



Your Damen guide to navigating European emission regulations

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Introduction

Since the [Paris Climate Agreement](#) in 2015, there has been a strong uptake in renewable energy projects. Nevertheless, emissions have steadily continued to rise ever since. Legislators across industries and countries have put in place innovative regulation to bend the curve and limit global warming. Accounting for 2-3% of greenhouse gas (GHG) emissions globally, shipping is on the brink of a significant transformation. With new regulations coming into force, shipowners must navigate a complex landscape of decarbonisation requirements. Damen understands the challenges you face and is here to guide you through these uncharted waters.

The [European Green Deal](#) includes the Fit-for-55 programme to reduce 55% of annual greenhouse gas emissions in 2030 compared to 1990, and net-zero emissions in 2050.

To meet these ambitions, the maritime industry is facing a wave of new European carbon regulations designed to reduce GHG emissions and promote sustainability. For shipowners, understanding and complying with these regulations is crucial. Here you will find a breakdown of the key regulations, their application criteria, and their impact.

EU MRV (Monitoring, Reporting, Verification)

The [EU MRV](#) regulation applies to ships over **5,000 gross tonnage** calling at EU ports, regardless of flag. It requires shipowners to monitor, report, and verify CO₂ emissions on a per-voyage and annual basis. This system, in place since 2018, serves as the foundation for the inclusion of maritime transport in the EU Emissions Trading System (ETS). From January 2025, ships between **400 – 5,000 gross tonnage in the segments General Cargo and Offshore** will be required to start reporting their emissions to the EU.

EU ETS (Emissions Trading System)

The [EU ETS](#) regulation also applies to ships over **5,000 gross tonnage** calling at EU ports, regardless of flag. Shipowners need to purchase and surrender emission allowances for each tonne of CO₂ emitted. These allowances are traded in a market price, which means that the price for ETS allowances is volatile and depending on their demand and (yearly reduced) supply. Shipowners will need to submit their verified emission reports to the THETIS-MRV platform, upon which the EU annually auctions allowances for that year. Non-compliance can lead to **finest of € 100 per tonne GHG emissions**. Outside of the auction, allowances can be traded on the market place.

The ETS system incentivises energy efficiency and the use of low-carbon fuels. For a shipowner this means that **every tonne of fuel burned within the EU will cost an additional 250 euros** in allowances, leading to a price premium of 30-50% at 2024 bunker price levels (see below table).

ETS impact for one tonne of fuel burned between EU-ports

	MGO	VLSFO	LNG
Fuel cost €/ t	€ 700	€ 550	€ 750
Emission factor	3.21	3.11	2.75
ETS price €/ t CO ₂ *	€ 85	€ 85	€ 85
Premium €/ t fuel	€ 273	€ 264	€ 234
Premium %	39%	48%	31%

Note (*) the ETS price of € 85 is an average for 2023-2024 and subject to market swings

FuelEU Maritime

Adopted as part of the Fit for 55 package, [the FuelEU Maritime](#) regulation promotes the use of renewable and low-carbon fuels. It sets limits on the greenhouse gas intensity of the energy used by ships, encouraging the adoption of cleaner fuels and technologies. The regulation applies to ships above **5,000 gross tonnage**. The measure has a progressive nature, initially requiring a reduction of greenhouse gas intensity of 2%, increasing to 80% in 2050.

At 2024 price levels this leads to a price premium of 5-10% in 2025, up to a 300% fuel premium in 2050 if no action is taken.

FuelEU Maritime impact for one tonne of fuel burned between EU ports

Year	GHG intensity targets	Penalty € / tonnefuel			Fuel premium %		
		MGO	VLSFO	LNG	MGO	VLSFO	LNG
2025	-2%	36	50	53	5%	9%	7%
2030	-6%	136	146	168	19%	27%	22%
2035	-15%	350	350	413	50%	64%	55%
2040	-31%	765	746	888	109%	136%	118%
2045	-62%	1,544	1,489	1,780	221%	271%	237%
2050	-80%	1,997	1,920	2,298	285%	349%	306%

However, the FuelEU penalties go even further. When ships fail to comply to their GHG intensity target reduction for multiple consecutive years, the EU imposes a penalty multiplier, which increases 0.1x every year the ship reports data (calls at an EU-port). This makes the penalty curve even steeper, and at 2024 price levels increases the fuel premium to 10x – 15x the cost of 1 tonne of fuel in 2050 if no action is taken. It is expected that with these penalties, together with subsidy programs for new renewable fuels, the shipping industry will rapidly transition to low carbon operations and pass on any excess costs where possible.

