



# CLEAN SHIPPING

VISION 2030 AND ACTION PLAN UNTIL 2021

---





# Preface

As a Harbour Master, citizen and mother, I strive for a sustainable world. A world in which it is good to live, work and enjoy life and where we care for our surroundings and the environment. Not only for our generation but also for future generations. That is why I am proud of Port of Amsterdam's Clean Shipping Vision. An ambitious vision that contributes to a clean shipping industry and thus to a sustainable port. This results in a 'licence to operate' and 'a licence to grow'. To me, that is corporate social responsibility.

Marleen van de Kerkhof  
Harbour Master of Amsterdam

# Shipping must be cleaner



The port of Amsterdam brings ships and cargo flows, energy and industry, people and ideas together in an enterprising metropolis. Together, the ports along the North Sea Canal tranship almost 100 million tonnes of goods. This involves many ship movements of both inland and seagoing ships. In addition, the port of Amsterdam is a popular cruise destination. In 2030, we are among the most sustainable ports in Europe and clean shipping makes a substantial contribution to this. This is one of the five pillars of Port of Amsterdam's The Sustainable Port<sup>1</sup>.

Our customers are looking for flexible ways to move goods faster, more efficiently and more consciously from port to final destination. We support, facilitate and stimulate this initiative. The Clean Shipping Vision, states in clear terms how we are going to do this - and how we would like to involve our partners in it.

