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Maritime Chokepoints and Risks to Global Shipping and Energy Security

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Kristian Coates Ulrichsen and Jim Krane

Abstract

Iran's halt of shipping through the Strait of Hormuz in 2026 has provided a palpable demonstration of the risks such maritime chokepoints pose to international shipping and the global economy. At the time of writing, the Hormuz closure was diverting or blocking some 20% of the global trade in crude oil and liquefied natural gas, as well as halting exports of petrochemicals, fertilizers, helium, aluminum and other materials critical for agriculture, manufacturing and the world economy in general. Hormuz is just one of an array of global chokepoints where maritime traffic is easily interdicted. This paper analyzes the various strategic chokepoints across the globe that are most relevant to the transit of oil and liquefied natural gas (LNG), with emphasis on those that most directly and critically affect major energy exporters in the Middle East. Chokepoints such as the Bab al-Mandeb and Strait of Hormuz are scrutinized because of the nature of fuel-based energy systems, as well as commodity trading critical for food supply and manufacturing, all of which require continuous uninterrupted supply chains from producer to consumer.

Introduction

While chokepoints can be land-based and affect pipeline networks or other forms of physical infrastructure, those that affect global energy trade are mainly waterways through which oil tankers and LNG carriers must pass. Maritime arteries include natural passages that connect larger bodies of water, such as straits, or those that are human-made, such as canals, and can be primary or secondary, depending on the availability of alternative routes (Figure 1).

Geography has endowed parts of the Middle East and North Africa with vast accessible oil and gas resources that have formed the mainstay of the global energy landscape for decades. Aside from the favorable geological conditions that created such resources, another accident of geography has framed the Arabian Peninsula with three critical maritime chokepoints on its eastern, western, and southern flanks. The strategic value of these passages has attracted numerous attempts to control or hinder seaborne trade. Maintaining access through chokepoints is a critical element of longer-term strategic thinking and policy planning for supply chain resilience and geo-economic security.

Raids on ships servicing East India Company outposts in the Gulf and as far as the coastline of western India in the early nineteenth century drew British retaliation against Ras al-Khaimah in 1809 and 1819 and contributed to the creation of a "trucial" system of British control of the coastal Gulf sheikhdoms after 1820.[1] Fierce competition between Marcus Samuel (later the founder of Shell) and John D. Rockefeller (of Standard Oil) played out in the unsuccessful attempt by Rockefeller to prevent Samuel from overturning a ban on tankers carrying bulk cargoes of kerosene from transiting the Suez Canal in 1892.[2] In the twentieth century, the shift from coal to oil in shipping meant that the port of Aden, at the entry to the Bab al-Mandab, became one of the busiest in the world by the 1950s, second only to New York for oil storage and refueling.[3] Far more recently, the grounding of the Ever Given container ship in the Suez Canal in March 2021 blocked the channel for six days and wrought havoc with supply chains worldwide already hit hard by the Covid-19 pandemic.[4]

While the Strait of Hormuz was all but closed to maritime traffic in 2026, two other chokepoints — the Bab al-Mandab and the Suez Canal — were significantly affected by Houthi attacks on maritime targets in the Red Sea between November 2023 and November 2025. The Houthi campaign forced most shipping to re-route around the Cape of Good Hope and raised average journey times by about ten days. By contrast, there are fewer alternatives to sending oil and gas through the Strait of Hormuz. Qatar and Kuwait are wholly dependent on seaborne transit of oil through the strait — with no other transit options — while LNG shipments from Qatar and Abu Dhabi are similarly lacking in alternate means of egress. Iran, Iraq, Saudi Arabia and the UAE have at least partial workarounds to avoid the Strait. Oman is the only Gulf State with unfettered access to open seas.

This paper is divided into four parts. The first section outlines the most significant chokepoints for transit from Middle East energy exporters to key import partners. Section two examines the different types of blockages and risk that have, at various times, created or worsened chokepoints; these include political disputes, war and conflict, and unforeseen events ("acts of God") such as the Ever Given grounding. Section three analyzes various countermeasures which have been adopted, and a final section looks ahead and links chokepoints to broader issues such as the importance of flows of energy from the Gulf to energy security in key Asian states as well as to concerns about "free-riding" and the potential for strategic rivalry, especially between the U.S. and China, to cause new disruption.

1. Significant Oil and Gas Transit Chokepoints

The passage of oil and gas is vulnerable to geopolitical risks and strategic vulnerabilities which arise from the fact that they are stocks that have a one-time use and must be continually replaced, as opposed to renewable energy flows derived from solar, wind, or water which are inexhaustible and harder to disrupt once the infrastructure to capture them is in place.[5] Nuclear fuels are also less subject to transit risks given their long duration and infrequent refueling.

Major oil and gas producing states in the Middle East and North Africa remain heavily reliant on revenues from the export of oil and gas which is therefore a part of their own energy security, just as the unimpeded transit of fossil fuels is to consumer states.[6] An attack on Saudi oil infrastructure in September 2019, which temporarily knocked out half the Kingdom's production, illustrated the threat to physical facilities which themselves can be chokepoints.[7] Cruise missiles and drones struck Abqaiq, the largest oil processing facility in the world which handles oil from multiple fields in Saudi Arabia, as well as the Khurais oilfield, the only field able to bypass the Abqaiq facility and supply the East-West pipeline for export via the Yanbu terminal on the Red Sea coastline.[8] Oil and gas pipeline networks are other examples of land-based chokepoints, with particular vulnerabilities in junctions where multiple lines connect.

