Facts and Figures

The Shipping Industry and Climate Change: An Overview

Ocean Conservancy®

Shipping Industry 101

The global commercial maritime industry is a truly international sector that includes vessels that trade internationally and those that trade domestically within one country; fishing vessels and passenger ferries; ports and fueling (a.k.a., bunkering) infrastructure; and so on.

Size and Scope

- As the backbone of the global supply chain, maritime shipping moves upwards of 80% of the world's goods from producers to consumers (SOURCE: UNCTAD).
- Ninety percent of global trade takes place via ocean transport and 95% of cargo in the U.S. arrives by ship (SOURCE: International Chamber of Shipping).
- In the United States there are over 360 commercial ports (SOURCE: CSA Transportation) with more than 150 deep draft ports (SOURCE: EPA) that serve ocean-going vessels.
- The maritime sector globally was valued at $2,181 billion in 2024 (SOURCE: Market Research Future). In the U.S., the domestic maritime fleet employs an estimated 650,000 people (SOURCE: Transportation Institute).

Governance

- The management and regulatory oversight of the shipping industry is complex. Governance includes making and enforcing policies, allocating resources, and ensuring safety, security, efficiency, and environmental sustainability of shipping.
- For international shipping, a specialized United Nations body, the International Maritime Organization (IMO), regulates safety and environmental standards. The IMO develops conventions and treaties such as the International Convention for the Prevention of Pollution from Ships (MARPOL). It is through MARPOL that binding rules are set to address shipping's air and water pollution.
- Regional bodies like the European Union have also established regulations related to shipping in their waters.
- For domestic shipping—shipping that happens from port to port within a country—governance involves national governments, state and local governments, and port authorities. The IMO rules do not apply.
- Other players, including shipping companies, cargo operators, port terminal operators, labor unions and NGOs, also influence shipping rules and regulations at all levels.

Pollution Impacts

Emissions and Climate

- Ship engines produce climate-changing pollutants, including black carbon, carbon dioxide, methane, nitrogen oxides and sulfur oxides; as well as particulate matter (black carbon, or soot), which absorbs light as heat.
- Shipping churns out around 1 billion metric tons of greenhouse gasses (GHGs)—equal to Japan's emissions—and other toxic pollutants into the atmosphere every year (SOURCE: IMO and Climate Watch Data).
- Global shipping emissions are now responsible for roughly 3% of the world's greenhouse gases (GHGs) (SOURCE: IMO).

- If shipping were a country, it would be the sixth-largest GHG emitter (SOURCE: IMO and Climate Watch Data)
- Unless action is taken, experts predict shipping emissions will increase and could account for upwards of 17% of GHGs by 2050 (SOURCE: IMO and ICCT).

Air Pollution and Public Health

- Exposure to air pollutants released from diesel engines can contribute to respiratory problems, heart and lung disease, and other health impacts (SOURCE: EPA).
- Emissions from the shipping industry cause an estimated 250,000 premature deaths and six million childhood asthma cases globally each year (SOURCE: Science Direct).
- A peer-reviewed study found that increasing vessel number at a port increases the number of hospital visits for community members (SOURCE: Journal of Human Resources).
- Approximately 39 million people across the U.S. live in close proximity (within 5km, or 3.1 miles) to ports (SOURCE: EPA).
- The Ports of Los Angeles and Long Beach, which together handle 40% of containers entering the U.S., produce 100 tons of smog every day; this is more than the daily emissions of the six million cars in Southern California (SOURCE: Environmental and Energy Study Institute).

Solutions

Reducing Energy Consumption

- Maximizing vessel efficiency is the cheapest and most readily available way to reduce emissions. Ships can improve efficiency through operational measures, such as route optimization, hull maintenance, and speed reduction (a.k.a. "slow steaming"); and technical measures, such as optimizing the shape of the hull, recovering waste heat, and propellor improvements, among others.
- Operational and technical measures available today can reduce energy consumption by up to 16% by 2030, which would avoid 120 MtCO2 emissions (SOURCE: DNV).
- Slowing ships down just 12% can reduce emissions by nearly a third while only negligibly impacting trade (SOURCE: Seas at Risk). Speed reduction also reduces underwater noise pollution and the risk of collisions with wildlife.

Using Clean Energy

- **Wind propulsion.** Emission-free renewable energy can be harvested directly on board ships through wind propulsion technologies, cutting emissions and saving on fuel costs.
    - As of September 2025, there were 71 large ships with wind propulsion technology with a cargo carrying capacity of 4 million tons, saving 165,875 tons of CO2 (SOURCE: International Windship Association).
    - Recent studies show that adding two to four sails to existing vessels can reduce energy consumption by as much as 12% (SOURCE: Seas at Risk).
- **Batteries and fuel cells.** Ships can be powered completely or in part by batteries or fuel cells, which are charged through the local grid or onboard renewable energy. Like electric vehicles, electric ships do not produce emissions.
- **Zero-emission fuels.** The shipping sector sees hydrogen, ammonia and methanol as a way to shift away from fossil fuels to a zero-carbon future. Each of these presents advantages and disadvantages, so their ultimate use as zero-emission maritime fuels will depend on establishing rules and handling protocols.