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Stranded at Sea:

Mapping LNG Carrier Shipowners' Exposure to Stranded Asset Risk

SFOC

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Mapping LNG Carrier Shipowners' Exposure to Stranded Asset Risk

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Author	**Lena Vivier-Endo** | Midstream Gas Private Finance Researcher, SFOC
Contributing Author	**Apolline Foucher** | Midstream Shipowners Researcher, SFOC
Data analysis	**Hyeonju Ryu** | CEO, DataTalks
Design	**Julissa Urena** | Designer, SFOC

Solutions for Our Climate (SFOC) is an independent policy research and advocacy group that aims to make emissions trajectories across Asia compatible with the Paris Agreement 1.5°C warming target.

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Executive Summary

The closure of the Strait of Hormuz since late February 2026 has shaped the year for LNG shipping. It cut off almost a fifth of global LNG supply, briefly lifted charter rates and left close to 50 Qatar-linked carriers without cargoes, yet by early October spot rates had fallen 83-91% from their wartime peaks.[1] The resulting jump in gas prices has also hit demand. In Asia, where most of the industry's growth was expected, importers have canceled or reconsidered LNG projects, restarted nuclear plants and fast-tracked renewables; IEEFA estimates these moves could erase 16 million tonnes a year of long-term demand.[2] Europe offers no offset: IEEFA forecasts that its LNG demand could fall about 23% between 2025 and 2030, while renewables, heat pumps and lower gas use reduce its need for imports.[3] The war has delayed the fleet's surplus, not removed it, and weakened the demand growth the orderbook was built for.[4]

LNG carrier owners have committed to a fleet that risks exceeding demand under several of the scenarios examined, and a short list of them carries most of the risk. This report examines who owns the expanding LNG carrier fleet, how exposed these companies are to stranded assets, and what shipowners, financial institutions and insurers can do about it.

Key Findings

- **Committed Oversupply:** The large LNG carrier fleet (vessels of 100,000 cbm or more) grew from at least 335 vessels in 2016 to **833** today, and its capacity from 54.1 to 140.9 million cbm. A further **278 vessels** (51.1 million cbm, **36%** of today's capacity) are on order, 237 of them delivering in 2027 or later. Independent analysts project a surplus of 110-200 vessels.[5]

1 International Energy Agency. (2026). Gas market report, Q3-2026. https://www.iea.org/reports/gas-market-report-q3-2026/executive-summary; OilPrice.com. (2026, April 6). Nearly 50 Qatar LNG tankers sit idle across Asia. https://oilprice.com/Latest-Energy-News/World-News/Nearly-50-Qatar-LNG-Tankers-Sit-Idle-Across-Asia.html, reporting Bloomberg data from Kpler; Shipuniverse. (2026, October 7). LNG carrier freight rates collapse 83-91% from wartime peaks as vessel supply surges. https://www.shipuniverse.com/news/lng-carrier-freight-rates-collapse-83-91-from-wartime-peaks-as-vessel-supply-surges/

2 Reynolds, S. (2026, April 15). The Iran conflict is cutting the long-term role of LNG in Asia. Institute for Energy Economics and Financial Analysis. https://ieefa.org/resources/iran-conflict-cutting-long-term-role-lng-asia; Institute for Energy Economics and Financial Analysis. (2026, September 16). The LNG glut has been delayed, not cancelled (IEEFA Market Signals, Edition 3). https://ieefa.org/resources/lng-glut-has-been-delayed-not-cancelled

3 Institute for Energy Economics and Financial Analysis (2026), The LNG glut has been delayed, not cancelled.

4 International Energy Agency (2026); Institute for Energy Economics and Financial Analysis (2026).

5 Clarksons Research. (2026). World Fleet Register [Data set]. Vessel extract of 15 September 2026; group-level listings, group profiles and sale-and-purchase record of 18 September 2026; SFOC analysis. On the projected surplus: Riviera Maritime Media. (2026, October 28). LNG carrier fleet surplus projected despite rising demand from US exports. https://www.rivieramm.com/news-content-hub/lng-carrier-fleet-surplus-projected-despite-rising-demand-from-us-exports-90407, reporting a simulation by Maritime Optimisation & Integrated Consulting.

- **Stranding Already Under Way: 78 vessels** (9.4% of the fleet, 13.0 million cbm) are idle or laid up. **A quarter of the 186 steam turbines** are not trading, 4.7 times the rate for other ships, and the average LNG carrier scrapped in 2025 was **26 years** old. The 2026 Gulf war has idled more ships (without the 27 idle ships tied to Qatar's trade, the count is 51, or 6.1% of the total), but the steam pattern predates it: without those ships, steam turbines are ten times as likely as other ships to be idle or laid up.[6]
- **Concentrated Exposure**: **Ten owner groups** hold 43.7% of capacity in service and 45.0% of capacity on order. The five largest orderbooks, held by Nakilat, Mitsui OSK Lines, China Merchants, NYK Line and ADNOC, account for **36.3%** of all capacity on order.[7]
- **No Cushion, No Exit: Nine of 31** profiled groups have at least half their fleet in LNG carriers, and six have 80% or more. Seventeen increased their LNG share since 2016. The only two whose share fell still hold at least as many LNG carriers as in 2016; their other fleets grew faster, and Shandong Marine's nine LNG carriers on order will lift its share again.[8]
- **Invisible Charter Cover**: Only **174 of 833 vessels (21%)** have a forward charter expiry on public record, and **84%** of those end by 2035. For approximately four ships in five, no forward charter expiry is recorded in the dataset used for this analysis.[9]
- **The 2050 Trap**: On a 30-year design life, **55%** of capacity in service and on order is still in its working life after 2050; on the 38-year average lifespan used in the Investment Risk Monitor, **78%**. Either these ships lock in emissions beyond shipping's net-zero target date, or they retire early and the capital is written off. The orderbook alone represents about **US$69 billion** of committed capital.[10]

6 Clarksons Research (2026); SFOC analysis. Idle and Laid Up are Clarksons' status labels, used as recorded on 15 September 2026; Clarksons does not publish definitions for them. Definitions, the breakdown of the 78 and the rates without the 27 idle ships tied to Qatar's trade are set out in Sections 6.1 and 6.2 and in notes 88 and 90. On scrapping age: Argus Media. (2025b, December 17). LNG supply growth outstrips carrier orderbook to 2030. https://www.argusmedia.com/en/news-and-insights/latest-market-news/2767075-lng-supply-growth-outstrips-carrier-orderbook-to-2030

7 Clarksons Research (2026); SFOC analysis. Capacity is equity-attributed.

8 Clarksons Research (2026); SFOC analysis. LNG shares are measured against each group's whole fleet; sales are from the Clarksons sale-and-purchase record.

9 Kpler. (2026). Time-charter records [Data set]. Extracted 17-23 September 2026; SFOC analysis.

10 Clarksons Research (2026); SFOC analysis; Kuehne Climate Center & UCL Energy Institute. (2025, September). Investment risk monitor: Storybook. https://www.kuehneclimatecenter.org/fileadmin/user_upload/Storybook_Investment_Risk_Monitor_final.pdf. Committed capital applies the mean recorded contract price (US$249 million, available for 182 of the 278 hulls on order) to the whole orderbook.

New Orders Add to the Surplus

LNG carriers ordered today would deliver around 2029-2031 into a market that analysts already expect to be oversupplied, and would need to trade until around 2060 to complete a 30-year design life.[11] Under the IEA's net-zero pathway, no new LNG carriers are needed at all.[12] For shipowners and their financiers, the most effective way to limit stranded asset risk is to avoid adding speculative capacity, and never to order a ship without long-term employment.

Strategic Recommendations

- **For Shipowners**: Avoid speculative newbuilds and order against long-term charters, test fleet values against a shortened 25-year economic life and climate-aligned demand, share charter cover and useful-life assumptions vessel by vessel with lenders and investors, and set out a plan for how the LNG fleet will peak and decline.

- **For Banks, Lessors and Export Credit Agencies:** Match loan tenors to firm charter cover, report LNG carrier exposure, and test whether public guarantees for new LNG carriers are consistent with their climate commitments and risk appetite.

- **For Insurers:** Reflect transition risk in hull and machinery pricing, and use annual renewals to discuss clients' transition plans, including fleet age and utilization.

The data show that stranding in LNG shipping has already begun: 78 large carriers, 9.4% of the fleet, are idle or laid up, a quarter of steam turbines are not trading, and the average carrier scrapped in 2025 was 26 years old, against the 35-40 years owners and lenders often assume.[13] Owners and financiers who plan now for a smaller LNG fleet will protect more of their asset value than those who keep adding capacity to an oversupplied market.

11 Clarksons Research (2026); Riviera Maritime Media (2026); Wood Mackenzie. (2026a, June). Wood Mackenzie models three global LNG market scenarios as Iran conflict removes 20% of global supply [Press release]. https://www.woodmac.com/ja/press-releases/wood-mackenzie-models-three-global-lng-market-scenarios-as-iran-conflict-removes-20-of-global-supply/

12 Solutions for Our Climate. (2023a, May 24). High and dry: The global energy transition's looming impact on the LNG and oil shipbuilding industry. https://forourclimate.org/research/336, with Climate Analytics, based on the IEA's Net Zero Emissions by 2050 Scenario.

13 Clarksons Research (2026); SFOC analysis; Argus Media (2025b).

Introduction

Almost all of today's orderbook, 266 of the 278 large carriers on order, was contracted from 2022 onwards, just as the market for those ships turns.[14] This report asks who carries that bet, how large it is, and how long it lasts.

LNG carriers are the physical link between gas export projects and their buyers. On recorded contract prices, a large LNG carrier on order costs about US$250 million, and it is designed to trade for 30 to 40 years.[15]

In this report, a stranded asset is defined as a ship that loses its value or earning power before the end of its expected economic life: through idling, write-downs or early retirement. We already observe these signals in the market. Future exposure depends on how many ships are built, for how long they are expected to trade, and what the world's climate goals leave for them to carry.

What This Report Adds

Since 2023, SFOC has published research on LNG carrier expansion, ship finance, stranded asset risk, and environmental and social impacts. This report builds on those findings and moves from the market to the owner. It maps all 1,111 large LNG carriers (100,000 cbm or more) in service and on order to 125 owner groups, and profiles 31 groups in depth.[16] It addresses four questions:

1. **Fleet development.** Who owns the operational fleet and the orderbook, and how has that expansion changed since 2016?
2. **Fleet concentration.** How dependent is each group on LNG shipping, and is that dependence rising?
3. **Stranded asset risk**. How much of each group's fleet is already idle, how much charter cover is visible, and how much will still be in its design life after 2050?
4. **Implications for decision-making.** What actions can shipowners, financiers and insurers take to assess and manage these risks?

14 Clarksons Research. (2026). World Fleet Register [Data set]. Vessel extract of 15 September 2026 and group data of 18 September 2026; SFOC analysis. Of the 278 large LNG carriers on order, 266 were contracted between 2022 and 2026.

15 Clarksons Research (2026); SFOC analysis. Contract prices are recorded for 182 of the 278 hulls on order, from US$193 million to US$364 million, with a mean of US$249 million. On design lives of 25 to 40 years, see Kuehne Climate Center & UCL Energy Institute (2025) and Solutions for Our Climate (2025a).

16 Clarksons Research (2026); Kpler. (2026). Time-charter records [Data set]. Extracted 17-23 September 2026. Data analysis by DataTalks for SFOC.

The report is intended primarily for LNG carrier owners making decisions about fleet investments, chartering, asset values and retirement. It also provides evidence for the banks, lessors, export credit agencies, investors and insurers assessing vessel-level and counterparty exposure. The findings identify indicators of exposure rather than forecast losses for individual companies; Chapter 3 explains the underlying assumptions and data limitations.

LNG Carrier Market and Regulatory Outlook

The LNG carrier market of 2026 combines a record delivery wave, a war-related disruption that has temporarily obscured oversupply, and climate rules that are tightening around the least efficient ships. This year's war-driven rate spike does not, by itself, indicate a sustained market recovery.

Charter Rates and Market Disruption: From Collapse to War Spike, and Back

Charter earnings collapsed between late 2023 and early 2025 as new ships arrived faster than new cargoes. Modern two-stroke spot rates fell from about US$197,000 a day in November 2023 to US$30,000 a year later, and steam turbines from about US$112,000 to US$11,250.[17] By January 2025 steam ships earned US$2,000-3,000 a day against operating costs of about US$17,000,[18] and Clarksons reported steam rates turning negative.[19]

Since late February 2026, the war in the Gulf has largely closed the Strait of Hormuz, which carried almost 20% of global LNG supply.[20] QatarEnergy declared force majeure in early March, and strikes on Ras Laffan damaged two of its 14 liquefaction trains. Qatari exports in April-September 2026 were down almost 90% year on year,[21] and force majeure was still in place at the end of October.[22]

17 Lloyd's List. (2024, November 14). LNG shipping rates slump to historic lows — and they're still falling. https://www.lloydslist.com/LL1151435/LNG-shipping-rates-slump-to-historic-lows--and-theyre-still-falling

