

On your radar

Navigating reform: EEXI and CII

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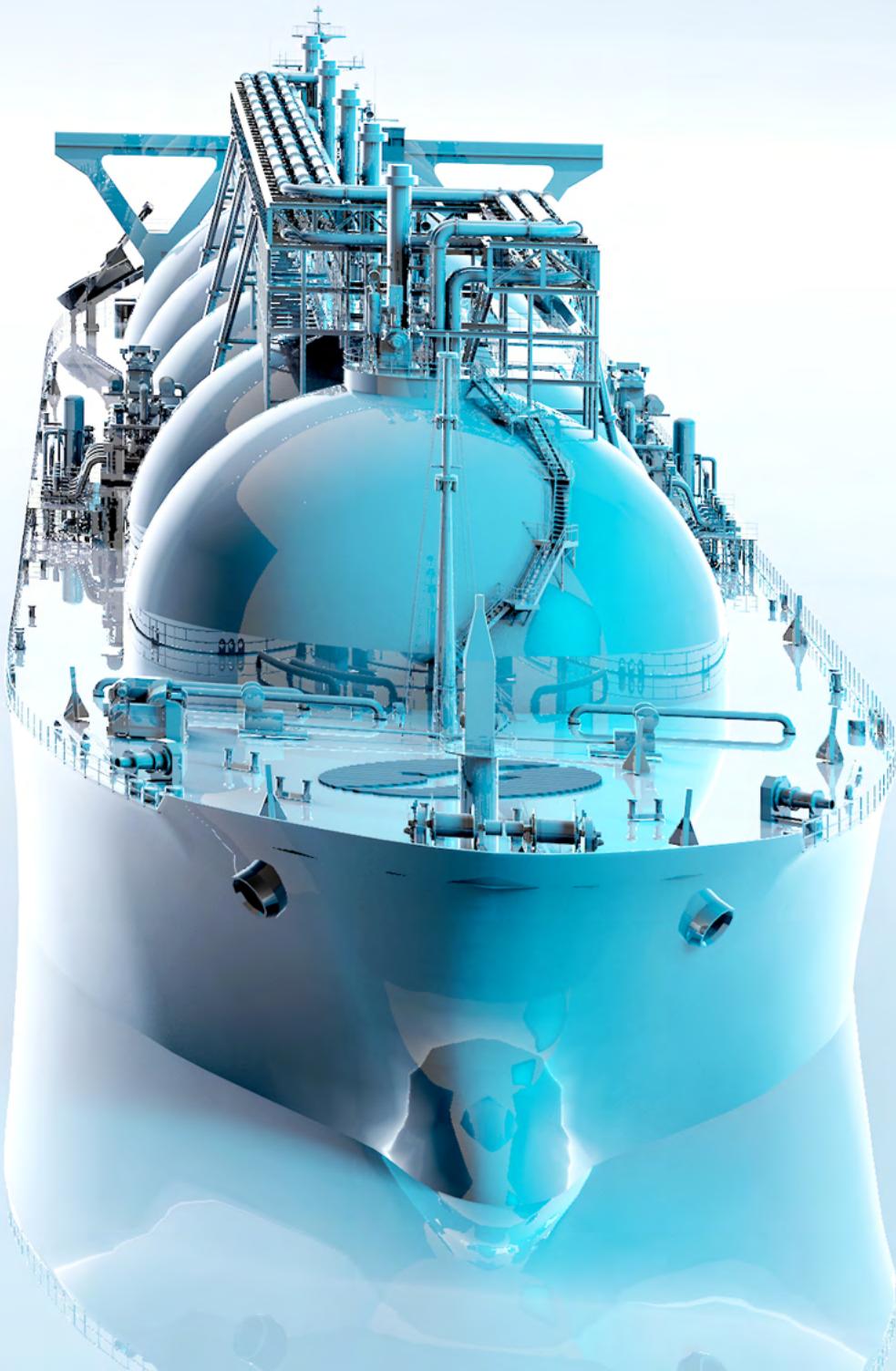
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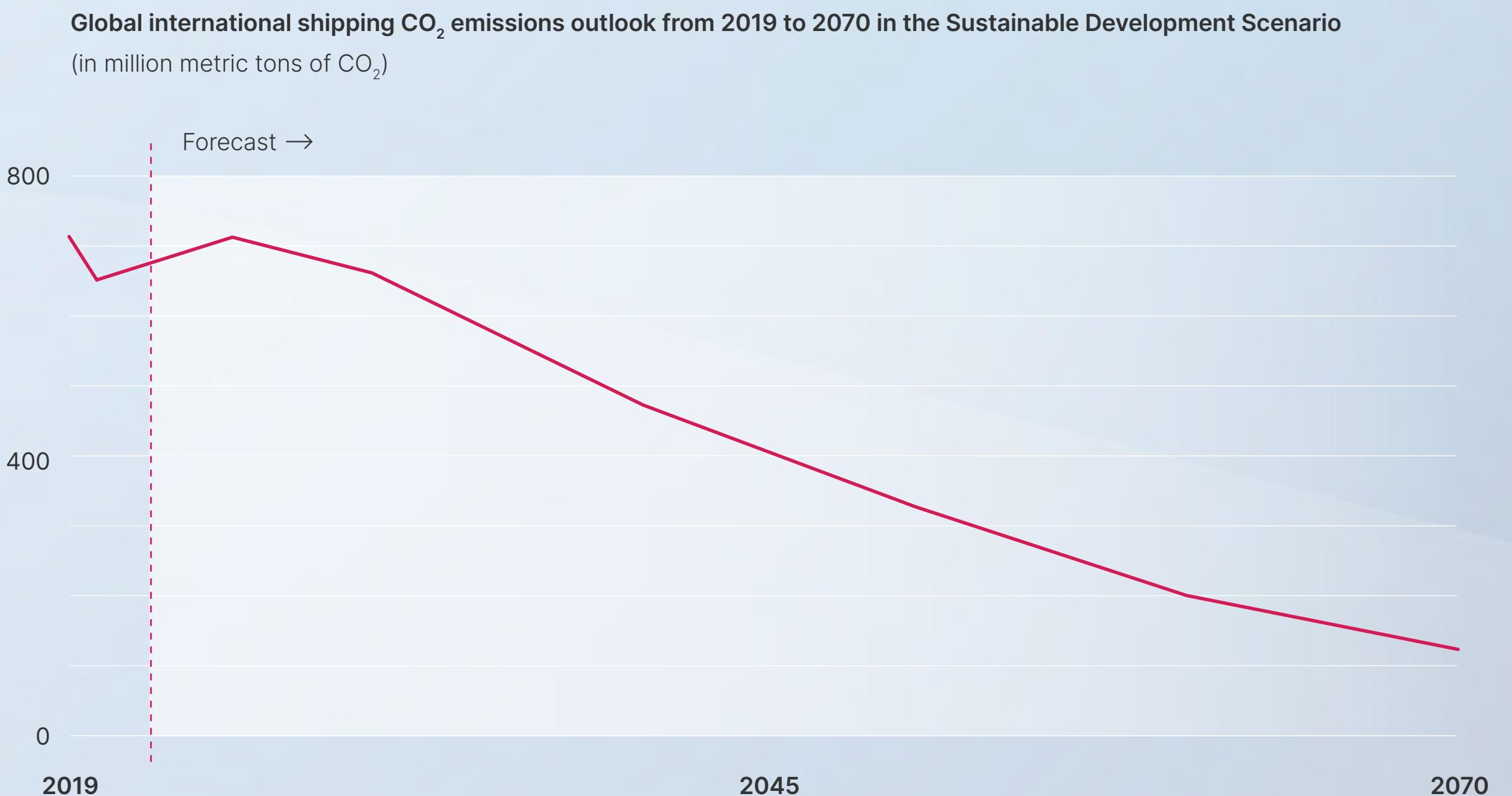


