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Air pollution from ships

Ships pour out large quantities of pollutants into the air, principally in the form of sulphur and nitrogen oxides and particulate matter (PM).

The emissions from ships engaged in international trade in the seas surrounding Europe - the Baltic, the North Sea, the north-eastern part of the Atlantic, the Mediterranean and the Black Sea - are estimated to amount to 1.6 million tonnes of sulphur dioxide and 3 million tonnes of nitrogen oxides a year in 2013.

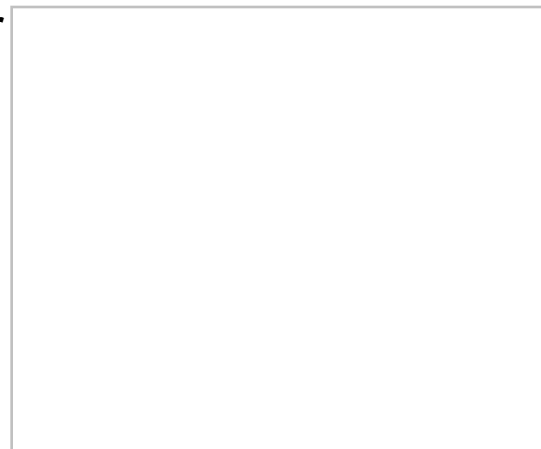
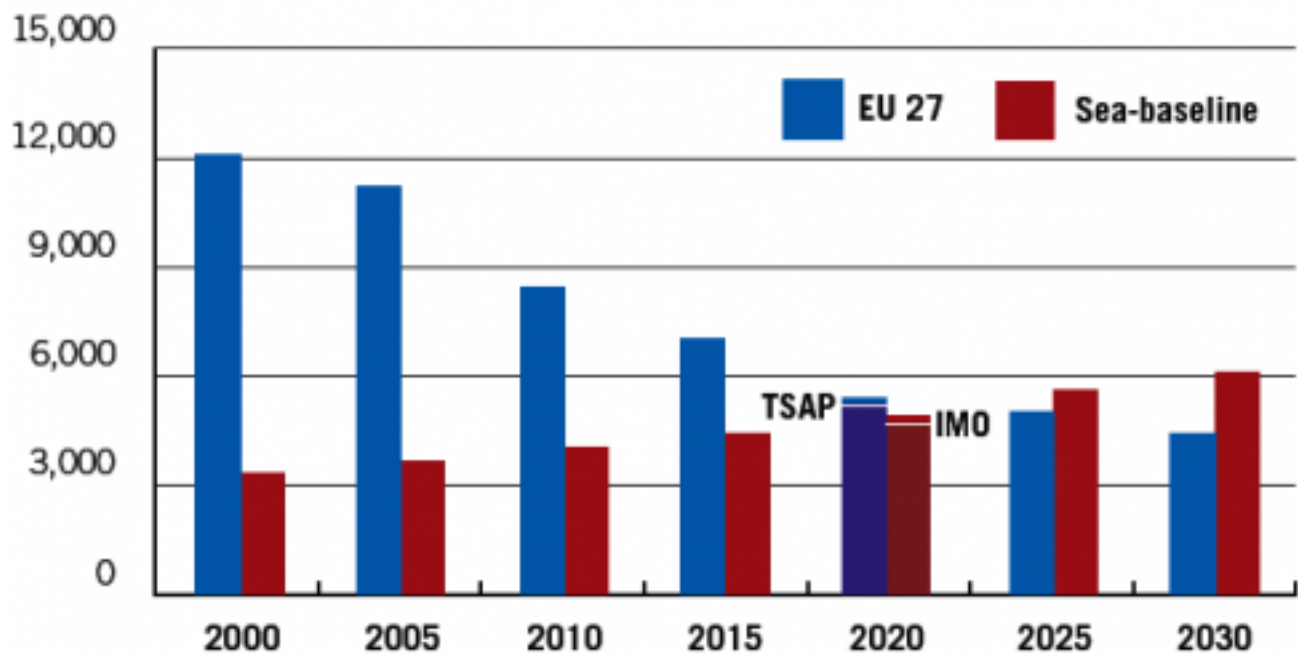


Illustration: Lars-Erik Håkansson

In contrast to the progress in reducing emissions from land-based sources, shipping emissions of sulphur and nitrogen oxides have steadily been increasing over the last thirty years. While recently introduced sulphur standards at global and EU levels have halted this increasing trend for SO₂-emissions (at least in the Sulphur Emission Control Areas - SECAs) in northern Europe and North America), NO_x-emissions are expected to continue increasing. As a result, within ten years the NO_x-emissions from international shipping around Europe is expected to equal or even surpass the total from all land-based sources in the 28 EU member states combined (see chart below).