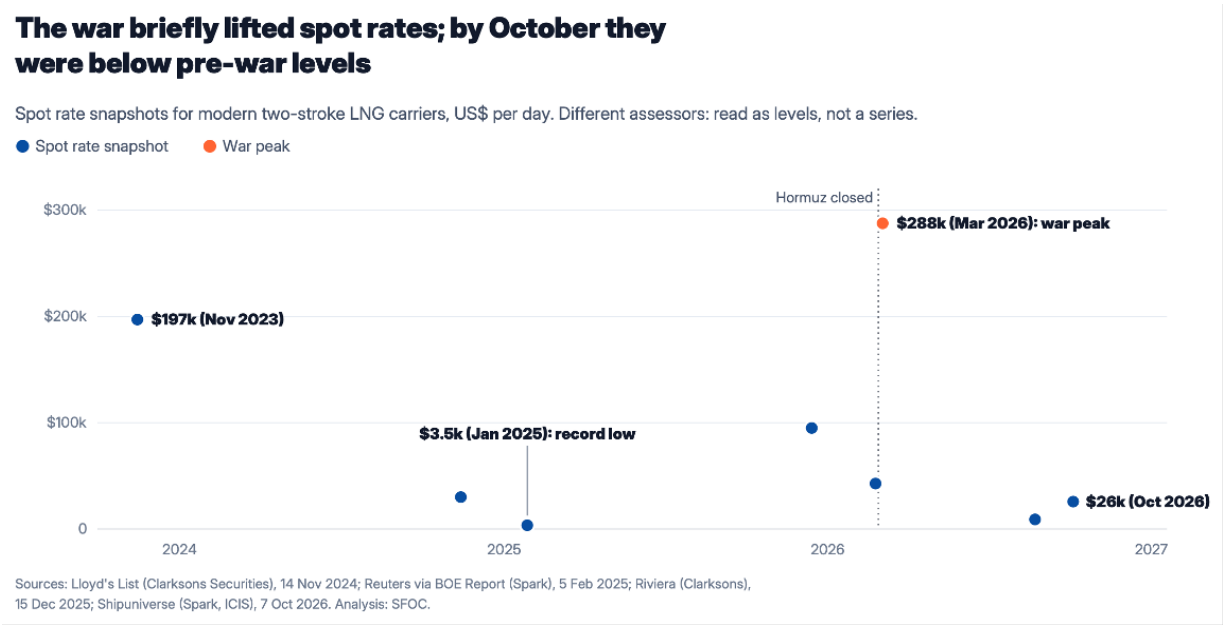
18 Argus Media. (2025a, January 31). LNG freight market to stay oversupplied until mid-2026. https://www.argusmedia.com/en/news-and-insights/latest-market-news/2653294-lng-freight-market-to-stay-oversupplied-until-mid-2026

19 Clarksons. (2025, July 18). LNG shipping: Short-term headwinds, long-term growth. https://www.clarksons.com/home/news-and-insights/2025/lng-shipping-short-term-headwinds-long-term-growth/

20 International Energy Agency. (2026). Gas market report, Q3-2026. https://www.iea.org/reports/gas-market-report-q3-2026/executive-summary

21 Bloomberg. (2026, October 14). Qatar rewrites its gas playbook with old tankers and new tactics. Energy Connects. https://www.energyconnects.com/news/gas-lng/2026/october/qatar-rewrites-its-gas-playbook-with-old-tankers-and-new-tactics/

22 The National. (2026, October 29). QatarEnergy turns to US LNG with Woodside deal as Hormuz force majeure drags on. https://www.thenationalnews.com/business/2026/10/29/qatarenergy-turns-to-us-lng-with-woodside-deal-as-hormuz-force-majeure-drags-on/



[Figure 1] Spot rate snapshots for modern two-stroke LNG carriers, 2023-2026. January 2025 marks the low point of the 2023-25 slump, when new ships arrived faster than new cargoes. Chart: SFOC, in the DataTalks design.

The spike was a supply-chain shock, rather than growth in demand: cargoes were rerouted, ships repositioned, and close to 50 Qatar-linked carriers sat empty.[23] As the rush to secure vessels eased, the underlying surplus reasserted itself, with Atlantic rates down 91% from their peak by early October.[24] When Qatari exports restart, Qatar's idle ships will return to a market that has meanwhile absorbed record deliveries.

The Supply Wave Is Delayed, Not Canceled

IEEFA expects the war to postpone the LNG glut by about a year rather than eliminate it. The IEA expects 140 bcm of cumulative LNG supply losses over 2026-2030, about 15% of the new supply wave, concentrated in 2026-27. The war has also cut into demand. Gas prices rose sharply in both Asia and Europe, and Asian spot LNG prices doubled after the war began. In Asia, where most of the industry's growth was expected, importers responded by canceling or reconsidering LNG projects in China and Vietnam, restarting nuclear plants and fast-tracking renewables, as in South Korea and the Philippines.[25] IEEFA estimates these moves could erase 16 million tonnes a

23 OilPrice.com. (2026, April 6). Nearly 50 Qatar LNG tankers sit idle across Asia. https://oilprice.com/Latest-Energy-News/World-News/Nearly-50-Qatar-LNG-Tankers-Sit-Idle-Across-Asia.html, reporting Bloomberg data from Kpler.

24 Shipuniverse. (2026, October 7). LNG carrier freight rates collapse 83-91% from wartime peaks as vessel supply surges. https://www.shipuniverse.com/news/lng-carrier-freight-rates-collapse-83-91-from-wartime-peaks-as-vessel-supply-surges/

25 Reynolds (2026). In China, Sinopec canceled a planned LNG import terminal expansion; in Vietnam, Vingroup asked to replace its 4.8 GW Hai Phong LNG-to-power project with solar, wind and batteries. South Korea is restarting six nuclear reactors (4.75 GW) and fast-tracking more than 7 GW of renewables, Taiwan plans to restart two nuclear plants, and the Philippines is accelerating 22 renewable projects (1.47 GW).

year of long-term LNG demand. European demand is projected to decline: IEEFA forecasts that LNG demand could fall about 23% between 2025 and 2030, while renewables, heat pumps and lower gas use reduce import needs.[26] Wood Mackenzie expects markets to soften from 2028, while the delivery wave shown later in this report is still arriving: 77 carriers are due that year and 58 in 2029.[27]

Over the life of today's newbuilds, the outlook depends on climate policy. In the IEA's World Energy Outlook 2025, LNG trade grows from 560 bcm in 2024 to about 760 bcm in 2030 under stated policies, leaving 65 bcm of export capacity unused. Under current policies it reaches about 880 bcm by 2035. In the net-zero pathway, export plants would run at about 75% of capacity in 2030 and 50% in 2035, and many projects now under construction would no longer be needed.[28]

Translating trade into ships suggests that the committed fleet exceeds what stated-policies trade can employ in 2030, even after older ships retire. At about 1.45-1.6 large carriers per million tonnes of annual trade, an indicative SFOC estimate, the stated-policies trade of 2030 employs some 810-900 carriers, and current-policies trade in 2035 some 940-1,040. The large-carrier fleet in service and on order is 1,111. If all 186 steam turbines retire by 2035, 925 remain, within the current-policies range for that year, so the 2035 surplus depends on how fast the steam fleet leaves. Longer voyages, such as US cargoes routed to Asia via the Cape, and heavy scrapping would narrow that gap; slower demand would widen it.[29]

Independent shipping analysts also identify potential surplus. A simulation by Maritime Optimisation & Integrated Consulting projects a surplus of 110-200 vessels from 2026 and fleet utilization of 83-87% through 2031, balancing by 2030 only if ordering stops or more ships are phased out.[30]

26 International Energy Agency (2026); Reynolds, S. (2026, April 15). The Iran conflict is cutting the long-term role of LNG in Asia. Institute for Energy Economics and Financial Analysis. https://ieefa.org/resources/iran-conflict-cutting-long-term-role-lng-asia; Institute for Energy Economics and Financial Analysis. (2026, September 16). The LNG glut has been delayed, not cancelled (IEEFA Market Signals, Edition 3). https://ieefa.org/resources/lng-glut-has-been-delayed-not-cancelled

27 Wood Mackenzie. (2026a, June). Wood Mackenzie models three global LNG market scenarios as Iran conflict removes 20% of global supply [Press release]. https://www.woodmac.com/ja/press-releases/wood-mackenzie-models-three-global-lng-market-scenarios-as-iran-conflict-removes-20-of-global-supply/

28 International Energy Agency. (2025). World energy outlook 2025. https://www.iea.org/reports/world-energy-outlook-2025/executive-summary

29 SFOC estimate. LNG trade from International Energy Agency (2025) is converted from bcm to million tonnes and multiplied by 1.45-1.6 large carriers per million tonnes of annual trade; the upper bound adds about 10% for longer voyages. The ratio is calibrated on Maritime Optimisation & Integrated Consulting's estimate of about 595 ship-equivalents of demand for 2024-25 trade, reported in Riviera Maritime Media (2026). Voyage lengths are held constant.

30 Riviera Maritime Media. (2026, October 28). LNG carrier fleet surplus projected despite rising demand from US exports. https://www.rivieramm.com/news-content-hub/lng-carrier-fleet-surplus-projected-despite-rising-demand-from-us-exports-90407

There is a bullish case, and owners ordering today rely on it. EA Gibson sees a shortage of 350-400 vessels by around 2030,[31] and Argus and GTT argue that export capacity already sanctioned needs more ships than are on order.[32] Argus and GTT's case is a supply-side one: it counts the ships needed to carry what sanctioned export plants can produce and assumes every new export train runs full and finds buyers through the 2040s. Climate policy points the other way. On the policies governments have already announced, 2030 LNG trade employs some 810-900 carriers, against 1,111 in service and on order, and on the IEA's net-zero pathway no new LNG carriers are needed at all.[33] For a ship financed today, that gap is the risk under test.

Climate Rules Are Turning Against Inefficient and High-Slip Ships

The International Maritime Organization aims for net-zero greenhouse gas emissions from shipping by or around 2050, with cuts of 20-30% by 2030 and 70-80% by 2040 against 2008 levels.[34] The instruments that turn that goal into costs are arriving unevenly.

31 Lloyd's List. (2026, July 15). Speculative LNG carrier orders rise despite mounting Hormuz uncertainty. https://www.lloydslist.com/LL1157856/Speculative-LNG-carrier-orders-rise-despite-mounting-Hormuz-uncertainty

32 Argus Media. (2025b, December 17). LNG supply growth outstrips carrier orderbook to 2030. https://www.argusmedia.com/en/news-and-insights/latest-market-news/2767075-lng-supply-growth-outstrips-carrier-orderbook-to-2030

33 SFOC estimate based on the International Energy Agency's Stated Policies Scenario (International Energy Agency, 2025), as set out earlier in this section; Solutions for Our Climate (2023a), with Climate Analytics, based on the IEA's Net Zero Emissions by 2050 Scenario.

34 International Maritime Organization. (2023). 2023 IMO strategy on reduction of GHG emissions from ships. https://www.imo.org/en/ourwork/environment/pages/2023-imo-strategy-on-reduction-of-ghg-emissions-from-ships.aspx

[Table 1] Climate rules affecting LNG carriers, status in October 2026

Instrument	Gas covered	Status, October 2026	What it means for LNG carriers
IMO Net-Zero Framework (NZF)	**CO2, CH4, N2O (well-to-wake)**	Approved April 2025; adoption adjourned October 2025; not adopted at MEPC 84. Next decision: MEPC 85 and a resumed session, 30 November–4 December 2026[35]	A well-to-wake fuel intensity limit, tightening 8% by 2030 and 30% by 2035 on the base target, with deficits priced at US$100 per tonne CO2e (tier 1) and US$380 (tier 2), starting from 2028.[36] Fossil LNG is only modestly below the reference and loses its margin within years[37]
EU Emissions Trading System (EU ETS)	**CO2, CH4, N2O (tank-to-wake)**	In force; 100% of 2026 emissions covered; methane and nitrous oxide included from 2026[38]	Ships pay for CO2 and methane slip on 100% of emissions within the EU and at berth, and 50% on voyages into or out of it
FuelEU Maritime	**CO2, CH4, N2O (well-to-wake)**	In force since 2025; GHG intensity cut 2% in 2025, 6% in 2030, 14.5% in 2035, 31% in 2040, 80% in 2050[39]	Modern high-pressure engines comply for now; ships with high default methane slip fall into deficit much earlier
IMO Carbon Intensity Indicator (CII), under MARPOL Annex VI	**CO2 (tank-to-wake)**	In force; required improvement rises to 21.5% below 2019 by 2030; review under way to 2028[40]	Low ratings trigger corrective plans, and charterers increasingly screen them out. Steam turbines, the least efficient, are most exposed

The NZF would also reach further than the ships in this report: it would cover ocean-going ships over 5,000 GT, count methane slip through well-to-wake accounting and, if adopted at the resumed session in December, be the first framework to combine mandatory emission limits and GHG pricing across an entire industry sector.[41]

35 Ship & Bunker. (2026, September 4). ISWG-GHG 22: Working group ends with net-zero framework text expected at MEPC 85. https://shipandbunker.com/news/world/596439-iswg-ghg-22-working-group-ends-with-net-zero-framework-text-expected-at-mepc-85

36 International Maritime Organization. (n.d.). FAQs: The IMO net-zero framework. https://www.imo.org/en/mediacentre/hottopics/pages/faqs-the-imo-net-zero-framework.aspx

37 Riviera Maritime Media. (2025a, April 17). IMO climate rules challenge LNG fuel assumptions. https://www.rivieramm.com/news-content-hub/imo-climate-rules-challenge-lng-fuel-assumptions-84574

38 European Commission. (n.d.-b). Reducing emissions from the shipping sector. https://climate.ec.europa.eu/eu-action/transport-decarbonisation/reducing-emissions-shipping-sector_en

39 European Commission. (n.d.-a). FuelEU Maritime. https://transport.ec.europa.eu/transport-modes/maritime/decarbonising-maritime-transport-fueleu-maritime_en

40 Lloyd's Register. (2026). MEPC 84 summary report. https://www.lr.org/en/knowledge/regulatory-updates/imo-meetings-and-future-legislation/mepc-84-summary-report/

41 International Maritime Organization. (2025, April 11). IMO approves net-zero regulations for global shipping [Press briefing]. https://www.imo.org/en/mediacentre/pressbriefings/pages/imo-approves-netzero-regulations.aspx; International Maritime Organization (n.d.).

Methane slip is the weak point of LNG as a ship fuel. Measured slip from low-pressure four-stroke engines, used on diesel-electric carriers, averaged about 6.4%, twice the EU default of 3.1%; the EU assumes 1.7% for low-pressure two-stroke engines and 0.2% for high-pressure ones.[42] That puts the 192 diesel-electric ships in our dataset next in line after steam turbines. Drewry already expects about 100 steam carriers to be scrapped by 2030 and sees diesel-electric tonnage as "next".[43]

There is no established evidence that LNG cargo tanks can practically be converted to carry ammonia, hydrogen, or liquid CO2. The exits in use today are conversion to floating storage or regasification units (FSRU), which absorb a handful of ships a year, and scrapping. In October 2026, for example, Mitsui OSK Lines agreed to convert one of its LNG carriers into an FSRU for Deutsche ReGas at Mukran, Germany, on a long-term charter from 2028.[44] Bio-LNG and synthetic LNG could cut a ship's fuel emissions, but supply is small and costly.[45]

A delay at the IMO does not remove this risk; it changes its timing. The EU rules already price emissions on European trades, and a weaker or later IMO deal would leave ships built today facing a sharper adjustment later in their lives.