INTRODUCTION

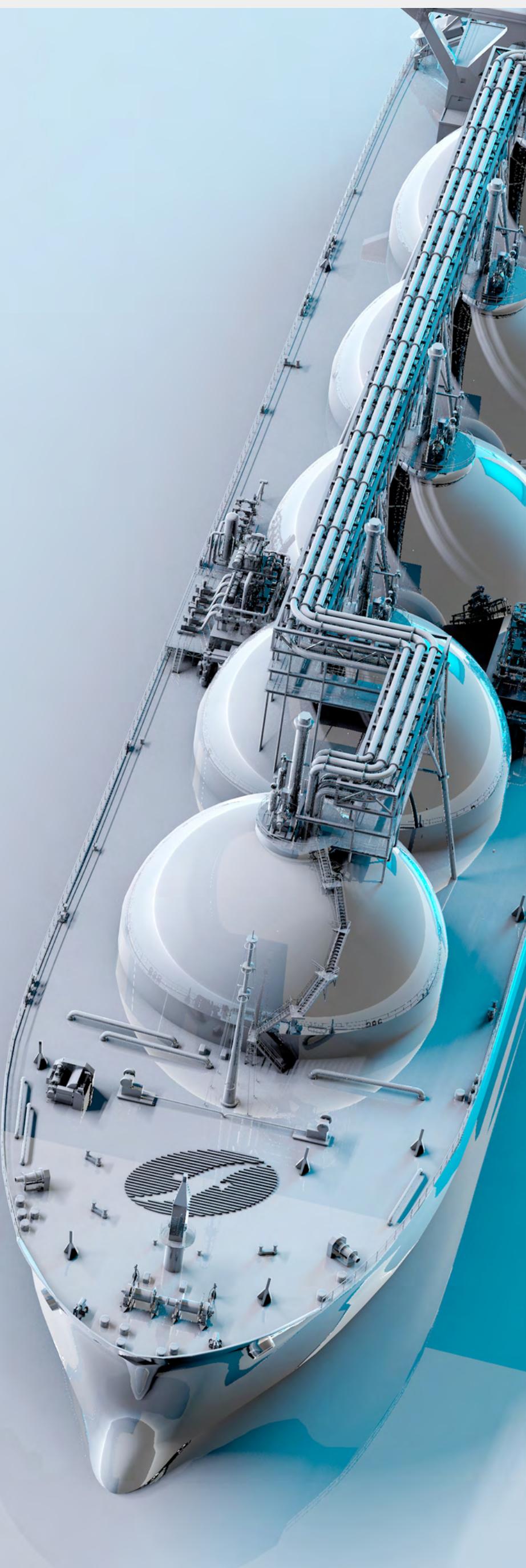
This is what the future of our industry looks like

While the journey towards 2070 and beyond is seemingly being defined as we go, we are now preparing to tackle a new milestone on the immediate horizon: meeting regulatory requirements to reduce the carbon emissions generated by shipping.

In June 2021, the International Maritime Organisation (IMO) adopted amendments to MARPOL Annex VI that will come into effect on 1 January 2023. Compliance with these forthcoming **Energy Efficiency Existing Ship Index (EEXI)** and **Carbon Intensity Indicator (CII)** requirements will necessitate a combination of technical and operational changes to improve ships' energy efficiency, and not everyone has a gameplan.



Source: Statista



The shipping sector, which has made collective efforts to reduce GHG emissions, is now at an inflection point. These latest regulations mark a turn in the industry's decades-long journey towards decarbonisation and put all stakeholders on a fast-track to compliance and alignment with global targets around carbon dioxide emissions.

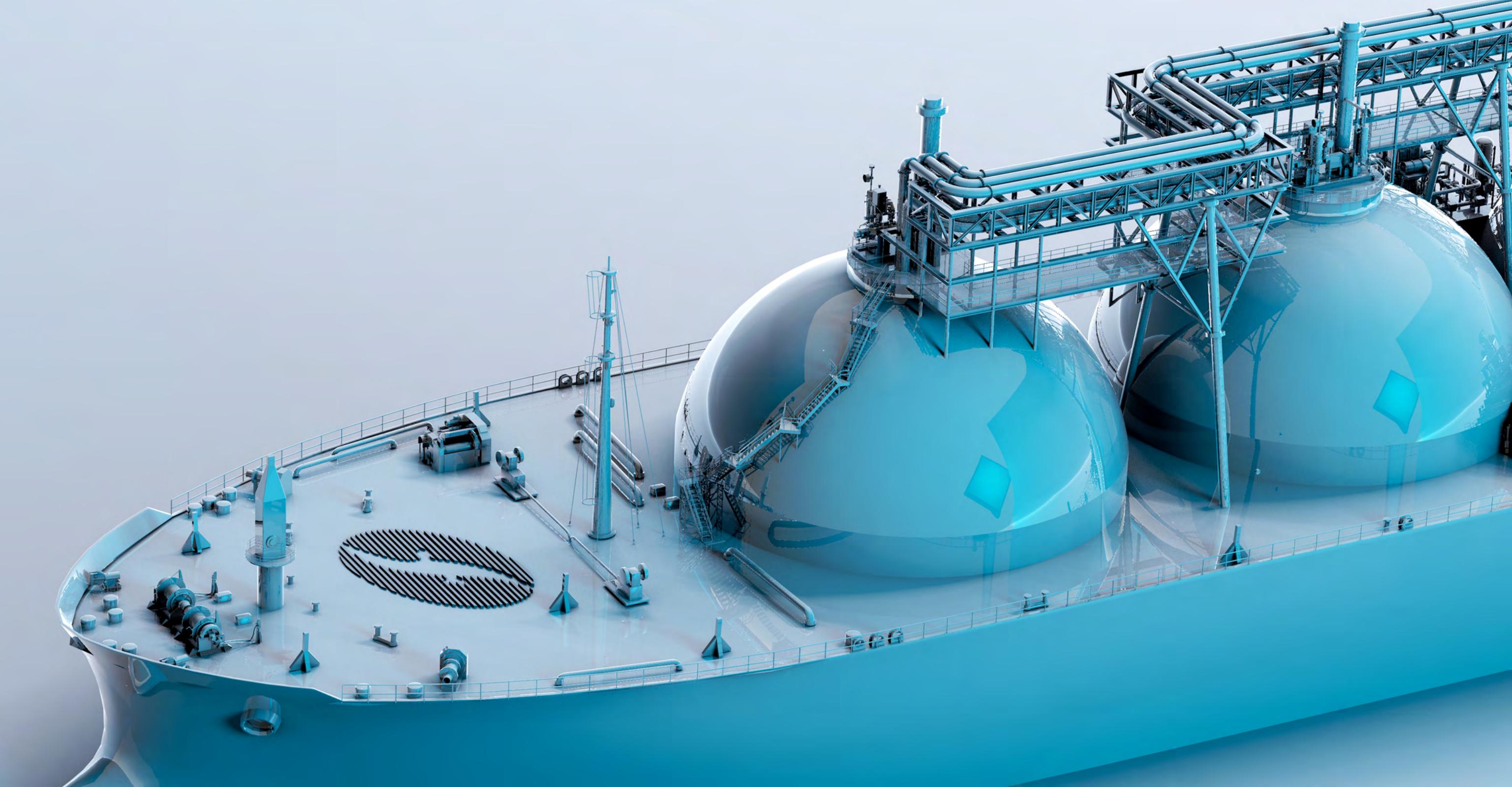
Energy efficiency is key to a sustainable and successful future for shipping. However, at this juncture, ship owners and operators must brave the full force of the EEXI and CII regulations on their operations, amid uncertainty towards compliance implementation and requirements.

