

ESPO Environmental Report 2023

EcoPorts in Sights 2023



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FOREWORD

By ESPO Chair
Zeno D'Agostino

I am delighted to present you the ESPO Environmental Report 2023. This 8th edition of the Report demonstrates that overall, Europe's ports are moving forward in their environmental performance while we also see that concerns and priorities evolve and reflect current policy priorities and overall concerns in the daily work and development of Europe's ports. It is for instance important to see that ports are not only working on climate mitigation, but also on climate adaptation.

This year, European policy-makers have finalised the "Fit for 55" policy framework containing different measures of importance to ports: the FuelEU Maritime Regulation providing an emission reduction path for shipping lines to green, the Alternative Fuels Infrastructure Regulation with adapted rules for the supply of LNG in ports, and a strict framework for the supply of onshore power supply in ports. Last but not least, there is the extension of the Emission Trading System to the shipping sector, which enters into force in the beginning of 2024.

This report provides important indicators to monitor the achievements on these different pillars of the Fit-for-55 package. As you will see, ports have already started implementing the measures foreseen in the Fit-for-55 package, even if complying with the strict AFIR obligations will require substantial efforts in terms of infrastructure, planning and financing.

During the Fit-for-55 implementation and the overall race to net-zero processes, I think it would be mostly interesting to put the results of this report, our throughput data in the PortinSights database and our forthcoming updated report on the investment needs of Europe's ports side by side. It is without saying that the only way for ports to maintain their license to operate and evolve is by working in the most sustainable way and progress on the path towards net-zero. At the same time, ports in Europe have an instrumental role in helping Europe's economy and society through the energy transition. This, however, will require additional infrastructure, space, including in some cases expansion of the port on the water side, and might therefore oblige all relevant stakeholders and policy-makers to make difficult choices. Moreover, if Europe wants to become a leader in the net-zero industry and wants to enhance its energy independency through strategic autonomy but also through diversification of suppliers, it will have to embrace the role of its ports as central players and allow for the necessary investments to be made in those.

The results of this year's Environmental Report convince me that ports can further develop and strengthen their role while continuing to be responsible stewards of sustainability and greening.

I would like to thank all the ports that entered the EcoPorts network over the last year and congratulate all those that got (re)certified with the only port-specific environmental certification, the PERS certificate.

Also big thanks to the verifiers, to the academics who have made the report and to Anaëlle, the new EcoPorts coordinator and Belén for monitoring the network.

INTRODUCTION

The Annual Environmental Report is part of the EcoPorts Network, which is the environmental flagship initiative of the European Sea Ports Organisation (ESPO). The report provides ESPO and European policymakers with insights on the environmental issues that European ports are working on, and guides the initiatives taken by ESPO.

The ESPO Environmental Report 2023 presents the latest environmental management performance of European sea ports based on selected benchmark indicators. The data was obtained from the responses of 90 European ports, representing 20 countries, in the EcoPorts Network, to the **EcoPorts Self-Diagnosis Method (SDM)**. The methodology itself is a concise checklist of components expected in an effective Environmental Management System (EMS) program. Against this checklist port managers can self-assess the environmental management of their port in relation to specified criteria of the EcoPorts quality standard. All responses provided by ports are treated in strict confidence and are independently assessed.

The SDM is considered to be the first key component for the achievement of the **EcoPorts Port Environmental Review System (PERS)**, the only international quality standard of EMS that is specifically dedicated to the port sector.

Aiming to increase the transparency and accountability of the European port sector and to further enhance the relationship of ports with their local communities, ESPO decided to publish an environmental report annually as from 2016. This decision followed the previous publication of ESPO environmental surveys in 1996, 2004, 2009 and 2013.

The overall profile of the sample of ports is given in the Annex of this Report and includes the number of ports by country, geographical characteristics of the sample, size as well as Trans-European Transport Network (TEN-T) status and the list of participating ports certified with the EcoPorts' PERS. The sample of ports is balanced in terms of geographical and tonnage characteristics and, importantly, more than 75% of the ports are part of the EU TEN-T Network.