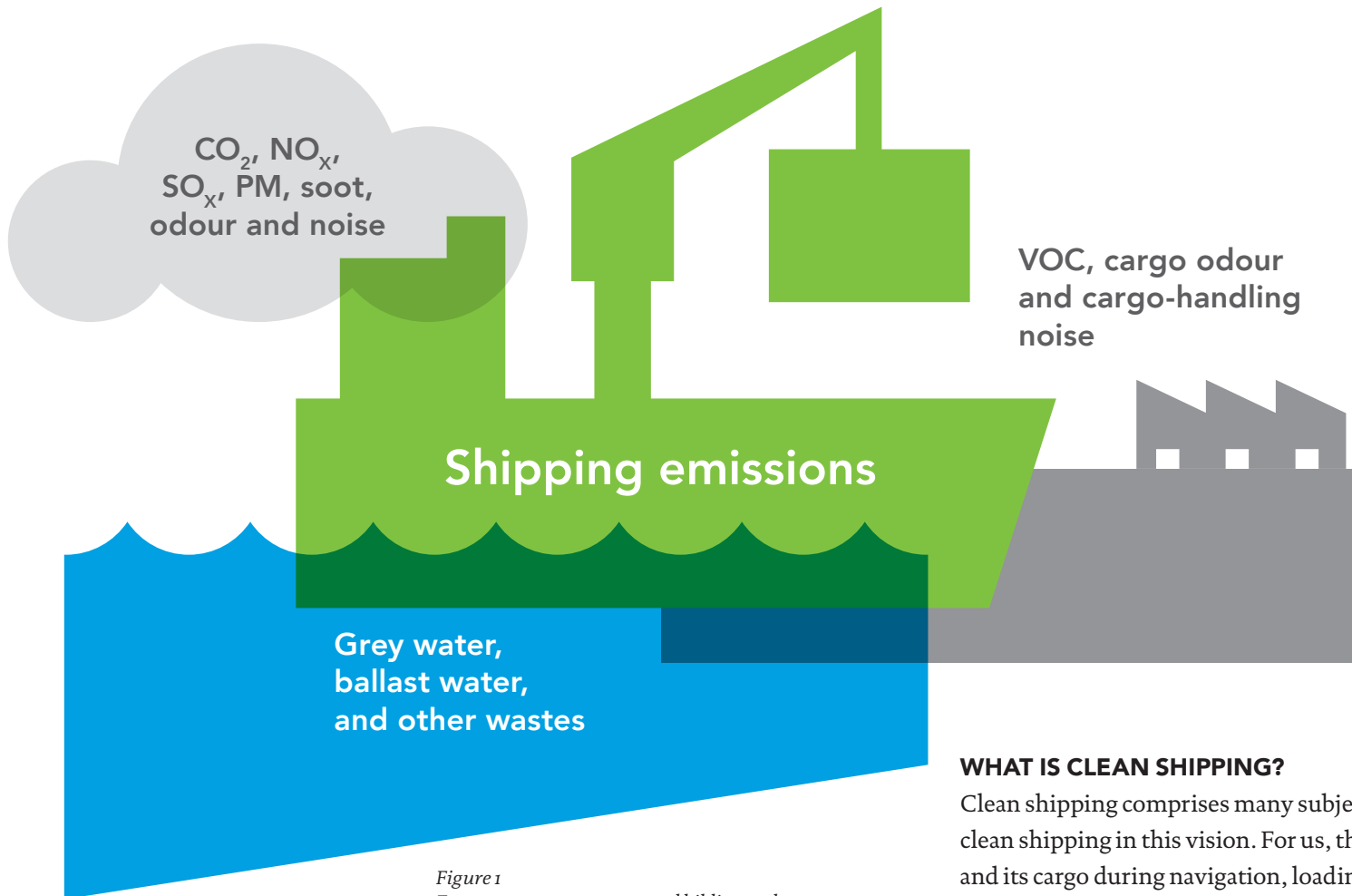


Figure 1  
For terms, see acronyms and bibliography

### WHAT IS CLEAN SHIPPING?

Clean shipping comprises many subjects. Figure 1 shows what subjects fall under clean shipping in this vision. For us, this term refers to the emissions of the ship and its cargo during navigation, loading and unloading. In this vision, we focus on shipping in the management area of the Port of Amsterdam. Lower emissions have a positive impact on the natural environment and the living environment.

If several ports simultaneously promote clean shipping, this will speed up the implementation of new and cleaner technologies. With this vision, Port of Amsterdam seeks to play a pioneering role.

# Clean shipping contributes to a sustainable port



## THIS IS WHERE WE ARE IN 2030

In 2030, we are a sustainable energy port that is strongly connected to the environment and provides prosperity, jobs and green energy as set out in Vision 2030<sup>2</sup>. Of course, we ensure optimal quality of life in and around the port. We see this as our responsibility. This is a prerequisite for a licence to operate and to grow. To achieve this, we work together with companies in the port, with Environmental Agencies and with other partners. In our Strategic Plan 2017-20213, we have set out the course to a metropolitan port. You can read our vision on sustainability in The Sustainable Port 2016-2020<sup>1</sup>. In both policy documents, clean shipping plays a crucial role.

Our ideal is that shipping is completely clean and without any side effects. We are ambitious enough to pursue this ideal and realistic enough to see that this cannot be achieved overnight, because ships have a long service life. That is why we need to take smart and pragmatic short-term as well as long-term actions.

# Ambitions for clean shipping



## IN 2030, WE AIM TO HAVE A PORT IN WHICH:

- Seagoing cruise ships when berthed emit on average 50% less  $\text{NO}_x$ ,  $\text{SO}_x$ , and PM than the zero line permitted by law in 2018.
- Noise and air pollution caused by diesel generators of inland ships and river cruise ships on public berths within the A10 Ring Road around Amsterdam are as near to zero emission as possible.
- The environmental performances of all visiting ships are at least equal to today's cleanest ships according to the ESI (with an ESI score of more than 20).
- Shipping companies have safe access to alternative fuels.
- Ships can have their waste collected and processed in an easy and sustainable way.
- Cargoes are transported and transhipped without causing emissions of harmful concentrations of VOCs or PM.
- No specific regulations issued by the Municipality of Amsterdam are needed, as everything has been well organised at the international level.
- Cooperation and consultation take place on the basis of unambiguous information.

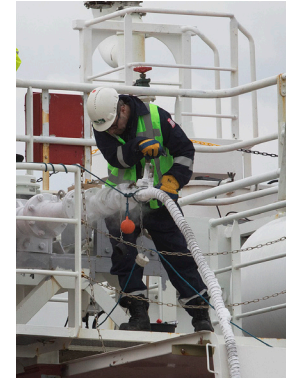
# Shipping is becoming increasingly cleaner and more efficient

## MARINE FUELS ARE BECOMING GREENER....

It is estimated that 85%<sup>4</sup> of the world's ships are still running on low-quality bunker oil. Low-quality fuel is cheap and widely available everywhere. During the operational life of a ship - usually a period of 25 years - fuel regulations will change significantly. That is why many shipowners are already making adjustments to their ships to keep them future-proof. With the prospect of stricter fuel regulations from the International Maritime Organization (IMO<sup>5</sup>) and the European Commission<sup>6</sup>, shipowners are also more often considering alternative fuels such as Liquefied Natural Gas (LNG). Alternative fuels result in substantially fewer emissions. However, it is expected that only after 2030 will electricity, biofuels, and hydrogen become more important.