The changes they need to address today bear concerns on their commercial viability, return on investment and tradability for the coming decades. There is an imminent deadline in sight but no straight road to compliance.

At Fleet Management Limited (FLEET), we have already completed the EEXI and CII assessments for each of the 600+ ships under our technical management, and in the process, we have developed tailored roadmaps for any ship that is not on track with compliance.

We have the technical experience and expertise to turn this regulatory trial into a business opportunity that will secure your investment today and in the future as the regulatory landscape continues to evolve.

Energy efficiency is on your radar, let us trace it throughout your value chain.



SECTION 1

Navigating reform

We are on a journey to reform.

The introduction of EEXI and CII regulations requires ship owners and operators to find the most efficient ways to reduce carbon emissions from their ships.

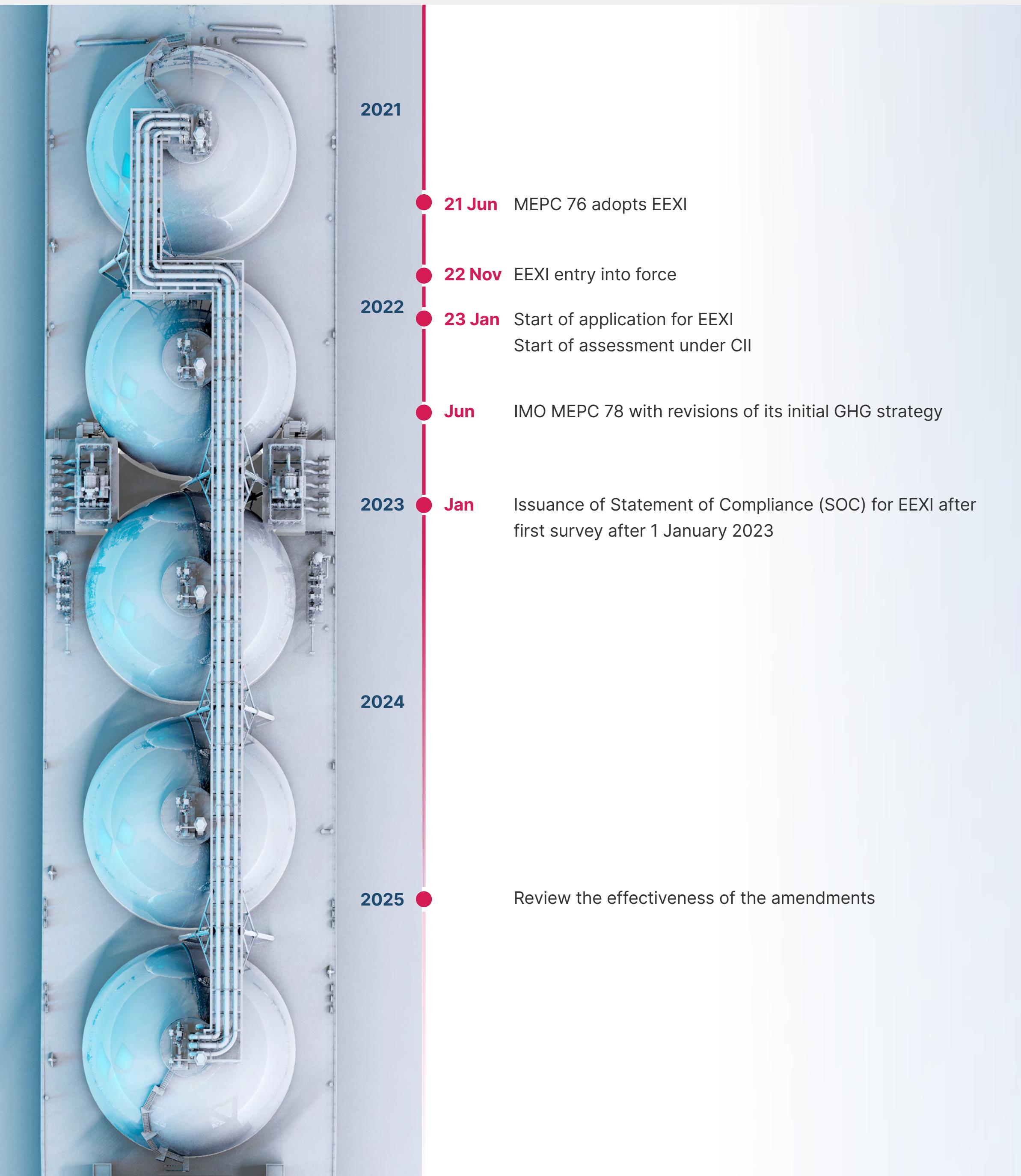
With our deep technical expertise, we know compliance can be achieved by empowering them with customised action plans where a range of operational and technical solutions can be executed.

While the shipping industry has always met sector-wide challenges with force, drive and resilience; today, we see our role and expertise as a leading ship manager instrumental in navigating reform.

1.1 Why now?

Ship owners and operators must assess and update their fleet to comply with the new EEXI and CII regulations now. It is the only way to pursue their trading activities in 2023 and beyond, challenging their commercial viability upfront and threatening their long-term profitability.

At FLEET, we understand the value of good timing. We responded to the introduction of EEXI and CII compliance early on and are now best positioned to provide the necessary support to master these prompt changes. Our technical expertise is our customers' roadmap to success.



EEXI AND CII: KEY POINTS

		Energy Efficiency Existing Ship Index (EEXI)	Carbon Intensity Indicator (CII)
Approach	Technical	Operational	
Compliance goals	Ensure reduction in carbon emissions by design changes and enhancements	Monitor and enhance the sustainable operation of a ship	
Assessment	Determine the carbon emissions of each vessel based on the IMO approved formula for EEXI	Define a vessel's performance within a five-tiered rating from A to E (where A is most efficient)	
Assessment purpose	Focus on the vessel's design	Focus on the vessel's operating efficiency	
Assessment frequency	One-time certification	On-going annual assessment	
Target vessels	All new-build vessels/in-service vessels of above 400 GT	All in-service vessels of over 5,000 GT	
Energy efficiency performance calculation	It measures the level of carbon emissions related to the CO ₂ reduction factor, specific fuel consumption, engine power, transport capacity and speed.	It measures the grams of CO ₂ emitted by cargo-carrying capacity and nautical mile.	
Energy efficiency performance compliance	The regulation sets the required EEXI and the carbon emission limit of a vessel, depending on its type, age and condition. For each of their vessels, owners and operators need to calculate the attained EEXI. Once calculated, it informs whether a vessel meets EEXI requirements or needs to undergo design changes.	The required CII will be reduced year-by-year. The reduction rates are already set for 2023 to 2026, and subsequent reduction factors will be set during a review in 2025. Ship owners and operators assess the annual rating for each vessel. C is the minimum rating required for compliance. Owners and operators will need to establish a Corrective Action Plan to achieve the required CII for vessels rated E over one year, or D for three consecutive years.	
Process to compliance	1. Undergo a preliminary assessment of the vessel/fleet 2. Submit the preliminary technical files for approval 3. Check compliance status after the deadline of 1 January 2023, with the annual, intermediate or renewal survey (whichever comes first)	(Anticipated and still under review by the IMO) 1. Determine vessel carbon intensity profiles 2. A verified Ship Operational Carbon Intensity Plan, or SEEMP Part III, is to be kept on board from 1 January 2023 to document how you plan to achieve your CII targets.	
Proof of compliance	The attained EEXI will need to be verified and meet the required EEXI via the application for a survey and the submission of an EEXI technical file to the recognised administration or class for approval.	Each vessel will need an enhanced SEEMP III or Ship Operational Carbon Intensity Plan. The SEEMP must contain: — A description of the methodology used to calculate the Attained Annual Operational CII — The Required Annual Operational CII for the next three years and a plan to show how it will be achieved within that time — A procedure for self-evaluation and improvements	
Actions to meet compliance	If compliance is not met, ships will go under technical and design improvements such as power optimisation (Shaft/Engine Power Limit), fuel change and/or energy saving devices.	The SEEMP CII Implementation Plan must be supplied for verification of compliance and revised in a Corrective Action Plan for vessels that need urgent actions. As an on-going scheme, it requires further data collection and monitoring to ensure the implementation plan will support the fleet's CII compliance.	
Compliance certification	Compliance with EEXI will be granted with a ship's International Energy Efficiency Certificate (IEEC) issued by a Flag or recognised organisation. Technical files will need to be readily available onboard for inspection.	The Statement of Compliance (SOC) will confirm the attained Annual Operational CII and the energy efficiency rating (A to E). The SEEMP will need to be reviewed and approved to be always kept on board.	

