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Sanctions evasion at sea

The expanding role of the grey fleet

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Key takeaways

- The **grey fleet grew to 3,000 vessels in 2024**, now comprising 10% of global capacity.
- **15%** of grey fleet ships moved **sanctioned oil from Russia and Iran to Asia**, often via risky STS transfers.
- **23% of grey vessels manipulated AIS in 2024**, while 40% used flags of convenience to evade oversight.
- Aging ships and poor maintenance heightened **the risk of accident and spill risks**, as evidenced by the 2024 Black Sea collision.
- The **U.S. sanctioned 183 Russian-linked vessels in January 2025**; more enforcement expected under Trump.
- **Freight for Russian crude surged 300% post-sanctions**, tightening vessel supply and raising global shipping rates, particularly for shippers handling Russian cargoes.
- The **grey fleet may exceed 13% of global tanker capacity in 2025**, but tightening sanctions could disrupt operations.

Executive summary

The grey, or shadow fleet, has become a critical enabler of sanctioned trade, allowing Russian and Iranian oil to continue flowing to international markets despite extensive restrictions. The grey fleet has expanded 2,800% since 2022, now comprising 10% of the global tanker market for ships over 5,000 DWT. This surge is driven by geopolitical pressures and sanctions, particularly on Russia and Iran, which rely on these fleets to sustain energy exports.

Looking ahead, the grey fleet is projected to exceed 13% of the global tanker market in 2025, with operators adopting more sophisticated evasion tactics to counter enhanced enforcement efforts.

To address these issues, the report recommends:

For traders:
Strengthen due diligence using real-time tracking solutions to avoid compliance risks.

For policymakers: Close flag registry loopholes and extend sanctions to service providers facilitating grey fleet operations.

For enforcement agencies: Invest in maritime intelligence and risk assessment tools to improve detection of deceptive shipping practices.

Introduction

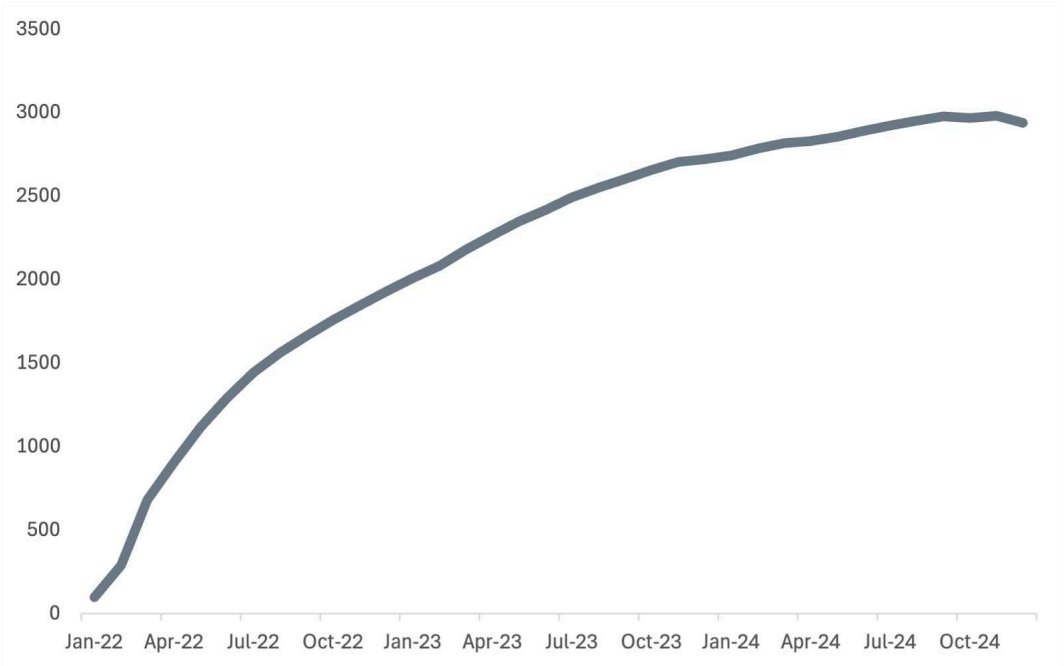
The grey, or shadow fleet, is an expanding and complex phenomenon reshaping global maritime trade. This fleet consists of vessels primarily engaged in transporting sanctioned or restricted cargo under highly opaque operational practices. These ships often operate under non-transparent ownership structures, lack classification from the International Association of Classification Societies (IACS), and obtain insurance from non-International Group of P&I (IGP&I) providers. They also employ advanced Automatic Identification System (AIS) spoofing techniques and frequently engage in dark activities, where AIS is deliberately disabled to obscure their movements.

The boom

The expansion of the grey fleet is driven by a combination of economic pressures, regulatory challenges, and the strategic roles of certain regions and nations in facilitating this shadow trade.