*MT Fure West was the first seagoing ship to be bunkered with LNG in the port of Amsterdam (November 2016)*



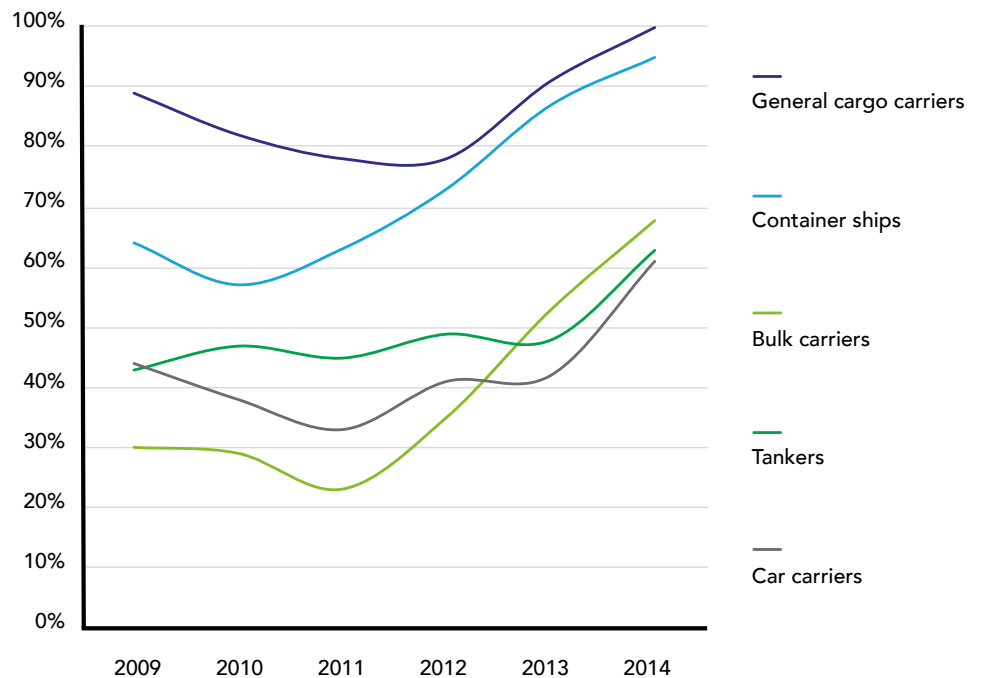


#### .... AND SHIPS ARE BECOMING CLEANER

In addition to low-quality bunker oil, outdated engines also cause high emissions. Technological developments, fortunately, are leading to cleaner and more efficient engines. Figure 3 shows that ships from the 2009 - 2014 period are substantially more efficient than ships delivered during the decade before that. This applies to all types of ships.

We expect that as a result of stricter regulations and further technological developments, ships will become increasingly cleaner and will cause fewer emissions.

FIGURE 3: % OF NEW SHIPS DELIVERED IN THE PERIOD 2009-2014 WHICH ARE MORE ENERGY-EFFICIENT THAN NEW SHIPS IN THE REFERENCE PERIOD 1999-2009<sup>7</sup>.





# International regulation of clean shipping is effective, but takes time



## INTERNATIONAL STANDARDS...

Although environmental standards are badly needed, they often have a cost-increasing effect. Cost price, at the same time, is often the decisive factor in competition between shipping companies. If a country unilaterally tightens its environmental regulations, 'local' ships will have more difficulty in competing with other ships that do not have to comply with these regulations. Regulations and standards, therefore, are only truly effective if they are adopted and implemented internationally. Seagoing and inland shipping, after all, are international by definition.

In order to ensure fair international competition, it is important that the International Maritime Organization (IMO) sets standards for seagoing vessels. In the case of European inland shipping, this should be done by the Central Commission for Navigation on the Rhine (CCNR) and the European Commission. These international conventions are implemented through national legislation. Examples of international provisions are:

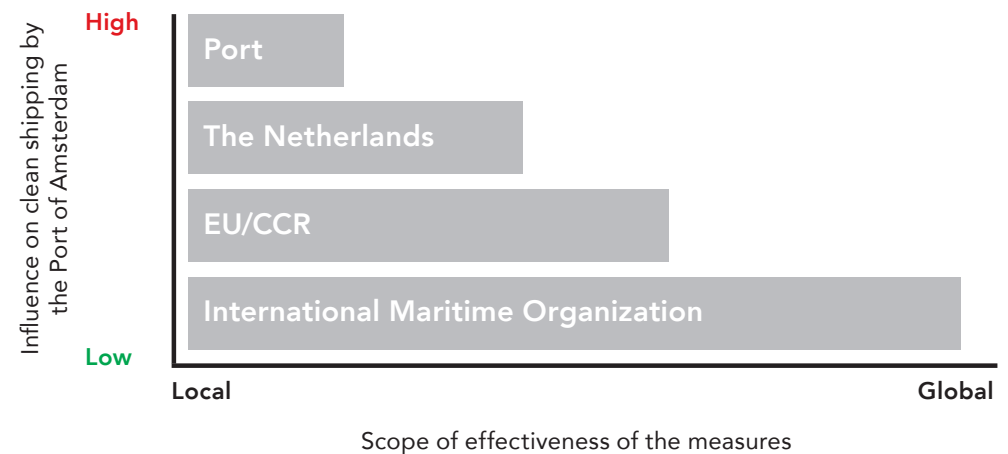
- An Emission Control Area (ECA), established by the IMO in the North Sea, with stricter requirements for sulphur emissions, and a North Sea ECA for nitrogen expected to come into force with effect from 2021.
- Regulations, established by the CCNR since 2009, for the collection, deposit and reception of waste from ships on the Rhine and inland waterways.
- The permitted sulphur content of marine fuels will go down from 3.5% to 0.5% in international waters as from 2020.

#### .... AND LOCAL MEASURES

However important international agreements may be, they do not always offer solutions for regional or national situations. That is why it is sometimes necessary to impose local regulations. The Amsterdam Port Bye-laws contain specific provisions for Amsterdam. Examples of these include a ban on the use of diesel generators by inland ships in specific areas, or the mandatory use of vapour return connections when loading seagoing ships at oil terminals. These measures ensure a local reduction in emissions, but the impact is limited when compared to global emissions.



SCOPE OF EFFECTIVENESS VERSUS INFLUENCE  
BY THE PORT OF AMSTERDAM ON CLEAN SHIPPING:



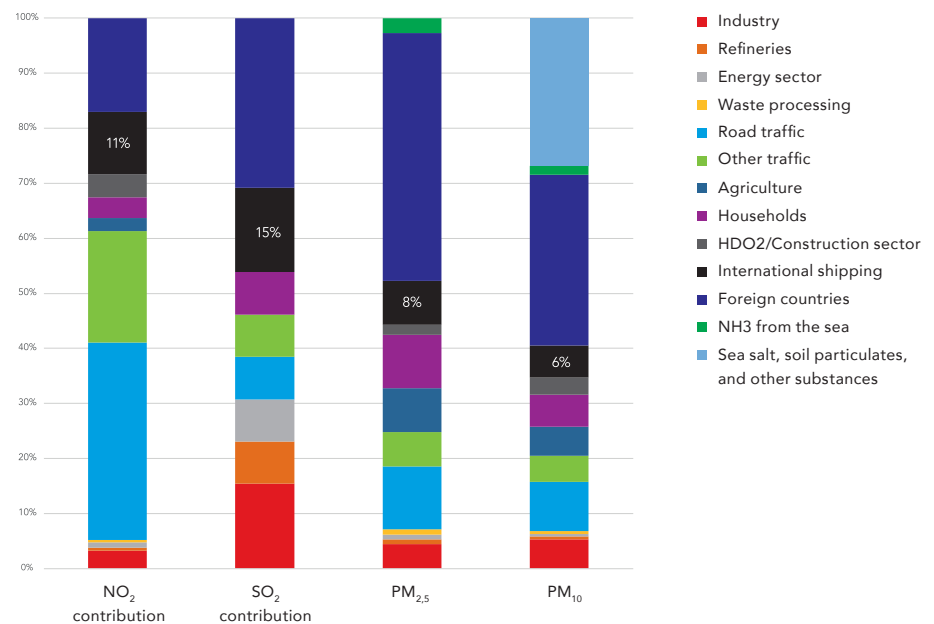
# Clean shipping ensures better air quality

The GGD (Municipal Health Service) publishes annual reports on the measured air quality in the port. It is important that local residents are not inconvenienced by port activities. That is why the air quality around the port is being measured. In 2016 (according to the latest measurement data), the legal air quality limits were met at all port locations.<sup>8</sup>

## SHIPPING AS AN EMISSION SOURCE

It is very difficult to measure the contribution of shipping to emissions. Emissions attributed to shipping can only be estimated afterwards by the RIVM (Dutch National Institute for Public Health and Environmental Protection). The graph shows the estimate for 2016<sup>9</sup>.