The structure of the report follows the established pattern of recent years in order to allow identification and comparison of trends. The report comprises the benchmark results of more than 60 indicators of environmental management, along with the results of previous years, so that significant variations over time are identified. However, it is important to mention that the sample of ports varies year on year to some extent, as new ports join the EcoPorts Network, so the results are analysed and interpreted with this in mind. Therefore, trends are more significant and representative than absolute values. The five categories in this report are:

- A. Environmental management indicators
- B. Environmental monitoring indicators
- C. Top 10 environmental priorities
- D. Services to shipping
- E. Annex: Sample of ports

The environmental performance indicators included in this report feed into **PortinSights**, which is ESPO's tool for European ports to collect, share, compare and analyse their data. The digital platform includes throughput data, environmental data (EcoPorts) and port governance data (www.portinsights.eu).

Executive Summary

The results on the environmental management indicators demonstrate that there has been an increase in the positive responses to most of the reviewed parameters of performance indicators. Most of the surveyed ports (93%) have an inventory of relevant environmental legislation. Then, three indicators show the same performance and are adopted by 92% of the surveyed ports: i) existence of an Environmental Policy, ii) compilation of an inventory of Significant Environmental Aspects (SEA) and iii) application of an environmental monitoring program.

The results indicate that the highest increase (+7%) compared with the previous ESPO Environmental Report 2022 refers to the question “Does the Environmental Policy refers to international and/or national port environmental policy guidelines?”.

Moreover, when analysing the trends over the last ten years, the indicator on documenting environmental responsibilities of key personnel has experienced the strongest increase (+18%), followed by the existence of a certified Environmental Management System (+15%).

Regarding the sector's Top 10 priorities, the results for 2023 show minimal changes. The first five priorities remain steadfast, maintaining their positions from the previous year, in descending order Climate change, Air quality, Energy efficiency, Noise and Water quality. However, there have been variations in the order of the subsequent four priorities: Ship waste, Relationship with local community, Port development (land related) and Garbage/ Port waste. Finally, there has been a noteworthy shift in the final priority, as Dredging operations have been replaced by water related Port development which enters the Top 10 for the first time since 2009.

As regards monitoring, 92% of surveyed ports have implemented an environmental monitoring program, the three most monitored indicators being water quality (82%), port waste (81%), and energy efficiency (76%).

As regards climate change indicators, it is worth noting that, although less than half of the ports (47%) experienced climate-related operational challenges, a significant percentage (76%) incorporates considerations related to climate change adaptation when planning and implementing new infrastructure projects.

In terms of the provision of green services to shipping, 57% of surveyed ports are offering onshore power supply (OPS) at one or more berths, 49% of them with high voltage. In addition, a significant 52% of surveyed ports are planning to step up their efforts in offering OPS in the next two years. A lower percentage of ports offer LNG bunkering (42%), although an additional 21% are planning to develop LNG bunkering facilities during the next two years. Finally, another significant result indicates that 63% of ports provide differentiated dues for ships that go beyond regulatory standards. Out of the ports that offer differentiated dues, the main qualifying criterion includes i) vessels ensuring waste management/segregation (57%) and ii) vessels ensuring air emissions reduction (55%). An additional 38% of ports are planning to introduce environmentally differentiated port dues during the next two years.

About ESPO

The European Sea Ports Organisation (ESPO) is the principal interface between European seaports and the European institutions and its policy makers. Founded in 1993, ESPO represents the port authorities, port associations and port administrations of the seaports of 22 Member States of the European Union and Norway at EU political level. ESPO also has observer members in Albania, Iceland, Israel, Montenegro, Ukraine and United Kingdom. While being the first port of call for European policy makers in Brussels is its main responsibility, ESPO is also a knowledge network that drives ports to perform better. In the context of environmental management, ESPO coordinates the collaborative efforts of the port sector to develop policies for monitoring, environmental protection, and sustainability.