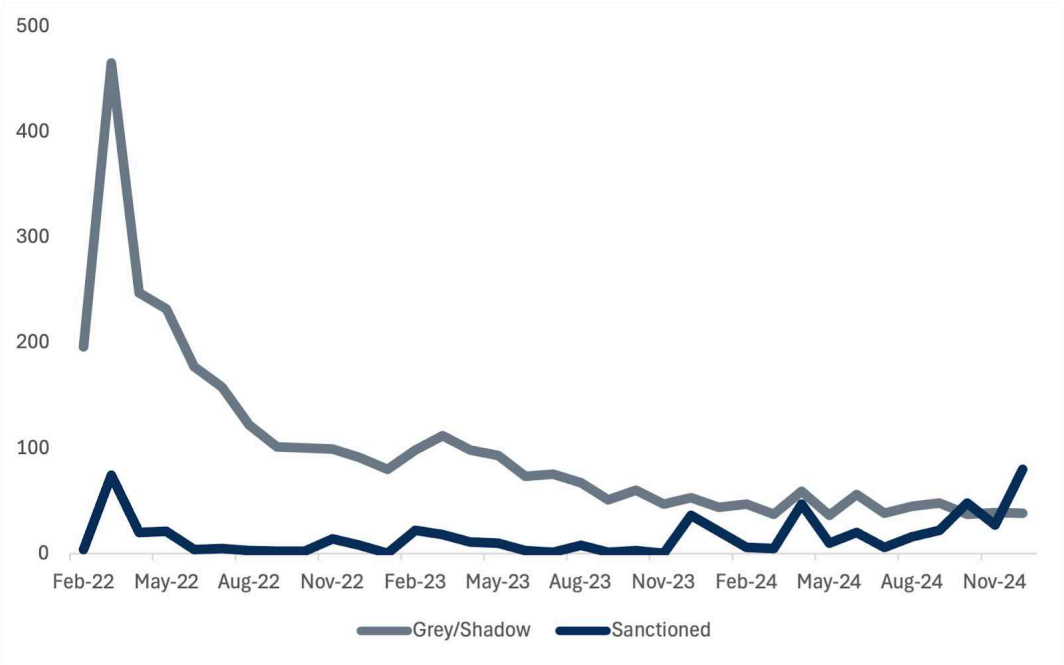
Growing from just 97 vessels in 2022 to an estimated 3,000 vessels by the end of December 2024, it now accounts for approximately 10% of the global fleet capacity of over 5,000 Deadweight tonnes. This represents an astonishing increase of over 2,800% in just two years.

Graph 1: Growth of the grey fleet by vessel count (from 97 to 3,061)



Source: Kpler

Graph 2: Month-on-month change of number of grey and sanctioned vessels



Source: Kpler

After Russia invaded Ukraine in February 2022, the EU, UK, and US quickly imposed sanctions on Russian oil and energy exports. This led to a surge in grey fleet activity as operators found new ways to transport restricted goods. However, as enforcement improved, the grey fleet's growth slowed in late 2022 and stabilised in 2023.

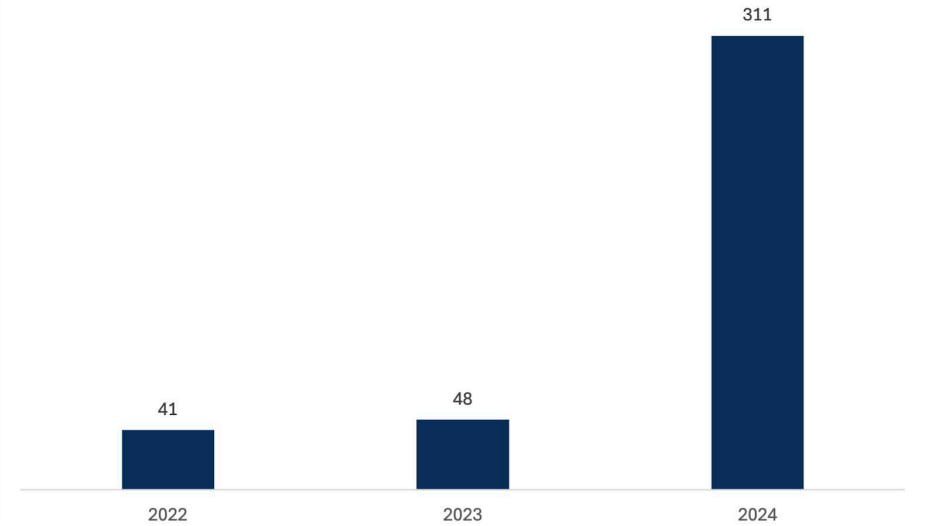
By late 2024, sanctioned fleet activity increased, suggesting attempts to bypass enforcement. Since September 2024, new sanctions from OFAC, FCDO, and the EU have targeted Russian and Iranian grey fleets, leading to more sanctioned ships.

To continue energy exports, Russia and Iran use sanctions evasion tactics. Data shows 15% of grey fleet ships carried sanctioned oil, mainly to Asia. Risky STS transfers in the Eastern Mediterranean and Malta have tripled in two years. In 2024, 23% of the grey fleet also manipulated AIS signals to avoid detection.

AIS manipulation tactics

One of the primary methods employed by grey fleet vessels to evade detection is the manipulation of the Automatic Identification System (AIS), which plays a critical role in global maritime safety. Operators of grey fleet vessels exploit AIS vulnerabilities, including deactivating AIS transponders (leading to AIS blackouts) or engaging in AIS spoofing. These tactics are often used during high-risk operations, such as STS transfers or when approaching ports with sanctioned cargoes.