In 2021, shortly after the Ever-Given incident, the *American Journal of Transportation* identified eight primary global chokepoints, all of which were maritime rather than land-based. The list of primary chokepoints included the Suez and Panama Canals, the Strait of Gibraltar, the Cape of Good Hope, the Bosphorus Strait, the Bab al-Mandab at the southern end of the Red Sea, the Strait of Hormuz, and the Strait of Malacca (Table 1).[9] In addition, the same journal noted that there are dozens of secondary chokepoints, such as those in the South China Sea, the Baltic Sea and the narrow waterways between Sweden and Denmark, the English Channel, the Java Sea in Indonesia, and the Torres Strait between Australia and New Guinea.[10] In 2022, a list of major chokepoints published in *Maritime Transport Research* featured seven of the eight above-mentioned arteries with only the Cape of Good Hope not included and with the Dardanelles added to the Bosphorus in an extended bottleneck into and out of the Black Sea.[11] A third list, compiled by *Rystad Energy* in September 2025, identified five critical chokepoints for oil and gas transit, namely the Strait of Malacca, the Strait of Hormuz, the Suez Canal and Bab al-Mandab (listed together as a two-stage chokepoint at either end of the Red Sea), the Turkish Straits, and the Cape of Good Hope.[12] The Cape of Good Hope differs from the other chokepoints as it is neither a strait nor a passage but a geographical transit point for shipping passing between the Atlantic and Indian Oceans.

Table 1 — Maritime Oil Trade and Strategic Chokepoints

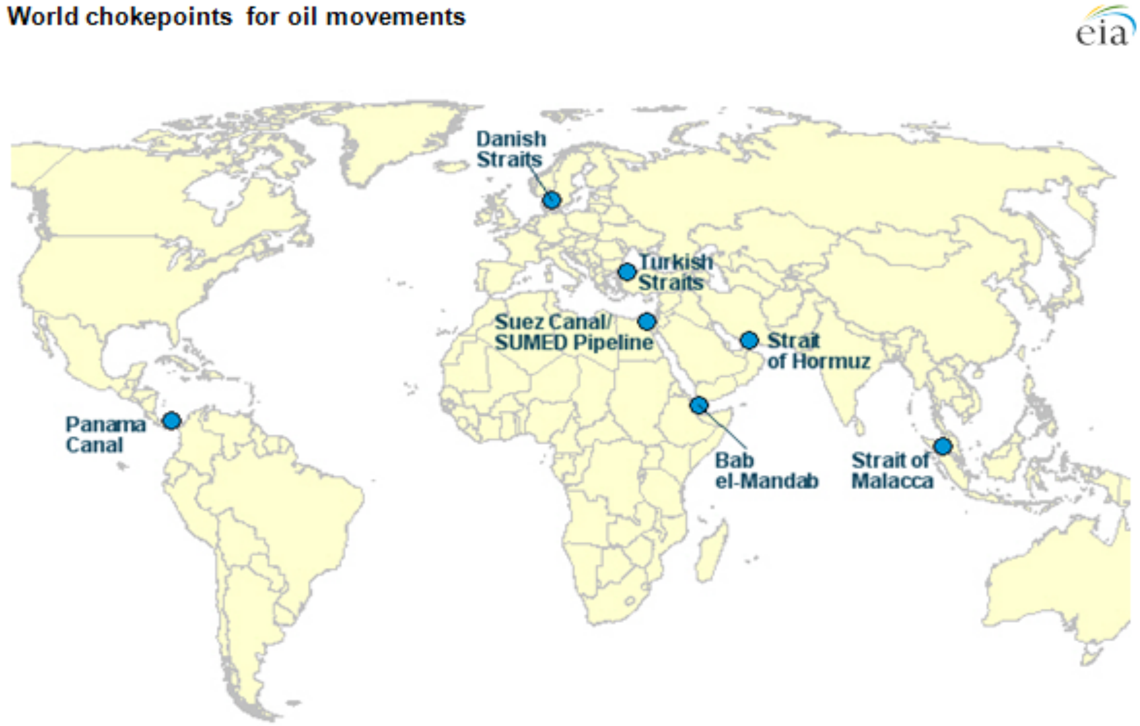
Some 90% of Global Maritime Oil Trade Passes Through One or More Strategic Chokepoints
Strait of Malacca — 29.1% of global maritime oil trade
Strait of Hormuz — 26.2%
Cape of Good Hope — 11.4%
Suez Canal / SUMED Pipeline — 6.1%
Bab el-Mandeb — 5.3%
Danish Straits — 6.1%
Turkish Straits — 4.6%

Source: US Energy Information Administration, Visual Capitalist 2025.

Before the start of the Gaza War in 2023 and the subsequent disruption to shipping in the Red Sea, Rystad Energy calculated that their five listed maritime chokepoints accounted for estimated daily flows of about 71.3 million barrels of oil and petroleum products as well as 26 billion cubic feet of LNG. These daily averages dropped to 65 million barrels of oil and petroleum products and 24.8 billion cubic feet of LNG in 2024 as the impact of the rerouting of oil tankers and LNG carriers away from the Red Sea became clear. In absolute terms, the Strait of Malacca handles the most oil and gas transits with approximately 24 million barrels/day and is critical for the transport of oil and LNG from the Middle East to East Asia, including China and Japan. By contrast, 14 million barrels/day of oil and condensates transit the Strait of Hormuz, including around half of Saudi and Emirati oil exports, together with almost every LNG cargo sent from Ras Laffan in Qatar and Das Island in Abu Dhabi.[13] Some Qatari LNG cargoes have remained within the Gulf, serving import terminals in Dubai and Kuwait.[14]