**FIGURE 5: CONTRIBUTION OF SHIPPING TO EMISSIONS IN THE AMSTERDAM-HAARLEM REGION 2016**



# We are working on clean shipping with the help of regulations, supervision and enforcement activities, and a pricing policy

## WE IMPOSE REGULATIONS AND CARRY OUT SUPERVISION AND ENFORCEMENT ACTIVITIES

Our Harbour Master's Division is the supervising authority for the relevant national legislation and regulations in the port area. As a rule, we act as eyes and ears in the port. We do this together with partners such as the Human Environment and Transport Inspectorate and Rijkswaterstaat (the Directorate-General for Public Works and Water Management). With respect to the Amsterdam Port Bye-laws, we lay down and enforce specific regulations where necessary. Examples are:

- Regulations for waste delivery by ships.
- The mandatory use of vapour return lines for board-to-board transshipments of volatile organic compounds (VOCs) such as petrol.
- A ban on the use of waste incinerators on board ships in port.
- A ban on the use of generators on board inland ships in areas with shore-side electricity.
- A mandatory bunker checklist to prevent water pollution.



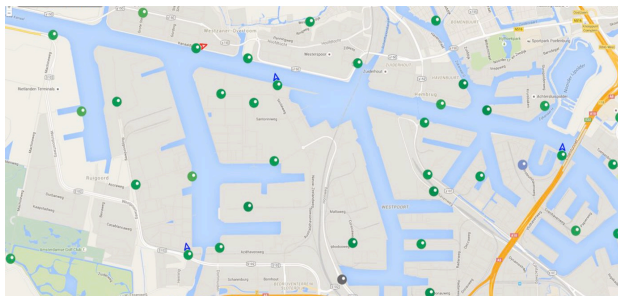


## WE MONITOR ODOUR NUISANCE

Shipping can also cause odour nuisance. The number of odour complaints has been falling in recent years. In order to reduce these complaints even further, Port of Amsterdam, in cooperation with the Environment Agency North Sea Canal Area, the Province of North Holland, and port companies, has installed 43 e-noses<sup>10</sup>. These electronic noses detect changes in the chemical composition of the air, which makes it possible to track down the source of a potential odour nuisance. In addition, the e-noses act as an early warning system in the event of any incidents. The e-noses thus contribute to increasing the quality of life. The Environment Agency links the information supplied by e-noses to complaints.