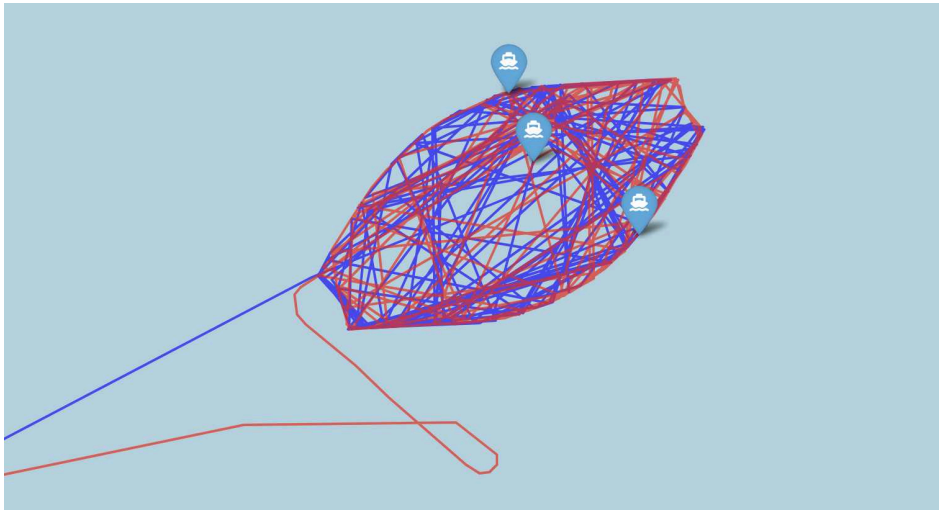
Graph 3: The evolution of AIS spoofing events



Source: Kpler

In addition to blackouts, AIS spoofing is a common tactic where vessels broadcast false AIS information regarding their identity, position, or course. Discrepancies between the reported AIS data and observable satellite imagery allow for the identification of fraudulent activities. These tactics present substantial challenges in tracking grey fleet operations, but advances in AIS data analysis and satellite-based imagery offer promising solutions for detecting illicit maritime activities.

Image 1: Pioneer spoofing pattern in August 2024



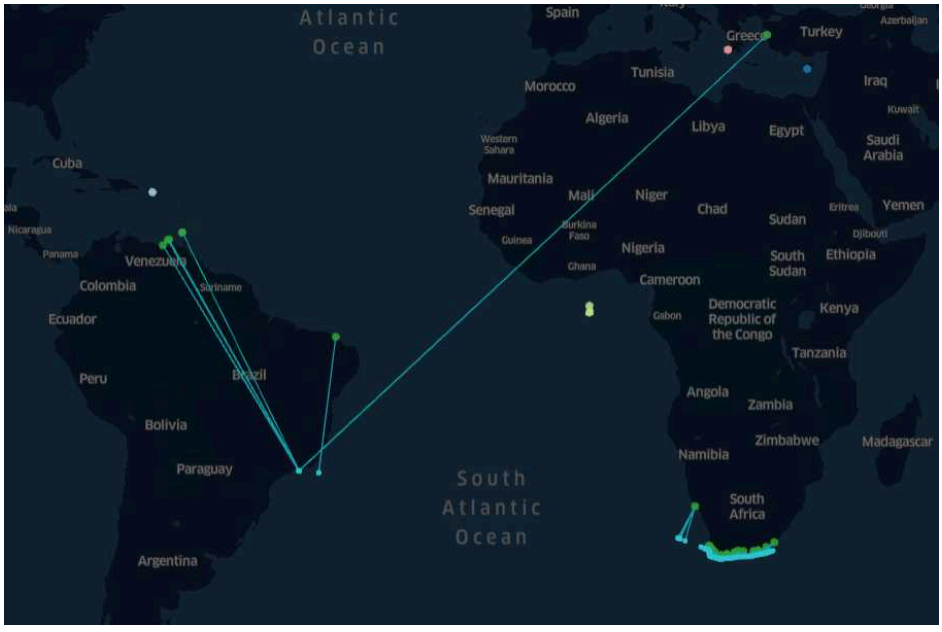
Source: Kpler

Image 2: LNG tanker PIONEER dark loading at Arctic LNG 2 terminal on 1 August 2024, far from the AIS position she was reporting at the time

Source: Kpler

In 2024, anomalies such as AIS spoofing were detected in 35% of grey fleet voyages, and further advancements in these systems are anticipated to improve risk assessments and interception capabilities in real-time. At first, spoofing was simple - ships would copy the routes of anchored vessels. Now, they use more advanced tricks, like pretending to follow normal routes but sending signals to places they couldn't actually be. A good example is a ship's transponder showing it was near Brazil, but the signal was actually picked up by stations in Venezuela, which isn't technically possible. To understand and analyse these cases, we need access to raw AIS data to track the real routes and see what's really happening.

Image 3: Spoofing pattern in July 2024 - Fake route to Brazil using signals from Venezuela