The study of chokepoints presented in *Maritime Transport Research*, prepared by a team of researchers at Hamad bin Khalifa University in Qatar, divided them into three levels of "criticality" — "very high," "high," and "moderate — depending on the availability of alternative routes. In this typology, Hormuz was listed as a "very high" level of criticality as there is no maritime alternative to passage through the Strait, while the Panama Canal was pegged as "high" as "there are alternatives, but they lead to way longer shipping times and over costs," and the Strait of Malacca was flagged as "moderate" since "maritime alternatives are relatively close, leading to smaller increases in time and costs."[15] Figures from the 2025 *Statistical Review of World Energy* show that the vast majority of crude oil exports and LNG cargoes from the Gulf States go east to Asia and are vulnerable to disruption at Hormuz and Malacca, as well any potential instability in the South China Sea. The same goes for flows of refined products, although Kuwait, Saudi Arabia, and the UAE send sizeable amounts to Europe, some of which have had to avoid the Red Sea since 2023. Saudi Arabia benefited from being able to send oil via pipeline to its two Red Sea terminals that enabled shipments going north through the Suez Canal to avoid the Houthi threat in the Bab al-Mandab.[16]

Figure 1 — Waterway Chokepoints

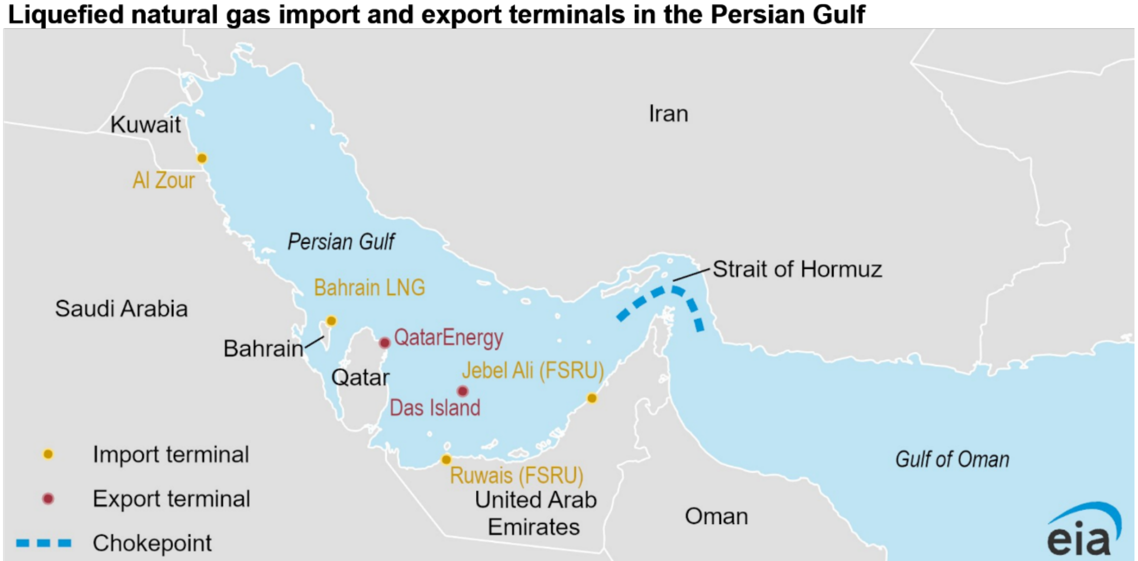


Source: EIA 2012, https://www.eia.gov/international/analysis/special-topics/World_Oil_Transit_Chokepoints.

2. Different Types of Blockages and Risk

Until Iran began blocking shipping in the Strait of Hormuz in March 2026, the question of whether an adversarial state could ever block the strait was a hypothetical one. No prior blockage of the Strait of Hormuz had been attempted in recent decades, and analysts were unsure whether it was technically possible to prevent flows of maritime traffic into and out of the Gulf. The possibility had been raised periodically for decades as the region experienced four major inter-state wars (the Iran-Iraq War, 1980–88, the Gulf War, 1991, the Iraq War, 2003, and the 12-Day War between Israel and Iran in June 2025). Times of crisis and conflict in the region are frequently accompanied by speculation that Iran will “close” the Strait of Hormuz, and Iran’s parliament (Majlis) reportedly voted to approve such a move after U.S. airstrikes against Iranian nuclear facilities at the end of the 12-Day War with Israel in June 2025.[17] While such proclamations may play well domestically and invariably secure media attention, until March 2026 it was understood to be far harder in practice to close the Strait (as Egypt did, for example, with the Suez Canal in 1956–57 and 1967–75).[18] Alleged difficulty in closing the passage was partly because the waterway lies in Omani as well as Iranian territory; indeed, both the inbound (northern) and outbound (southern) shipping lanes are located in Omani waters as they traverse the Strait itself, although portions of the approaches either side of Hormuz pass through Iranian water.[19] As such, any attempt by Iran to prevent shipping from transiting the Strait would be an act of aggression against Oman.

Figure 2 — LNG terminals in the Persian Gulf



Source: U.S. Energy Information Administration, World Bank, and Global Energy Monitor, Global Gas Infrastructure Tracker.
Note: LNG=liquefied natural gas, FSRU=floating storage regasification unit.

