



Zero emissions in 2050



The road to zero emissions

Climate change must be taken seriously. If we are to succeed in curbing its effects, we must act quickly.

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We believe this is the right way to go, both for the environment and for the industry



The goal of the Paris Agreement is to limit global warming to 1.5 degrees. The UN Intergovernmental Panel on Climate Change has given us ten years to halve greenhouse gas emissions, and maintains that they must drop to zero by 2050.

In response, Norwegian shipping aims to take a leading role in developing new technology and sustainable solutions to drastically reduce emissions in the years ahead. The Norwegian Shipowners' Association's roadmap to zero emissions in 2050 prescribes proactive goals and a willingness to take action. We believe this is the right way to go, both for the environment and for the industry.

Tomorrow's shipping companies must be climate resilient. If the industry does not take climate challenges seriously now, they will compound over time. As an industry, we see great business opportunities in taking leadership in the development of innovative technology that we, and the world, need. The technological development is happening

now, and Norway, with its strong maritime cluster and established competence, can take the lead in developing green solutions. Our members will use their buying power to demand low and zero-emission solutions for their ships, but all stakeholders in the industry must work together in order for this effort to succeed. International, regional and national authorities also have a crucial role to play in facilitating a development that is both desirable and necessary.

There is a great need for new technology and new sustainable solutions, and the development must happen quickly. We can meet global climate targets while generating business opportunities for Norway as a shipping nation. This is our plan for reaching both these goals.

Harald Solberg

Harald Solberg
 CEO, Norwegian Shipowners' Association

Our goals

50%

Norwegian Shipowners' Association members will cut their greenhouse gas emissions by 50 percent per unit by 2030 compared to 2008*

*Emissions per unit refer to transport work or other relevant value creation parameters.



Norwegian Shipowners' Association members will only order vessels with zero emission technology from 2030



Norwegian Shipowners' Association members will have a climate neutral fleet from 2050



The Norwegian Shipowners' Association will strive for an international ban from 2050 on fuel that is not climate neutral

Our intentions

1

To upgrade the existing fleet in order to reduce emissions

2

To use sustainable low and zero-emission fuels from an early stage, and contribute to the development of infrastructure for these fuels

3

To phase in ships with zero-emission technology as quickly as possible, and no later than 2030, to ensure that the fleet sails without emissions from 2050

4

To operate ships as energy-efficiently as possible using voyage planning, low friction anti-fouling paint, and optimised speed

To minimise the environmental impact of our entire enterprise in a lifecycle perspective, using the best overall solutions

To measure, analyse and publish our environmental and climate accounting in a consistent, relevant and transparent manner

5

6

The purpose of the roadmap

This roadmap shows how the shipping industry will achieve the goal of 50 percent reduction in greenhouse gas emissions by 2030, and a climate neutral fleet from 2050.

The Norwegian Shipowners' Association will work to implement ambitious climate goals and the necessary incentives in national and international arenas. On their part, association members will contribute to green invention and innovation, and reduce emissions through a number of technical and operational measures.

The most important measures are energy efficient operations, improvements to existing ships, fleet renewal, and the phasing in of sustainable low and zero-emission fuels.

■ In order to speed up the transition, the authorities must

- 1 Target research and development resources related to the development and testing of zero-emission solutions
- 2 Establish a maritime research and development fund for zero-emission technology under the auspices of the IMO
- 3 Establish market regulations that make it profitable to order zero-emission technology on ships as quickly as possible and by 2030 at the latest
- 4 Establish an international ban from 2050 on fuel that is not climate neutral

Shipping and climate

International shipping ties the world together. It represents the most important infrastructure for trade between the continents, and accounts for about 80 percent of world trade. Around 95 percent of all goods to Norway arrive by sea, and ships account for one third of domestic goods transported in Norway.