About EcoPorts

EcoPorts is the main environmental initiative of the European port sector. It was initiated by a number of proactive ports already in 1997 in collaboration with academia and has been fully integrated into the European Sea Ports Organisation (ESPO) since 2011. The EcoPorts Network helps raise awareness of environmental issues through the sharing of knowledge and experience between ports, enabling good practices and continuous improvement of environmental management in Europe.

As the flagship initiative of the European port sector, developed by ports, for ports, EcoPorts was specifically developed to deliver compliance on the basis of voluntary self-regulation and to demonstrate the competence of the sector to deal responsibly with its environmental liabilities and responsibilities. EcoPorts increases awareness of environmental challenges, facilitates regulatory compliance, and demonstrates a high standard of environmental management amongst its 92 members from 26 countries (as of August 2023).

The environmental performance is demonstrated in the following report and by the achievement of many members of international standards of EMS, including its own, independently verified international standard of EcoPorts PERS.

This is the basis on which EcoPorts helps European ports to be at the front-line of environmental management, to take initiatives to protect the environment, to improve public health, and to address the challenges of climate change. The publication of the environmental report is an important tool of the ESPO EcoPorts Network, together with the Self-Diagnosis Method (SDM) and the Port Environmental Review System (PERS).

The annual environmental report relies on consolidated data derived from the Self-Diagnosis Method (SDM). Serving as a concise checklist, the SDM allows port managers to conduct self-assessments of their port's environmental management program. These evaluations gauge the port's adherence to both sectoral and international standards, forming the foundation for the comprehensive environmental report. The EcoPorts Network also provides the option to get independent and confidential analysis and interpretation of the ports' responses to the SDM through the EcoPorts SDM comparison and SDM review.

PERS started as an EU research initiative connecting the ESPO Network, port professionals, academia, and the maritime industry. Developed by ports themselves, PERS has firmly established its reputation as the only port sector-specific international quality standard of environmental management system. PERS certification is voluntary and provides evidence of compliance that is independently audited by Lloyd's Register Quality Assurance (LRQA). Currently, over a fifth of EcoPorts members are PERS-certified ports.

ESPO actively encourages the exchange of environmental knowledge and experience throughout the international port sector. Information regarding membership of EcoPorts and its global network may be accessed as follows:

For ports in the European Union and countries neighbouring Europe:
www.ecoport.com

For ports outside Europe: www.ecoslc.eu

A Environmental management indicators

In the context of this report, environmental management is defined as the functional organisation necessary to deliver environmental protection and sustainable development to the highest possible standards of compliance and accountability. It is the process of dealing with, or controlling impacts on, the environment arising from port activities and operations.

Table 1 presents the **10 selected environmental management indicators** that have been consistently reported and that provide information about the management efforts that influence the environmental performance of the port. It includes the percentage of positive responses to these indicators relative to the baseline year of 2013 in order to be able to analyse the trends over time.

TABLE 1
Percentage of positive responses to the environmental management indicators

Indicators	2013 (%)	2018 (%)	2019 (%)	2020 (%)	2021 (%)	2022 (%)	2023 (%)	% CHANGE 13–23
A Existence of a certified Environmental Management System (EMS) – ISO, EMAS or PERS	54	73	71	65	75	75	69	+15
B Existence of an Environmental Policy	90	96	95	96	93	90	92	+2
C Environmental Policy makes reference to international and/or national port environmental policy guidelines	38	36	38	43	39	46	53	+15
D Existence of an inventory of relevant environmental legislation	90	97	96	91	88	90	93	+3
E Existence of an inventory of Significant Environmental Aspects (SEA)	84	93	89	92	92	90	92	+8
F Definition of objectives for environmental improvement	84	93	90	88	87	88	90	+6
G Existence of an environmental training program for port employees	66	58	53	55	56	49	49	-17
H Existence of an environmental monitoring program	79	89	82	81	86	90	92	+13
I Environmental responsibilities of key personnel are documented	71	86	85	85	82	88	89	+18
J Publication of a publicly available environmental report	62	68	65	69	68	74	76	+14

By analysing the 2023 results of the proposed ten environmental management indicators, it is seen that there has been an increase of performance in most of the parameters compared to 2022, except in the provision of a certified EMS (-6%) and the existence of an environmental training program (status quo).