As Iran has demonstrated, in a war for national survival as Tehran faced at the time of writing, such considerations were secondary. In fact, closure of Hormuz has been central to Iran's strategic doctrine in the 2026 war with the United States and Israel. By closing the strait and halting trade, and through the knock-on effects on the cost of shipping, insurance premiums and heightened risks for maritime operators, Iran sought to impose costs on its US-allied neighbors and on the global economy that, in turn, impose pressure on Washington and Jerusalem to end the war (see Figure 2). As it turned out in the opening weeks of March 2026, closing the strait was far simpler than envisioned. Practical restrictions on the passage of traffic through the Strait came as much from soaring war risk premiums and other insurance bottlenecks as from attacks on the vessels themselves.[20]

During the Iran-Iraq War, Iran took similar actions to harass shipping but did not close Hormuz. Then, Tehran placed mines in shipping lanes and struck tankers and oil loading facilities with anti-ship missiles, drawing a U.S. military response in 1988 after an American ship struck a mine.[21] Iran refrained from attacking shipping in the Strait of Hormuz itself and instead did so near the Shatt al-Arab in the northern Gulf, astride Iraq's only outlet to the sea, and also planted mines north of Qatar in 1987 which inflicted some damage on commercial and military shipping.[22]

Shipping also became a major target in what became known as the Tanker War, leading Kuwait to ask the U.S. to protect its tankers. In 1987, the United States reflagged Kuwaiti tankers under the American flag to provide them with naval protection through the Gulf in Operation Earnest Will.[23] This operation, along with U.S. naval escorts, was intended to ensure freedom of navigation and deter attacks from Iran, which was targeting shipping to disrupt oil revenues.[24] During the Iraqi occupation of Kuwait, Iraq mined the Kuwaiti coast in 1991, to forestall coalition naval operations, and, a decade later, placed mines around the Khor Abdullah channel to the Iraqi port of Umm Qasr ahead of the 2003 U.S.-led invasion; in both cases, the affected areas were at the northern end of the Gulf rather than in or near the Strait of Hormuz.[25]

Iran's attacks on shipping in 2026 appear to largely be caused by unmanned aerial vehicles or armed drones. Other options to disrupt flows include mine laying, use of anti-ship missiles, armed speedboats, artillery, rocket, and submarine attacks launched from the network of IRGC-Navy bases located along the Iranian coastline.[26] The shallow passage is also thought to be vulnerable to blockage by scuttled ships. As seen, conflict in the Strait brings sharp rises in hull and machinery insurance costs and war risk premiums which feed into higher operating costs, even in the absence of an actual attack on a vessel. During the 12-Day War in June 2025, the cost of insurance surcharges rose more than 60 percent although rates subsequently fell back once Iran and Israel agreed to a U.S.-brokered ceasefire.[27] The collision of two oil tankers in the Gulf of Oman, near the entrance to Hormuz, during the 12-Day War highlighted another risk arising out of interference with, or jamming of, GPS signals and navigational systems in such a busy shipping channel.[28] In March 2026, ships in (or on their way to) the Gulf had existing war risk policies cancelled and replaced by new insurance rates for physical damage to vessels that rose to between 1 and 1.5% of a vessel's insured value, from an average of 0.25% prior to the start of military operations in Iran.[29]

The Bab al-Mandab and the extended waterway through the Red Sea (to the north) and the Gulf of Aden (to the east) illustrates a different set of blockages and risks that are rooted in the lack of stability on land. Here, challenges of governance create and amplify gaps in security. The nature of the threat posed by "failed" or "failing" littoral states such as Yemen and Somalia has changed over time. In the Somali case, policymaking was initially focused on the breakdown of governance and state collapse in the 1990s.[30] The challenge of "Somali piracy" first presented itself in 1994 when 26 "pirates" posing as coastguard personnel hijacked a cargo vessel, the *MV Bonsella*, and used it as a base from which to attack other shipping in the Gulf of Aden.[31] Already in 2000, 23 incidents of piracy were recorded off the Somali coastline as clan-based conflict on land fueled localized armed conflicts and networks of criminality which included contests over marine resources.[32] In 2007, after the ousting of the Union of Islamic Courts from power in Mogadishu, political instability across Somalia worsened, and the incidence of maritime attacks off its coastline more than doubled, and then doubled again in 2008, by which time "Somali piracy" had become an issue of mounting global concern.[33] The attack on the *MV Sirius Star*, a VLCC operated by Vela International Marine, the shipping subsidiary of Saudi Aramco, in November 2008, drew worldwide focus to the issue of piracy off the East African coast as it was the largest ship captured by pirates and the attack took place 450 miles out to sea. The tanker was loaded with two million barrels of crude oil, worth about $100 million (at the time), and was sailing from Saudi Arabia to the U.S. via the Cape of Good Hope.[34] The *Sirius Star* was diverted to Somalia and pirates initially demanded a ransom of $25 million but the ship and its crew were released in January 2009 after a reported ransom payment of $3 million was made.[35]

On the other side of the Gulf of Aden and the Bab al-Mandab, state control (which was weak and tenuous to begin with) began to break down in Yemen in the late-2000s and accelerated sharply in the 2010s. Political contestation of Ali Abdullah Saleh's patronage-based regime emerged in north and south Yemen with the onset of the Houthi wars and the rise of the Southern Movement in 2004 and 2007, respectively.[36] A sense of permanent crisis was apparent even before the mass protests in 2011 which toppled Saleh and set in motion a chain of developments which culminated in the seizure of Sana'a by the Houthis in September 2014, and a Saudi-led military intervention in March 2015.[37] Much of northern and western Yemen, including the Tihamah Red Sea coastline and the port of Hodeida, came under Houthi control,[38] and in 2017 the Houthis began to target shipping in the southern Red Sea. A July 2018 attack on two Saudi oil tankers did little physical damage but led the Kingdom to temporarily suspend transit through the Bab al-Mandab.[39]

Attacks by the Houthis on shipping since the start of the Gaza War in October 2023 largely closed off the Red Sea to oil and gas transit, except for oil through the East-West pipeline in Saudi Arabia for loading at the Yanbu terminal onto tankers bound northward for Europe. In the first half of 2023, prior to the October 7 attack which precipitated the war, 12 percent of seaborne oil trade and 8 percent of LNG trade passed through the Bab al-Mandab on its way through the Red Sea to the Suez Canal.[40] The first attack on a commercial vessel occurred in November 2023 seized the *Galaxy Leader*, a Bahamian-flagged cargo ship bound from Turkey to India, near Hodeida, and by September 2025 a total of 114 ships had come under various forms of attack in the Gulf of Aden, the Bab al-Mandab, and the southern Red Sea. These included 32 tankers carrying crude oil or oil products and one tanker carrying Liquefied Petroleum Gas (LPG) which was attacked twice with missiles in March 2024 off the coast of Hodeida.[41] The attacks peaked between December 2023 and February 2024, spiked again in June 2024, and after months of dormancy, saw two bulk carriers — the *Magic Seas* and *Eternity C* — sunk on consecutive days in July 2025.[42]

