were rerouted around the Cape of Good Hope rather than transiting the Bab el-Mandeb and the Suez Canal. The proxy methodology, therefore, reflects typical routes rather than real-time shipping behaviour.

3. **Pipeline and alternative export routes**

Some exporters can partially bypass chokepoints using pipelines. Examples include the Saudi East–West pipeline to the Red Sea and the UAE pipeline to Fujairah. These reduce chokepoint exposure in certain cases.

4. **Crude origin may be obscured by blending or storage**

Oil stored or blended in trading hubs may appear as originating from those hubs in trade statistics.

Interpretation of results

Because of the above limitations, the chokepoint exposure values calculated using this methodology should be interpreted as structural indicators of systemic dependency rather than precise measurements of tanker flows. They illustrate how strongly national oil supply structures are tied to chokepoint routes under normal trading conditions.

Annex 2: Determining importers' structural exposure to chokepoint risk

This annex describes the methodology used to assess how exposed major energy-importing economies are to disruptions affecting key maritime energy chokepoints. We developed an exposure–resilience matrix, as described in Chapter 3, with the results presented in Figure 2.

The matrix uses qualitative categories (Low / Medium / High / Very High). These are not forecasts; they reflect structural conditions under plausible disruption scenarios.

The framework recognises that vulnerability to energy supply shocks is not determined solely by the presence of physical risks along trade routes. Rather, it depends on the interaction between structural exposure to fossil fuel imports and the capacity of an economy to absorb supply or price shocks.

The framework therefore evaluates three dimensions: oil exposure, gas exposure, and resilience. These dimensions are combined to derive an overall assessment of vulnerability.

Full data sets underpinning this Annex are available from https://www.e3g.org/publications/chokepoints-systemic-threat-energy-security-oil-gas-importers/

Oil exposure

Oil exposure captures the extent to which an economy is structurally vulnerable to disruptions in global oil markets or to physical interruptions affecting key maritime chokepoints. Oil markets are globally integrated and priced through international benchmarks such as Brent. As a result, oil exposure reflects not only the physical dependence on imported oil but also the broader economy's sensitivity to global oil price shocks.

Three indicators are used to assess oil exposure:

1. **Net oil import dependence**, measured as the share of domestic oil consumption met by imports. Countries that rely heavily on imported oil are structurally more exposed to supply disruptions or price volatility. Data for this indicator are drawn from the IEA Energy Balances and the Energy Institute Statistical Review of World Energy.
2. **Chokepoint reliance of oil imports**, measured as the proportion of oil imports that transit major maritime chokepoints. The values are derived from the supplier proxy dataset developed in the chokepoint analysis (**Annex 1**), which combines crude import

partner data from UN Comtrade / World Bank WITS with typical shipping routes based on the U.S. Energy Information Administration (EIA) global chokepoint analysis.

3. **Oil intensity of the economy**, expressed as oil consumption relative to GDP, reflecting how strongly economic activity depends on oil consumption. Economies with high oil intensity are more vulnerable to price spikes because oil price increases translate more directly into inflation and economic stress. Data for this indicator are taken from the World Bank, IEA, and the Energy Institute Statistical Review.

These three indicators are combined to produce an overall qualitative assessment of oil exposure.

Gas exposure

Gas exposure reflects an economy's vulnerability to disruptions in (LNG) supply chains and to price transmission from global gas markets into domestic energy systems. Unlike oil markets, gas markets combine elements of regional pricing with physical delivery constraints. LNG supply disruptions can therefore affect both prices and the physical availability of gas.

Three indicators are used to assess gas exposure, which together capture both the physical and economic channels through which LNG market disruptions can affect importing economies:

1. **LNG import dependence**, defined as the share of national gas consumption supplied by LNG imports. Economies that rely heavily on LNG imports are more vulnerable to shipping disruptions, terminal constraints and global LNG price volatility. Data for this indicator are derived from the GIIGNL LNG trade matrix and IEA gas balances.

2. **LNG chokepoint reliance**, measured as the share of LNG imports that transit major maritime chokepoints. These values are derived from the LNG supplier proxy dataset developed in the chokepoint analysis (**Annex 1**), which combines the GIIGNL trade matrix, UN Comtrade LNG trade data (HS code 271111) and route assignments based on the EIA chokepoint framework.

3. **Transmission of gas prices into electricity markets**, assessed using the share of gas in electricity generation and the extent to which gas sets the marginal electricity price. In systems where gas-fired power plants frequently set wholesale electricity prices, increases in gas prices propagate rapidly through the broader economy. Data for this indicator are sourced from Ember electricity statistics, the IEA electricity database, and national energy statistics. The following table shows how these assessments were arrived at for each importer assessed.

Importer	Gas share in electricity generation	Electricity market structure	Gas marginality	Transmission level
EU	20%	Liberalised wholesale markets with marginal pricing	Frequently sets marginal price	High
Japan	34%	Liberalised power exchanges but partial regulation	Often marginal generator	Very high
China	3%	Administratively controlled electricity tariffs	Rarely sets price	Low
South Korea	28%	Single buyer market with fuel-cost pass-through	Affects tariffs strongly	High
India	4%	Regulated tariffs and coal-dominated system	Rarely marginal	Low
Bangladesh	5–10%	State-controlled power pricing	Affects some tariffs	Medium
Pakistan	10–12%	Regulated electricity tariffs with fuel pass-through	Affects tariffs moderately	Medium
Thailand	60%	Regulated but gas-dominated generation mix	Effectively sets system cost	Very high
Singapore	95%	Competitive wholesale market	Almost always marginal	Extremely high

Resilience and buffers

Resilience measures the capacity of an economy to absorb energy supply shocks without triggering broader economic or social instability. This dimension captures the existence of physical buffers, financial capacity to absorb price spikes, and institutional capacity to manage crises.