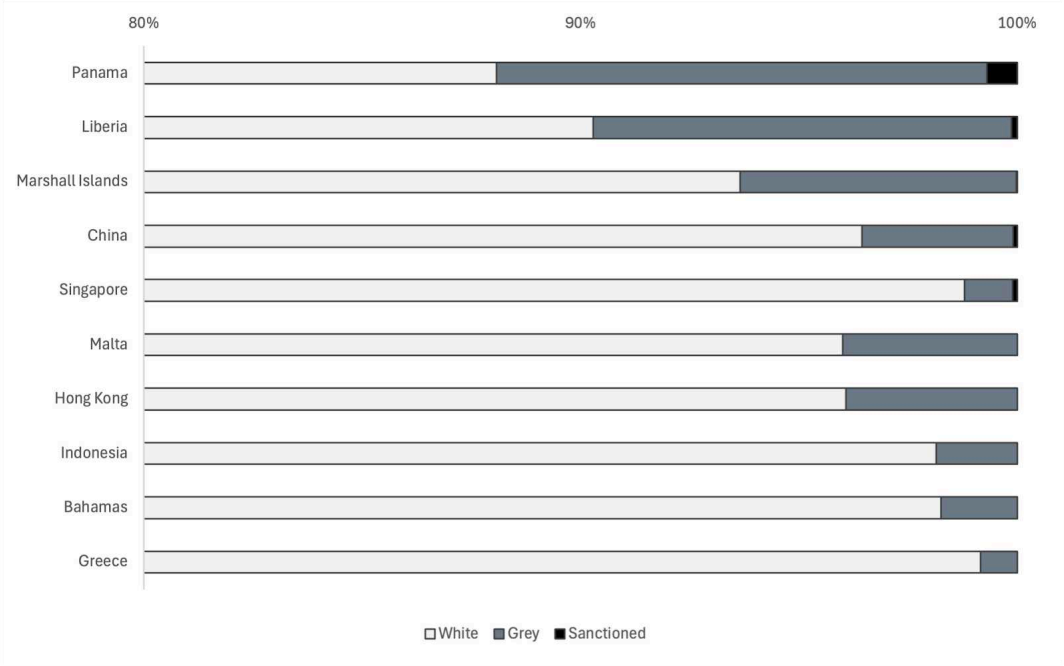


Source: Kpler

Irregular vessel information

Grey fleet vessels often exhibit significant inconsistencies in their registration details, frequently altering names, flags, and ownership to conceal their true identities. As many as 40% of sanctioned vessels are registered under flags of convenience, with the largest registries including Guyana, Eswatini, and Guinea. These frequent changes in a vessel's country of registration enable operators to exploit regulatory loopholes, forcing enforcement agencies to restart tracking efforts with each modification.

Graph 4: Compliance distribution of fleets among top 10 vessel registries by total number of vessels



Source: Kpler

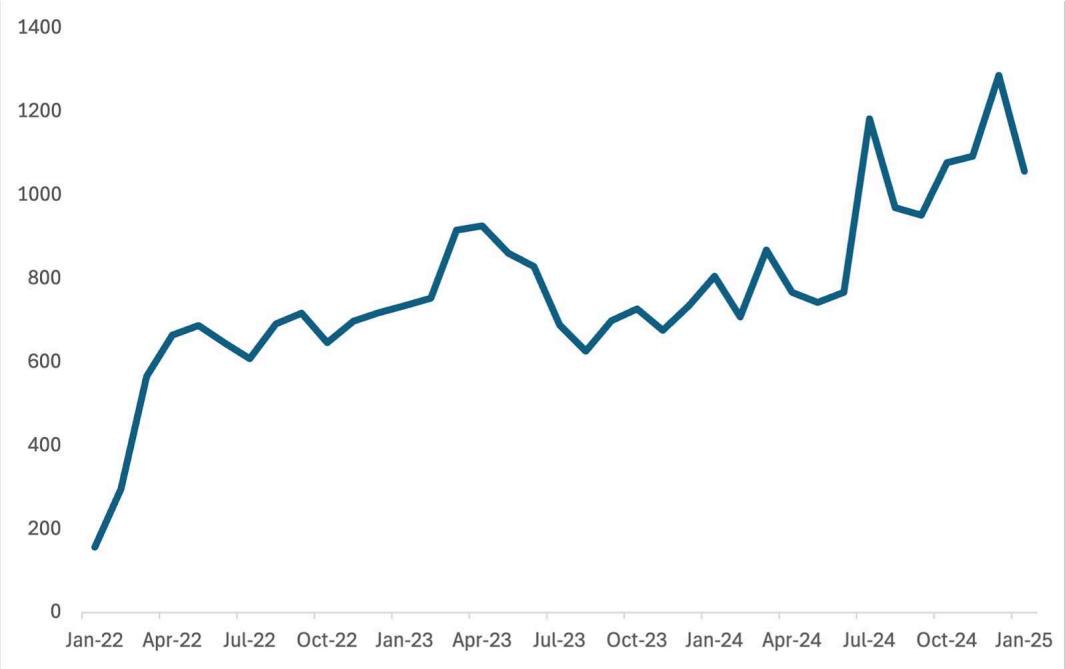
In addition to flag manipulations, fraudulent or fictitious registrations are often used to obfuscate vessel identities. For example, the Aframax tanker Yi Meng Shan (IMO: 9436941) falsely claimed to be registered under the Netherlands Antilles flag while carrying Russian crude oil. However, the Netherlands Antilles does not have an international ship register, so the ship was using this flag illegally. Similarly, vessels like Cimarron (IMO: 9255933) and Metagas Everest (IMO: 9243148) have employed fictitious registrations to facilitate Iranian energy trades.

High-risk ship-to-ship (STS) transfers

STS transfers are a central component of grey fleet operations, enabling vessels to exchange liquid bulk cargoes such as oil while at sea. While legitimate fleets also use STS transfers for operational efficiency, grey fleet vessels exploit this method to obscure the origin of sanctioned commodities. These transfers often occur in high-traffic maritime regions like the Eastern Mediterranean, the Black Sea, and waters near Malaysia. By operating in international waters, these vessels bypass port inspections, preventing authorities from detecting illicit cargo or violations of sanctions, such as breaches of the G7 price cap on Russian crude. In many cases, sanctioned oil is mixed with other sources, further obfuscating its origin and facilitating its delivery to restricted markets.

An STS transfer is classified as high-risk when at least one of the vessels involved is either sanctioned, transferring sanctioned cargo, or has sanctioned owners. High-risk STS transfers have shown a clear upward trend, with activity rising significantly since early 2022. The data indicates that the number of these transfers started below 200 but quickly escalated, surpassing 600 by mid-2022 and fluctuating between 600 and 1,000 over the following months. A notable surge occurred in mid-2024, with transfers peaking above 1,200, marking the highest recorded level.

Graph 5: Monthly high risk STS transfer events



Source: Kpler

Implications for sanctions enforcement

Enforcement actions by agencies like OFAC and the EU have targeted illegal shipping activities, especially deceptive practices in the grey fleet.