1.2 The next steps

The first step towards compliance is assessment.

To assess what the right solutions are to reduce carbon emissions and improve operational efficiency, we draw upon our knowledge and resources of each vessel including its size, capacity, speed, year of build, power limitation; and a deep analysis of parameters that can impact EEXI and CII requirements. The compliance exercise, covering investigation and implementation for each vessel within a fleet, requires a tailored and detail-oriented approach – a timely exercise fronting the IMO deadline.

With over 600 ships of all types, ages, and conditions at FLEET, our challenges with EEXI and CII compliance reflect what the international maritime trade is currently going through. We conquer these challenges with rigorous preparation and structured planning.

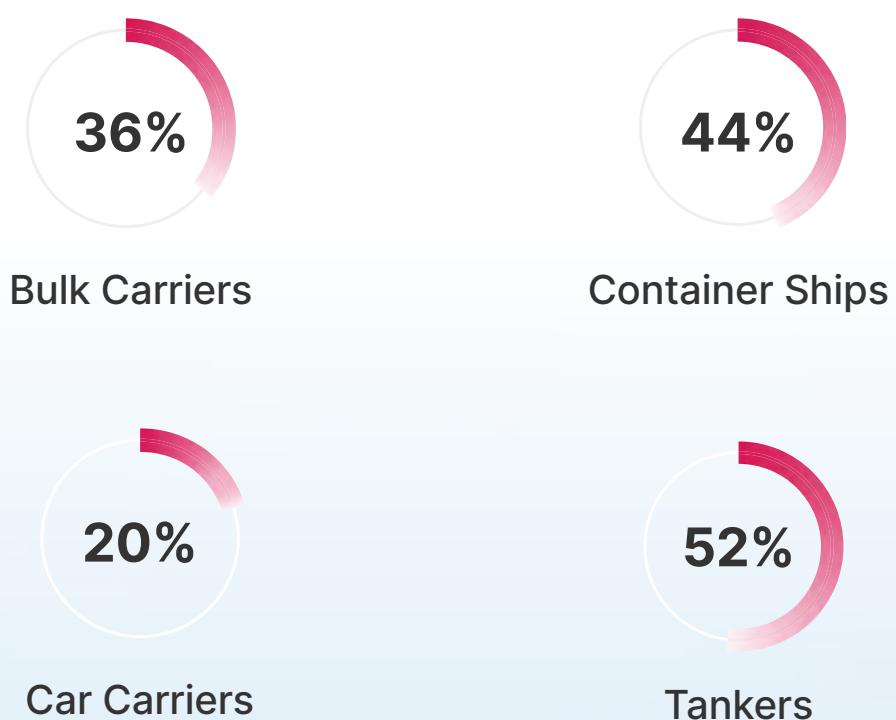
Early on, we surveyed all the ships under our technical management and analysed each vessel type against compliance requirements. We investigated a vessel's design aspects and features to identify key EEXI and CII parameters and determine what operational and technical solutions are viable.

We don't stop here. We analyse the ramifications of these updates across several financial entry points (savings, costs, implementation, feasibility and return on investment) to identify the best commercial trajectory.

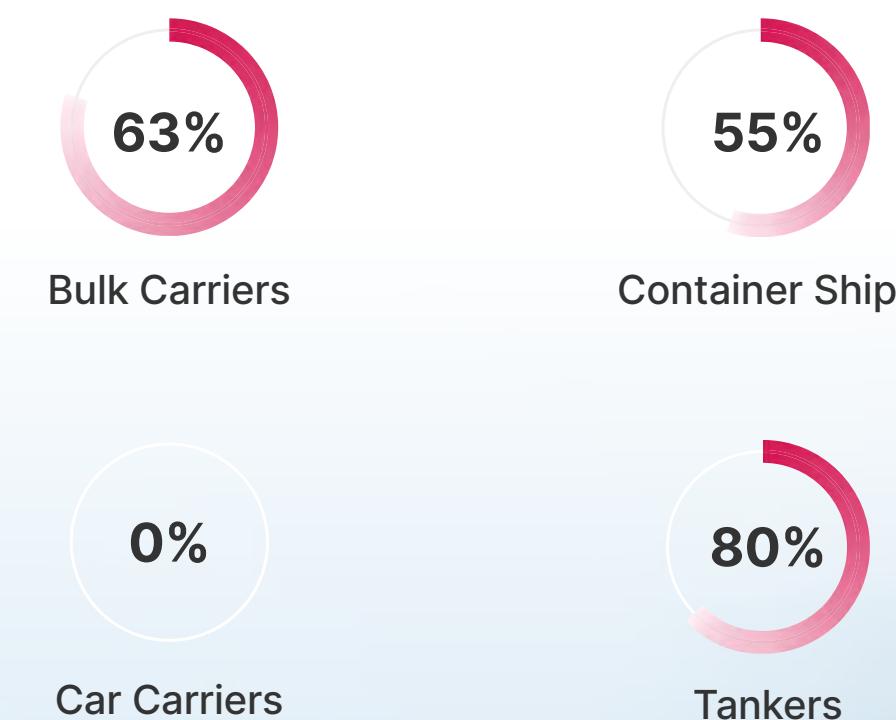
Our credibility leans on decades of experience advising on our customers' next moves – towards compliance, profitability and importantly, long-term commercial success.