Baseline scenario for emissions of NO_x (in kilotonnes) up to 2020 from landbased sources in EU27 and from international shipping in European sea areas.

EU27 = Emissions from land-based sources in all EU countries (incl. domestic shipping).

Sea = Emissions from international shipping in European sea areas.

TSAP = Target in line with the EU Thematic Strategy on Air Pollution from September 2005

IMO = Expected outcome from implementing MARRPOL Annex VI as revised in October 2008

For details see [Air Pollution from Ships](#) (pdf, 980 kB).

Control measures

There are however available means by which air pollutant emissions could be reduced by as much as 80-99 per cent, and very cost-effectively compared with what would have to be done to achieve similar results onshore.



Viking Line's Grace is the first large passenger ship in the world to use gas (LNG)



The freighter MS Cellus emits 90 per cent

passenger ship in the world to use gas (LNG) as its primary fuel. As result, emissions into the air of SO₂, NOx and PM are reduced by around 99, 85, and 85 per cent, respectively, and emissions of greenhouse gases by some 15 per cent, as compared to using marine heavy fuel oil Photo: Viking Line.

less NOx and 80 per cent less sulphur dioxide than an equivalent standard ship. It is equipped with an SCR flue gas emission control system and uses low-sulphur fuel oil. Photo: EI Bingle CC BY-NC.

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Significant health effects

Smokestack emissions from international shipping kill approximately 50,000 people a year in Europe, at an annual cost to society of more than €58 billion, according to a Danish study from 2011. The researchers used data and projections of ships' emissions of SO₂, NOx and PM for the years 2000-2020.

Through chemical reactions in the air, SO₂ and NOx is converted into very small airborne particles, sulphate and nitrate aerosols. Tiny airborne particles are linked to premature deaths. The particles get into the lungs and are small enough to pass through tissues and enter the blood. They can then trigger inflammations which eventually cause heart and lung failures. Ship emissions may also contain carcinogenic particles.

Implementing the stricter ship fuel standards agreed by the International Maritime Organisation in 2008 is estimated to save up to 26,000 lives per year in the EU in 2020.

>> Further reading

Lower speed - less emissions. Article in Acid News 3/2015.

Ship scrubbers questioned. Article in Acid News 2/2015.

Enforcement of ship sulphur standards. Article in Acid News 1/2015.

New figures on global ship emissions. Article in Acid News 3/2014.

SCR can cut ship NOx emissions. Article in Acid News 2/2014.

Ships should use advanced emissions monitoring. Article in Acid News 1/2014.

Shipping air pollution costs €60 billion per year. Article in Acid News 3/2013.

Ship emissions down in the Baltic and North Sea. Article in Acid News 3/2013.

Shipping should cut greenhouse gases and air pollutants. Article in Acid News 1/2013.

[Air pollution from ships](#) (November 2011). A pamphlet published jointly by AirClim and five other environmental NGOs (pdf)

[Cleaner ship fuels will dominate in 2020](#). Article in Acid News 4/2012.

[Slow steaming saves money and the climate.](#) Article in Acid News 3/2012.

[Great benefits of NOx reductions in the North Sea](#) . Article in Acid News 3/2012.

[The arrival of a new EU sulphur law.](#) Article in Acid News 2/2012.

[New standards save lives.](#) Article in Acid News 4/2011.

[California rules give great benefits.](#) Article in Acid News 3/2011.

[Ship pollution causes 50,000 deaths per year.](#) Article in Acid News 2/2011.

[Avoided Global Premature Mortality Resulting from Reduction of Sulphur in Marine Fuel \(January 2008\).](#) NGO submission to IMO (pdf)

[Appropriate standards to reduce air pollution from ships \(October 2006\).](#) NGO submission to the IMO (pdf)

[International Maritime Organization.](#) Full text of the convention and its annexes, as well as ratification update.

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Policy initiatives



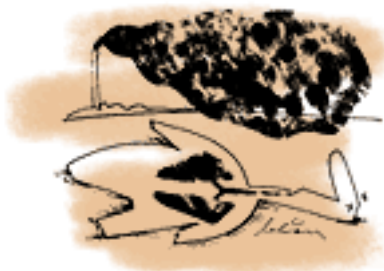
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