The management indicator with the highest positive response (93%) is the existence of an inventory of relevant environmental legislation. Three other management indicators achieve a very high rate of positive responses at 92%: i) existence of an Environmental Policy, ii) compilation of an inventory of Significant Environmental Aspects (SEA) and iii) application of an environmental monitor-

ing program. All these four indicators are key components of an effective environmental management:

- **Environmental legislation** outlines the laws and regulations that govern the protection and preservation of the environment. By maintaining an inventory of this legislation, port authorities can ensure that they are aware of and comply with all applicable environmental requirements. Compliance with environmental laws is crucial to avoid legal penalties, and fines.
- An **Environmental Policy** of the port sets out the port's commitment to environmental stewardship and establishes the guiding principles that shape its approach to environmental management. It serves as a foundation for decision-making and provides a framework for setting environmental objectives and targets.
- Identifying and documenting **Significant Environmental Aspects (SEA)** allows ports to assess the potential environmental impacts of the activities, products and services functioning in their port area. It helps to systematically evaluate the interactions between port activities and the environment, including air quality, water quality, noise levels, waste generation, energy consumption, and biodiversity. This assessment enables ports to prioritise their environmental management efforts and allocate resources effectively. Such an inventory is a major tool in terms of compliance and control.
- An **environmental monitoring program** allows ports to detect and identify any adverse environmental impacts resulting from their activities. By regularly monitoring key environmental indicators, ports can quickly identify deviations from expected conditions and take appropriate actions to address potential issues. Early detection of environmental impacts enables timely intervention and minimises the risk of significant harm to ecosystems or public health.

The aforementioned top positive responses in 2023 are followed by the definition of objectives for environmental improvement (90%). This definition provides a clear direction and focus for the port's environmental improvement efforts. They establish specific and measurable targets that the port aims to achieve, guiding the allocation of resources and efforts towards environmental sustainability. Clear objectives help align the port's activities and initiatives with its long-term environmental vision.

The indicator on the **documentation of environmental responsibilities of key personnel** performs slightly better than last year (89% in 2023) and overall, markedly better over the last ten years, showing a significant progress of +18%. Documenting environmental responsibilities clarifies the roles and expectations of key personnel regarding environmental management. It clearly outlines the specific tasks, duties, and accountabilities related to environmental protection and sustainability. This clarity ensures that everyone understands their roles and responsibilities, reducing ambiguity and promoting accountability.

The **publication of a publicly available environmental report** (76%) is the indicator that continues the ranking of positive responses. An environmental report enhances transparency by providing detailed information about the port's environmental performance, initiatives, and impacts. By publishing the report, the port demonstrates its commitment to transparency and accountability. It allows stakeholders, including the public, local communities, regulatory agencies, and environmental organisations, to access reliable and up-to-date information about the port's environmental activities.

The achievement of a certified **Environmental Management System (EMS)**, either PERS, ISO 14001, or EMAS, has reduced its share compared to last year (69% in 2023). This decrease needs to be monitored to understand whether it is a one-off decrease or a future trend. However, it is worth noting that this particular indicator follows a long period of increase of 15% over the past decade. This notable growth serves as a testament that the sector has accepted the importance of demonstrating its competence to manage its environmental responsibilities on the basis of voluntary, self-regulation that has been independently audited against international quality standards.

