NIRVA ENERGY

MARKET INSIGHTS REPORT

Marine Biofuels Market Insights Report

This report introduces the EU's new regime which seeks to reduce EU greenhouse gas (GHG) emissions in shipping by 55% by 2030.
This has the goal of encouraging the uptake of cleaner fuels, including Biofuels. Fuel choice is the most direct means of minimising the carbon price placed on ship operations and avoiding penalties for not meeting GHG intensity reductions.
The report provides an overview of Biofuels and how they can help to achieve the GHG intensity reductions.
Nirva supply a range of Marine Fuels from Marine Gas Oil to Biofuels. Our goal is to work in partnership with our clients to make well-informed decision on how to transition from traditional fossil fuels to lower carbon marine fuels in the energy transition.

Introduction

The EU Emissions Trading System and FuelEU Maritime sit within the broader context of Europe's evolving climate policy framework including;

- The Alternative Fuels Infrastructure Regulation (AFIR): establishing targets for the rollout of fuel and energy supply infrastructure to support renewable fuels across road, aviation and maritime transport.

- The revised Renewable Energy Directive (RED III): setting enhanced economy-wide and sector-specific targets for renewable energy use.

- The Carbon Border Adjustment Mechanism (CBAM): designed to prevent carbon leakage by accounting for emissions associated with certain imported goods and materials.

- FuelEU Maritime and the inclusion of shipping in the EU ETS are key components of the EU's Fit for 55 package, which seeks to reduce EU greenhouse gas emissions by 55% by 2030.

EU Emissions Trading System (EU ETS)

From 1 January 2024, shipowners, operators and charterers became subject to the world's first carbon pricing regime for shipping, following the inclusion of the maritime sector in the EU Emissions Trading System (EU ETS).

From September 2025, the entity responsible for EU ETS compliance will be required to surrender EU Allowances, traded on the European Energy Exchange, covering 40% of the fleet's 2024 tank-to-wake (TtW) carbon dioxide (CO_2) emissions. This obligation will progressively increase, and by 2027 allowances must be surrendered for 100% of emissions, extending beyond CO_2 to include methane (CH_4) and nitrous oxide (N_2O). Failure to surrender sufficient allowances by the annual September deadline will result in financial penalties, in addition to the requirement to purchase the outstanding allowances.

In May 2025 the UK and EU agreed to work towards linking the UK Emissions Trading Scheme (UK ETS) and EU Emissions Trading System (EU ETS) at the UK-EU Summit.

Fuel EU Maritime Regulation

Running in parallel to the Emissions Trading Scheme is the FuelEU Maritime regulation, which requires shipping companies to achieve progressively tighter reductions in the lifecycle greenhouse gas (GHG) intensity of the energy used across their fleets. Companies that fail to meet these targets will be subject to penalties. The first such penalties, payable by June 2026, will apply to operators that do not achieve at least a 2% reduction in GHG intensity in 2025 relative to 2020 levels.

Further FuelEU obligations will come into effect from 2030, when container ships and passenger vessels will be required to use onshore power supply (OPS) or an equivalent zero-emission solution while berthed at major EU ports. This requirement will be extended to a broader range of ports from 2035. By that point, shipping companies will also face penalties if their annual GHG intensity has not fallen by at least 14.5% compared with 2020.

Taken together, carbon pricing under the EU ETS and the penalty-based performance standards introduced by FuelEU Maritime represent a step-change for the sector. They impose new demands on shipping stakeholders in areas such as administration, emissions monitoring, reporting and verification, contractual arrangements and cost forecasting. As with any new regulatory framework, these regimes also create opportunities for competitive advantage for those able to optimise compliance.

These include fleet deployment, routing, charter party structures, pricing strategies, participation in emissions trading, and the uptake of cleaner, alternative fuels.
Fuel choice is the most direct means of minimising the carbon price placed on ship operations and avoiding penalties for not meeting GHG intensity reductions.

Alternative Fuels

What does “alternative fuels” mean in shipping?

A new generation of fuels is intended to serve as an alternative to conventional fuels and contribute to bringing the shipping sector to net zero.

In shipping, 'alternative fuels' refer to energy sources that can replace traditional fossil fuels like heavy fuel oil (HFO) and marine gas oil (MGO) used to power ships.

These alternative fuels produce lower emissions of pollutants like sulfur oxides (SOx), nitrogen oxides (NOx), and carbon dioxide (CO2), which are major contributors to air pollution and climate change. The shipping industry is exploring alternative fuels to meet stricter environmental regulations and reduce its carbon footprint.