Shipping is vital for the global economy. Ships are the most energy efficient transport alternative and consume far less energy per unit of cargo than trucks, trains or planes. Nevertheless, shipping is also a source of greenhouse gas emissions, though shipping contributes only two percent of man-made CO₂ emissions.

Global warming represents perhaps the greatest threat to ecosystems, biodiversity, nature, and life itself. Drastic and sudden temperature changes will also challenge the economy, migration, and the entire global community. The ocean has absorbed 90 percent of surplus heat and is increasingly acidified. The global average temperature has already risen by about one degree Celsius. Furthermore, global warming can potentially trigger tipping points that we do not currently fully understand, nor will be able to control.

The UN Intergovernmental Panel on Climate Change has concluded that we must halve global emissions by 2030 and eliminate greenhouse gas emissions altogether by 2050. In order to reach these goals, shipping must take responsibility for substantial reductions in emissions from our own industry.

The Norwegian Shipowners' Association recognises and builds its environmental policies on fundamental knowledge, the UN Sustainable Development Goals, and environmental legal principles, including the precautionary principle.

As early as 2008, the Norwegian Shipowners' Association adopted a vision of "zero harmful emissions to air and sea". Since then, greenhouse gas emissions from international shipping have dropped more than ten percent, while carbon intensity has fallen by 30 percent.

Our members have achieved emissions reduction through operational measures, improvements to existing vessels, and fleet renewal.

In this sense, the industry is already making good progress. But the work must continue with unabated vigour, and it must take place in close collaboration with customers and financial institutions. In 2020, the Norwegian Shipowners' Association concretises the vision of 2008 and sets targets for zero emissions by 2050.

The term zero-emission vessels refer to vessels equipped to operate without emissions most of their time at sea. To strike a balance between cost and benefits, the vessels may be equipped with backup solutions that generate some emissions for a few operating hours a year. Nonetheless, this is a dramatic decline compared to previous emission levels, and a major step in the right and necessary direction.

Ships are the most energy efficient transportation alternative

Framework conditions

The shipping industry is global. Ships sail freely on the world's oceans and can be operated commercially and technically from almost every country in the world. International shipping is therefore regulated by a transnational United Nations body, the International Maritime Organization (IMO).

Global warming is a problem the world must solve in unison. New regulations should be developed through the IMO, in order to ensure global support and enforcement. In this way we avoid differential treatment of vessels from different flag states and loopholes in regulations, while ensuring fair competition. The IMO supports the Paris Agreement and has committed to follow the research of the UN Intergovernmental Panel on Climate Change. The IMO adopted an ambitious climate strategy in 2018. International shipping has committed to reducing its carbon intensity by 40 percent per unit by 2030, and halving emissions by 2050 compared to 2008 levels. The IMO has also set a target of carbon neutrality as soon as possible in this century.

The Norwegian Shipowners' Association supports the IMO's efforts to make global shipping more environmentally friendly, and actively participates in the negotiations and implementation of the IMO's climate strategy.

Research and development on new technologies and the immediate phasing in of operational measures to reduce emissions are important first steps. In the longer term, however, we are dependent on more radical measures, and the Norwegian Shipowners' Association is working towards a ban from 2050 on fuels that are not climate neutral.

The EU is working to reach its goal of climate neutrality by 2050 through the action plan 'European Green Deal'. The Norwegian Shipowners' Association welcomes this ambition and anticipates that a number of measures will impact shipping as the plan is implemented over the years to come. We believe that the EU can play a particularly important role in facilitating a modal shift from road and air to sea and railways. We also believe that the EU can assume a leading role in international regulatory processes in the IMO.

Global warming is a global problem

In February 2020 Norway committed to reducing Norwegian greenhouse gases by at least 50 percent by 2030, compared with emissions in 1990. With this, Norway is one of very few countries to set targets that support the 1.5 C degree target from the Paris Agreement.

In 2019, Norway pledged to set similar climate targets as the EU. Transport is identified as a sector with significant potential for emission cuts. In the action plan for green shipping, the government has set targets for halving emissions from domestic shipping by 2030 compared with 2005 levels.