KEY FIGURES

Percentage of FLEET vessels already **EEXI** compliant:

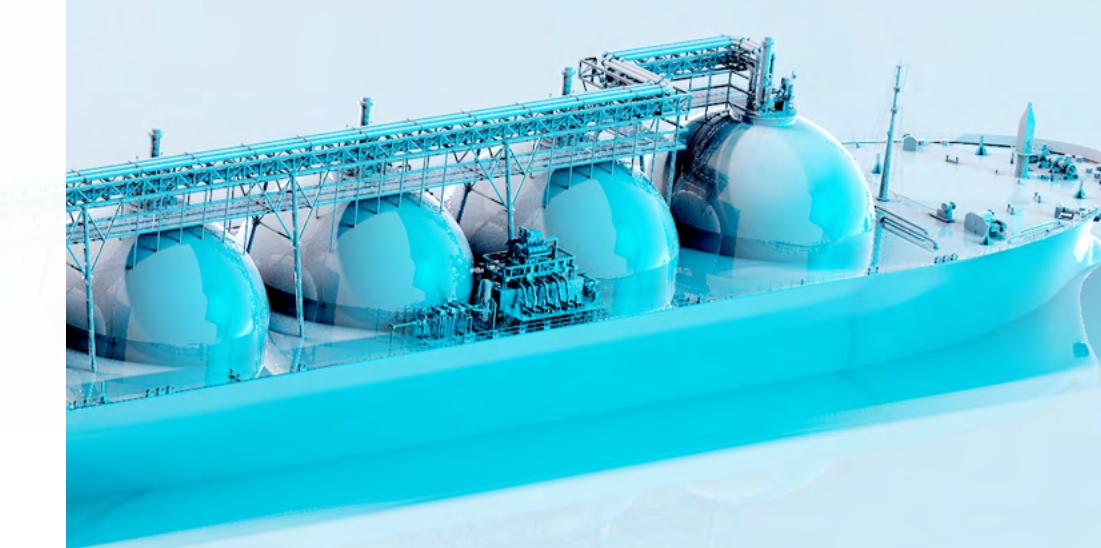
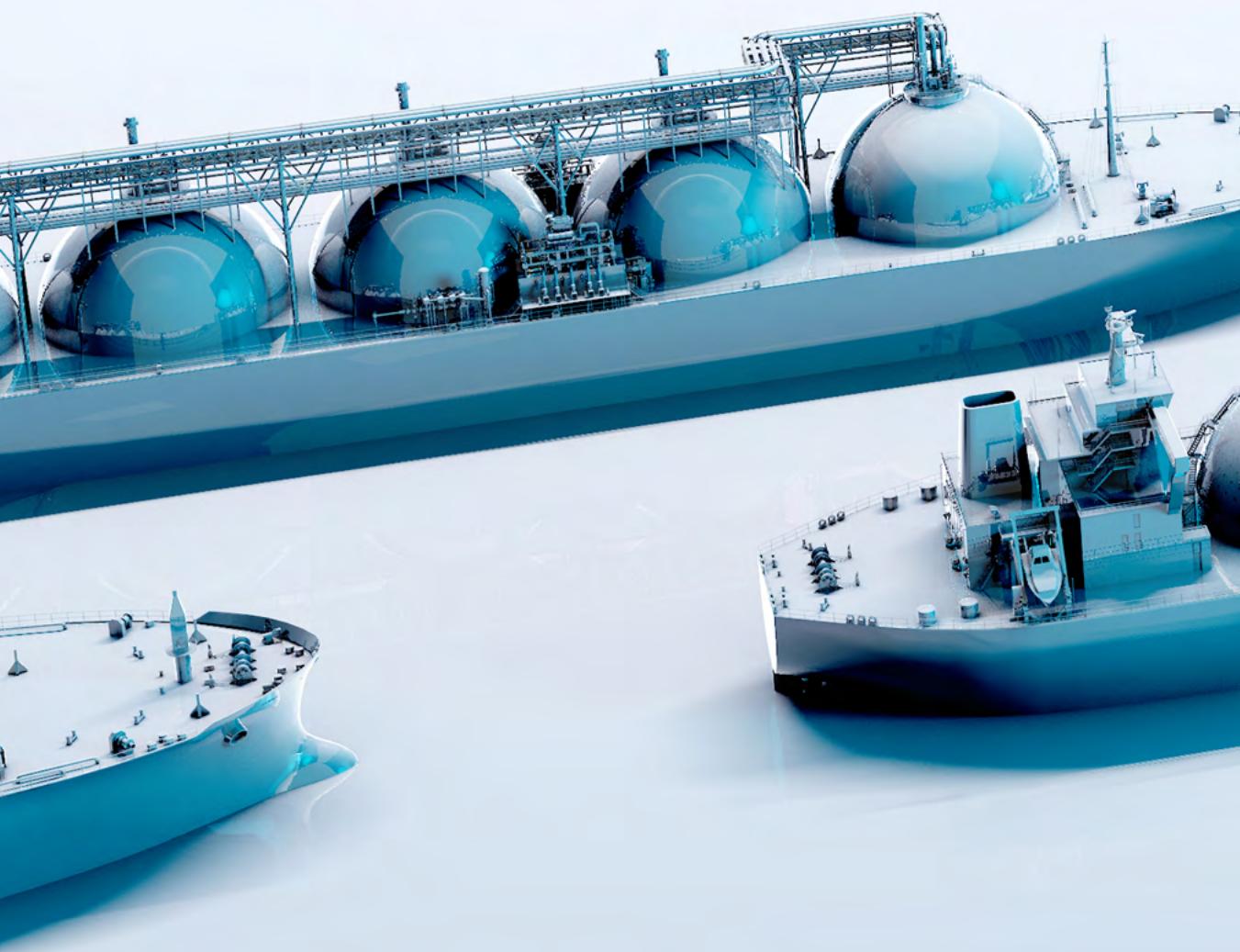
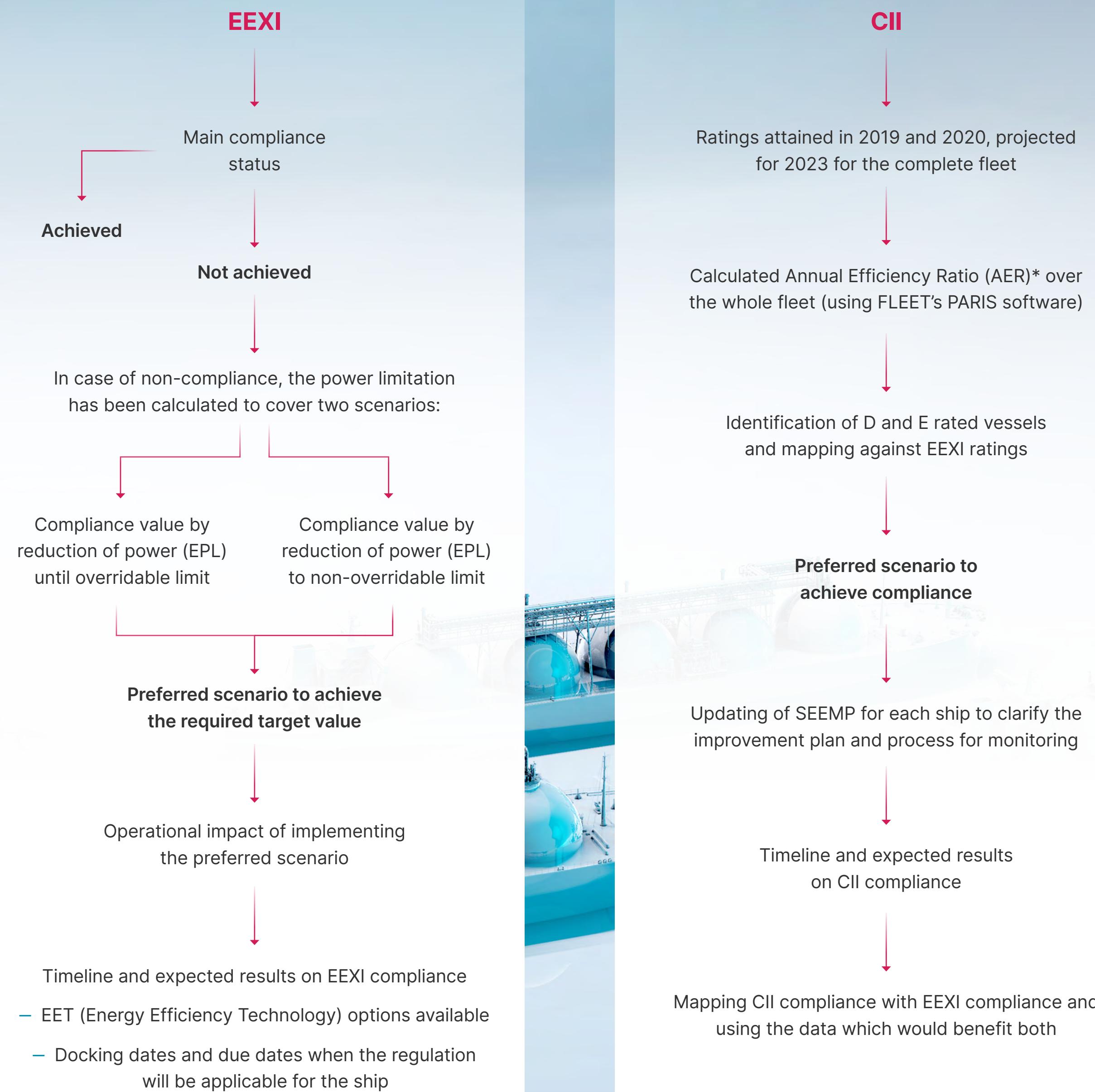