Finland has also stepped up monitoring, exposing tankers hiding their locations to conceal visits to Russian ports. These actions have changed market behaviour, making shipping operators more cautious due to financial penalties and service restrictions.

Major insurers like Britannia Steam Ship Insurance have stopped covering high-risk vessels, and classification societies such as Bureau Veritas no longer certify ships involved in sanctions evasion. Banks are also tightening financial restrictions to reduce exposure to illicit shipping.

Increased scrutiny has caused port clearance delays for grey fleet-linked tankers, raising risks. Meanwhile, self-insurance and unregulated registries have added uncertainty, making trade more expensive for compliant operators. As a result, charterers and traders are avoiding high-risk flag states and unclear ownership structures to reduce financial and regulatory risks.

Recent Applications of Regulations

One notable enforcement action occurred in November 2024 when OFAC sanctioned 29 vessels and several companies tied to sanctions evasion schemes. These entities were implicated in STS transfers in remote locations, manipulation of AIS, and the use of false flags. The EU followed suit with measures that expanded restrictions on entities violating price caps on Russian crude oil exports, further tightening the regulatory net.

On December 3, 2024, OFAC implemented sanctions targeting 35 entities and vessels involved in the unlawful transport of Iranian petroleum to global markets. This action represents a deliberate step in intensifying economic pressure on Iran following its October 1, 2024, assault on Israel and its advancing nuclear pursuits. Iran's petroleum exports serve as a key financial pillar, funding its nuclear program, missile and UAV development, and regional terrorist proxies.

These sanctions build on measures introduced on October 11, 2024, under Executive Order (E.O.) 13902. This earlier action granted the U.S. Department of the Treasury expanded authority to penalise individuals, entities, and activities tied to Iran's petroleum and petrochemical sectors. By targeting these operations, the United States seeks to disrupt Iran's revenue sources, which are critical to its reliance on grey fleets and evasion tactics.

Market participants - such as oil traders and vessel operators - have intensified due diligence to avoid links to Iranian entities. Insurers and reinsurers, becoming more risk-averse, have withdrawn coverage for vessels suspected of ties to Iran's grey fleet. Additionally, financial institutions have upgraded compliance programs, adopting advanced monitoring technologies to detect and report connections to sanctioned entities.

Increased risks for shipowners and charterers have raised transportation costs for Iranian petroleum, making it less competitive in global markets. As a result, some buyers have turned to alternative suppliers, reshaping supply chains and inducing price volatility in specific energy sectors.

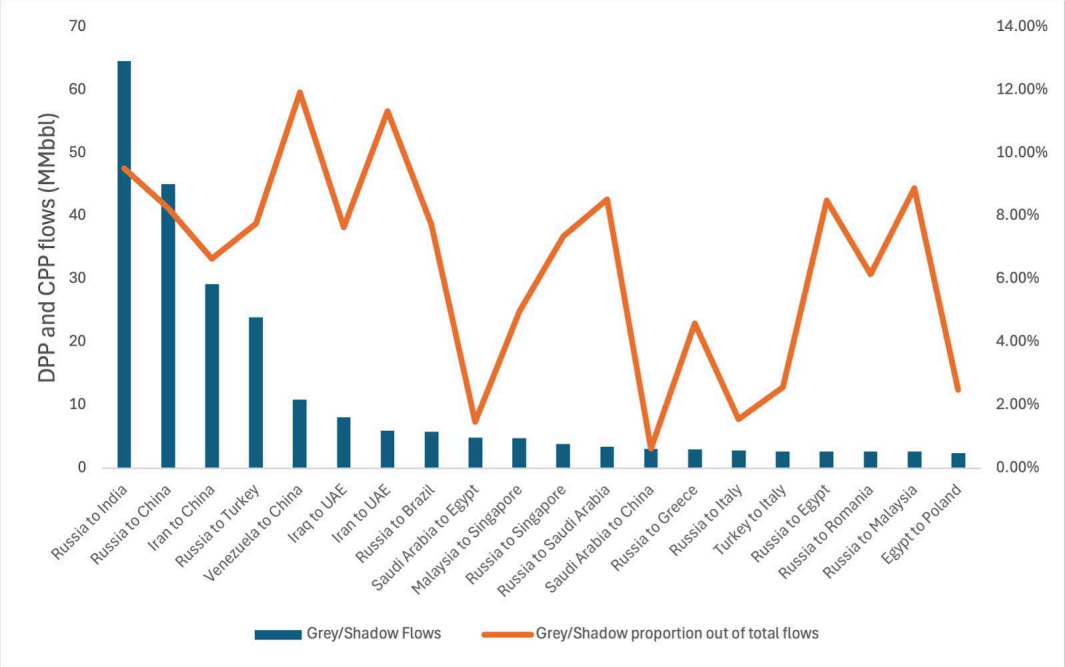
Strategically, the December sanctions reaffirm the United States' commitment to combating threats posed by Iran's destabilising activities. By leveraging expanded legal authorities, the U.S. is dismantling financial lifelines that sustain Iran's nuclear and military ambitions, ensuring greater security in the Middle East and beyond.

Trade Flows and Cargo Impacts

In 2024, the transportation of dirty and clean petroleum products (DPP and CPP) was overwhelmingly carried by white-listed fleets, which moved over one billion tons of cargo, representing the bulk of global operations. Grey fleets accounted for 109.2 million tons - approximately 10% of the total flows - playing a substantial role in routes involving politically sensitive or sanctioned regions. Meanwhile, sanctioned fleets contributed a negligible amount, transporting just 3.78 million tons - 0.3% of the total volume - underscoring the effectiveness of global restrictions in curbing their activity.