The impact of the disruption to shipping in the Red Sea was immediate and lasting. Data from Lloyd's List showed that weekly transits through the Bab al-Mandab more than halved in the two months after the first Houthi maritime attack in November 2023 and has remained at a level of about 200 transits a week ever since (from more than 500 weekly transits prior to the Gaza War). Moreover, the two attacks in July 2025 which followed months of quiet had the effect of setting back operators' plans to consider returning to the Red Sea rather than continuing to re-route around the Cape of Good Hope.[43] Shipments of crude oil through the Red Sea fell to 2.48 million barrels/day by August 2024, a 40 percent drop from the twelve-month average prior to October 2023. Primarily affected were flows of oil from Iraq and Saudi Arabia to Europe and from the U.S. Gulf Coast to South Korea, China, and India. The drop-off in "Western" trade was in fact even larger as the overall figures were cushioned by a significant increase in Russian oil shipments to Asia as Russian (and Chinese) vessels largely avoided becoming Houthi targets.[44] Shipments of LNG through the Bab al-Mandab came to a halt in February 2024 although LNG carriers passed southbound through the Suez Canal for deliveries to Aqaba and Ain Sokhna in the northern Red Sea only.[45] Average journey times from GCC ports to Rotterdam rose from 19 to 34 days as a result of sailing around Africa.[46]

Whereas the attacks on shipping in the Bab al-Mandab and the Red Sea typically involved the use of drones, cruise missiles, antiship ballistic missiles, rocket-propelled grenades, and remote-controlled explosive boats, attacks in the other key maritime Straits of Malacca and Singapore were lower-intensity. Acts of piracy in the Strait of Malacca rose significantly in the 1990s and early-2000s but the establishment of coordinated naval patrols in 2004 — the Malacca Straits Patrol initiative involving naval forces from Indonesia, Malaysia, Singapore, and Thailand — was highly effective in combating the threat to shipping.[47] More recently, the threat to shipping from armed robbery (more than outright piracy) has shifted eastward to the Singapore Strait, a distinct body of water but part of the extended waterway that is one of the busiest shipping lanes and trade routes in Southeast Asia (Figure 3). The lack of any equivalent to the Malacca Straits Patrol and the inability of Singapore, Malaysia, and Indonesia to coordinate naval activity has led to a high incidence of maritime crimes against ships as they slow down to enter the narrow channel.[48] A fourfold rise in incidents was recorded in the Straits of Malacca and Singapore for January-June 2025 to 80 incidents compared with the same six month period of 21 incidents in 2024 with all but one occurring in the Singapore Strait. This was the highest level of incidents since 2015 but none of the attacks were categorized as serious and 72 of the 80 incidents did not result in any harm to crews; moreover, bulk carriers were targeted rather than oil and gas transits and there was no appreciable impact on shipping costs or insurance premiums.[49]

Figure 3 — Indian and Pacific Oceans Chokepoints

Source: EIA 2025, https://www.eia.gov/todayinenergy/detail.php?id=32452.

Other types of blockages and risk also present themselves. Passage through the Panama Canal is a shortcut between the Atlantic and Pacific that cuts thousands of miles from journeys. Transiting cargoes include exports of oil and LNG from the U.S. Gulf Coast bound for Asian destinations. Between 4 percent and 6 percent of global trade passes through the Panama Canal each year and in 2023 one-third of trade going through the canal was made up of vessels carrying petroleum products, hydrocarbon gas liquids, and chemicals.[50] However, low water levels in the canal in 2023 and 2024, a result of reduced rainfall, longer periods of drought, and a particularly strong El Nino, led the Panama Canal Authority to impose restrictions on the number of ships that could pass through the canal each day, from 38 down to 20 (and then raised to 24).[51] The overall number of ship transits through the Panama Canal fell by 29 percent in the fiscal year 2023-24 and Very Large Gas Carriers and LNG carriers were more affected by lower draft levels than container ships.[52] It was for this reason that more shipments from the U.S. Gulf Coast to Asian markets were being re-routed through the Suez Canal when the Gaza War and Houthi maritime attacks began. As a result, journey times from the U.S. Gulf Coast to Chiba in Japan increased from about 27 days (through the Panama Canal) to 44 days across the Atlantic and through the Suez Canal and 48 days around the Cape of Good Hope.[53]

Finally, tensions between U.S. and Chinese interests vis-à-vis the Panama Canal at the start of Donald Trump's second term in office in 2025 illustrated how chokepoints remain vulnerable to geopolitics. A subsidiary of a Hong Kong-based company, CK Hutchison, had operated the ports of Cristobal and Balboa, at the Atlantic and Pacific entrances to the canal, respectively, since 1997 in a contract that had just been extended for another 25 years, but the Panamanian authorities came under strong U.S. pressure to cancel the contracts and award them to a consortium of U.S. investors led by BlackRock.[54] While the mercurial stance of the second Trump administration played into the transactional pressure on Panama, the underlying points of geopolitical contention were of longer standing. Indeed, in March 2024, during the Biden administration, the commander of U.S. Southern Command claimed that China was playing a "long game" with the "development of dual-use sites and facilities" through investment in "critical infrastructure sites such as deep-water ports" and mentioned the Panama Canal as one such "global strategic chokepoint."[55]