Finance and Insurance: Risk Priced on Assumptions

LNG carriers are among the most leveraged assets in shipping. Debt usually covers 60-80% of the cost, but bank loans typically run 5-12 years on repayment profiles of 18-20 years, leaving large balloon payments that depend on the ship's value or a new charter at maturity. Chinese leases can run 20 years; Japanese operating leases about 12.[46]

42 Riviera Maritime Media. (2024, January 29). Methane slip-up: Study reveals levels twice those assumed by EU. https://www.rivieramm.com/news-content-hub/methane-slip-up-study-reveals-levels-twice-those-assumed-by-eu-79417; default slip values: European Union. (2023). Regulation (EU) 2023/1805 on the use of renewable and low-carbon fuels in maritime transport (FuelEU Maritime), Annex II. https://eur-lex.europa.eu/eli/reg/2023/1805/oj

43 Drewry. (2026, March). Shrinking lifeline for steam LNGCs: Are TFDE/DFDE carriers next? https://www.drewry.co.uk/maritime-research-opinion-browser/maritime-research-opinions/shrinking-lifeline-for-steam-lngcs-are-tfdedfde-carriers-next

44 Mitsui O.S.K. Lines. (2026, October 29). MOL signs long-term charter contract with Deutsche ReGas for Energie-Terminal "Deutsche Ostsee" in Germany [Press release]. https://www.mol.co.jp/en/pr/2026/26050.html

45 Riviera Maritime Media. (2025c, October 17). Steamers reconsidered: Options for older LNG carriers. https://www.rivieramm.com/news-content-hub/steamers-reconsidered-options-for-older-lng-carriers-86398; Wood Mackenzie. (2026b, June 2). LNG carriers face compliance-driven fleet bifurcation as EU maritime carbon costs reach US$125.6/t by 2030. LNG Industry. https://www.lngindustry.com/lng-shipping/02062026/wood-mackenzie-lng-carriers-face-compliance-driven-fleet-bifurcation-as-eu-maritime-carbon-costs-reach-us1256t-by-2030/

46 Petrofin Research. (2026, July). Petrofin global bank research and Petrofin index of global ship finance, end-2025. https://maritimes.gr/wp-content/uploads/2026/07/Petrofin-Global-Bank-Research-and-Petrofin-Index-of-Global-Ship-Finance-end-2025.pdf. Loan tenors and profiles are from published LNG carrier financing terms.

That structure is safe only while charters outlast loans. Ordering without charters is rising again: at least 17 LNG carriers were ordered without them in the first half of 2026, as many as in 2024 and 2025 combined.[47] Most of the orderbook still has employment: Capital Clean Energy Carriers, citing analysts, puts 48 of the 338 LNG carriers on order at the end of June (14.2%) without employment. Its total uses a wider vessel definition than this report's 278 large carriers.[48]

Existing climate frameworks and disclosure requirements address some aspects of LNG carrier exposure, but leave significant gaps:

- **Poseidon Principles.** 36 lenders covering almost three-quarters of ship finance report their portfolios' climate alignment. In the latest annual report, portfolios averaged 11.7% above the IMO minimum trajectory, and only three were aligned.[49] The scores measure the emissions from operating the ships, the fuel they burn counted from production to combustion, including methane, not the lifecycle emissions of the gas they carry, and no results are published by vessel type. Mizuho, KEXIM, JBIC and the Chinese leasing companies are not signatories; the only Chinese member is COSCO Shipping's captive insurer, which joined as an associate member.[50]
- **Marine insurance.** The insurers' version of the Principles stopped operating separately in September 2026 and was folded into the banks' framework as a non-reporting associate membership.[51] We found no insurer, bank or export credit agency with a general exclusion for LNG carriers; existing restrictions target LNG export terminals, and commitments on carriers are project-specific, as for Mozambique LNG.[52]

47 Lloyd's List. (2026, July 15). Speculative LNG carrier orders rise despite mounting Hormuz uncertainty. https://www.lloydslist.com/LL1157856/Speculative-LNG-carrier-orders-rise-despite-mounting-Hormuz-uncertainty

48 Capital Clean Energy Carriers. (2026, July 29). Capital Clean Energy Carriers Corp. announces second quarter 2026 financial results [Press release, Form 6-K]. https://www.sec.gov/Archives/edgar/data/0001392326/000119312526330964/d13735dex99i.htm

49 Poseidon Principles. (2025a, December). Annual disclosure report 2025. https://assets.ctfassets.net/gk3lrimlph5v/3L0krJE2uMfbdYXZANaP6f/27cf1caec3100a80c7f97f2ddc9d4f53/Poseidon_Principles_Annual_Disclosure_Report_2025.pdf; Poseidon Principles. (n.d.). Signatories. Retrieved November 5, 2026, from https://www.poseidonprinciples.org/finance/signatories/

50 Poseidon Principles (n.d.), Signatories.

51 Global Maritime Forum. (2026, September). Poseidon Principles expands associate membership to marine insurance sector [Press release]. https://globalmaritimeforum.org/press/poseidon-principles-expands-associate-membership-to-marine-insurance-sector/; Poseidon Principles. (2025b). Poseidon Principles opens associate membership, further joining forces with the Poseidon Principles for Marine Insurance. https://www.poseidonprinciples.org/finance/news/poseidon-principles-opens-associate-membership-further-joining-forces-with-the-poseidon-principles-for-marine-insurance/

52 SFOC review of the published fossil fuel policies of banks, export credit agencies and insurers, October 2026.

- **Disclosure.** Japan's sustainability disclosure standards (SSBJ) will become mandatory for the largest Prime-listed companies from the financial year ending March 2027, and Korea's from 2028.[53] The IASB has published examples showing how climate-related uncertainty should be reflected in financial statements, including in impairment assumptions.[54]

Shipowners' Fleet Expansion Plans

The largest owners plan to keep growing their LNG fleets through 2030. Mitsui OSK Lines' chief executive has spoken of almost 150 LNG carriers around 2030, up from about 100 in 2024.[55] NYK Line targets about 130 by fiscal 2028 and K-Line 75 by 2030. An independent review by the Kamakura Sustainability Institute found that none of the three discloses scrapping plans or stranded asset mitigation for its LNG fleet.[56]

Following the delay in adopting the IMO Net-Zero Framework, Mitsui OSK Lines said it may slow the timing and scale of its climate investments.[57] Flex LNG reported about 60 newbuilds ordered in 2026, many without charters.[58] The owners that have written down LNG carriers so far, Seapeak and GasLog Partners, are those whose steam ships came off charter first, illustrating the financial exposure associated with older tonnage losing contracted employment.[59]

53 Financial Services Agency of Japan. (2026, January 8). [Roadmap for the application of SSBJ sustainability disclosure standards]; Financial Services Commission of Korea. (2026, July 8). [Roadmap for mandatory sustainability disclosure].

54 IFRS Foundation. (2025, November 28). IASB issues illustrative examples on reporting uncertainties in financial statements. https://www.ifrs.org/news-and-events/news/2025/11/iasb-issues-illustrative-examples-reporting-uncertainties-financial-statements/

55 S&P Global. (2024, October 9). [Interview with Mitsui O.S.K. Lines CEO Takeshi Hashimoto]. Hellenic Shipping News. https://www.hellenicshippingnews.com/?p=1059025

56 Kamakura Sustainability Institute. (2026, August 13). Transition 2026: Shipping sector. https://www.kamakurasustainability.com/kamasasu-column/transition2026-shipping-sector-en

57 Mitsui O.S.K. Lines. (2026, January 5). MOL CEO Hashimoto's 2026 New Year message. Hellenic Shipping News. https://www.hellenicshippingnews.com/mol-ceo-hashimotos-2026-new-year-message-management-plan-blue-action-2035-toward-phase-2/

58 Flex LNG. (2026, August 19). Second quarter 2026 results [Press release]. https://www.sec.gov/Archives/edgar/data/1772253/000162828026057820/q22026flexpr.htm

59 Seapeak. (2025). Report on Form 6-K for the quarter ended September 30, 2025. https://www.sec.gov/Archives/edgar/data/1308106/000130810625000005/seapeak6-kq3x25doc.htm; GasLog Partners. (2025). Report on Form 6-K for the quarter ended September 30, 2025. https://www.sec.gov/Archives/edgar/data/1598655/000110465925101931/tm2529350d1_ex99-1.htm

Data and Methodology

This report maps the world's large LNG carriers, in service and on order, to their owning groups using Clarksons Research data from mid-September 2026.[60] The approach is built to answer one question for each owner: how much of its fleet is in LNG shipping, and how long those ships are expected to trade under alternative assumptions. The data analysis was carried out by DataTalks.

The 31 profiled groups are selected as the owners of more than ten LNG carriers in service and on order in Clarksons' owner data at the time of selection. This report counts only carriers at or above the 100,000 cbm threshold and attributes joint-venture ships differently; a few of the 31 show ten or fewer such ships in Annex A, and a few groups outside the 31 show more. Exposure is analyzed by owner group, not by country; a breakdown by owner nationality is outside the scope of this report.

[Table 2] Data and methodology choices

Element	What was done	Why it matters
Universe	Clarksons types "LNG Carrier" and "LNG/Regasification" of 100,000 cbm or more: 833 vessels in service and 278 on order, 192.0 million cbm in total	Excludes 42 small-scale and bunkering vessels and 101 other LNG-adjacent vessels, such as multi-gas carriers, which serve coastal distribution and ship fueling rather than the long-haul trade the orderbook is built for. The universe still covers 99.3% of all LNG cargo capacity Clarksons records
Sources	Clarksons World Fleet Register: vessel extract of 15 September 2026, group data of 18 September 2026, sale-and-purchase record (172 transactions). Kpler: time-charter records (17–23 September 2026)	Clarksons drives every count, share and ranking. Kpler is used only for charter cover and for the capacity of 83 vessels Clarksons does not publish
Unit of analysis	The ultimate parent group, not the single-ship company that holds title	A stranded vessel sits on the parent's balance sheet, in front of its lenders and shareholders

60 Clarksons Research (2026); Kpler (2026).

[Table 2] Data and methodology choices

Element	What was done	Why it matters
Joint ventures	Nine joint ventures split between parents by published equity share, or equally where none is published	Capacity, shares and market totals use equity shares and sum exactly to the market. Group vessel counts (Figures 6 and 8 and the text) count each joint-venture ship in full for every parent; summed across groups they would exceed the market by 159 vessels, so they are used only within each group
Capacity	Published by Clarksons for 599 vessels, from Kpler for 83, derived from deadweight (1.854 cbm per tonne) for 429	The size threshold was checked on the 630 vessels where Clarksons publishes both capacity and deadweight, with no disagreements. On published figures, the deadweight rule estimates capacity with a median error of about 3%. Almost all orderbook capacity is derived this way
Realized stranding	Vessels Clarksons records as Idle or Laid Up	An idle ship is stranding that has already happened. Vessels under repair or survey are excluded
Prospective stranding	Vessels still within design life after 2050, tested on five lifespans: 25, 30, 35, 38 and 40 years	30 years is the headline case, with the 38-year average lifespan of the Investment Risk Monitor (UCL Energy Institute and Kuehne Climate Center, co-launched with SFOC) shown beside it[61]; 25 years is a stress test, close to the age at which ships are scrapped today
LNG fleet concentration	Large LNG vessels as a share of each group's whole fleet, all vessel types, for 31 profiled groups	Both sides of the ratio are Clarksons counts of the same date

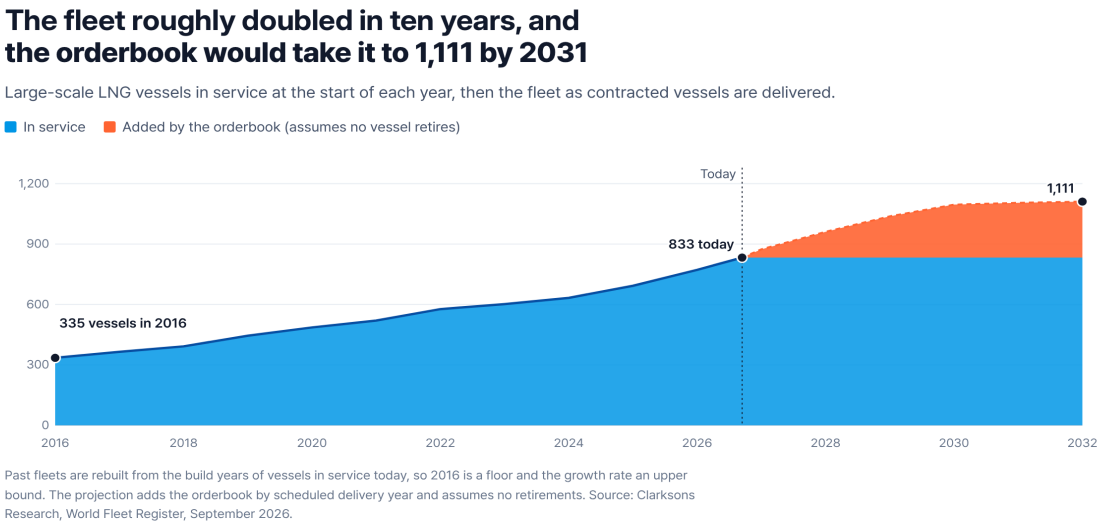
Three limits to keep in mind. First, Clarksons does not publish a group fleet by year, so past fleets are rebuilt from the build years of ships still held today. The 2016 figures are therefore floors and growth rates are upper bounds; 51 vessels sold since 2016 were added back to their sellers to reduce the bias. Second, Kpler records a forward charter expiry for only 174 of the 833 vessels in service, so charter findings are indicative. Third, 39% of capacity in the dataset is derived from deadweight rather than published, which matters most for owners outside the 31 profiled groups. The Annex provides further methodological details, the joint-venture equity shares, and the additional data needed to strengthen the analysis.