The largest volume of grey fleet activity was observed between Russia and India, where 9.5% of total flows were conducted using these vessels with approximately 64 million tons, reflecting India's growing demand for Russian energy. Trade between Russia and China followed closely at 8.3%, underscoring China's continued energy diversification strategies. Meanwhile, routes like Venezuela to China (11.9%) and Iran to the UAE (11.3%) had some of the highest proportions of grey fleet involvement, indicating a heavy reliance on grey fleets in regions affected by sanctions or geopolitical tensions.

Graph 6: Global flows of DPP and CPP transported by the grey fleet in 2024



Source: Kpler

Sanctions impact of freight markets

Growth in demand has increased demand for vessels on sanctions routes, providing employment for ships well beyond the typical useful life. Iranian exports for example accounted for 7% of dirty tanker demand at the end of 2024, the highest share since before sanctions were re-imposed in 2019.

Freight rates on sanctioned routes trade at a considerable premium to the commercial market in order to incentivise vessels to switch to the sanctioned market. Even freight rates for Russian oil exports which are subject to the less clearcut, price cap sanctions, have maintained a premium over non-Russian rates since the outbreak of the Russia-Ukraine war.

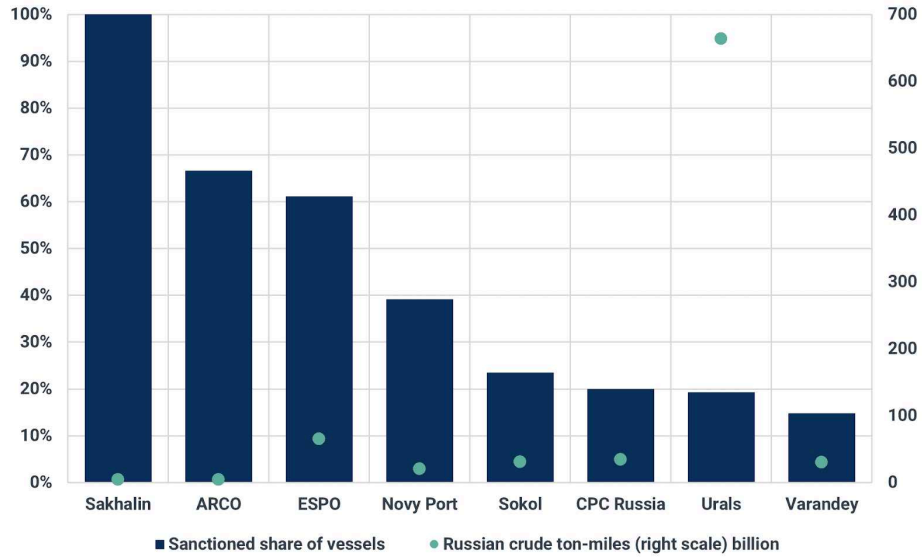
Prior to the 10 January 2025 US sanctions package, sanctions targeting vessels were applied piecemeal. But, in sanctioning 183 vessels related to Russia, at the same time, it potentially signals a new approach to addressing the rise of the grey fleet.

Russian freight

The 10 January 2025 sanctions also provided insight into how the application of sanctions on a large number of tankers simultaneously can have an impact on freight rates and how that impact can be observed geographically.

Collectively, the tankers listed in the 10 January OFAC sanctions accounted for 25-30% of Russian crude and DPP export ton-miles in recent months. However, the impact on freight rates from Russia was not uniform. Over 60% of the tankers that traded ESPO last year were sanctioned on 10 January, compared to just 19% of the vessels that shipped Urals. This disparity arises because ESPO, exported from the Russian Far East port of Kozmino, is sold at a premium to Urals. As a result, it is likely that the U.S. Treasury was able to gather more evidence of price cap infringements against vessels carrying ESPO than those carrying Urals.

Graph 7: Sanctioned share of tankers involved in shipping Russian crude by grade



Source: Kpler

Freight for ESPO shipped to China rose by over 300% to over $8/bbl whereas freight for Urals from the Black Sea to India rose a comparatively small 130% to $7/bbl. The jump in freight is proportional to the increase in demand for “new” vessels to maintain exports.

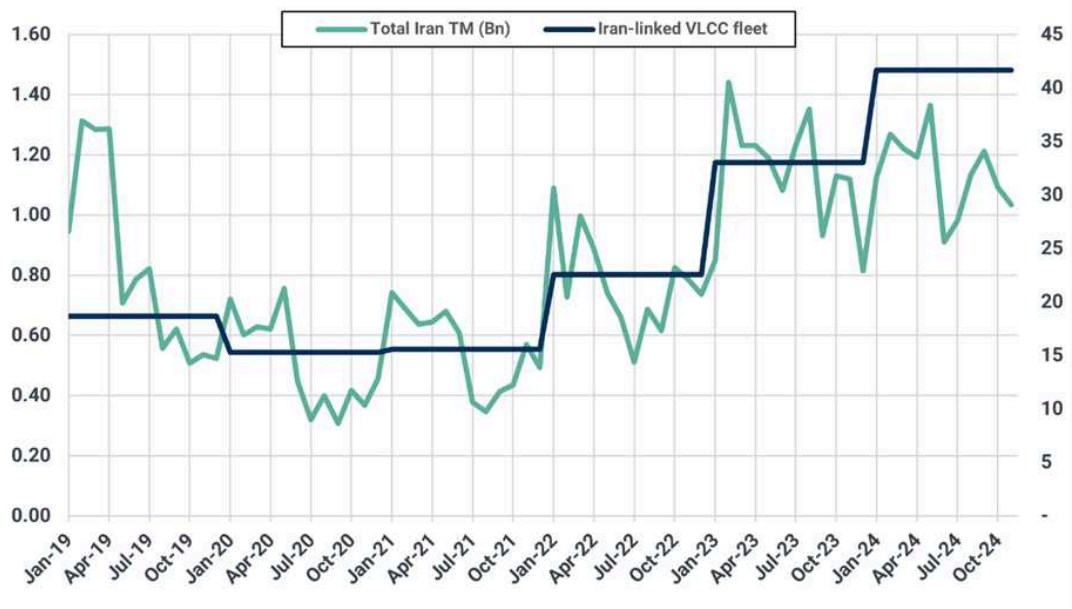
The fact that the freight rate for ESPO exports is higher means there is a greater imperative to replenish the fleet in the East. This can be achieved by drawing ships from the West. Already, ships with no previous history of trading with Russia have been pulled into the grey fleet, tightening supply in the non-sanctioned freight market.