Percentage of FLEET vessels already categorised within A, B or C for **CII** compliance:



ASSESSMENT METHODOLOGY

Our expert methodology enables ship owners and operators to quickly establish their fleet's energy efficiency profile.



*Annual Efficiency Ratio: This is a ship's carbon emissions per actual capacity-distance and measured in gmCO₂/DWT mile. The AER uses parameters of fuel consumption, distance travelled and design deadweight tonnage.

SECTION 2

Our expertise, your anchor

With the enforcement of EEXI and CII regulations, processes that have been in place for decades may now be outdated, inefficient or unsustainable. Throughout the maritime sector, design and operational improvements need to be implemented to meet with the new agenda for energy efficiency compliance.

At FLEET, we investigate the risks as well as the opportunities within any operational and technical updates. Our experience with various technologies and solutions across our fleet and our exposure to their advantages and challenges allows us to successfully design the best option for a specific ship, leading to the best results.

2.1 Stay afloat during industry-wide transition

Meeting EEXI and CII requirements can be achieved through a set of technical and operational solutions whose output vary depending on each ship's parameters. There is no 'one-size-fits-all' solution, but rather different scenarios based on a combination of parameters such as limiting engine loads, speed reduction and retrofitting ships with energy-efficient technology.

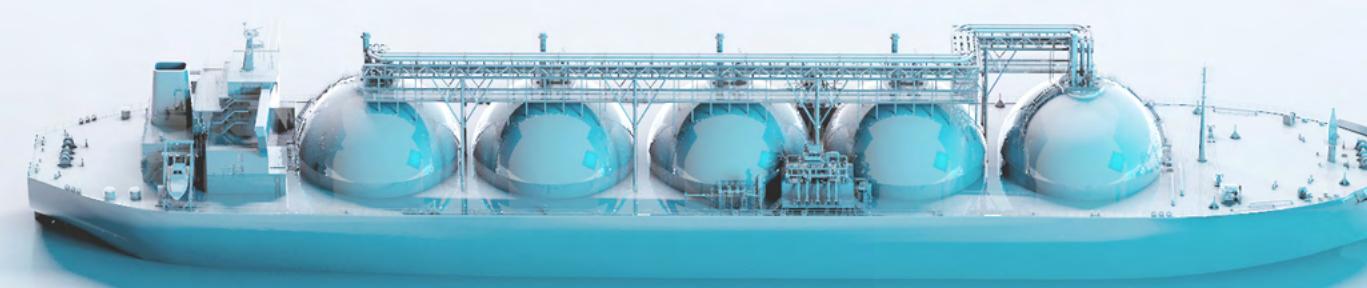
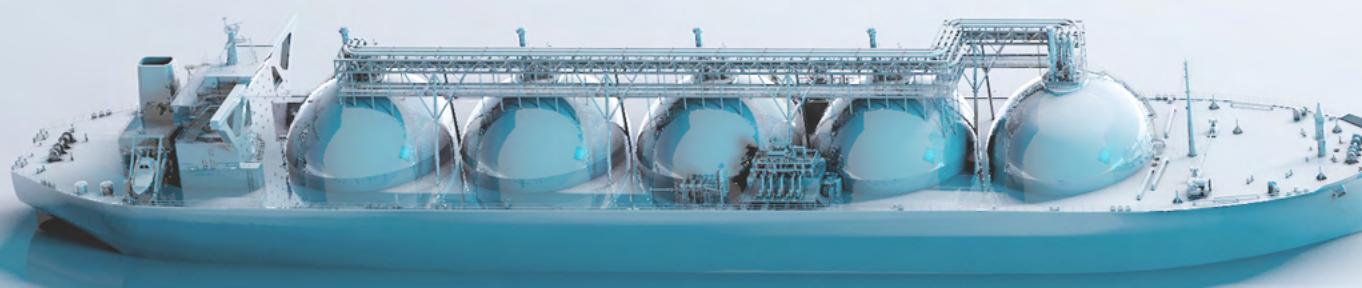
Here are examples of some of the technical solutions that are available to help a ship reach EEXI/CII compliance:

EEXI

- Propulsion optimisation
- Updating to alternative fuels (e.g. ammonia, methanol, LNG, LPG, synthetic fuels...)
- Modifying the engine power limitations
- Installing energy-saving devices (e.g. PBCF or Mewis duct)
- Applying high-performance hull coating

CII

- Improving voyage planning
- Updating to alternative fuels (e.g. ammonia, methanol, synthetic fuels...)
- Improving the ship's condition (e.g. cleaning fouling, marine growth...)
- Installing energy-saving devices (e.g. PBCF or Mewis duct)
- Fitting a more efficient propeller
- Increasing cargo capacity
- Reducing CII with overridable power limitation



EXAMPLE EEXI SHIP-SPECIFIC ASSESSMENT

Ship type:	Chemical Tanker
Year Built:	2012
Age:	10 years old
DWT:	19800
Required EEXI:	7.83
Attained EEXI:	8.85

Problem:

If the vessel only opted for a reduction in engine power limitation (EPL) to achieve the attained EEXI, it would have reduced the trading speed by 14% to 17% of its maximum designed speed. This could negatively impact its hire and result in a loss of revenue for the ship owner.

Solution:

FLEET carried out a complete analysis on possible solutions to limit the speed loss and improve the performance by increasing propulsion efficiency.

During the scheduled docking, FLEET submitted two proposals to ship owners for consideration:

1. Installation of a **Propeller Boss Cap Fin (PBCF)** which would improve the speed by 2 to 3%
2. Application of a **high-performance coating** which would improve hull efficiency by 4%

By implementing the two solutions above, the projected outcome is a **reduction in speed loss by 6 to 7%** leading to a lower reduction in power and, ultimately, an improvement in the ship's commercial viability.

Next, a new sea trial/CFD analysis takes place at the ship's next dry docking. It is carried out in the presence of Class and their approved third-party partner with the objective of getting an improved attained EEXI.

Estimated total cost: US\$125,000*

*Note: cost is an estimate only and will vary based on many considerations including the port of repair, time, and installation cost, among other factors.

In the short term, ship owners and operators will have to decrease the speed of their ships to meet EEXI and CII requirements. It is essential to provide visibility towards the implementation and repercussions of this strategy on their commercial viability.

At FLEET, we define the most cost-effective route to compliance based on a variety of criteria and a deep understanding of each type of vessel composing a fleet to maximise our customers' returns.



2.2 Targeted technical solutions to compliance

Implementing technical solutions comes with its fair share of cost challenges, and, alongside the current persisting enforcement of EEXI and CII, the pressure is certainly tough for ship owners and charterers alike.