In an era of intensifying great power competition and global strategic rivalries, the fact that Russia is a major exporter of oil and gas and that China is the largest importer of hydrocarbons means that the energy sector is more vulnerable than most others to direct as well as indirect geopolitical tension. Russian oil and gas from terminals in the Baltic Sea and the Black Sea must pass through the Danish Straits and Turkish Straits (Bosphorus and Dardanelles), respectively, and could be subject to potential attempts at closure. In addition, the pipelines through which Russian gas flows to Europe are exposed to similar transit risks. Pipelines were susceptible to sabotage, attack, or political action, both before and after the Russian invasions of Ukraine in 2014 and 2022 in incidents such as the 2008–9 disruption to Russian gas supplies to (and through) Ukraine and the 2022 explosions that rendered the Nord Stream pipeline inoperable.[56] Most Russia-EU pipeline flows had halted by mid-2025.

China's leadership has determined the country's dependence on imported oil — particularly from US-friendly Middle East exporters — renders it acutely vulnerable since it "lacks domestic resources, cannot create new ones through application of its industrial prowess, cannot control events abroad in producing regions, and is vulnerable to naval blockades," Collins writes.[57] Besides exposures to key chokepoints patrolled by the US Navy — Hormuz and Malacca in particular — any rise in tension in areas such as the South China Sea (and its numerous flashpoints over islands and shoals) could quickly generate secondary impacts that hit maritime and energy trade in some of the busiest shipping lanes in the world.

3. Examples of Countermeasures

A range of countermeasures have been adopted by governments and the energy and private sectors alike to address and attempt to mitigate the various threats to chokepoints. The most visible is the plethora of naval task forces that have been established to escort and protect shipping as they pass through several of the most vulnerable Straits and other maritime hotspots. Mention has already been made of the Malacca Straits Patrol Initiative and its effectiveness in reducing to almost zero the incidence of piracy in the Strait of Malacca — but not the Singapore Strait. Moreover, the U.S. Navy has a presence near virtually every major global chokepoint in a reflection of the close links between economic and energy security.

In the Middle East, the Combined Maritime Forces (CMF) were formed in 2001 as a U.S.-led coalition initially with 12 members that rose to 46 until the UAE withdrew from the initiative in 2023. The CMF consists of five task forces on patrol or otherwise seeking to secure maritime areas along the entire coastline of the Arabian Peninsula and Horn of Africa.[58]

The US-led task forces coexist alongside other naval initiatives that amount in practice to a fragmented rather than a genuinely multinational response to maritime threats, especially in and around the Red Sea, the Bab al-Mandab, and the western Indian Ocean. Both NATO and the European Union launched their own maritime initiatives (*Operation Ocean Shield* and *Operation Atalanta*, respectively) to provide escorts to shipping and establish deterrence in the Horn of Africa in 2009. Other countries, such as Japan, India, and China, sent vessels of their own, resulting in a patchwork of missions. The lack of a fully integrated approach was replicated a decade later when, in 2019, U.S. authorities sought to establish a new naval coalition to protect shipping in the Gulf from Iranian attack, only for European states, including France and Germany, to avoid any perceived association with "maximum pressure." The U.S., United Kingdom, and Australia then set up a relatively small International Maritime Security Construct, based in Bahrain, to provide escorts for their ships in and near the Strait of Hormuz, while nine European states established a separate (also small) set of naval escorts (EMASOH), based in Abu Dhabi.[59]

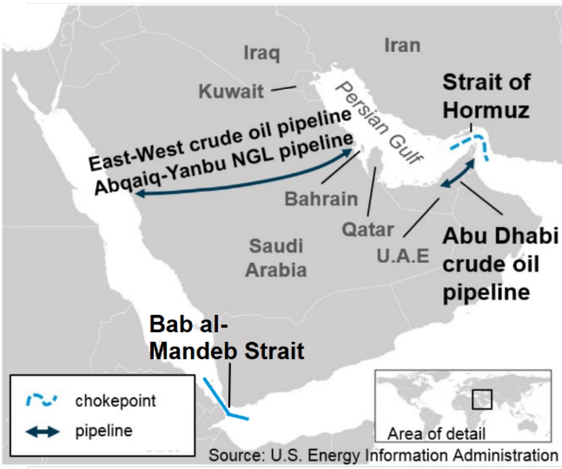
Policy responses in 2024 to the Houthi attacks on shipping indicated how political and security considerations do not always align. Once again, U.S. officials put together a coalition to undertake military operations against Houthi targets in Yemen, but Bahrain was the only Arab state to join *Operation Prosperity Guardian* (and in an administrative rather than operational capacity).[60] Memories in Saudi Arabia and the UAE of years of Houthi missile and drone attacks on cities and infrastructure, which largely ended in 2022, precluded any participation in a new campaign against the group. Separately, the U.S. and British forces launched airstrikes against the Houthis (*Operation Poseidon Archer*) to some effect.[61] The European Union formed a separate naval patrol, *Operation Aspides* to patrol the Red Sea, Bab al-Mandab, and Gulf of Aden, and accompany merchant vessels to offer protection against strikes, with a defensive posture that lacked the offensive capabilities assigned to the U.S.-led military operations. And yet, the combined naval and air operations made little dent in the Houthis' ability to conduct attacks, either before or after the U.S.-Houthi ceasefire agreement in May 2025 which temporarily limited them.[62]

Aside from greater sharing of intelligence and streamlining of the use of existing and available assets, a different example of a countermeasure is investment in alternative infrastructure, such as pipelines, to bypass or mitigate the vulnerability to seabound chokepoints. This is not a failsafe option, as the pipelines themselves can become targets and can function as chokepoints, and geopolitical considerations mean they are not viable options for the export of oil from Kuwait or LNG from Qatar or Abu Dhabi. Nevertheless, both Saudi Arabia, with the East-West Pipeline from the Abqaiq fields to Yanbu on the Red Sea and the UAE, with the Abu Dhabi Crude Oil Pipeline from the

Habshan field to Fujairah on the Gulf of Oman, have options in the event of a shutdown (however unlikely) or restricted transit through Hormuz.