Iranian freight

Over the last year we have also observed a change in how vessels trading with Iran have responded to OFAC sanctions. Previously, sanctions had little to no effect on vessel trading behaviour, but over 2024 as more vessels were added to the OFAC list, a larger share were shown as idle or trading at a much lower level of utilisation.

To fill the vessel supply gap, more vessels have begun trading with Iran. But as exports from Iran have slowed in recent months, the productivity of these vessels trading with Iran, sanctioned and non-sanctioned, has fallen further. Essentially, more and more vessels are sharing increasingly limited demand.

Graph 8: Iran-linked fleet - billion ton-miles/day (left scale)**; fleet size million DWT** (right scale)



Source: Kpler

Projections for 2025

The grey fleet is projected to expand significantly, with its total count expected to exceed 13% of the global tanker market by 2025, up from approximately 10% today. This growth is driven by the demand from sanctioned regions like Russia, Venezuela, and Iran, coupled with their strategic focus on diversifying trade flows to Asia. The fleet's size and operational sophistication are likely to increase as older vessels - many over 20 years - are reflagged and repurposed for grey activities. Estimates suggest over 500-600 vessels may join the grey fleet by 2025.

The G7 price cap on Russian crude has already prompted increased reliance on opaque ship-to-ship transfers in the Eastern Mediterranean, with such activities rising by 40% in 2024 alone. Similarly, Southeast Asia provides grey fleets with pathways to blend or rebrand cargoes for compliant markets.

The Biden administration's final wave of sanctions ahead of the January 2025 transition underscored the effectiveness of expanding enforcement beyond grey fleet operators to include broader maritime support networks. By targeting not only the shipping fleet but also the ecosystem that enables its operations - such as P&I Clubs and smaller vessels - sanctions regulators can enhance enforcement efforts and more effectively disrupt sanction evasion tactics.

China and India, as primary importers of Russian crude, are exhibiting notable caution amid evolving market dynamics. This caution has far-reaching implications for global tanker demand and freight volatility. To replace Russian crude, importers may turn to sources in the Middle East, Latin America, Canada, West Africa, Brazil, and the United States.

All eyes on Trump

During his first term, President Donald Trump used maritime sanctions as a strategic tool, targeting Iran, Venezuela, North Korea, and China to disrupt illicit oil flows and pressure adversaries. The reimposition of sanctions on Iran in 2018 and the blacklisting of Venezuela's state-owned oil company, Petróleos de Venezuela, S.A. (PDVSA), in 2019 crippled both nations' energy exports, forcing them to rely on dark fleet operations, AIS spoofing, and STS transfers. The Trump administration also cracked down on North Korean smuggling networks and Chinese shipping entities, including subsidiaries of China Ocean Shipping Company (COSCO), for facilitating sanctions evasion.

Now, in his second term, President Trump has signalled an even more aggressive maritime sanctions policy, particularly in response to Iran, Venezuela, and China's expanding threat. The enforcement of tighter shipping restrictions and secondary sanctions is expected to further drive grey fleet expansion, as sanctioned nations seek alternative trade routes and evasive shipping tactics. This approach is already evident in Venezuela, where in February 2025, Trump rescinded a license that allowed Chevron to operate in the country, reversing previous concessions to intensify pressure on Nicolás Maduro's regime by disrupting its oil production and revenue streams.

By cutting off Chevron's access, the U.S. is tightening economic pressure on Venezuela, restricting its ability to generate income through oil exports. As a result, Venezuela may strengthen partnerships with China and Russia, both long-standing supporters of Maduro, to compensate for financial losses and sustain oil production. If Venezuela strengthens its ties with Russia, Iran, or China, an increase in sanctioned vessel usage and grey fleet operations is likely, alongside a rise in AIS spoofing and dark STS transfers as these nations seek to evade enforcement and obscure oil shipments from detection.

Ukraine, sanctions, and the shifting balance of power

Recent developments have further complicated U.S.-Ukraine relations and the broader geopolitical landscape. In late February 2025, President Trump suspended all military aid to Ukraine, marking a significant shift in U.S. policy and increasing pressure on Kyiv to negotiate a settlement with Russia. While European allies face growing pressure to fill the arms gap, they are unlikely to match U.S. military support for several years, leaving Ukraine in a weakened position.

At the same time, a highly anticipated U.S.-Ukraine mineral rights agreement remains unsigned, as Kyiv seeks nuclear security assurances from Washington - something Trump is unwilling to provide. Trump has actively pushed for the deal, and if it is finalised under favourable terms for the U.S., it could shift Washington's stance back toward military support for Ukraine, potentially leading to a renewed wave of sanctions on Russian cargoes and fleet operations to force Moscow to the negotiating table. However, Trump's approach remains transactional, meaning U.S. actions could shift rapidly if a new arrangement aligns with American strategic or economic interests.