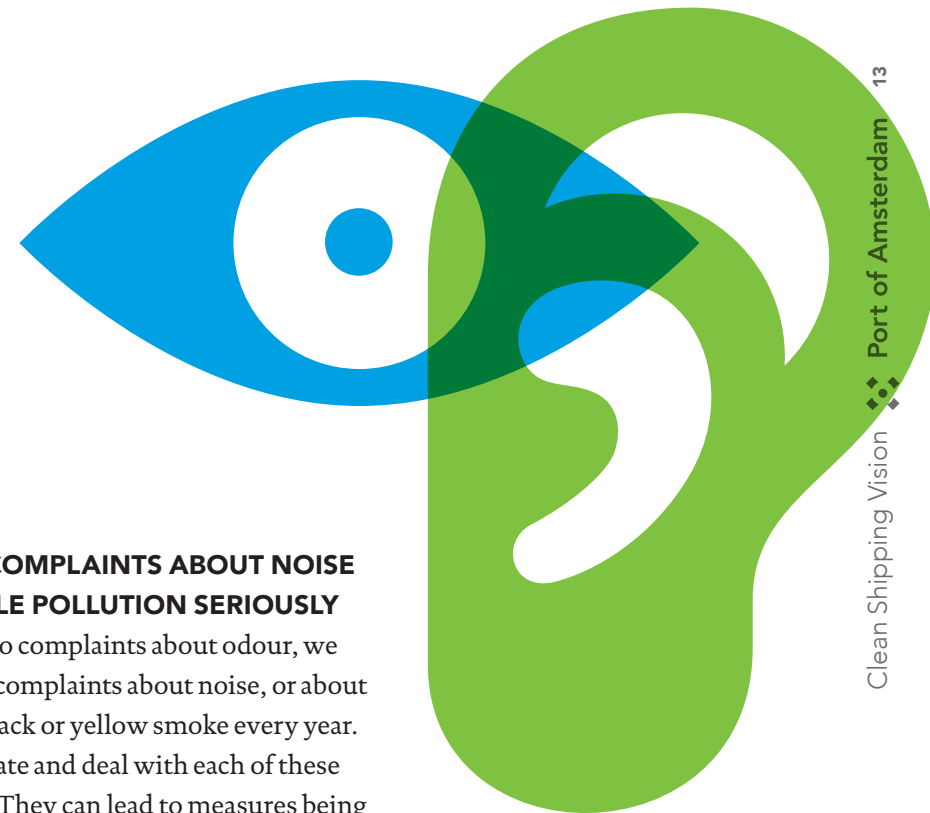


*e-noses in  
the port area*



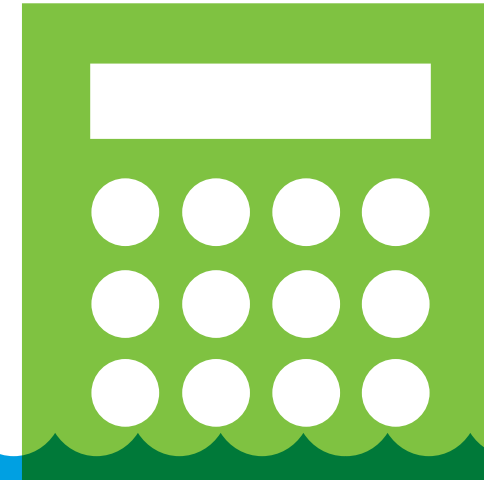
## WE TAKE COMPLAINTS ABOUT NOISE AND VISIBLE POLLUTION SERIOUSLY

In addition to complaints about odour, we also receive complaints about noise, or about plumes of black or yellow smoke every year. We investigate and deal with each of these complaints. They can lead to measures being taken or to a tightening up of our policy.



### WE PURSUE AN INCENTIVE PRICING POLICY

We reward clean seagoing and inland ships with a discount on their harbour dues. We do this on the basis of the Environmental Ship Index and the Green Award.



### THE ENVIRONMENTAL SHIP INDEX<sup>11</sup>

Since 2008, we have been co-initiators of the World Ports Climate Initiative. This has grown to become the World Ports Sustainability Program which has led to the Environmental Ship Index (ESI). The higher a ship scores on this index (on a scale from 0 to 100), the higher the discount given on its harbour dues. This discount applies in the port of Amsterdam if a ship has an ESI score of 20 points or higher. Ships that attain a score of 31 points or higher are awarded a bonus. We note that this incentive scheme has a positive effect and we are monitoring compliance with the ESI requirements. With almost 50 international seaports participating, it is becoming more attractive for shipping companies to invest in cleaner ships.



### THE GREEN AWARD FOR INLAND SHIPPING<sup>12</sup>

In 2015, we were the first port to reward inland ships based on the level they achieved within the Green Award programme. Bronze brings in 5% discount on the port dues, silver 10% and gold 15%. The level depends, inter alia, on emissions of NOx and PM and the energy-saving measures that have been taken. A total of 18 ports are now following our example. As Port of Amsterdam, we support the Green Award Foundation financially and with expertise.



# We make shipping cleaner with port facilities and knowledge development

## WE ARE INVESTING IN FACILITIES THAT SUPPORT CLEAN SHIPPING

We do this ourselves and with our partners. A few examples:

- Together with our partners, we are investigating possibilities to reduce emissions from cranes and PM emissions from cargo sources. This has led to the introduction of a new fuel systems in a number of cranes and to a pilot with water spray systems for unloading dry bulk. As the first terminal to start using this technology, Rietlanden switched to gas-to-liquid (GTL) fuel for its floating cranes at the end of 2016. GTL reduces emissions even further.
- Together with market participants, we are developing facilities to enable implementation of the prohibition on degassing by ships while underway. In the province of North Holland, degassing of VOCs by inland ships while underway has been prohibited as from March 2017.
- We are installing shore-side electricity facilities for inland shipping on public berths within the A10 Ring Road around Amsterdam. More than 160 shore-side electricity sockets have now been installed.
- We provide waste disposal facilities for ships.