61 Kuehne Climate Center & UCL Energy Institute (2025).

Fleet Growth and Committed Newbuild Deliveries

Ten Years of Growth, Three More Years of Deliveries Locked In

The large LNG carrier fleet has roughly doubled in a decade, and the next wave is already contracted. At least 335 vessels were in service in 2016; there are 833 in September 2026. Capacity grew faster, from at least 54.1 to 140.9 million cbm (an increase of up to 160%), as newer ships carry more cargo than older ones. Both 2016 figures are minimums, so the true growth is lower.[62]



[Figure 2] Large LNG carriers in service since 2016, and the fleet as the orderbook is delivered. Chart: DataTalks.

Six in ten vessels in service today (498 of 833) were delivered since 2016, and they carry 62% of the fleet's capacity. The fleet is young as a result: its median age is 8 years, and three-quarters of it is 17 years old or younger. The average, 9.9 years, is pulled up by a tail of 104 vessels aged 20 or older, all but one of them steam turbines. Deliveries rose from 37 a year in 2016-2020 to 50 a year in 2021-2025.

Mitsui OSK Lines has taken delivery of the most of this new tonnage that it still holds (45 vessels, 6.4 million cbm), followed by Angelicoussis Group (35 vessels, 6.1 million cbm), Knutsen OAS Shipping (30 vessels, 5.2 million cbm) and NYK Line (31 vessels, 4.1 million cbm). These vessel counts include jointly owned ships in full for each parent, while the capacity is each group's

62 Clarksons Research (2026); SFOC analysis. Past fleets are reconstructed from the build years of ships still in service, so the 2016 figures are floors.

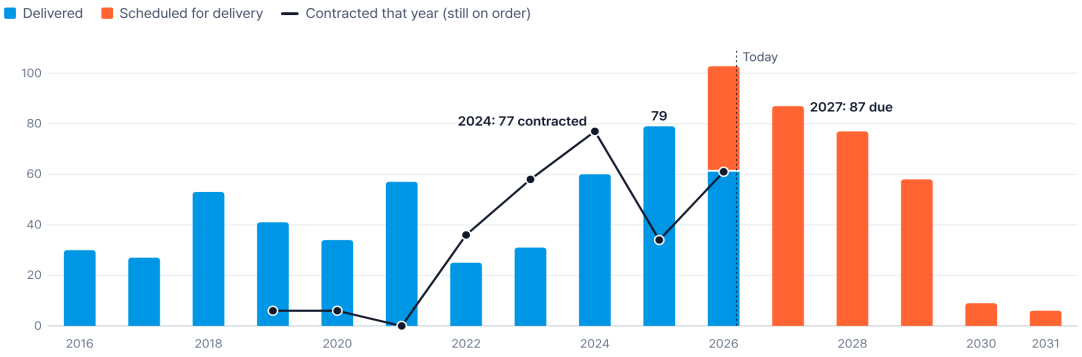
ownership share.[63]

The 278 vessels on order are not a forecast. They are contracted hulls with yard slots and delivery dates, adding 51.1 million cbm, equal to 36% of today's operating capacity. Deliveries are at their peak now: 61 ships arrived in 2026 by mid-September and 41 more are due by the end of the year, followed by 87 in 2027 and 77 in 2028. In all, 237 arrive in 2027 or later.[64]

Ordering dipped in 2025 and picked up again in 2026. Of the hulls still on order, 77 were contracted in 2024, 34 in 2025 and 61 in 2026 up to mid-September. Earlier years look smaller in this count only because most of their orders have already been delivered.[65] A slowdown in ordering would not undo what is already committed, and it is this committed tonnage that the stranded asset question is about.

Deliveries peak in 2026-27 and keep arriving until 2031; ordering picked up again in 2026

Vessels delivered each year (still in service), vessels on order by scheduled delivery year, and outstanding orders by the year they were contracted.



Ordering is measured from the contract dates of hulls still on order, so it covers only orders not yet delivered. Deliveries before 2016 are a floor. Source: Clarksons Research, World Fleet Register, September 2026.

[Figure 3] Vessels delivered and scheduled for delivery each year, and outstanding orders by the year they were contracted. Orders from earlier years look smaller because most have already been delivered. Chart: DataTalks.

Interpreting the 2016 baseline. Historical fleet series are rebuilt from the build years of ships still in service. Ships scrapped or sold out of the market since 2016 are missing, so the 2016 figures (335 vessels and 54.1 million cbm) are floors and the growth rates are upper bounds. Because almost no modern LNG tonnage has been demolished, the delivery series from 2016 onwards can be read as it stands.

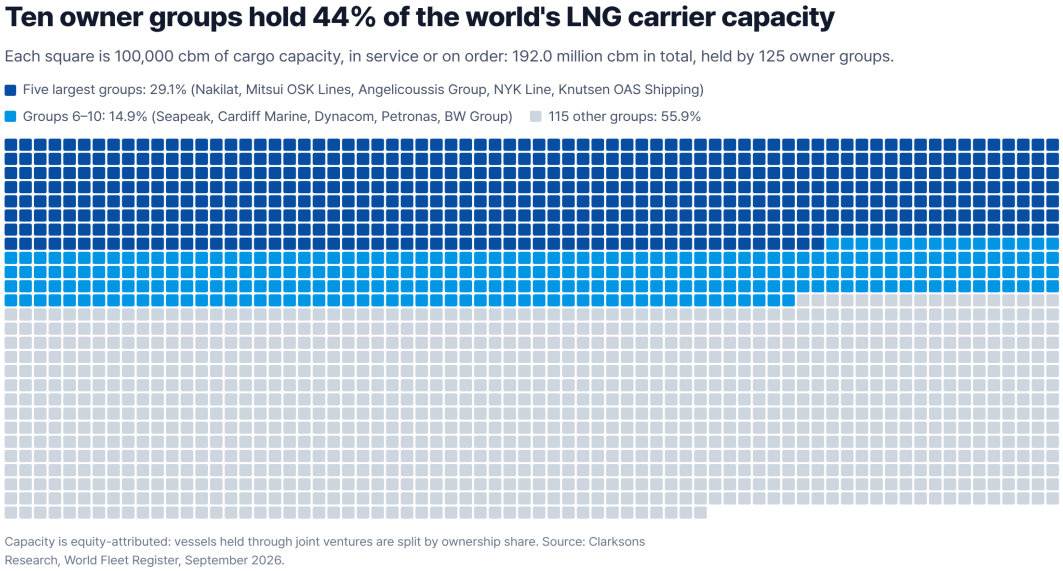
63 Clarksons Research (2026); SFOC analysis.

64 Clarksons Research (2026); SFOC analysis.

65 Clarksons Research (2026); SFOC analysis. Contract years are those of hulls still on order.

A Short List of Owners Carries Most of the Exposure

125 owner groups own the 833 large LNG carriers in service and the 278 on order, but ten of them hold 43.7% of the capacity in service and 45.0% of the capacity on order. Transition risk in LNG shipping therefore sits with a short, nameable list of counterparties, many of which share the same lenders, lessors and insurers.[66]



[Figure 4] Share of LNG carrier capacity, in service and on order, held by the ten largest owner groups. Shares are rounded. Together the ten groups hold 44.1% of capacity in service and on order, and 43.7% of capacity in service alone. Chart: DataTalks.

Nakilat holds the largest combined operating fleet and orderbook, at 16.6 million cbm, built around Q-Flex and Q-Max tonnage that no other owner runs at scale. Its 7.1 million cbm orderbook is equal to 74% of the fleet it already operates.[67]

Growth is concentrating in a few groups, though not only in today's largest. The five largest orderbooks (Nakilat, Mitsui OSK Lines, China Merchants, NYK Line and ADNOC) hold 36.3% of all capacity on order, against 28.2% of capacity in service for the five largest fleets. Two of them, China Merchants and ADNOC, are outside today's ten largest owners. The market of 2030 will be bigger, slightly more concentrated, and ranked differently.[68]

66 Clarksons Research (2026); SFOC analysis. On the concentration of LNG shipping finance, see Solutions for Our Climate. (2025a, May 13). No room for more: Why LNG carriers are a climate and financial risk. https://forourclimate.org/research/581

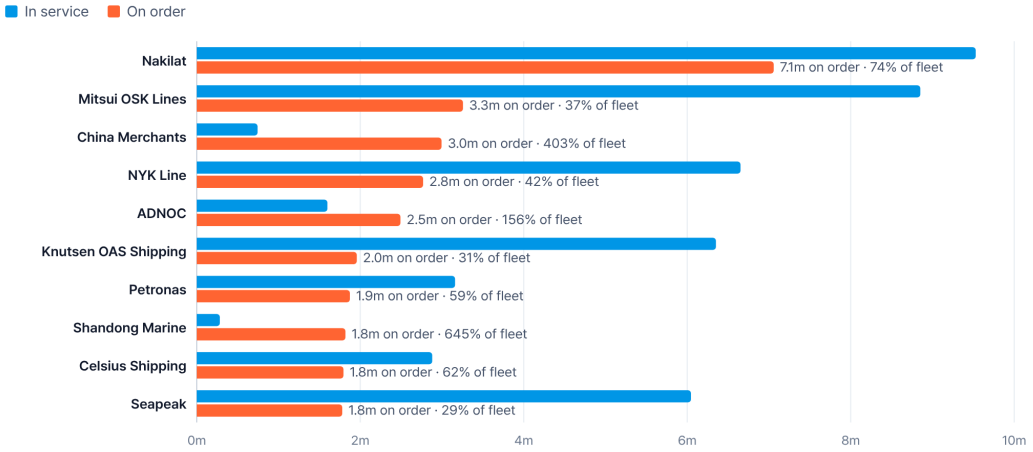
67 Clarksons Research (2026); SFOC analysis. Capacity is equity-attributed.

68 Clarksons Research (2026); SFOC analysis. The five largest fleets in service by capacity are Nakilat, Mitsui OSK Lines, Angelicoussis Group, NYK Line and Knutsen OAS Shipping (39.7 million cbm, 28.2%). Figure 4 measures capacity in service and on order, on which the same five hold 29.1%.

For some owners the orderbook dwarfs the existing LNG business. China Merchants has four times its current LNG capacity on order (3.0 against 0.7 million cbm), Shandong Marine more than six times (1.8 against 0.3) and ADNOC 1.6 times (2.5 against 1.6). These groups are taking on most of their LNG exposure now, as the market turns.[69]

Five groups hold 36% of all LNG capacity on order

The ten largest orderbooks by capacity, against the fleet each group already has in service. Disclosed newbuild prices total US$45.4 billion for 182 of the 278 hulls on order; at the same average (US$249 million), the whole orderbook is worth about US$69 billion.



Million cbm, equity-attributed. Percentages show the orderbook as a share of each group's capacity in service.
Newbuild prices: Clarksons, US$ quotes only. Source: Clarksons Research, World Fleet Register, September 2026.

[Figure 5] The ten largest orderbooks, against the fleet each group already has in service. Chart: DataTalks.

Two national clusters stand out. The three Japanese diversified carriers, Mitsui OSK Lines, NYK Line and K-Line, hold 25.2 million cbm (equity-attributed, including their shares of joint ventures), or 13.1% of world capacity in service and on order, much of it through joint ventures with Qatari and Chinese state-owned partners. Seven Greek-controlled groups among those profiled hold 32.4 million cbm, or 16.9%. Altogether, the 31 groups profiled in this report hold 75% of world capacity.[70]

Ownership is not the whole picture. A vessel on a long charter passes demand risk to its charterer, usually an LNG producer or buyer, until the charter ends. Chapter 6 shows how little of the fleet has charter cover that is visible to outsiders.

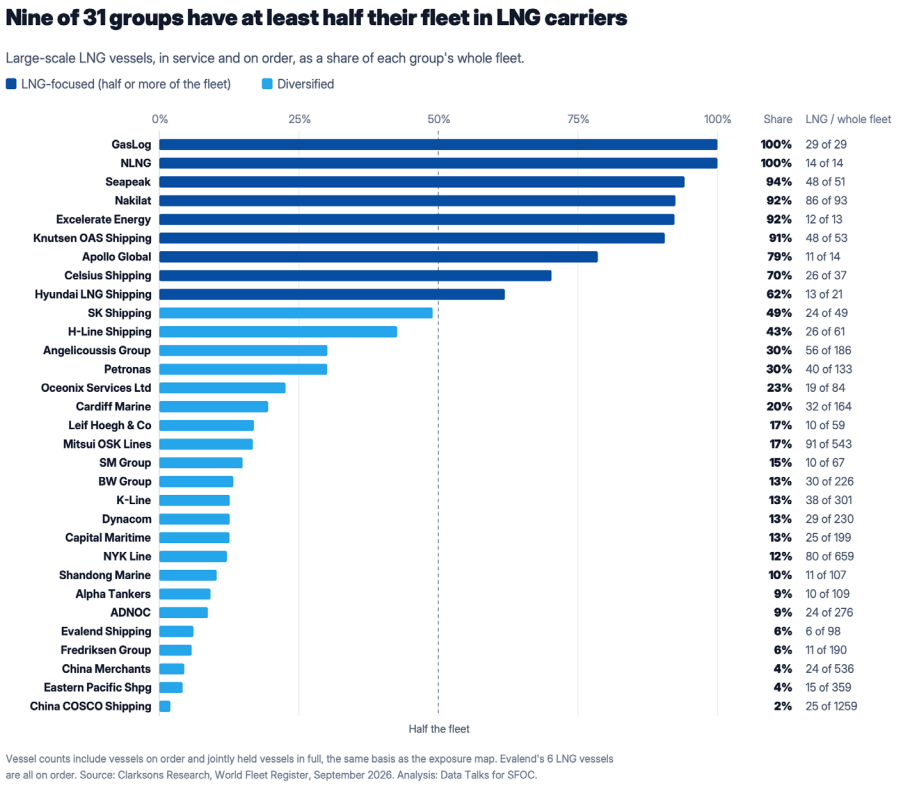
69 Clarksons Research (2026); SFOC analysis.

70 Clarksons Research (2026); SFOC analysis. Nationality as recorded by Clarksons. Mitsui OSK Lines 12.1, NYK Line 9.4 and K-Line 3.7 million cbm. The seven Greek-controlled groups are Angelicoussis Group (9.5 million cbm), Cardiff Marine (5.5), Dynacom (5.2), GasLog (5.0), Capital Maritime (4.4), Alpha Tankers (1.7) and Evalend Shipping (1.1).