Some common examples of alternative fuels in shipping include:

1. Biofuels
2. Liquefied Natural Gas (LNG)
3. Methanol
4. Ammonia
5. Hydrogen
6. Renewable Fuels of Non-Biological Origin (RFNBO), otherwise known as e-fuels.

Shipowners will need to consider fuel choices and related technology investments – and subsequent exposure to carbon price and penalties – based on both regulatory approaches.

Biofuels provide a pathway to avoid high carbon costs and penalties, with relatively low technological investment.

Marine ‘Biofuel’

'Biofuel' is a term used to describe a fuel, gas or liquid that derives from biomass or biomass residues.
For the marine industry, biofuels offer an immediate drop-in solution to reduce GHG (greenhouse gas) emissions, without requiring significant modifications to existing engines or infrastructure. They can be blended seamlessly with conventional marine fuels such as HSFO, VLSFO, MGO & LSMGO.

The biofuels that are considered promising in the maritime industry are fatty acid methyl ester (FAME) & hydrotreated vegetable oil (HVO). These are drop-in biofuels and can be used in existing engines and fuel infrastructure. However, biofuel covers a large range of other products too, making the overview of different biofuel products, generations, feedstocks, and blends rather complex.

There are three different generations of biofuels, depending on the source from which the fuel is derived:

- 1st generation biofuels are produced directly from food crops, such as corn, wheat, soybeans, and sugarcane.
- 2nd and 3rd generation biofuels are not produced from food crops but from non-edible plants and are classed as sustainable.

The infrastructure for the most dominant biofuels is well developed in several ports worldwide, especially the main ones.

For HVO and FAME, which are drop-in biofuels, it is possible to make use of the already established bunkering infrastructure. It is, however, not a global widespread operation outside the main ports.

What is FAME?

FAME is produced from feedstocks like used cooking oil and animal fats, contributing to significant greenhouse gas emission reductions. It can reduce greenhouse gas (GHG) emissions by up 90%, possibly higher, depending on the feedstock used.

Its characteristics make it an attractive drop-in solution for operators looking to optimize their fuel strategies without requiring extensive modifications to existing ship engines. Fatty Acid Methyl Ester (FAME) is produced through a process called transesterification. Through transesterification, fatty acids are separated from the glycerins, which creates methyl esters (FAME).

FAME contains about 10% oxygen, setting it apart from hydrotreated vegetable oils (HVO) that have almost no oxygen content. With a density similar to marine gasoil, around 880 kg/m³, FAME offers comparable cold flow properties to a good summer grade marine gasoil, boasting a pour point around 0°C and a cold filter plugging point and cloud point slightly higher, around 10°C. FAME can be stored for up to six months, and under perfect conditions, it can be stored even longer. Versatile in blending, FAME is compatible with marine gasoil and heavy fuel oil.

What is HVO?

HVO stands for “Hydrotreated Vegetable Oil.” However, this acronym is no longer accurate. It is produced by hydrotreating renewable raw materials — mainly waste and residue fats and oils such as used cooking oil and animal fats - to remove oxygen and convert them into clean-burning hydrocarbon fuel. The result is a paraffinic renewable diesel that is chemically very similar to conventional fossil diesel but made from renewable sources. This is often referred to as the ‘next-generation biofuel’ given it’s high-quality and ability to ‘drop-in’ existing engines and fuel infrastructure.

How can Nirva help?

At Nirva, we simplify sustainable fuel oil. Our team helps you cut emissions, meet customer and regulatory demands, and protect margins—without operational disruption.

We review your current fuel supply and deliver clear, pragmatic strategies to reduce emissions using drop-in alternatives like HVO, FAME, and other certified low-carbon fuels. Please see our range of Marine Fuels.

Need to understand the options from a technical, supply chain, emissions, or cost perspective?

Want to do the right thing but fear getting it wrong? You're not alone—and we've got you covered.

We secure reliable supply by leveraging our independent wholesale network, offering fixed-price or index-linked contracts to keep you in control.

Our solutions help you decarbonise operations without downtime, confusion, or unnecessary cost.

From advisory to delivery, Nirva is your partner in sustainable fuel oil supply.

More Information

Nirva's dedicated fuel expertsstrive to find the optimum fuel solution tailored to your needs. Send us a brief message, and we'll ensure an appropriate member of the team gets back to you promptly.

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