In contrast, there are two indicators which, while increasing (+14% in the last two years), remain at a lower performance compared to the other indicators: indicator C with 53% (reference of the environmental policy to international/national port policy guidelines) and indicator G with 49% (existence of an environmental training programme for port employees). On one hand, **International and national port environmental policy guidelines** are developed based on extensive research, best practices, and lessons learned from various ports and organisations worldwide. By referencing these guidelines, a port's Environmental Policy can align itself with recognised industry standards and established frameworks for environmental management. This alignment ensures that the port is adopting and implementing practices that are widely regarded as effective and efficient in promoting environmental sustainability.

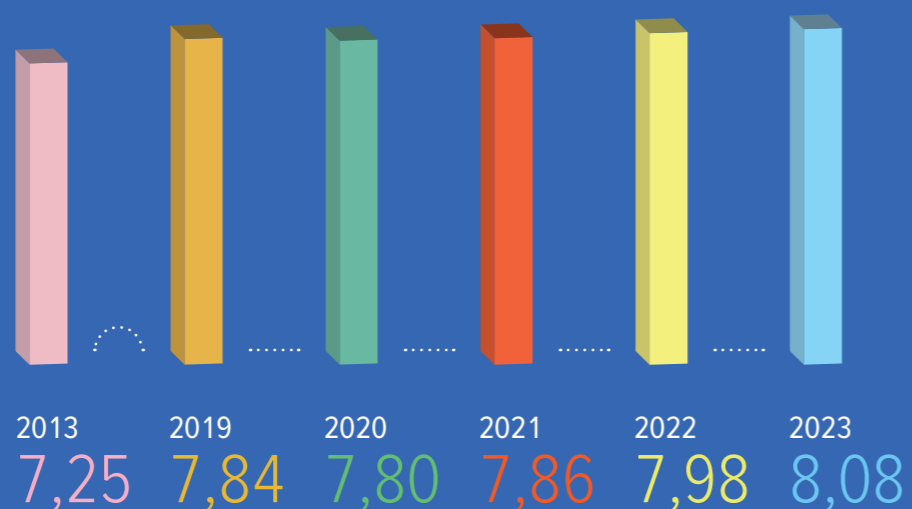
On the other hand, the **existence of an environmental training program for port employees**, although it currently has the same performance as last year, has an overall decrease of 17% since 2013. Training programs create environmental awareness among port employees by educating them about the importance of environmental protection and sustainability, and providing an understanding of the potential environmental impacts associated with port operations and activities. This awareness empowers employees to make informed decisions and take actions that minimise negative environmental effects.

Overall, it may be stated that the development of positive results is sustained over the recent years and that ports are demonstrating progress and a trend of continuous improvement in terms of compliance and the implementation of good practices. The improved performance in such indicators, as the existence of an inventory of relevant environmental legislation or the environmental monitoring program, has led to a rise in the **Environmental Management Index (EMI)**, as compared to 2022 (see Figure 1). ESPO Green Guide 2021 aimed at achieving an EMI score of 8 by 2025. We now see that this objective is already achieved in 2023. EMI is an established formula that measures the whole environmental performance of the port by aggregating the ten environmental indicators presented in Figure 1. The indicators are weighted in accordance with their significance for environmental management. The EMI is calculated by multiplying the weighting of each indicator (see Figure 1 and formula below) with the percentage of positive responses. The final score is calculated using the following formula:

$$\text{Environmental Management Index} = A*1,5 + B*1,25 + C*0,75 + D*1 + E*1 + F*1 + G*0,75 + H*1 + I*1 + J*0,75.$$

The numerical value of each letter is the percentage of positive responses divided by 100 (e.g., A is 0,69 in the results of 2023 as shown in Figure 1).