Portfolio Exposure: LNG Fleet Concentration

Nine of the 31 profiled groups have at least half of their fleet in large LNG carriers, and six have 80% or more. These owners have no other trade to absorb a weak LNG market, and their dependence has deepened over a decade in which LNG shipping was reliably profitable.

In August 2026 SK Shipping and H-Line Shipping, both owned by the private equity firm Hahn & Co., agreed to move 16 LNG carriers from H-Line to SK Shipping in exchange for 12 tankers and about US$300 million. The swap had not completed when the data were extracted, so this report shows both fleets before it; on completion SK Shipping's LNG share would rise from 49% to about 75%, making it a tenth group with at least half its fleet in LNG carriers and, depending on the ages of the ships transferred, moving it into the most exposed group in Figure 14.[71]



[Figure 6] LNG carriers, in service and on order, as a share of each profiled group's whole fleet. Vessel counts include jointly held vessels in full (Nakilat: 78 wholly owned plus 8 through Nakilat JC); capacity elsewhere in the report is equity-attributed. Chart: SFOC, in the DataTalks design.

71 Clarksons Research (2026), group listings and group profiles of 18 September 2026; SFOC analysis. On the H-Line and SK Shipping swap: Maritime Gateway (2026).

Pure Plays and Diversified Groups Carry Different Risks

The share depends on where you look. Many LNG arms are separate legal entities that look like pure plays, but at group level the parent's other ships dilute them: Mitsui OSK Lines is 17% LNG, NYK Line 12%, Angelicoussis Group 30% and Cardiff Marine 20%. For a lender to the parent, or an investor in it, the group figure is the relevant one.[72]

The most concentrated are the groups whose fleets are almost entirely LNG carriers: GasLog and NLNG at 100%, Seapeak at 94%, Nakilat and Excelerate Energy at 92%, Knutsen at 91%. For most of them, a weak LNG charter market is not a segment problem but a company problem. Fleet share counts ships rather than their value, and for NLNG, whose parent runs the Nigeria LNG export plant, and Excelerate, which also runs terminals and sells gas, it describes the shipping fleet rather than the whole business.[73]

Diversification is a cushion, not an exit. Ship loans are normally secured on individual vessels and their charters, so at asset level the exposure is undiluted, whoever the parent is.

Dependence Has Deepened, Not Eased

Counting delivered vessels only, and leaving out Hyundai LNG Shipping, which held too few ships in 2016 to compare, 17 of the other 30 groups increased their LNG share since 2016, 11 changed little and only two reduced it[74]. The eight other LNG-focused groups moved from 79% to 83% LNG, and the 22 diversified groups from 4.3% to 7.2%. The orderbook does not change that pattern: committed capacity sits mostly with groups that already specialize, so they will become more focused still.[75]

72 Clarksons Research (2026); SFOC analysis.

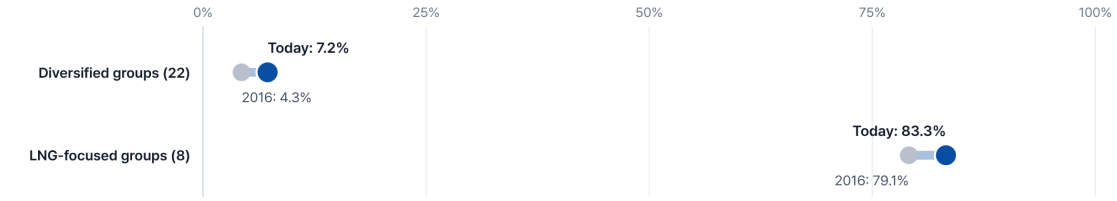
73 Clarksons Research (2026); SFOC analysis.

74 Both still hold at least as many LNG carriers as in 2016. For Shandong Marine the fall is largely a matter of timing: with its nine LNG carriers on order, LNG is 10% of its fleet including all orders (Figure 6), close to its 2016 level of 11%. Eastern Pacific Shipping's two LNG orders do not offset its much larger orders of other ships. Clarksons Research (2026); SFOC analysis.

75 Clarksons Research (2026); SFOC analysis. Shares count delivered vessels, with past fleets reconstructed from build years.

Both business models became more reliant on LNG, from opposite ends

LNG vessels as a share of the combined fleet of each type of owner group, 2016 and today.



30 profiled groups (Hyundai LNG Shipping is excluded: fewer than four vessels in 2016). LNG-focused: at least half of the fleet in LNG. Delivered vessels, by count; 2016 fleets are rebuilt. Source: Clarksons Research, World Fleet Register, September 2026.

[Figure 7] LNG carriers as a share of the combined fleet of LNG-focused and diversified groups, 2016 and today. Chart: DataTalks.

Growth rates tell a similar story. Among owners that held at least four LNG carriers in 2016, Cardiff Marine grew its LNG fleet fastest, from 5 to 22 vessels (+340%), followed by Knutsen OAS Shipping (+311%). Growth from a small base overstates the change, which is why Figure 8 ranks owners by vessels added.

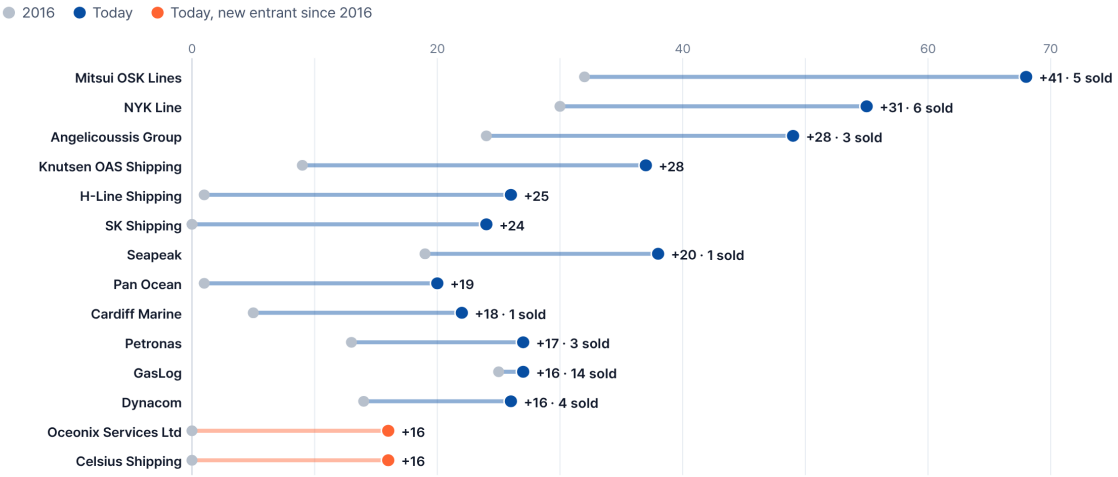
Several owners entered the trade from nothing. Oceonix Services, Celsius Shipping and CSLNG had no large LNG tonnage in 2016 and now rank among the larger owners; Celsius's LNG share of its delivered fleet went from zero to 59%. These are entries rather than expansions, and the clearest sign that LNG shipping drew new capital over the decade.

SK Shipping is not a new entrant, although Figure 8 shows it starting from zero. It operated steam carriers for KOGAS for over two decades, but because the 2016 fleet is reconstructed from the current register, ships that have since left the fleet, as SK's did when they were scrapped or sold in 2024-2025, are not captured. The same applies to H-Line Shipping and, to a lesser extent, to any owner that has retired older tonnage, so 2016 fleets are somewhat understated and growth since then somewhat overstated.[76]

76 Clarksons Research (2026); SFOC analysis. On SK Shipping's steam fleet: TradeWinds (2024, 2025).

Established owners doubled their fleets, and new entrants came in from zero

LNG vessels held in 2016 and today, for the groups that added the most. Oceonix and Celsius held no large-scale LNG vessels in 2016; SK Shipping's earlier steam fleet has been scrapped or sold, so it is missing from its 2016 count.



Labels count vessels added since 2016, by newbuilding or purchase, and vessels sold. 2016 fleets are rebuilt from vessels each group holds today, with vessels sold since 2016 added back to the seller, so a group that sold vessels moved less far than its label: Mitsui OSK Lines added 41 and sold 5, a net gain of 36. Vessel counts include jointly held vessels in full. Source: Clarksons Research, World Fleet Register and sale-and-purchase record, September 2026.

[Figure 8] LNG carriers held in 2016 and today, for the groups that added the most. Labels show vessels added since 2016 and, where a group also sold vessels, how many it sold; the line shows the net change. SK Shipping's earlier steam fleet, since scrapped or sold, is missing from its 2016 count. Chart: DataTalks.

The two groups whose share fell did not leave LNG. Shandong Marine dropped from 11% to 3% and Eastern Pacific Shipping from 23% to 6%, but only because the rest of their fleets grew four to five times faster. Shandong Marine has nine more LNG carriers on order, so its share will rise again on delivery; Eastern Pacific's two will not offset its much larger orders of other ships.[77]

Owners Are Trading Ships, Not Exiting

136 large LNG vessels changed hands since 2016, yet for major owners these were transfers rather than exits. GasLog, for example, sold 14 and still holds 27. Exit appears only at the edges: Sovcomflot, the Russian state shipowner, sold 8 and operates 1; in 2022 it sold ships to repay its Western lenders after sanctions were imposed.[78]

The clearest reduction of LNG exposure anywhere in the data is not a sale but a retirement: the steam-turbine fleet leaving the market, covered in Chapter 6. One caution applies. Because past fleets are rebuilt from ships held today, a fall in LNG share driven by disposals would be invisible here.

77 Clarksons Research (2026); SFOC analysis.

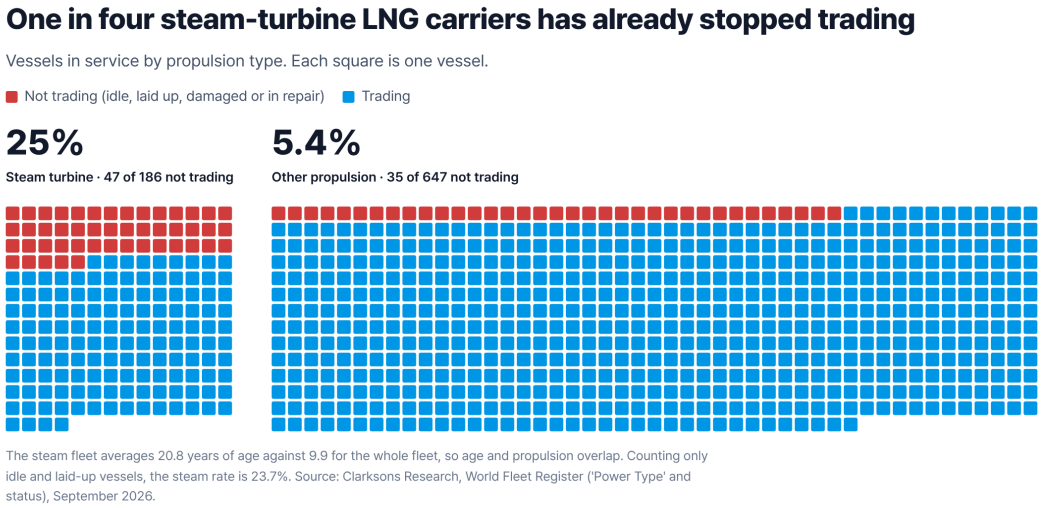
78 Clarksons Research (2026), sale-and-purchase record of 172 transactions; SFOC analysis. On Sovcomflot's sales: Interfax. (2022, May 13). Sovcomflot sells tankers amid sanctions - WSJ. https://interfax.com/newsroom/top-stories/79108/

Stranded Asset Risk: Already Visible, and Building

Stranding Is Already Under Way

Stranding is not only a future risk. 78 of the 833 large LNG carriers in service (9.4%), carrying 13 million cbm, are idle or laid up today, and most of them are steam turbines. That is close to one ship in ten earning nothing in a fleet whose average age is under ten years.[79]

Clarksons records 82 vessels as not trading: 47 idle, 31 laid up, 3 damaged and 1 under repair. Only the 78 idle and laid-up ships are counted here as realized stranding, because a ship in survey or under casualty repair is not evidence that the market has rejected it. Clarksons does not record why a ship is not trading, but owner and operator data separate the 78. 27 are idle ships tied to Qatar's halted exports, and 4 are operated for Russian LNG projects (Arctic LNG 2 and Yamal LNG). Of the other 47, 38 are steam turbines built between 1977 and 2013, 26 of them laid up, and two are 2018-built ships laid up since 2024 over defects in their KC-1 cargo tanks.[80]



[Figure 9] Vessels in service by propulsion type, trading and not trading. Chart: DataTalks

Steam turbines are the clearest stranded cohort. They are 22% of vessels and 19% of capacity, yet a quarter of them are not trading, 4.7 times the

79 Clarksons Research (2026); SFOC analysis. Status as recorded by Clarksons on 15 September 2026.

80 Clarksons Research (2026); SFOC analysis of owner and operator data. On the KC-1 defects: The Maritime Executive. (2023, December 19). Shipbuilder Samsung ordered to pay $290M in dispute over defective LNG tank. https://maritime-executive.com/article/samsung-shipbuilder-ordered-to-pay-290m-in-dispute-over-defective-lng-tank; PortNews. (2024, May 2). Pair of six-year-old LNG carriers primed for scrapping having never traded. WorldPorts. https://www.worldports.org/pair-of-six-year-old-lng-carriers-primed-for-scrapping-having-never-traded/

rate for the rest of the fleet (5.4%). Counting only idle and laid-up ships, the rates are 23.7% (44 of 186) and 5.3% (34 of 647), still 4.5 times higher. This is the mechanism SFOC's earlier work described: older, less efficient tonnage comes off a long charter and finds no new employment.[81] Steam carriers burn more fuel and cost more to maintain than ships with modern dual-fuel engines, carry less cargo, and cannot slow down to save fuel without losing more cargo to boil-off. Charterers favor the newer ships, and the EU ETS, FuelEU Maritime and the CII weigh most heavily on steam ships.[82]

Age and technology move together, so the data cannot fully separate them. The steam fleet averages 20.8 years against 6.8 for the rest of the fleet (9.9 for the fleet as a whole). What the data does show is a hard end date. The last steam turbines were delivered in 2018 (Oceanic Breeze for K-Line, Pacific Mimosa for NYK Line, Seri Cemara for Petronas) and none is on order. Even on a 35-year life, the entire 186-vessel cohort is gone by 2053; on a 25-year life, close to the average scrapping age of 26 in 2025, by 2043.[83]

For owners of dual-fuel vessels, the steam-turbine fleet illustrates how technological disadvantage, weak charter markets and charter expiry can combine to reduce employment prospects and asset values. All three conditions are now forming again: methane slip and fuel efficiency set newer ships apart, the market is oversupplied, and many recorded charters end by 2035, as Section 6.2 shows.