Sanctions in flux: A growing divide between the U.S. and Europe

With the situation in flux, U.S. sanctions policy toward Russia remains highly fluid, dependent on evolving geopolitical dynamics. While economic restrictions on key Russian industries and trade have been a central tool of U.S. strategy, their future enforcement - or potential easing - will likely be dictated by how negotiations unfold and what serves American interests at any given moment. Trump's deal-making approach leaves open the possibility of intensifying sanctions to pressure Moscow or scaling them back as part of a broader settlement.

However, a growing divide between the U.S. and its European allies on Russia sanctions is emerging. While the European Union is expected to maintain strict sanctions on Russian energy exports, shipping, and trade, the Trump administration may pursue a more flexible approach, potentially lifting some restrictions in exchange for trade or security concessions.

Cracking down on the grey fleet amid regulatory uncertainty

Regardless of how sanctions evolve at the strategic level, efforts to crack down on the grey fleet are expected to intensify. Enforcement actions will likely focus on directly sanctioning vessels involved in transporting restricted cargo, an approach that remains underutilised. According to Kpler's Risk and Compliance models, only a small percentage of ships transporting sanctioned cargo have been blacklisted - 22.7% for Iranian oil, 8.7% for Russian cargo, and 17.1% for Venezuelan shipments.

Closing the enforcement gap: The role of AI and predictive analytics

The rising prevalence of dark STS transfers and AIS spoofing highlights a critical enforcement gap in global sanctions monitoring. Data from 2024 shows that more than half of the vessels engaged in illicit activities were not under existing sanctions, allowing operators to continue evading oversight. Historically, around 34% of high-risk vessels face sanctions within 250 days, but many remain unsanctioned for over two years, enabling constant adaptation by grey fleet operators.

In 2025, predictive analytics suggests that over 370 vessels currently active in grey fleet operations are at high risk of future sanctions. As regulatory authorities tighten enforcement, the use of AI-driven tracking and real-time risk assessment tools will be critical in closing the oversight gap and proactively disrupting illicit maritime networks.

Conclusion and recommendations

The fleet's dramatic expansion, driven by geopolitical tensions and sanctions, underscores its central role in circumventing international trade restrictions. Key challenges include advanced AIS manipulation, flag-hopping, and risky STS transfers.

For Traders: It is essential to strengthen due diligence practices and avoid engaging with vessels that display characteristics of the grey fleet. Advanced screening tools and real-time tracking solutions should be integrated into operations to mitigate compliance risks.

For Policymakers: Governments and regulatory bodies must close loopholes exploited by the grey fleet. This includes harmonising international maritime regulations, enhancing the transparency of flag registries, and expanding the application of sanctions to enablers, such as insurers and service providers linked to grey fleets.

For Enforcement Agencies: Greater investment in technology, such as maritime intelligence and machine learning-powered risk assessment tools, is vital for improving detection capabilities. Collaborative frameworks between nations, leveraging shared intelligence and resources, are necessary to monitor and intercept illicit maritime activities effectively.

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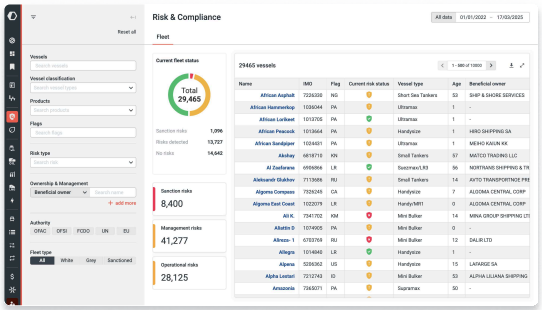
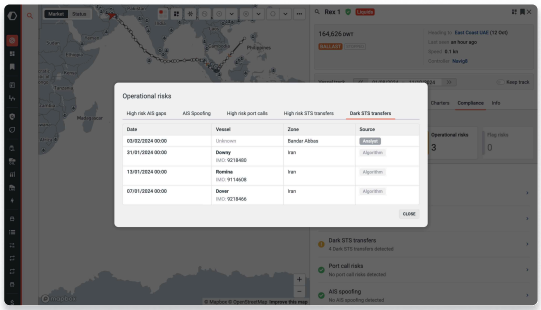
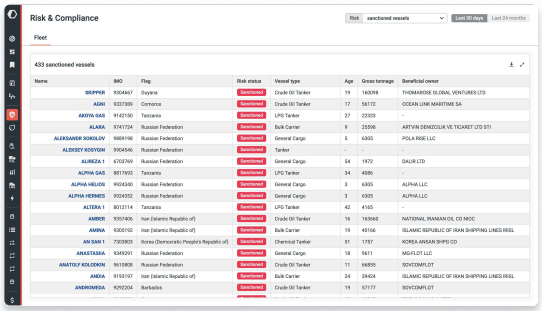
Real-time compliance monitoring



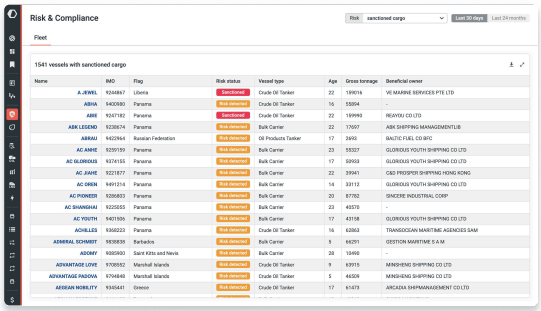
Dark STS transfers



Sanctioned vessels



Sanctioned cargo



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Kpler Risk & Compliance is the ideal solution for those aiming to accurately identify risks.

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