*KNSM Island shore-side electricity facility*

## WE EXCHANGE KNOWLEDGE AND WORK TOGETHER

We are working together with other ports to ensure effective measures that do not distort the level playing field. A few examples:

- We are making agreements with Port of Rotterdam on waste plans and associated procedures.
- With the International Association of Ports and Harbours, we have set up the World Ports Sustainability Program, developed the ESI and agreed on standards for shore-side electricity and LNG.
- With other ports that are fellow members of the European Seaport Organisation, we are involved in setting up EcoPorts. Within this initiative, we have been exchanging success stories and setting up benchmarks at a European level.
- We share our experiences and successes with our chain partners via Platform Schone Scheepvaart ('Clean Shipping Platform' - a Dutch collaborative project of experts in the sector, government organisations, and knowledge leaders).



# Green Deal

*Green Deal on  
Ship-Generated  
Waste*

## WE INVEST IN GREEN DEALS

Cooperation with chain partners and central and local governments is also taking shape in Green Deals. The Green Deal on Ship-Generated Waste has been introduced to stimulate clean shipping. With this Green Deal, Dutch seaports and partners, including the North Sea Foundation and the Dutch government are committed to reducing the volume of waste on board. We do this by focusing on waste prevention in relation to ships supplies, by better separating plastic waste on board and by collecting plastic waste in ports as much as possible.



# Concrete steps to 2030

## REDUCTION OF EMISSIONS FROM SHIPPING

### OUR 2030 AMBITION

### FIRST ACTIONS AND TARGETED RESULTS UP TO 2021


#### Ships

<p>⚓ In 2030, seagoing cruise ships when berthed emit, on average, 50% less NO<sub>x</sub>, SO<sub>x</sub> and PM than the zero line laid down by law in 2018.</p>	<ul style="list-style-type: none"> <li>• We develop an emission model for seagoing cruise ships when berthed and establish a zero line in 2018, after which emissions will be monitored at yearly intervals.</li> <li>• We investigate emission reduction measures, including shore-side electricity and LNG-driven power supply barges for seagoing cruise ships.</li> <li>• We translate the results of pilot projects into permanent measures.</li> </ul>
<p>⚓ In 2030, noise and air pollution at public berths for inland ships within the A10 Ring Road are as close to zero emission as possible.</p>	<p>We make shore-side electricity available at all permanent waiting berths for inland ships and at berths for river cruise ships within the A10 Ring Road. To realise this, we:</p> <ul style="list-style-type: none"> <li>• Expand the number of shore-side electricity units.</li> <li>• Optimise or replace existing shore-side electricity units.</li> <li>• Maintain a prohibition on the use of generators or an obligation to use shore-side electricity.</li> </ul>
<p>⚓ In 2030, the environmental performances of all visiting ships are at least equal to the current ESI standard.</p>	<ul style="list-style-type: none"> <li>• We support ESI and Green Award and give cleaner ships a discount on their seaport dues and an additional discount to LNG-powered ships. In 2021, 20% of the ship visits are clean in accordance with ESI.</li> <li>• We develop an emission model for NO<sub>x</sub>, SO<sub>x</sub> and PM for all ships. This is done for monitoring purposes and to enable possible or necessary emission reduction measures.</li> <li>• We make sure that we can measure and label shipping noise emissions in a uniform way.</li> <li>• We translate the results into permanent measures.</li> </ul>
<p>⚓ In 2030, shipping companies have safe access to alternative fuels.</p>	<ul style="list-style-type: none"> <li>• We develop a safe LNG bunkering location with appropriate regulations.</li> <li>• We make sure that all our own vessels use renewable fuels.</li> <li>• We continue to monitor and respond to fuel developments.</li> </ul>
<p>⚓ In 2030, collection and processing of ship-generated waste is sustainable.</p>	<ul style="list-style-type: none"> <li>• Together with Port of Rotterdam, we are investigating a savings scheme for port waste, aiming to implement such a scheme as soon as possible.</li> <li>• We conduct a pilot project on free collection of household waste from inland ships and, if successful, we will implement it.</li> </ul>

## OUR 2030 AMBITION


## FIRST ACTIONS AND TARGETED RESULTS UP TO 2021

### Cargo

 In 2030, cargoes are transported and transhipped without any harmful emissions of VOCs or PM.

- We organise and implement enforcement and monitoring of the prohibition on degassing.
- We develop a degassing facility with market participants.
- We use water spray systems during transhipment of dry bulk cargoes at lightering facilities and coal terminals.

### Cooperation

 In 2030, there is no need for specific Amsterdam measures as emission reduction is guaranteed by international agreements.