Hormuz Bypass Pipelines

Figure 4 — Chokepoints and Bypass Pipelines on the Arabian Peninsula



Source: EIA 2025, https://www.eia.gov/todayinenergy/detail.php?id=32352.

Table 2 — Active Pipelines Bypassing the Strait of Hormuz

Hormuz Bypass	Operator	Export Capacity
East-West Pipeline	Saudi Aramco	~5.5 million b/d
AdCorp Pipeline	ADNOC (UAE)	1.8 million b/d
Kirkuk-Ceyhan Pipeline	BOTAŞ/SOMO	230,000 b/d (up to 1.6M b/d)
Goreh-Jask Pipeline	NIOC	Up to 1 million b/d

Source: Abi Aad 2026.[63]

Table 3 — Inactive Hormuz Bypass Pipelines That Could Be Revived

Pipeline	Background
IPSA (Iraqi Pipeline through Saudi Arabia) — 1.65 million b/d	Opened in the 1980s. Shut/confiscated by Saudi Arabia after Iraq's 1990 invasion of Kuwait. Saudi portion since used for gas and crude transit. Could be repurposed to ship crude for export at Muajjiz.
Tapline (Trans-Arabian Pipeline) — 500,000 b/d	Opened in 1950. Carried crude from Eastern Saudi Arabia to Sidon. Shut in 1983 due to transit fees. Saudi portion is intact and maintained. Would need refurbishment to reopen.
IPC Pipeline (Kirkuk to Banias/Tripoli) — 700,000 b/d	Opened in 1952. Closed 1982 due to Iraq-Syria enmity. Not intact.
Kirkuk-Ceyhan Pipeline — upgrade to full capacity of 1.6 million b/d	Unused capacity on this pipeline could be filled with rehabilitation of Strategic Pipeline connecting Kirkuk to Southern Iraqi oilfields (would require Kurdish/Turkish agreement)

Source: Abi Aad 2026.[64]

Constructed in 1982 with an initial capacity of 1.85 million barrels/day, the 1200 kilometer East-West Pipeline was expanded to a capacity of 3.2 million barrels/day in 1987, during the Tanker War phase of the Iran-Iraq War and upgraded again to 5 million barrels/day in 1993. The line was initially meant to transport natural gas to the oil refineries and industrial complexes on the west coast of Saudi Arabia, but was extended to carry crude oil for export, while its parallel gas pipeline is part of Aramco's 12.5 bcfd Master Gas System (MGS).[65] A recent expansion has expanded pipeline capacity to 7 million barrels/day. The East-West Pipeline remained unable at the time of writing to re-route all Saudi oil exports, because some of its contents supply domestic refineries on the Red Sea, and due to limitations of export infrastructure at Yanbu's oil terminal.[66] ADNOC's 380-kilometer pipeline to Fujairah was completed in 2012 and connects the Habshan oilfields in Abu Dhabi to the export terminal at Fujairah, bypassing Hormuz, and having a capacity of 1.5 million barrels/day which, at the time of opening, was equivalent to more than half the UAE's daily production of oil.[67]

The fact that Yanbu is itself located on the Red Sea, with chokepoints at either end, is itself a challenge that illustrates that pipelines alone are not a failsafe alternative option. The 200-mile- (320 km-) long SUMED pipeline at the northern end of the Red Sea adds additional optionality for potential Suez Canal blockage or congestion. SUMED, co-owned by Egypt, Saudi Arabia, Kuwait, UAE and Qatar, allows up to 2.8 million barrels/day of oil shipments bound for the Mediterranean Sea to be offloaded at Ain Sukhna on the Gulf of Suez and piped northwest to Sidi Kerir on the Mediterranean coast, where the crude is reloaded onto tankers and delivered to final destinations. SUMED is the only Suez Canal bypass option in the event the canal is blocked.[68]

Limited access is less of a factor for the crude oil pipeline from Abu Dhabi, given the location of Fujairah on the coast of the Gulf of Oman, beyond Hormuz. Its strategic location has allowed Fujairah to develop into one of the largest bunkering hubs and oil storage areas in the world.[69] Bypassing Hormuz by constructing a pipeline from Habshan to the Indian Ocean had first been proposed in 1984 during the Iran-Iraq War, when the GCC also considered plans to link existing pipeline networks to facilities on the Omani coast also beyond Hormuz.[70] Iran also inaugurated a new oil pipeline to bypass Hormuz in July 2021, when a 1,000-kilometer link from Goreh to Jask oil terminal on the Gulf of Oman opened. The Iranian bypass had an initial capacity of 300,000 barrels/day with plans to reach 1m b/d, although operating at full capacity has proven to be more challenging.[71]

The shipping industry has taken a layered approach to security across all the maritime chokepoints listed above. Examples of mitigation strategies include stronger and more deterrent ship defenses such as citadels and locked access points that provide secure spaces for crewmembers on the vessels themselves, greater flexibility in routes and schedules, updated insurance policies and contract terms, and, where the law allows, the use of armed escorts and guards. However, distinctions between piracy and "acts of robbery" (and whether incidents take place in international or territorial waters) as well as port restrictions on the use or possession of weapons by private security personnel are issues that have not fully been resolved, while the use of armed guards increases the liability for shipowners and operators.