Charter Coverage: The Blind Spot

For farm households to make an initial investment in agrivoltaic facilities, agrivoltaics itself must become a viable long-term revenue model. Extending the temporary use permission to at least 20 years is therefore a critical and urgent step toward enabling agrivoltaics to generate a stable, long-term revenue flow. This sustained profitability will provide farm households with a stable non-agricultural income. For some households that currently struggle to make ends meet with agricultural revenue alone, this supplementary income will provide the security needed for them to remain engaged in farming without feeling forced to abandon it due to financial reasons.

81 Clarksons Research (2026); Solutions for Our Climate. (2025b, August 1). Post-2022 order boom fuels oversupply, LNG shipping sector faces steep decline as renewables gain edge [Press release]. https://forourclimate.org/newsroom/1107. Other propulsion includes the eight steam-and-gas (STaGE) hybrids delivered in 2018-2019, one of which is idle.

82 Drewry. (2025, March 3). Steam turbine carriers are at higher risk amid increasing scrutiny and rising market uncertainty. https://www.drewry.co.uk/maritime-research-opinion-browser/maritime-research-opinions/steam-turbine-carriers-are-at-higher-risk-amid-increasing-scrutiny-and-rising-market-uncertainty; Riviera Maritime Media (2025c).

83 Clarksons Research (2026); SFOC analysis.

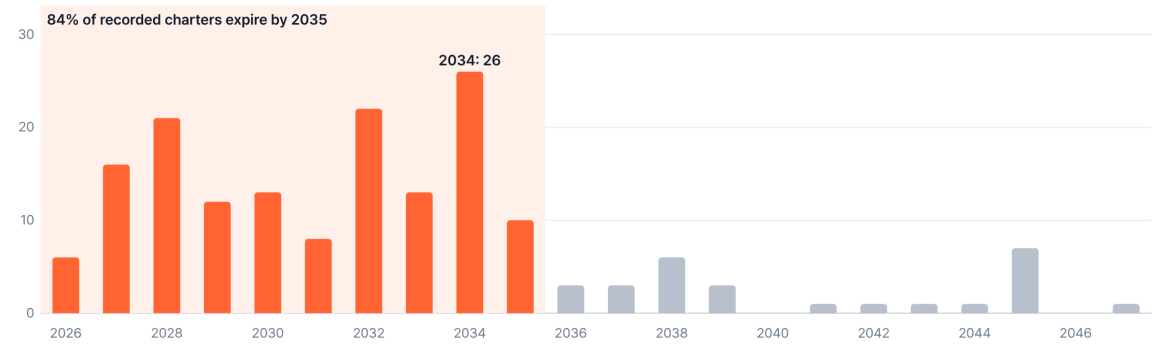
Charter cover determines when market risk returns to the owner, yet it is mostly invisible. Kpler records a forward time-charter expiry for only 174 of the 833 vessels in service (21%). Of those, 84% (146 vessels) end by 2035, just as the delivery wave and the regulatory tightening described earlier bite.[84]

Steam turbines are slightly better covered than the rest of the fleet: 49 of the 186 (26%) have a recorded forward charter, against 19% of other ships, but 47 of those 49 end by 2035. Only two Petronas ships, Seri Ayu and Seri Cemara, are chartered beyond that, to 2036 and 2038. For the remaining 137, as for most of the fleet, a missing record usually means the charter is private rather than absent. Recorded charters probably miss many long project charters, so the 84% figure likely overstates near-term expiry across the fleet as a whole. No charter data is available for ships on order.[85]

For financiers and insurers, this opacity is itself a risk: a loan or hull policy priced on the assumption of charter cover depends on information about that cover, its counterparty and its end date that is largely not public. Complete charter data would turn this analysis from a ranking of concentration and age into a true ranking of re-employment risk.

Most recorded charters expire by 2035, long before 2050

Forward time-charter expiries by year. Only 174 of 833 vessels in service (21%) have a recorded expiry; 84% of those expire by 2035.



Indicative only: a missing record usually means the charter is not public, not that the vessel is uncharted. 137 of 186 steam turbines have no recorded forward charter. Source: Kpler, September 2026.

[Figure 10] Recorded time-charter expiries by year (Kpler data, indicative only). 2050 is the year by or around which the IMO aims for net-zero GHG emissions from international shipping. Red bars are charters expiring by 2035. Chart: DataTalks.

84 Kpler. (2026). Time-charter records [Data set]. Extracted 17-23 September 2026; SFOC analysis. Kpler time-charter records were matched by vessel name to the 833 large LNG carriers in service in Clarksons Research (2026). A vessel counts as covered if a time charter with a future end date is recorded; spot fixtures carry no end date and are excluded. A missing record usually means the charter is not public, not that the vessel is unchartered.

85 Kpler (2026); SFOC analysis.

Interpreting vessel status. Status definitions differ between providers. Clarksons records commercial status but does not publish its definitions: an idle ship is unemployed but still operating, while a laid-up ship has been taken out of service. In hot lay-up the machinery is kept running and the ship can return to service within about a week; in cold lay-up the machinery is shut down and reactivation takes weeks to months.[86] P&I insurers treat a ship as laid up after at least 30 consecutive days with no cargo on board at a lay-up location approved by its hull insurers.[87] Kpler tracks vessel movements and has no idle category. Of Clarksons' 31 laid-up ships, Kpler also shows 16 as laid up; most of the 47 idle ships are moving in ballast, without cargo. The 78 figure uses Clarksons' definition throughout.[88]

The effect of Qatari export disruption

Since QatarEnergy declared force majeure in early March 2026, the closure of the Strait of Hormuz and damage at Ras Laffan have halted most Qatari exports, leaving close to 50 Qatar-linked carriers empty in Asia.[89] Nakilat owns 21 of the 78 idle or laid-up ships in our data: 13 idle ships tied to Qatar's trade, and 8 steam turbines built in 1996-2000 that are laid up. The 27 idle ships tied to Qatar's trade, Nakilat's 13 among them, would be expected to return to work when Qatar restarts. Excluding those 27, 51 ships (6.1% of the 833) are idle or laid up, and steam turbines are ten times as likely as other ships to be idle or laid up (21.1% against 2.1%). The steam-turbine pattern predates the war: in February 2026 Drewry already counted over 60 idle or laid-up LNG carriers, 70% of them steam.[90]

The 2050 Question: Run the Ships, or Write Them Off

All LNG carriers currently on order would still be within their design life in 2050, the year by or around which the IMO aims for net-zero emissions from international shipping.[91] On a 30-year life, 39% of capacity in service is still within its design life after 2050, and 55% once the orderbook is added. On 35 years the figures are 62% and 72%, and on the 38-year average lifespan used by the Investment Risk Monitor, 70% and 78%.[92]

86 Shipowners' Club. (2016, December 13). What steps should a prudent shipowner take when placing vessels in layup? https://www.shipownersclub.com/latest-updates/news/what-steps-should-prudent-shipowner-take-when-placing-vessels-layup/; Lloyd's Register. (2020, May). Owners look to lay-up as they navigate COVID-19 trade declines. https://www.lr.org/en/knowledge/insights-articles/maritime-rules-safety/owners-look-to-lay-up-as-they-navigate-covid-19-trade-declines; Riviera Maritime Media (2025c).

87 Gard. (n.d.). Premiums and calls - Rule 22: Laid-up returns. https://gard.no/rules-statutes-and-guidances/document/premiums-and-calls-rule-22-laid-up-returns

88 Clarksons Research (2026); Kpler (2026). Kpler's vessel status is based on cargo tracking and has no idle category. On lay-up: Shipowners' Club (2016). An idle ship has no employment but is still operating: 46 of the 47 had a current position in Clarksons' data, and Kpler shows most of them sailing without cargo. Only 8 of the 31 laid-up ships had a current position. The 47 idle ships average 17 years and 38% are steam turbines; the 31 laid-up ships average 24 years and 84% are steam turbines.

89 OilPrice.com (2026), reporting Bloomberg data from Kpler. The two counts measure different things. The figure of close to 50 is Bloomberg's April 2026 count, from Kpler tracking, of Qatar-linked carriers sitting empty in Asia. The 27 are ships that Clarksons recorded as idle on 15 September 2026 and that are owned or operated by Nakilat, RasGas or Petronet LNG (note 90). They are not directly comparable.

90 Drewry (2026), republished by Hellenic Shipping News on 16 March 2026. Counts excluding Qatar-linked ships: Clarksons Research (2026); SFOC analysis. The 27 idle ships tied to Qatar's trade are owned by Nakilat (13) or operated by Nakilat (7), RasGas (3) or Petronet LNG (4); Nakilat's other 8 ships in the count are steam turbines built in 1996-2000 and laid up. Without the 27, 38 of 180 steam turbines (21.1%) are idle or laid up, against 13 of 626 other ships (2.1%); counting damaged ships and ships under repair as well, 41 (22.8%) against 14 (2.2%).

91 International Maritime Organization (2023).

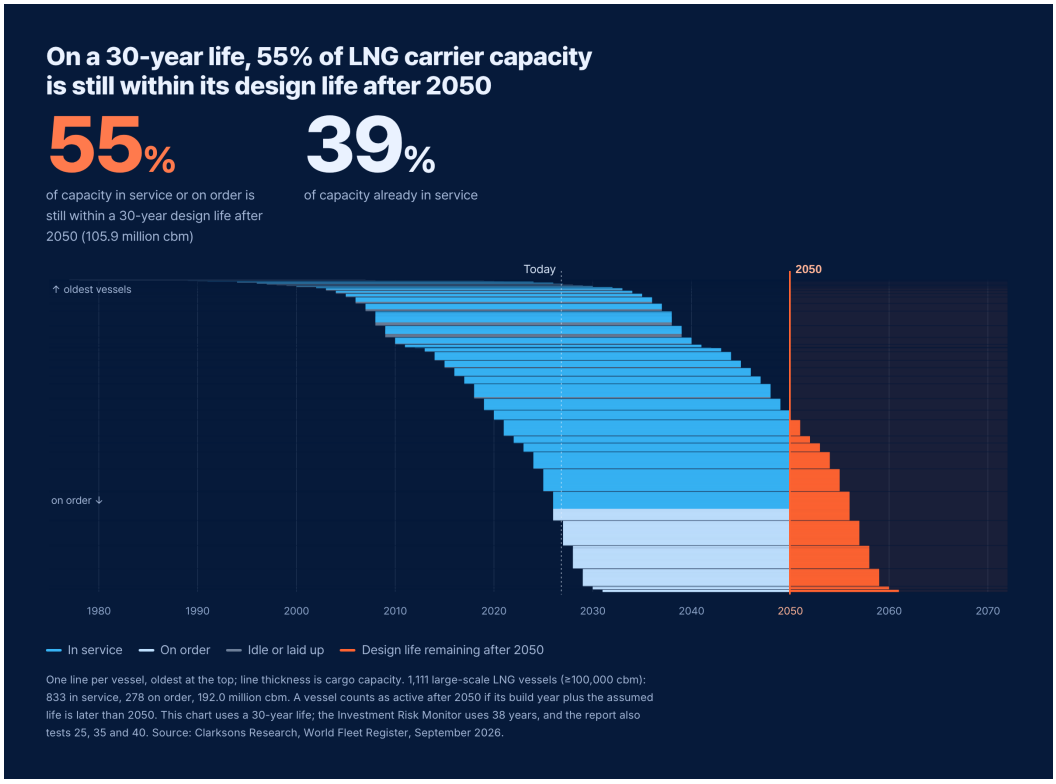
92 Clarksons Research (2026); SFOC analysis. A vessel counts when its build or scheduled delivery year plus the assumed life exceeds 2050. On the 38-year lifespan: Kuehne Climate Center & UCL Energy Institute (2025).

[Table 3] Share of capacity, fleet and orderbook still within design life after 2050, by lifespan assumption

Assumed life	Counts if built in or after	Capacity in service	Vessels in service	Fleet and orderbook
25 years	2026	8%	7%	32%
30 years	2021	39%	38%	55%
35 years	2016	62%	60%	72%
38 years	2013	70%	69%	78%
40 years	2011	72%	70%	79%

The five lifespans are alternatives, not a forecast range. Source: Clarksons Research (2026); SFOC analysis.

Even on a 25-year life, close to today's scrapping age, the orderbook dominates the post-2050 picture: only 8% of capacity in service today would still be within its design life after 2050, but 32% of fleet and orderbook capacity would be, almost all of it from ships not yet delivered.

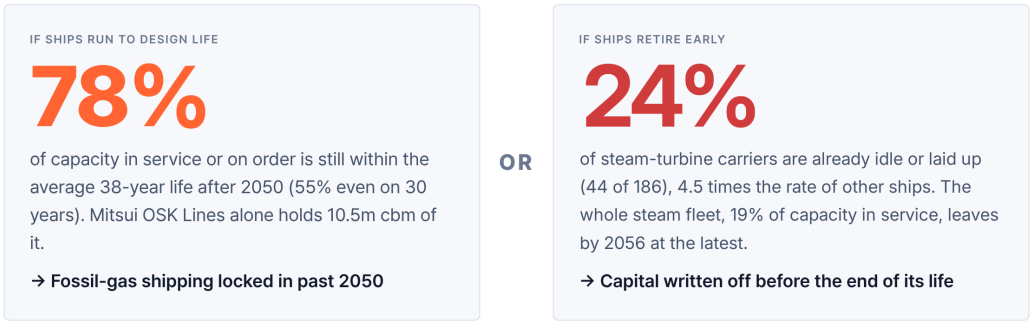


[Figure 11] Each large LNG carrier's design life on a 30-year assumption, set against 2050. Chart: DataTalks.