The longer the wait, the higher the risk to jeopardise tradability. Acting now requires a proper level of assessment and experience to design a ship-specific strategy for EEXI and CII compliance. With all types and sizes of bulk carriers, tankers and container ships under our technical management, our fleet of over 600 vessels across six Classification Societies allows us to apply a tailored approach providing expert management advice for every vessel.

What seems to be a very daunting and stressful process is actually a race for new business opportunities, bringing all actors together to look towards one horizon for growth.

ENERGY EFFICIENCY CASE STUDY

Two **bulk carrier ships** (built 2015 and approximately 82,000 DWT) managed by FLEET required an **EEXI improvement** of 2.5 to 3%.

To meet the EEXI requirements, a number of retrofits and upgrades were made to the ships, including installing a **Hull Vortex Absorbed Fin (HVAF)** and **trimming the propeller**. Each solution reduced the vessel's carbon emissions through energy saving or by increasing thrust efficiency. We then employed a renowned marine energy saving technology and research company to evaluate the performance of the vessels on these modifications. They concluded that the changes would result in the following:

- **Fuel consumption** was reduced by approximately 10% at the same RPM. This was proven by a verified reduction in fuel consumption during its next voyage.
- The **propeller light margin** increased by about 3.6% by cutting the propeller trailing edge, and, after installation of a HVAF, it was 4%. As a result, the main engine performed better.
- The Model Test done by the research centre established that the **efficiency of the propeller** increased by about 2% with a HVAF. The efficiency gain of the HVAF comes from the propeller thrust increasing and the torque decreasing.

Through the expert management and advice of FLEET, **both ships reduced their gm-CO₂/Tonne Mile** to successfully meet the EEXI regulations – ahead of schedule. Both vessels have been rated a **CII value of C**.

US \$82K

total cost for each ship

10% ▼

reduction in fuel consumption

4% ▲

increase in propeller light margin



SECTION 3

Engaging the industry

As leaders in the industry, we have the due diligence and foresight to advise in what appears to be an uncertain future. Beyond the technical updates needed to meet EEXI and CII requirements, the shipping industry relies on a holistic approach to drive the shift towards decarbonisation.

Technology has the potential to drive our energy efficiency efforts further and help the sector to achieve its global sustainable goals. At FLEET, our force lies in our innovative and collaborative mindset, enabling us to advise ship owners and charterers beyond compliance. We believe this is an opportunity to make meaningful changes while opening our sector to new opportunities.

Many are also on edge about the [EU's "Fit for 55" package](#), which will introduce carbon allowances, estimated from 20% in 2023, to 100% in 2026, of a ship's carbon emissions when sailing in the EU zone. The International Chamber of Shipping (ICS) and Intercargo also explored a 'carbon tax' system targeting high-emissions vessels, from ships exceeding 5,000 gross tonnes and trading globally. With carbon tax and the rising cost of refinancing non-compliant ships, today's decisions around EEXI and CII regulations will impact on mid- and long-term operations.



3.1 Agility and innovation for strategic planning

An ageing fleet combined with a lack of investment in new technologies in the maritime sector dampen stakeholders' agility and flexibility in implementing rapid changes. Our experience tells us agility is required to predict and foresee potential challenges on the horizon and that's why it's so important to build that agility into our mindset early on.

Over 27 years, we have provided high-quality ship management services. Better still, we have committed to technological and technical developments to sport a top-notch customer experience. At FLEET, we maintain this approach with EEXI and CII compliance. We have kept abreast of trends to successfully support our customers on all their value chain touchpoints.

The way we have consistently navigated our way through the Covid-19 pandemic is testament to our agile nature. We achieved **18%** growth compared to the industry average of **3%** and retained **90%** of our staff.

Our proprietary technology platform PARIS has today evolved into a digital ecosystem providing a range of digital products and services to plan, analyse and optimise the performance and efficiency of our fleet. Such tools power data-led decision-making and the agility to plan ahead and implement improvements that will respond to today's requirements and build tomorrow's sustainable growth.

While investing in digital technology is key to long-term profitability for ship owners and operators, the future of the industry also relies on their ability to embed alternative fuels into their strategy for energy efficiency compliance.

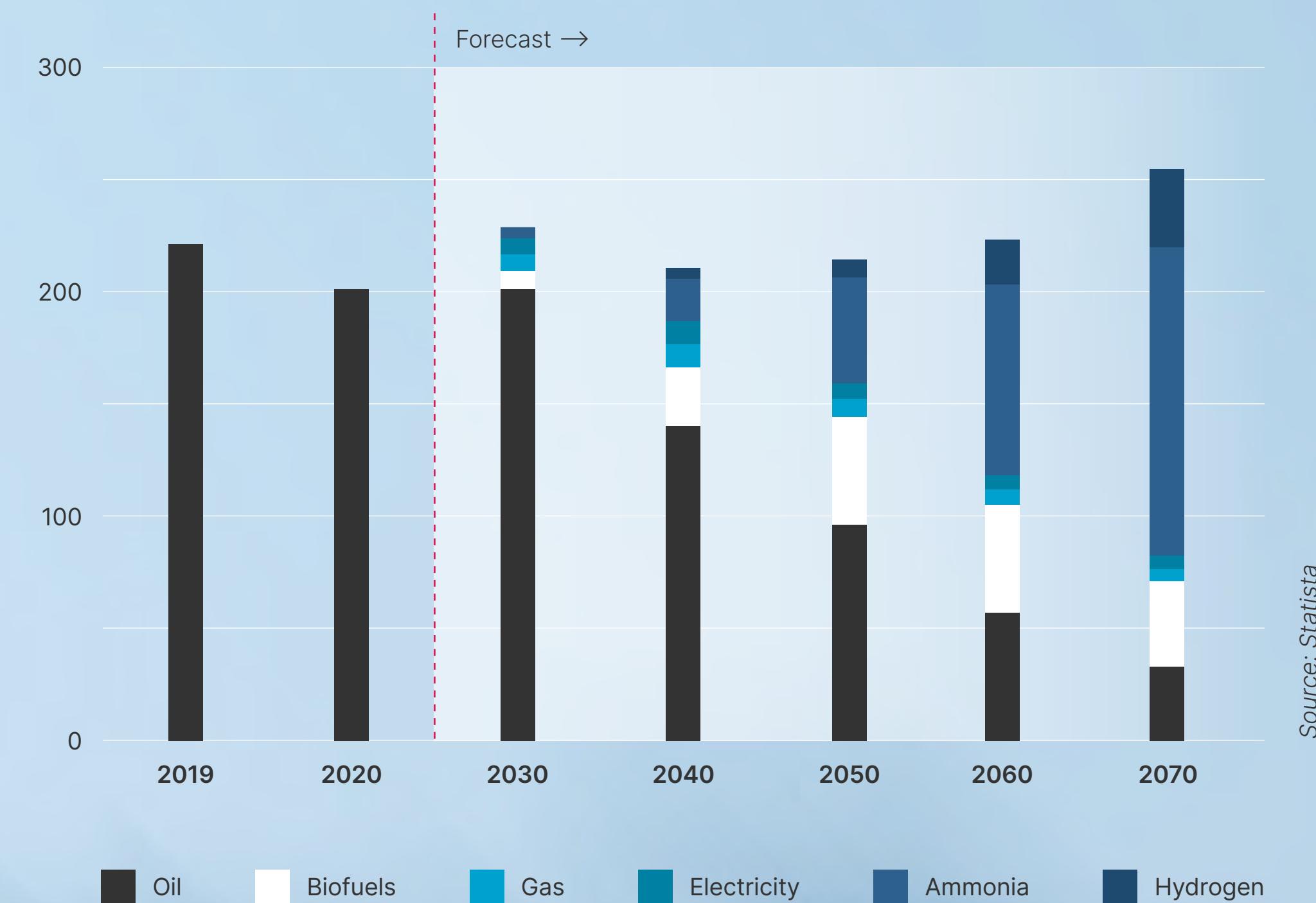
This is a future we need to prepare for by looking now at how to unlock these unique vessels' full potential. At FLEET, we don't shy away from concerns towards safety and performance and leverage our technical know-how and experience in innovation to introduce our customers to this new world.