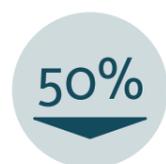
The Norwegian Shipowners' Association supports ambitious international and Norwegian climate targets and will do our part to meet those goals through drastic cuts in our own industry. To succeed, we are dependent on the authorities at all levels taking a holistic approach and regarding the transport sector as a whole. A level playing field and the promotion of transportation alternatives based on their environmental performance will reduce emissions. Specific climate requirements from local authorities with local application, on the other hand, can shift emissions from one transport segment to another, so-called carbon leakage.

Our goals

Norwegian Shipowners' Association members will cut their greenhouse gas emissions by 50 percent per unit by 2030 compared to 2008*

Measures to ensure lower emissions through efficient operation and retrofits to the existing fleet are important, as they cut emissions immediately.

*Emissions per unit refer to transport work or other relevant value creation parameters.



2030

Norwegian Shipowners' Association members will only order vessels with zero-emission technology from 2030



In their role as buyers, shipping companies can specify the technology and machinery solutions for their ships and therefore have a particular responsibility to give clear indication of what they expect shipyards, equipment and engine suppliers, and energy companies to develop in the years to come. Through this strategy, the Norwegian Shipowners' Association intends to communicate the clear expectation that significant resources should be devoted to developing zero-emission solutions that can be commercialised and scaled up as quickly as possible.

The Norwegian maritime cluster aspires to a leading role in the development of emission-free shipping. Guided by the vision of zero-emission ships, Norwegian Shipowners' Association members invite ship consultants, equipment and engine manufacturers, and other stakeholders to contribute their ideas, thinking outside the box and challenging widely accepted restrictions and conventions.

Norwegian Shipowners' Association members will have a climate neutral fleet in 2050

Ships normally operate for about 20-30 years before being taken out of service. In order to reach the goal of zero emissions from shipping in 2050, ships with zero-emission technology must be phased in as quickly as possible, and on a large scale from 2030.

The IMO strategy adopted in April 2018 requires halving greenhouse gases by 2050 compared with 2008. If we assume an annual growth in activity of 1-3 percent by 2050, an absolute halving will require a 70-90 percent reduction in carbon intensity. Shipping companies must therefore, under the IMO climate strategy, find measures that cut emissions by at least 70 percent, and perhaps as much as 90 percent. New low and zero-emission fuels are required to realise such emission cuts and must be made available at ports.



2050

The Norwegian Shipowners' Association will strive for an international ban from 2050 on fuel that is not climate neutral



High ambitions for the development of zero-emission solutions that can be built into new vessels from 2030 and onwards make it natural for the industry to take a proactive position on international regulations on greenhouse gas emissions from ships as well. Given the existence of technology and solutions for zero-emission operation of ships, we believe it is important for international authorities, working through the IMO, to prohibit the use of fuel that is not climate neutral from 2050. Such a ban will be an important driver for developing new technology and alternative fuels, and ensure a level playing field.

How to reach the climate goals in the road map

1

Upgrade the existing fleet in order to reduce emissions

It is not good for the climate, nor the environment to send fully functioning ships to early scrapping and recycling. Shipowners must therefore explore how emission reductions can be achieved from existing ships, making them as fuel efficient as newer vessels. Examples from Norwegian shipping companies have demonstrated that this indeed is possible.

2

Use sustainable low and zero-emission fuels from an early stage, and contribute to the development of infrastructure for these fuels

If we are to succeed in eliminating the emissions completely, sustainable low and zero-emissions fuels will be required. With vessels operating in all segments, members of the Norwegian Shipowners' Association can create demand for such fuels, first along the Norwegian coast, then in regions such as the North Sea or the Baltic, before the infrastructure is expanded to provide global coverage.