Every vessel on order clears all five assumptions: the earliest-scheduled hull will be only 24 years old in 2050. The orderbook is therefore post-2050 exposure that has been committed but not yet built, and much of it not yet drawn down from lenders.

This is the dilemma at the center of this report. Either these ships trade to 2050 and beyond, on fossil LNG, which the IMO's net-zero goal leaves little room for, or on scarce and costly bio- and synthetic methane, or they retire early and the capital is written off.[93]

Either the ships keep sailing past 2050, or the capital is written off early



Steam-turbine figures count idle and laid-up ships only (44 of 186); damaged ships and ships under repair are excluded. The last steam turbine was delivered in 2018; on a 38-year life it retires in 2056. Source: Clarksons Research, World Fleet Register, September 2026.

[Figure 12] The two ways the 2050 problem can resolve. The chart's headline share (78%) uses the 38-year average lifespan from the Investment Risk Monitor; on the 30-year life used elsewhere in this report it is 55% (Table 3). Both panels use the same 38-year life. Chart: DataTalks.

The market is already choosing the second half for older ships. The average LNG carrier scrapped in 2025 was 26 years old,[94] well short of the 35-40 years owners and lenders often assume; most of the ships scrapped were steam turbines. The age is falling fast: Drewry puts the average demolition age of steam carriers at 38 years in 2023 and 28 in 2024.[95] In 2023 steam ships still left the fleet at about the 38-year average lifespan used in the Investment Risk Monitor; the ships scrapped in 2025 were twelve years younger. Seapeak cut the useful life of seven steam carriers from 35 to 25 years from January 2025, with a reported US$387 million impairment.[96] It

93 International Maritime Organization (2023).

94 Argus Media (2025b).

95 Drewry (2025).

96 Riviera Maritime Media. (2025b, March 17). Seapeak cuts 10 years off useful lives of group of steam turbine LNG carriers. https://www.rivieramm.com/news-content-hub/seapeak-cuts-10-years-off-useful-lives-of-group-of-steam-turbine-lng-carriers-84228

then cut three of them to 20 years in 2025, with a further US$61.8 million impairment.[97]

Beyond scrapping, conversion to a floating storage or regasification unit offers another exit for some vessels, but it does not remove the underlying choice: a converted vessel still handles fossil LNG. Conversion has also become far more expensive. The first one, at Keppel Shipyard in 2006, cost about US$55 million.[98] Excelerate Energy now expects to spend more than the roughly US$200 million it first indicated to convert the Methane Patricia Camila, a ship it bought for about US$79 million, with delivery due in 2028.[99] Not every project goes ahead: Golar's €269 million (US$283.3 million) deal to supply Snam with the converted 2003-built steam turbine carrier Golar Arctic lapsed in July 2023.[100] The market for such units is small: at the end of February 2024, the 701 active LNG vessels included 47 operating FSRUs and 10 FSUs.[101] Conversion can give some older steam ships a second use, as with the 20-year-old Arctic Voyager, bought in August 2026 for conversion by 2028[102], but it offers little relief for the large orderbook of modern ships.

97 Seapeak (2025).

98 Offshore Magazine. (2006, February 1). Keppel Shipyard undertakes first LNG floating storage, regasification conversion. https://www.offshore-mag.com/vessels/article/16754501/keppel-shipyard-undertakes-first-lng-floating-storage-regasification-conversion

99 Baird Maritime. (2026, October 9). Excelerate Energy taps Singapore shipbuilder for FSRU conversion. https://www.bairdmaritime.com/offshore/vessels-rigs/fposfpsos/excelerate-awards-seatrium-fsru-conversion

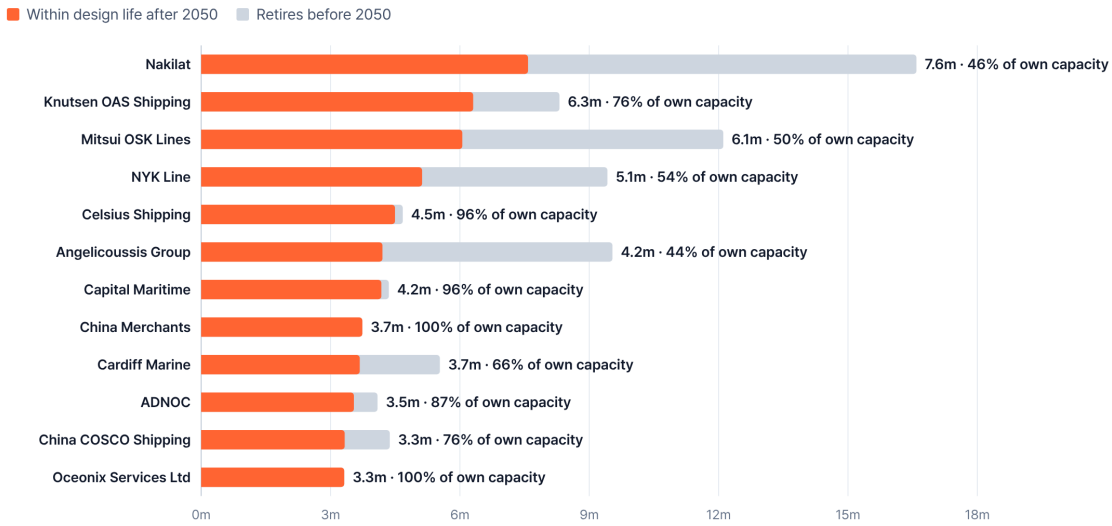
100 LNG Prime. (2022, May 18). Golar inks deal with Snam to supply converted FSRU for Sardinian project. https://lngprime.com/europe/golar-inks-deal-with-snam-to-supply-converted-fsru-for-sardinian-project/5183; LNG Prime. (2023, August 11). Golar's FSRU conversion deal with Italy's Snam falls through. https://lngprime.com/europe/golars-fsru-conversion-deal-with-italys-snam-falls-through/88647/

101 International Gas Union. (2024, October 6). LNG2024_01 [Data graphic]. https://www.igu.org/advocacy/graphics-data/lng2024-01

102 Riviera Maritime Media. (2026, October 1). Kinetics Energies acquires steam turbine-driven LNG carrier for FSRU conversion. https://www.rivieramm.com/news-content-hub/kinetics-energies-acquires-steam-turbine-driven-lng-carrier-for-fsru-conversion-90149

Nakilat holds the largest position still within design life after 2050: 7.6 million cbm

LNG capacity still within design life after 2050, by owner group, against each group's total LNG capacity.



Million cbm, in service and on order, equity-attributed. The twelve largest positions on a 30-year design life. Source: Clarksons Research, World Fleet Register, September 2026.

[Figure 13] LNG capacity still within a 30-year design life after 2050, by owner group, against each group's total LNG capacity. Chart: DataTalks.

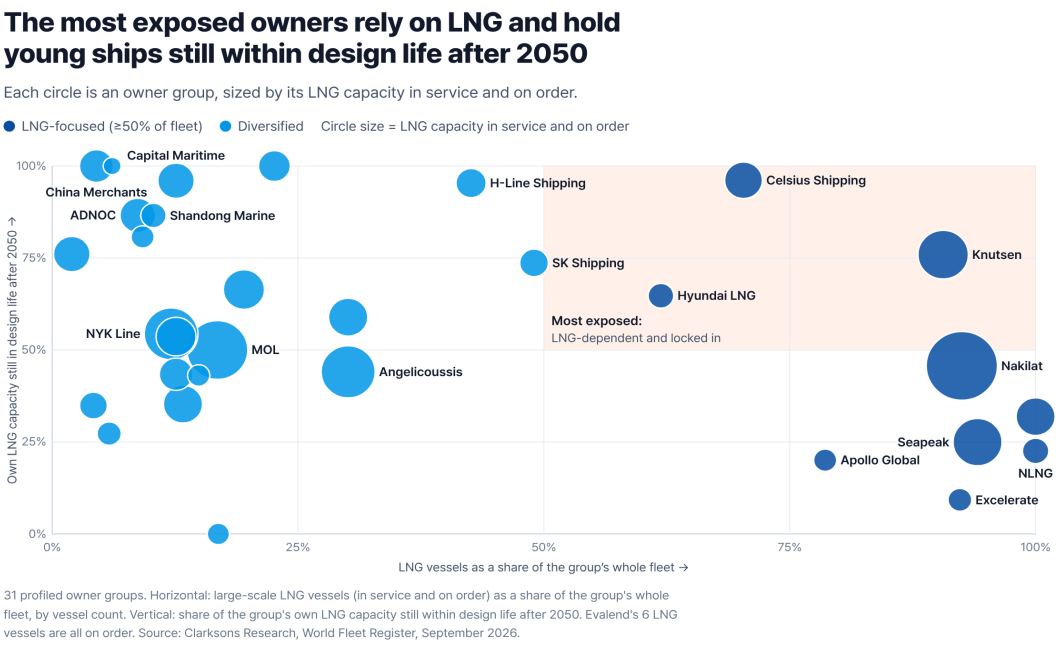
Nakilat holds the largest long-lived position: 7.6 million cbm still within a 30-year life after 2050, 39 vessels and 46% of its own LNG capacity. Knutsen combines a large position, 6.3 million cbm and 36 vessels, with a fleet that is 91% LNG, and 76% of its LNG capacity is still in life after 2050. Celsius, Capital Maritime, China Merchants and Oceonix have almost their entire LNG fleets in that window, because they are almost entirely new.[103]

Mitsui OSK Lines (6.1 million cbm) and NYK Line (5.1 million cbm) hold long-lived positions close to Knutsen's, but inside large diversified groups. Their risk is less about solvency than about capital allocation: Mitsui OSK Lines' position rises to 9.6 million cbm on a 35-year life and 10.5 million cbm on 38 years, the largest of any group on both assumptions.[104]

Figure 14 brings the two measures of exposure together: how much an owner depends on LNG, and how much of its LNG capacity is still within its design life after 2050. On a 30-year life, Celsius, Knutsen and Hyundai LNG Shipping sit in the most exposed corner. Nakilat sits just outside it, because its Q-Flex and Q-Max ships reach 30 years before 2050; on the 38-year lifespan, GasLog, Seapeak, NLNG and Apollo Global move into the corner too.

103 Clarksons Research (2026); SFOC analysis. Capacity is equity-attributed.

104 Clarksons Research (2026); SFOC analysis.



[Figure 14] Owner groups by LNG dependence and by the share of their LNG capacity still within a 30-year design life after 2050; circle size is LNG capacity in service and on order. Chart: DataTalks.

Capital Committed to the Orderbook

The orderbook carries contract prices for 182 of the 278 hulls on order, from US$193 million to US$364 million each, with a mean of US$249 million. That is US$45.4 billion of disclosed contract value, and roughly US$69 billion for the whole orderbook, assuming the 96 hulls without a recorded price cost the same on average. This is capital committed between 2022 and 2026.[105]

It sits on top of the existing fleet. Some 498 vessels delivered since 2016 are still within the early years of their loans and depreciation schedules. A charter market that cannot employ them on their original assumptions turns this book value into the write-down risk already seen in steam tonnage. The extent of any loss would depend on vessel-specific charter coverage, financing terms and carrying values.

105 Clarksons Research. (2026). World Fleet Register [Data set]. Vessel extract of 15 September 2026; SFOC analysis. Contract prices are recorded for 182 of the 278 hulls on order; US$45.4 billion is their sum, and US$69 billion applies their mean (US$249 million) to all 278. Contract dates are from the same extract.

Strategic Recommendations

Shipowners take the ordering, chartering and retirement decisions that create or reduce stranded asset risk in LNG shipping. Lenders, lessors and insurers can support those decisions through the terms on which they finance and insure ships.

For Shipowners

1. Avoid speculative newbuilds and order only against long-term charters. The orderbook already equals 36% of the fleet, 237 ships arrive from 2027, and independent analysts project a surplus of 110-200 vessels.[106] A newbuild ordered without a charter carries the same market risk that left much of the steam fleet idle, at around US$250 million a ship.

2. Stress-test fleet values against a 25-year economic life and climate-aligned demand. The average LNG carrier scrapped in 2025 was 26 years old, and Seapeak has already shortened the useful life of seven steam carriers from 35 to 25 years, and of three of them to 20.[107] Running asset values, depreciation and loan covenants on 25-year lives, and on the IEA's stated-policies and net-zero LNG trade, lets owners recognize impairments early and on their own terms, rather than when a charter ends.

3. Disclose charter cover and asset-life assumptions, vessel by vessel. Only 21% of the fleet has a forward charter visible to outsiders. Sharing charter end dates, counterparty type, propulsion and assumed useful life, and the share of the orderbook without employment, would let lenders, insurers and investors price risk on evidence. Japan's SSBJ standards will require transition-risk disclosure from the financial year ending March 2027 for the largest listed groups.[108]

106 Riviera Maritime Media. (2026, October 28). LNG carrier fleet surplus projected despite rising demand from US exports. https://www.rivieramm.com/news-content-hub/lng-carrier-fleet-surplus-projected-despite-rising-demand-from-us-exports-90407

107 Argus Media. (2025b, December 17). LNG supply growth outstrips carrier orderbook to 2030. https://www.argusmedia.com/en/news-and-insights/latest-market-news/2767075-lng-supply-growth-outstrips-carrier-orderbook-to-2030; Riviera Maritime Media. (2025b, March 17). Seapeak cuts 10 years off useful lives of group of steam turbine LNG carriers. https://www.rivieramm.com/news-content-hub/seapeak-cuts-10-years-off-useful-lives-of-group-of-steam-turbine-lng-carriers-84228; Seapeak. (2025). Report on Form 6-K for the quarter ended September 30, 2025. https://www.sec.gov/Archives/edgar/data/1308106/000130810625000005/seapeak6-kq3×25doc.htm

108 Financial Services Agency of Japan. (2026, January 8). [Roadmap for the application of SSBJ sustainability disclosure standards]. https://www.fsa.go.jp/en/news/2026/20260409/02.pdf

4. Plan retirement and cut methane slip before charters expire. Setting retirement dates for steam turbines now, and for higher-slip diesel-electric ships next, keeps recycling or conversion open while the ships still have value. Certifying actual slip, retrofitting abatement and specifying high-pressure engines cut both emissions and carbon costs, which the EU has applied to methane slip since 2026.[109]

5. Publish an LNG fleet transition plan aligned with the IMO's 2050 goal. A credible plan states when LNG fleet capacity will peak and how it will decline after 2030. The three Japanese majors plan to grow their LNG fleets to 2030 but have not yet set out how the fleets will contract afterwards.[110]

Priorities differ by business model. Diversified groups such as Mitsui OSK Lines, NYK Line, K-Line and Angelicoussis Group have the balance sheets to lead the transition. LNG-focused groups such as GasLog, NLNG, Seapeak, Nakilat, Excelerate and Knutsen have fewer other trades to fall back on; for them, charter cover and debt reduction come before fleet growth. Fleet concentration alone, however, does not establish the financial resilience of the wider business.