Four indicators are used to assess resilience, which together capture both physical and macroeconomic resilience.

1. **The availability of strategic petroleum reserves**, measured in days of net import cover. Strategic oil stocks can be released during supply disruptions to stabilise markets and cushion price shocks. Data for this indicator are drawn from the IEA emergency oil stocks database and national energy agencies.
2. **Gas storage capacity relative to demand**. Storage infrastructure can buffer short-term disruptions in gas supply, particularly during periods of high demand. Data for this metric are drawn from IEA gas infrastructure databases and national regulatory authorities.
3. **Foreign exchange reserves expressed in months of import cover**. Countries with large foreign exchange reserves are better able to absorb temporary increases in energy import bills during periods of price volatility. Data are sourced from the International Monetary Fund (IMF) and the World Bank.
4. **Fiscal space**, approximated through public debt levels and fiscal balances. Governments with greater fiscal flexibility are better positioned to cushion consumers and critical industries from energy price shocks through targeted subsidies or support measures. Data are taken from the IMF Fiscal Monitor and the World Bank.

Overall vulnerability

Overall vulnerability reflects the balance between exposure and resilience. Economies with high exposure to oil and LNG shocks but limited buffers are assessed as highly vulnerable. Conversely, economies with significant resilience mechanisms may face high exposure yet maintain lower overall vulnerability because they possess the financial, institutional or infrastructural capacity to absorb shocks.

The resulting vulnerability matrix, therefore, captures structural vulnerability under plausible disruption scenarios rather than short-term market conditions. It provides a comparative framework for assessing how different importing economies may experience energy supply disruptions linked to maritime chokepoints.

Oil exposure	Gas exposure	Buffer capacity (resilience)	Overall structural vulnerability
Oil exposure is structurally elevated for most importers due to global price transmission.	*LNG exposure reflects both physical availability risk and regional price competition.*		
Low Net exporter or minimal import dependence Diversified supply sources Low oil intensity in economy	**Low** Limited LNG dependence Strong pipeline alternatives or diversified power mix Substantial storage and contract flexibility	**Low** Limited strategic reserves Weak fiscal space Low foreign exchange reserves Limited ability to subsidise consumers or stabilise markets	High exposure + low buffers = Very High vulnerability High exposure + strong buffers = High but manageable vulnerability Moderate exposure + strong buffers = Medium vulnerability
Medium Moderate import dependence Some routing concentration Partial mitigation through diversification	**Medium** Moderate LNG dependence Diversified sourcing and storage capacity Mix of long-term and flexible contracts	**Medium** Moderate reserves and fiscal space Some capacity for short-term intervention	
High High import dependence Significant share transiting systemic chokepoints (e.g. Hormuz, Malacca) Strong sensitivity to global benchmark price spikes	**High** Significant LNG dependence Routing concentration through key chokepoints Limited storage or high reliance on spot markets	**High** Strategic petroleum reserves Gas storage capacity Strong fiscal capacity and access to capital markets Energy system diversification	
Very High Very high import dependence Heavy reliance on flows transiting systemic chokepoints Limited ability to offset price spikes through domestic production	**Very High** Heavy LNG dependence High chokepoint routing exposure Limited storage, contract flexibility or supplier diversification Vulnerable to being priced out during tight markets	**Very High** Deep financial reserves and strong macroeconomic position Extensive strategic stock systems Diversified energy mix	

Abbreviations

bcm	billion cubic metres
bpd	barrels per day
CRM	critical raw materials
EMDE	emerging market and developing economies
FSRU	floating storage and regasification unit
GDP	gross domestic product
GW	gigawatt
JKM	Japan Korea Marker (benchmark price assessment for spot LNG delivered to Northeast Asia)
LNG	liquefied natural gas
mbd	million barrels per day
NATO	North Atlantic Treaty Organization
OPEC	Organization of the Petroleum Exporting Countries
SPR	strategic petroleum reserve
TTF	Title Transfer Facility (benchmark price assessment for fossil gas in continental Europe)
TW	terawatt
VLCC	very large crude carrier
WTI	West Texas Intermediate (primary benchmark for oil in the US)

ABOUT E3G

E3G's mission: A safe climate for all

A safe climate for all underpins a future where humans and the natural environment can survive and thrive, where the most vulnerable are protected from climate impacts and economic systems prioritise people and the planet.

To achieve our mission, we build the policy solutions and political conditions for systemic action on climate. We:

- Work to win the politics and geopolitics of climate.
- Build the political conditions and policy solutions to drive the phase-out of coal, oil and gas from the global economy.
- Promote reforms to financial systems to secure the investment needed for mitigation and adaptation.

We are strategic thinkers

We combine deep strategic understanding with policy expertise. We analyse the political economy of climate and develop scenarios of how the future may evolve and what can be done to manage risks and exploit opportunities for action.

We are architects of climate action

We bring diverse stakeholders together to align action and foster dialogue. Through our collaborative approach we build connections and bridges, open windows of opportunity and create coalitions for change.

We are trusted brokers

We work closely with those driving climate politics forward, supporting them to tackle challenges behind the scenes. Governments rely on our knowledge of how to get things done in climate policymaking.

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