All fuels must also be considered in a life cycle perspective. Emissions from combustion of fuel must be considered together with the footprint from fuel production. Zero-emission fuels are not yet available

on a large scale, and they typically take up more space onboard and are more expensive than conventional fuels. This explains the need for reducing energy consumption to a minimum before we are able to begin using alternative fuels.

3

Phase in ships with zero-emission technology as quickly as possible, and no later than 2030, to realise zero emissions from 2050

In 2019, the average age of the Norwegian short sea fleet was about 22 years. In other words ripe for renewal, and the potential for emission cuts is considerable. The ability to optimise and utilise the most energy-efficient solutions is greatest when ordering new ships.

The coastal fleet is a natural starting point for testing new technology. Smaller ships have less machinery and lower energy requirements, and they sail within a limited area. They can therefore use fuel that is not yet widely available in large quantities. Ships normally operate for 20–30 years before being taken out of service. To achieve the goal of zero emissions from shipping, vessels with zero-emission technology must be phased in as quickly as possible.

In 2020, we do not have access to equipment or fuels that allow zero emissions, but we can build new ships

that cut emissions significantly compared to the ships they are replacing. In addition, shipowners can prepare for future zero-emission technologies to be phased in at a later date, to ensure that the largest possible share of the fleet can operate without emissions in 2050.

4

Operate ships as energy-efficiently as possible using voyage planning, low friction anti-fouling paint, and optimised speed

Wind and waves have a significant impact on fuel consumption and emissions. Better long-term weather forecasting helps the captain choose the greenest route to the next port. Enhanced understanding of a ship's wave resistance and fuel consumption allows the captain to further reduce emissions during operations. Hull and propeller cleaning significantly reduces the ship's frictional resistance, and speed optimisation can contribute to further reduced emissions.

5

Minimise the environmental impact of our entire enterprise by taking a lifecycle perspective, using the best overall solutions

In order to ensure that actions taken by shipowners are effective, and to avoid renewal and replacement leading to increased emissions, we must take a life cycle perspective on both ships and fuel. The industry has a tradition of seeing ships in a generational perspective. This is necessary when assessing the environmental impact of replacing technology on board or extending the life of existing vessels.

6

Measure, analyse and publish our environmental and climate accounting in a consistent, relevant and transparent manner

Reducing emissions begins with raising awareness. To create awareness, we need to both measure and analyse energy consumption and emissions. This enhances shipowner knowledge, while providing us with tools to see the effect of the various measures we implement. In addition to creating awareness internally, we also aim to be open about measures taken and their effects. This will help our environmentally conscious customers to make more informed choices.

New opportunities for maritime Norway

Despite much of the maritime industry having experienced very demanding markets in recent years, we can be proud of our proactive and forward-looking outlook on finding good solutions to the world's challenges.

The entire coast of Norway is teeming with ideas, project proposals and prototypes, and serves as a technology laboratory for the industry. Here we can test and try out new solutions that the entire international shipping industry will require in the years to come.

Norway plays a leading role in the development of environmentally and climate-friendly solutions for ships and is already a leader in LNG-powered vessels and electric ferries.

In 2020, the first hydrogen-powered ferry will be launched in Norway, and a Norwegian offshore ship is currently being retrofitted to use ammonia as fuel. Norway has a large offshore fleet, and this segment could be a driving force in developing new technologies that will in turn create demand for low-emission solutions. Towards 2050, the challenge is to find solutions that can convert the entire global fleet from heavy oil and diesel fuel to zero-emission solutions.

The Norwegian maritime industry has the unique opportunity to create a new export market. The maritime cluster has gained singular knowledge in the development and implementation of new green technologies. This knowledge gives us an important competitive advantage in the development of new solutions that the world will require. We also see that the expertise and technology developed in the maritime industry is becoming increasingly relevant for other sectors. Through knowledge transfer, we can develop solutions to meet future demands and become a world leader in multiple areas.

When sustainability and profitability go hand in hand, we create new opportunities for Norway as a maritime nation.