- We lobby within the European Sea Ports Organisation and the European Commission for a European Emission Control Area for SO<sub>x</sub> and NO<sub>x</sub>.
- We enable implementation of a national/international prohibition on degassing via participation in CDNI (Convention on the collection, deposit and reception of waste produced during navigation on the Rhine and inland waterways).
- We monitor the effects of shipping with Environmental Agencies and the GGD.
- We respond immediately to incidents. In the event of issues of a structural nature, we analyse and, if necessary, lobby for necessary policy adjustments.

 By 2030, there are uniform standards on and shared knowledge about emissions reduction in ports.

- We participate in the Clean Shipping Platform.
- We participate in the Dutch 'VoortVarend Besparen' programme, which stimulates inland skippers and shipping companies in adopting efficient navigation practices.
- We also participate in various working groups of the International Association of Ports and Harbours, such as ESI and LNG working groups.

# Acronyms

<b>CCR</b>	Central Commission for Navigation on the Rhine	<b>LNG</b>	Liquid Natural Gas
<b>CDNI</b>	Convention on the Collection, Deposit and Reception of Waste during navigation on the Rhine and Inland Waterways of 9 September 1996	<b>MRA</b>	Amsterdam Metropolitan Region
<b>CO<sub>2</sub></b>	Carbon dioxide	<b>NH<sub>3</sub></b>	Ammonia
<b>EC</b>	European Commission	<b>NO<sub>2</sub></b>	Nitrogen Dioxide
<b>ESI</b>	Environmental Ship Index	<b>NO<sub>x</sub></b>	Nitrogen Oxides
<b>EU</b>	European Union	<b>NZKG</b>	North Sea Canal Area
<b>GGD</b>	Municipal Health Service	<b>PM</b>	Particulate Matter
<b>HAP</b>	Port Waste Plan	<b>RIVM</b>	Dutch National Institute for Public Health and Environmental Protection
<b>HbA</b>	Port of Amsterdam	<b>RWS</b>	Rijkswaterstaat
<b>HbR</b>	Port of Rotterdam International	<b>SO<sub>2</sub></b>	Sulphur Dioxide
<b>IAPH</b>	Association of Ports and Harbours	<b>SO<sub>x</sub></b>	Sulphur Oxides
<b>IL&amp;T</b>	Human Environment and Transport Inspectorate	<b>VOS</b>	Volatile Organic Compounds
<b>IMO</b>	International Maritime Organization	<b>WPSP</b>	World Ports Sustainability Programme

# Bibliography




1. The Sustainable Port, Port of Amsterdam's sustainability objectives and initiatives (2017)  
[https://www.portofamsterdam.com/sites/poa/files/media/havenbedrijf/duurzaamheidsplan\\_2017.pdf](https://www.portofamsterdam.com/sites/poa/files/media/havenbedrijf/duurzaamheidsplan_2017.pdf)
2. Port of Amsterdam (2015), Vision 2030  
[https://www.portofamsterdam.com/sites/poa/files/media/projecten/strategie/ha-visie-2030-juni\\_2015\\_los.pdf](https://www.portofamsterdam.com/sites/poa/files/media/projecten/strategie/ha-visie-2030-juni_2015_los.pdf)
3. Strategic Plan 2017-2021 (in Dutch) [https://www.portofamsterdam.com/sites/poa/files/media/projecten/strategie/strategisch\\_plan\\_2017-01-24\\_.pdf](https://www.portofamsterdam.com/sites/poa/files/media/projecten/strategie/strategisch_plan_2017-01-24_.pdf)
4. DNV GL (2014), Alternative fuels for shipping
5. IMO (2011), IMO and the environment
6. European Commission (2014), Clean Power for Transport Directive (2014/94/EU)
7. CE Delft (2015), Estimated Index Values of new ships
8. Amsterdam GGD (2017), Air Measurements Report in the Amsterdam port area 2016 (in Dutch)
9. RIVM (2017), Large scale concentration and deposition charts of the Netherlands (in Dutch)
10. More information about eNoses (in Dutch):  
<https://www.odnzkg.nl/mozard/!suite05.scherm1070?mNwb=7691&mNwc=21>
11. More information about ESI:  
<http://www.environmentalshipindex.org/Public/Home>
12. More information about Green Award (in Dutch):  
<http://www.greenaward.org/greenaward/>





**THIS IS A PUBLICATION OF THE PORT OF AMSTERDAM**

De Ruyterkade 7, 1013 AA Amsterdam +31 (0)20 5234 500 [www.portofamsterdam.com](http://www.portofamsterdam.com)

 HavenAmsterdam  Port of Amsterdam  Havenbedrijf Amsterdam