4. Chokepoints and the Energy Transition

The energy transition involves building new sources of energy production and storage, particularly in electricity. As these technologies — such as wind and solar power generation, battery storage and electric vehicles — begin to replace fuel-based counterparts, energy security and strategic chokepoints assume a wholly different character. Transitioning from combustible fuels toward systems which do not use fuels results in reduced end-user exposure to supply chains and the chokepoints and interdiction risk that characterize them.[72] Fuel-importing states are the largest beneficiaries of these improvements. For instance, in the wake of the EU's loss of Russian gas supply after Moscow's 2022 invasion of Ukraine, several EU member states replaced Russian pipeline gas by ramping up imports of LNG, which increased exposure to transit risks in global chokepoints. However, the EU simultaneously accelerated deployments of wind and solar as additional substitutes for Russian gas. Renewables were chosen based on speed of construction as well as improved security of supply chains, which has allowed Europe to moderate its exposure to exporting states' attempts to leverage energy exports to achieve political aims.[73] Worth noting is that renewable power operations may not be subject to interdictions at maritime chokepoints, but face other risks such as unfavorable weather patterns, intermittent production and reduced services for grid stability.

China's push toward "electrostate" status is also partly based on perceived vulnerability in fuel supply chains, oil in particular. China has sought energy security by reducing dependence on imported oil, gas and refined fuels, with a focus on fuel imports via the straits of Hormuz and Malacca, both of which are overseen by the US Navy. Fuel-to-power switching is being accomplished by increasing production of electricity and electrification of end-use energy consumption, particularly the transport sector.[74] China's share of electricity in final energy demand reached 32% in 2023, higher than that of the United States and EU (24%).[75] Meanwhile, IEA data show China's consumption of oil-based transport fuels declined by small amounts in 2024 and 2025.[76] Electricity generated by coal, nuclear and renewables — wind, solar and hydro — are the main substitutes. Coal, mainly from domestic sources, remained the dominant power provider in 2024. However, coal-fired plants were beginning to be shifted from always-on baseload to flexible backup to synergize with the increasing deployment of intermittent renewables.[77] Over time, as coal consumption flattens and declines, China's coal imports could also be eliminated, which would remove a further point of chokepoint exposure.

Clean electricity systems are still exposed to risks, but in different ways. Shipments of minerals or components still transit strategic chokepoints, but since they are not fuels, the impact of blockages is mainly felt by investors, not end-users. Risks are "lumpier" and occur sporadically. A shipment of solar modules, batteries or rare earth magnets for turbines could be delayed or even interdicted, which could undermine construction of a solar or wind array or — in extremis — even delay a country's energy transition.[78] Once in place, however, these hardware components can operate nearly autonomously for 20 to 30 years without exposure to supply chains. Transit risks involving shipments of nuclear fuel are closer to those of renewable components than fossil fuel cargoes, given the long life and ease of storage of fissile fuels, and the infrequent requirements for additional supplies. Rather than sea-borne interdiction, blockages in the clean energy trade take the form of restrictive trade policies, such as the US import duties (up to 50%) on Chinese solar panels imposed by the Biden administration in 2024.[79] Imposition of such restrictions does not endanger existing renewables power generation, since supply chains are only relevant for future plants, not operating ones.

In these ways electricity, and particularly clean power, faces reduced exposure to strategic chokepoints than do current fuel-based systems. By shifting power generation toward renewables and nuclear, and shifting energy end-use away from fuels toward electricity (through electric vehicles and heat pumps), exposures of importing countries to fossil fuels and their transit chokepoints can be diminished.[80] Further end-use electrification, such as replacing industrial heat with electro-thermal batteries, may allow additional future declines in chokepoint exposure.[81] Such prospects are attractive to governments wishing to insulate their energy sectors from transit risk in general, as well as to the risk of falling afoul of the United States, and the possibility of a US-driven curtailment of fuel imports.

Conclusion

Since Shell's Murex-Suez incident in 1892, chokepoints have exacerbated trade and interdiction risks for energy commodity shipments. These physical "pinch points" that constrain seaborne transits expose cargoes to potential threats to prevent passage far more readily than do maritime crossings of the open sea. Threats posed by chokepoints arise from conflict and even the threat of conflict on insurance and container rates, as well as geopolitical standoffs and climate change.

The interruption of trade through the Strait of Hormuz in 2026 has rendered understanding of chokepoint risk far more relevant. Iran's successful closure has underlined an asymmetric ease of trade blockage and far more difficult task for major powers in reopening such routes during conflict. Looking ahead, new sources of risk emanate from growing naval capabilities of rising powers — China and India among them — which increase the opportunities for use of trade interdiction during conflict with rivals. Such interdictions are assisted by improved satellite observation and ship tracking, which makes hiding sanctioned cargoes more difficult. Actors such as the Yemeni Houthi have combined geographic advantages with inexpensive technology to create new and unique barriers to shipping at huge cost to the global economy as well as firms and states. The Houthi campaign in and near the Bab al-Mandab Strait is characterized by the selectivity of the strikes on shipping which resemble targeted economic sanctions on countries (and their firms) with trade and diplomatic connections with Israel.[82] In this way, political grievances with no link to transiting cargoes have been used to thwart passage of oil and LNG shipments. While the ceasefire in Gaza in October 2025 was followed by a Houthi declaration that the maritime attacks would end,[83] the Houthi "success" in thwarting passage presaged the Iranian move to shutter an even more important chokepoint several months later.

Maritime chokepoints will foster new and heightened trade risks over the coming decades. Increased chokepoint risk incentivizes fuel-importing states to seek diverse sources of fuel supply, avail — or repair — chokepoint bypass pipelines, and deploy fuel-substituting technologies less exposed to chokepoint interdiction.

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