With 10 vessels under our management using the only three commercially viable alternative fuels on the market (LPG, LNG, Methanol) and another 20 newbuilds we are supervising in the shipyards, we know clean fuels are not just a hot topic. Projected to be predominantly used in 2050, they will take more than half of the total energy consumption by the industry, with ammonia expected to power most international ships by 2070. An advanced technology we are already exploring with key partners in the industry, building ammonia-powered vessels to develop the viability of ammonia as a green maritime fuel.

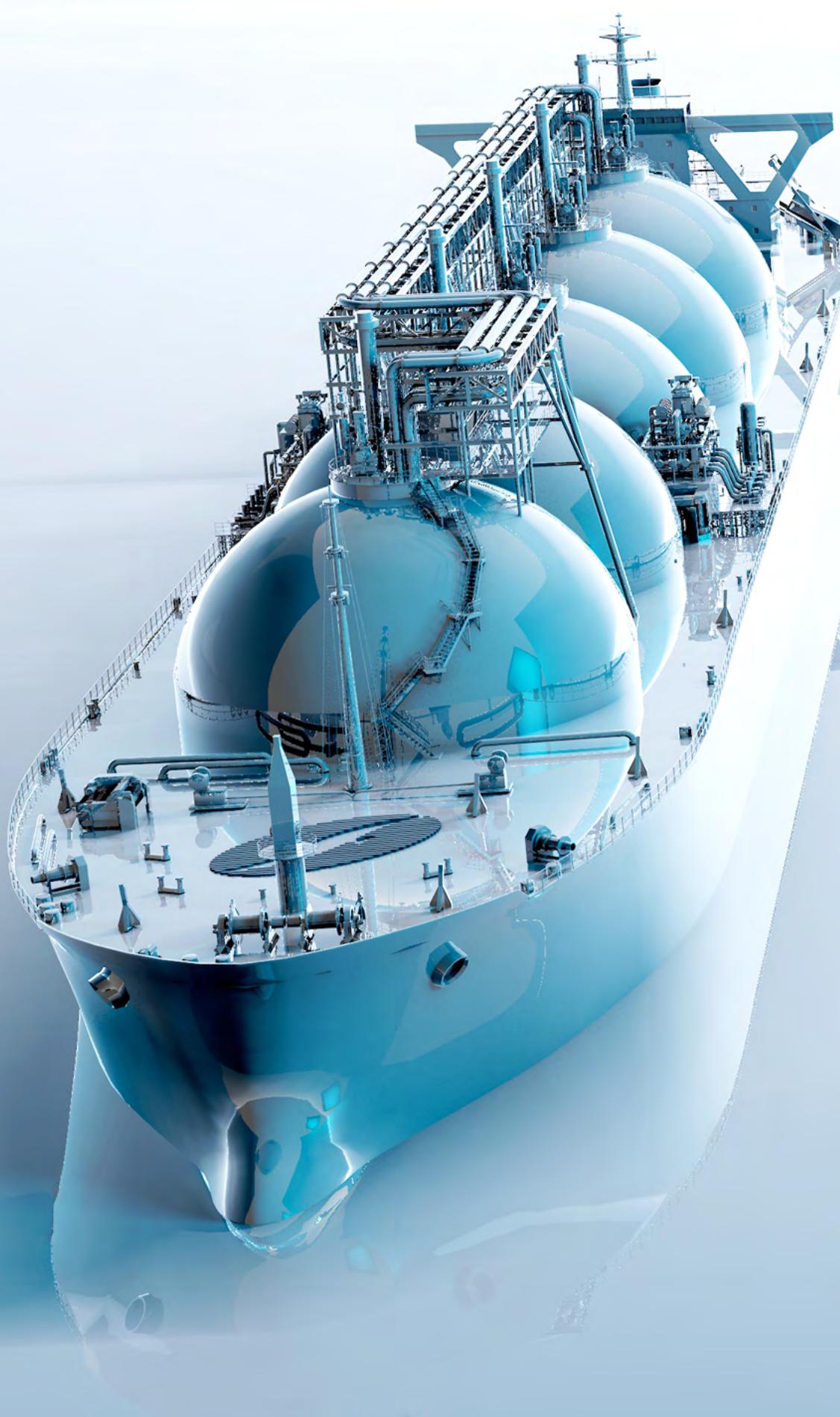
In fact, our Newbuilding department's pipeline is experiencing robust growth as energy efficiency remains a key consideration for new ships. Our in-depth experience is coming to the forefront as we consult on many new ship designs with energy saving devices and EEXI compliance top of mind as ship owners want to ensure their investments will have longevity.

Innovation at the service of decarbonisation will pilot our sector's growth towards sustainable energy use.

Consumption of energy by the shipping industry worldwide in 2019 and 2020, with a forecast through 2070, by fuel type (in million metric tons of oil equivalent)



Source: Statista



3.2 Collaboration to drive sector-wide growth

The latest regulations have set the journey towards energy efficiency in motion, one that ripples across international routes and involves us all to ensure its rapid and efficient development.

The initial step in supporting decarbonisation is to maintain tradability for ship owners and charterers. This will drive our sector's future growth and give all stakeholders a global view on what can be achieved in the coming decades.

The green synergies we build go beyond the maritime sector and are adopted by many large entities, sourcing low carbon partners and suppliers to collaborate with. Major retailers like Amazon, IKEA and Unilever have announced their target of reaching net-zero carbon emissions by 2040. If shipping does not align its emission standards it will fall by the wayside.

At FLEET, we understand the importance of collaboration and coordination to deliver business efficiency throughout this transformative journey. We are committed to working alongside other maritime players to define a sustainable and successful future for the maritime sector.

While our industry focuses on the challenges at hand – EEXI and CII compliance – we need to keep in sight the multi-sectoral approach that will convert ship owners and operators' compliance efforts into the pulse to achieve our decarbonisation goals.

OUR PARTNERS AND COLLABORATIONS

Sustainability is a global cause that is important to everyone, no matter their background, location or social status

We work alongside the **Global Maritime Forum** and many others in the **Getting to Zero Coalition**, which is committed to getting commercially viable deep sea zero emission vessels powered by zero emission fuels into operation by 2030. We set our standards and ambitions high, which is why we entered this ambitious coalition.

We are also actively collaborating with a number of shipping stakeholders to study the feasibility and build the supply chain for **future fuels**. One collaboration is focused on building an ammonia powered vessel and ammonia bunkering, while another collaboration is focused on building a new bulk carrier vessel that will run on Methanol.

Shipping is joining many other industries in setting out strict and ambitious carbon emission reduction targets, most of which include shipping in their business model or structure. Stakeholders in large companies now put great pressure on firms to improve their carbon emission reduction efforts, and as shipping becomes greener, will set higher competitive and attractive industry standards.

CHECKLIST

How can you act now?

- Check the EEXI and CII required rating for each vessel type within your fleet
- Evaluate the components that will affect your ships' ratings
- Benchmark your fleet when undergoing EEXI and/or CII compliance exercises
- Identify the available improvement options to meet the required ratings
- Prepare the requested documentations to attest your fleet's carbon efficiency compliance

Call us to help you navigate the reforming journey:

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