Increased impact for a consecutive year of non-compliance

Year	Penalty multipliers	Multiplied penalty € / tonnefuel			Fuel premium %		
		MGO	VLSFO	LNG	MGO	VLSFO	LNG
2025	1.0x	36	50	53	5%	9%	10%
2030	1.5x	204	219	253	29%	40%	46%
2035	2.0x	700	700	826	100%	127%	150%
2040	2.5x	1,913	1,864	2,220	273%	339%	404%
2045	3.0x	4,632	4,467	5,341	662%	812%	971%
2050	3.5x	6,990	6,722	8,045	999%	1222%	1463%

CSRD (Corporate Sustainability Reporting Directive)

The [CSRD](#) expands the scope of non-financial reporting to include sustainability information. It applies to large companies that meet two out of three criteria: **€40 million** in net turnover, **€20 million** in assets, or **250 employees**. Starting in 2025, shipowners will be required to disclose their environmental impact, including carbon emissions, in their annual reports.

EU emission regulation timeline	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	>2028
Cargo & passengers >5000GT	EU & UK MRV (since 2018)						EU & UK ETS				
								FuelEU Maritime			
Offshore vessels >5000GT*								EU MRV	EU ETS		
Gen Cargo vessels >400GT								EU MRV	New regulation		
Offshore vessels >400GT*								EU MRV	New regulation		
Shipowners >€20m assets & € 40m revenue								EU CSRD			

Note (*): the definition of offshore has not been definitively defined in 2024

Penalties for non-compliance

Non-compliance with these regulations can lead to severe consequences:

- › **Financial penalties:** Fines for failing to surrender allowances can reach up to **€100 per tonne of CO₂** emitted without coverage.
- › **Operational restrictions:** Ships may be denied entry to EU ports if they do not comply with the ETS requirements.
- › **Reputational damage:** Failure to meet sustainability standards can harm a company's reputation and stakeholder relationships.
- › **Personal liability:** Senior management could face personal liability claims if negligence in compliance leads to significant environmental damage.

Charting a course towards zero emissions

Shipowners can explore various decarbonisation strategies:

- › **Innovative solutions:** These will include digital solutions to assess feasibility of renewable technologies and monitor vessel emissions. Digital remote monitoring solutions, such as Damen Triton, will play a crucial role in success.
- › **Operational adjustments:** Slow steaming and enhancing engine efficiency are immediate steps, though they offer limited savings and need guidance to be applied correctly, possibly guided by remote monitoring.
- › **Hydrodynamic improvements:** Investing in propulsion enhancements, such as rudder appendices and wind rotors, or hull modifications like the Damen Air Cavity System (DACS), can yield significant efficiency gains.
- › **Renewable strategies:** Achieving carbon neutrality by 2050 will require carbon capture technologies or a complete transition to renewable fuels.

Damen Triton Emission Compliance

With close to 100 years of shipbuilding experience, Damen is well positioned to assist shipping companies in overcoming decarbonisation challenges. Our expertise in ship design, combined with EU emission and market data, allows us to offer tailored insights and solutions. In-house innovations like DACS, along with fuel analysis and vessel monitoring solutions, make Damen the ideal partner in setting a course towards a sustainable future. Damen Triton provides emission insights, improves sailing efficiency and harmonizes your energy saving technologies. Together, we can ensure a cleaner, greener, and more profitable future for the maritime industry.

Damen Emission Compliance solution includes:

- › **Emission Insights Report:** Monitor vessel emissions over time and improve operational decision making based on emissions data.
- › **Damen Triton Reporter:** Use Damen Triton Reporter to streamline and simplify emission data collection and verification for EU and IMO emission regulations.
- › **Emission Data Verification Integration:** Use Damen Triton to collect emissions data, and simplify verification through our integration with your accredited verification company of choice.



Looking to monitor and reduce your emissions?
Get in touch with the Damen team for more information
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Damen Triton Reporter

Want to learn more? Watch the video.





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