For Banks, Lessors and Export Credit Agencies

1. Align finance with charter cover. Match loan tenors to firm charter cover, and size balloon payments to residual values on a 25-year economic life under the IEA's stated-policies and net-zero scenarios.

2. Measure, report and stress-test LNG carrier exposure by owner, propulsion and charter expiry. Poseidon Principles signatories could report their LNG carrier alignment separately, with the cargo's lifecycle emissions as a supplementary metric. Ten owner groups hold 44% of LNG carrier capacity in service and on order, and nine of the 31 profiled groups depend on LNG for at least half their fleet; stress-testing these counterparties against a 2028-2030 market with 110-200 surplus ships would show how much of the book is exposed.[111]

109 European Commission. (n.d.-b). Reducing emissions from the shipping sector. https://climate.ec.europa.eu/eu-action/transport-decarbonisation/reducing-emissions-shipping-sector_en

110 Kamakura Sustainability Institute. (2026, August 13). Transition 2026: Shipping sector. https://www.kamakurasustainability.com/kamasasu-column/transition2026-shipping-sector-en

111 Clarksons Research. (2026). World Fleet Register [Data set]. Vessel extract of 15 September 2026; group-level listings of 18 September 2026; SFOC analysis. Riviera Maritime Media. (2026, October 28). LNG carrier fleet surplus projected despite rising demand from US exports. https://www.rivieramm.com/news-content-hub/lng-carrier-fleet-surplus-projected-despite-rising-demand-from-us-exports-90407

3. Apply consistent criteria to terminals and dedicated ships. Where a bank restricts finance for an LNG export terminal, the same test can apply to carriers dedicated to that terminal, as some banks already do for Mozambique LNG.[112]

4. Test export credit support for new LNG carriers against climate commitments and risk appetite. KEXIM, K-SURE, JBIC, NEXI and Sinosure carry much of the downside on ships built in Korea, Japan and China.[113] On the IEA's net-zero pathway, which needs no new LNG carriers, that test is hard to pass.

For Marine Insurers

1. Reflect transition risk in underwriting. Hull and machinery pricing can reflect propulsion technology, vessel age, idle status and charter cover, the factors this report finds separate trading ships from idle ones.

2. Prepare for idle and laid-up tonnage. With 78 large carriers already idle or laid up,[114] lay-up, reactivation and end-of-life cover will become a larger share of the book, along with questions about where these ships are recycled.

3. Keep disclosing, and use renewals. Annual renewals, more frequent than lenders' resets, are a natural point to ask owners for the disclosures recommended above. Insurers that joined the Poseidon Principles as associate members can also keep publishing their LNG carrier exposure and its climate alignment, as they did under the marine insurance principles until 2026.[115]

112 Solutions for Our Climate & Justiça Ambiental. (2026, September 30). Nine financial institutions confirm they are not financing Mozambique LNG carriers as Japanese shipowners face imminent decision on 17-vessel fleet [Press release]. https://forourclimate.org/newsroom/1261

113 Solutions for Our Climate. (2025c, October 26). Supplementary brief: South Korea's exposure to shipping stranded asset risks. https://forourclimate.org/research/615

114 Clarksons Research. (2026). World Fleet Register [Data set]. Vessel extract of 15 September 2026.

115 Poseidon Principles for Marine Insurance. (2025). Third annual disclosure report. https://www.poseidonprinciples.org/insurance/wp-content/uploads/2025/02/Poseidon-Principles-for-Marine-Insurance-third-Annual-Disclosure-Report.pdf; Poseidon Principles. (2025b). Poseidon Principles opens associate membership, further joining forces with the Poseidon Principles for Marine Insurance. https://www.poseidonprinciples.org/finance/news/poseidon-principles-opens-associate-membership-further-joining-forces-with-the-poseidon-principles-for-marine-insurance/

Conclusion

The LNG carrier fleet has expanded substantially over the past decade, and a further 36% of its capacity is already contracted. In 2026 a war in the Gulf hid the surplus for a few months; by October it was visible again.

Stranding in LNG shipping is not a hypothesis. One ship in ten is idle or laid up, a quarter of the steam-turbine fleet is not trading, owners are cutting ship lives from 35 years to 25 and then 20, and ships are being scrapped at 26. The question is which owners, lenders and insurers will hold the next cohort when its charters run out.

That exposure is concentrated and nameable, and most of the ships now being delivered will still be within their design life after 2050. Owners can reduce it by ordering only against charters, testing fleets against shorter lives and lower demand, disclosing charter cover and planning retirement before charters expire. Financiers and insurers can make these the conditions of their support. Each year of delay adds ships, and capital, to the risk.

116 Source: Bill Information official website, https://likms.assembly.go.kr/bill/

Annex:Owner Profiles and Detailed Methodology

A. The 31 Profiled Owner Groups

The 31 groups hold 144 million cbm, 75% of world large LNG carrier capacity in service and on order. Their LNG share of fleet is shown in Figure 6; their post-2050 positions in Figures 13 and 14.

[Table A1] The 31 profiled owner groups: LNG capacity and the fleet denominator used for LNG share

Owner group	Nationality	LNG capacity, in service and on order (million cbm)	Denominator for LNG share
Nakilat	Qatar	16.59	Group listing
Mitsui OSK Lines	Japan	12.11	Group listing
Angelicoussis Group	Greece	9.54	Group listing
NYK Line	Japan	9.42	Group listing
Knutsen OAS Shipping	Norway	8.31	Group profile
Seapeak	United States	7.83	Group profile
Cardiff Marine	Greece	5.54	Group listing
Dynacom	Greece	5.23	Group listing
Petronas	Malaysia	5.03	Group listing
BW Group	Singapore	5.00	Group listing
GasLog	Greece	4.97	Group profile
Celsius Shipping	Denmark	4.67	Group profile
China COSCO Shipping	China	4.37	Group listing
Capital Maritime	Greece	4.35	Group listing
ADNOC	United Arab Emirates	4.09	Group listing
China Merchants	China	3.74	Group listing
K-Line	Japan	3.66	Group listing
Oceonix Services Ltd	United Kingdom	3.32	Group listing
H-Line Shipping	South Korea	2.98	Group listing
SK Shipping	South Korea	2.69	Group listing
Eastern Pacific Shipping	Singapore	2.52	Group listing
NLNG	Nigeria	2.27	Group profile
Hyundai LNG Shipping	South Korea	2.15	Group profile
Shandong Marine	China	2.10	Group listing
Fredriksen Group	Norway	1.91	Group listing
Excelerate Energy	United States	1.83	Group profile
Apollo Global	United States	1.74	Group profile
Alpha Tankers	Greece	1.73	Group listing
SM Group	South Korea	1.62	Group listing
Leif Hoegh & Co	Norway	1.61	Group profile
Evalend Shipping	Greece	1.05	Group listing

Capacity is equity-attributed. “Group listing” is Clarksons’ all-ships group-level listing; “Group profile” is the group’s own profile listing across all vessel types. Both dated 18 September 2026.

B. Joint-Venture Equity Shares Applied

[Table A2] Joint-venture equity shares applied

Joint venture	Parents and equity share	Evidence
Nakilat JC (J5)	Nakilat 40%; Mitsui OSK Lines, NYK Line, K-Line, Mitsui & Co and Iino Lines 12% each	Nakilat Annual Report 2008; the 60% split among the J5 is not published, so it is divided equally
NYK / K-Line / MISC / CLNG	25% each to NYK Line, K-Line, Petronas (MISC) and CLNG	MISC Bursa announcement, 3 November 2022
CNOOC / CMES / NYK	CNOOC 50%, NYK Line 25%, China Merchants 25%	Press report of the framework agreement (Offshore Energy, 28 August 2023)
CNOOC / CSLNG / MOL	CNOOC 50%, CSLNG 25%, Mitsui OSK Lines 25%	COSCO Shipping Energy HKEX announcement, 7 January 2022
MOL / CSLNG	50% each	LNG Prime, 11 December 2024 (QC-Max hulls); equal split assumed for conventional hulls
Shanghai LNG / MOL	50% each	COSCO Shipping Energy announcement
NYK Line / Ocean Yield	50% each	Ocean Yield 2025 ESG Report
Seapeak / CLSICO (Yamal)	50% each	Seapeak Form 20-F FY2025
H-Line / Pan Ocean / SK Shipping	One third each	Partners' FY2025 audit reports (Korea Green LNG)

C. Method Notes and Checks

- **Reconciliation.** Equity-weighted capacity sums to 192,009,505 cbm and vessel equivalents to 1,111, matching the universe exactly. Clarksons records 193.3 million cbm of LNG capacity at all sizes, so the universe covers 99.3%.
- **Size threshold.** Applied on published capacity, or on 55,000 deadweight tonnes where capacity is unpublished. No LNG vessel lies between 45,447 and 66,892 dwt, so the boundary is unambiguous.
- **Capacity sources.** 53.6% of capacity is published by Clarksons, 7.1% comes from Kpler and 39.3% is derived from deadweight. Almost all orderbook capacity is derived, and 20.3 points of the derived share sit outside the 31 profiled groups.
- **Past fleets**. Each owner is assumed to have held each vessel it owns today from delivery. Vessels sold or scrapped are missing from past years, so growth rates are upper bounds; 51 vessels sold since 2016 are added back to their sellers.
- **Status**. Idle and Laid Up count as realized stranding. Damaged/Not in Service and Repairs stay in the fleet but are excluded from that indicator.

How long a ship must be idle before Clarksons reclassifies it is an open question with the provider.

- **Propulsion.** From the Clarksons Power Type field. The 8 combined steam-and-gas (STaGE) vessels are counted separately from pure steam turbines, within other propulsion. Other propulsion therefore covers 447 ships with two-stroke engines, most of them dual-fuel, 192 with dual-fuel diesel-electric propulsion and those 8 hybrids.
- **Lifespans.** A vessel counts as active after 2050 when its build or scheduled delivery year plus the assumed life exceeds 2050. The 38-year case matches the Investment Risk Monitor of UCL Energy Institute and the Kuehne Climate Center.[117]
- **Why figures differ from earlier SFOC publications.** SFOC's April 2026 report counted 746 vessels in service and 285 on order, and No Room for More (May 2025) counted 708 and 324. Those counts used different extracts and vessel definitions and are not directly comparable with this report's; the differences should not be read as changes in the fleet.

D. Data That Would Sharpen the Findings

[Table A3] Data that would sharpen the findings

Data needed	What it would allow
Charter status and expiry for the whole fleet	A true ranking of re-employment risk by owner, instead of a ranking by concentration and age
Each group's fleet by vessel type and year, 2016–2026	Observed rather than reconstructed portfolio history, including disposals
A complete annual contracting series for LNG newbuilds	The true record ordering year for the market, not just for the outstanding orderbook
Per-vessel capacity in the global vessel extract	Removal of the deadweight-based capacity estimates, mostly for the orderbook

Shipowners hold most of this information. Publishing it, as recommended in this report, would let lenders, insurers and investors price LNG carrier risk on evidence rather than assumption.

117 Kuehne Climate Center & UCL Energy Institute. (2025, September). Investment risk monitor: Storybook. https://www.kuehneclimatecenter.org/fileadmin/user_upload/Storybook_Investment_Risk_Monitor_final.pdf

E. SFOC's Earlier Work on LNG Shipping

Since 2023, SFOC has published a continuous series on LNG carriers, from shipbuilding overcapacity to finance and environmental impacts. This report builds on it.

Date	Publication	Key finding
June 2026	LNG運搬船の環境·社会影響評価 (Japanese edition, focused on Japanese banks and owners)	169 Japan-owned LNG carriers; Japanese banks provided 26.9% of LNG carrier project finance in 2020–2025
April 2026	An Assessment of Environmental and Social Impacts of LNG Carriers	Environmental and social impacts of 1,031 carriers in service and on order; US$48 billion at risk of stranding by 2035
January 2026	The Changing Legal Landscape for LNG Shipping Expansion	Climate litigation and sustainable-finance rules add legal risk to stranded asset risk for Japanese owners
October 2025	South Korea's Exposure to Shipping Stranded Asset Risks	Five Korean public institutions provided KRW 58.8 trillion for LNG carriers in 2015–2025
September 2025	Investment Risk Monitor, UCL Energy Institute and Kuehne Climate Center, co-launched with SFOC	US$48 billion of LNG carrier value at risk of write-off by 2035 in a 1.5°C world
August 2025	Post-2022 order boom fuels oversupply	Post-2022 orders fuel oversupply; some 60 carriers idle in mid-2025
May 2025	No Room for More: Why LNG Carriers Are a Climate and Financial Risk	US$335 billion of LNG maritime finance in five years; ten banks provided US$127 billion of it
October 2024	Still Adrift, Climate Analytics, supported by SFOC	Shipping capacity would exceed IEA net-zero needs by 62% in 2030 and 154% in 2035, and still by 26–34% under stated policies
November 2023	LNG Carriers: The Floating Pipeline Powering Global Gas Expansion	39% of LNG carriers on order had no long-term charter
May 2023	High and Dry: The Global Energy Transition's Looming Impact on the LNG and Oil Shipbuilding Industry, with Climate Analytics	No new LNG carriers are needed in the IEA's net-zero pathway

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