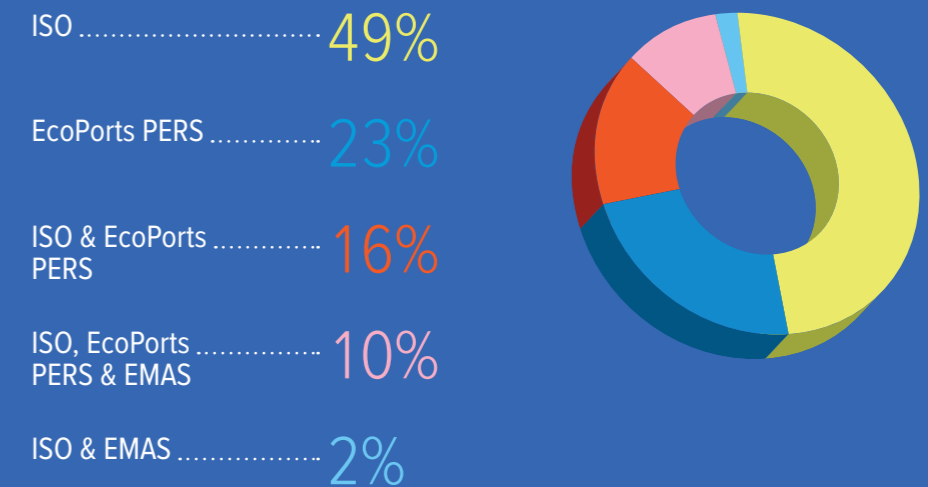
FIGURE 1
Evolution of the Environmental Management Index over the years



There are three main internationally recognised Environmental Management System (EMS) standards: the EcoPorts' Port Environmental Review System (PERS), ISO 14001 and Eco-Management and Audit Scheme (EMAS). Figure 2 shows the distribution among certified ports on the environmental standard that are certified, or the combination of them.

Out of the 69% of ports with a certified EMS, almost half of them have opted for ISO 14001 (49%) followed by the EcoPorts' PERS (23%), making ISO and PERS the most popular standards in the sector. The share of ports certified with PERS has increased by 4% compared to last year. It is significant to mention that some ports are certified with more than one standard, such as ports with ISO and EcoPorts' PERS (16%) or with the three certificates (10%).

FIGURE 2
Breakdown of the EMS certificates



As the only international, port sector-specific environmental management standard available, EcoPorts PERS is becoming increasingly recognised and adopted outside Europe. The international quality EMS standard of PERS is recognised by ESPO, AAPA, IAPH, WPSP, World Bank (European Investment Bank, and European Bank for Reconstruction and Development), the United Nations Environment Programme (UNEP), the African Ports Association, the Arab Sea Ports Federation, the Taiwan Ports International Corporation (TIPC) and the InterAmerican Committee for Ports (Organisation of the American States).

Representatives from major insurance companies state that a port's environmental performance and especially its risk prevention policy is "factored-in" to calculations of premiums; and those standards such as PERS are recognised components of a responsible approach. Such certification may also be a condition for funding to assist port- and terminal development. For ports and terminals outside Europe, administration, review/audit procedures and training options are provided by EcoSLC through a Memorandum of Understanding between EcoSLC and the respective port organisations (see www.ecoslc.eu).

Since 2018, the ESPO Environmental Report analyses indicators on **communication of the environmental policy**. The results provided in Figure 3 and Figure 4 demonstrate that the trends are steady regarding these indicators. Most ports communicate their environmental policy to relevant stakeholders (87%) and make their policy public on their websites (81%). This is a positive result and suggests that the relationship with the local community and other stakeholders remains as a high priority for ports.

Effective communication of the environmental policy engages stakeholders in the port's environmental efforts. It provides an opportunity for stakeholders, including local communities, regulatory agencies, customers, suppliers, and environmental organisations, to provide feedback, ask questions, and contribute to the development and implementation of environmental initiatives. Engaging stakeholders ensures that their perspectives and concerns are considered, leading to more effective and inclusive environmental management practices.

FIGURE 3
Communication of environmental policy to relevant stakeholders

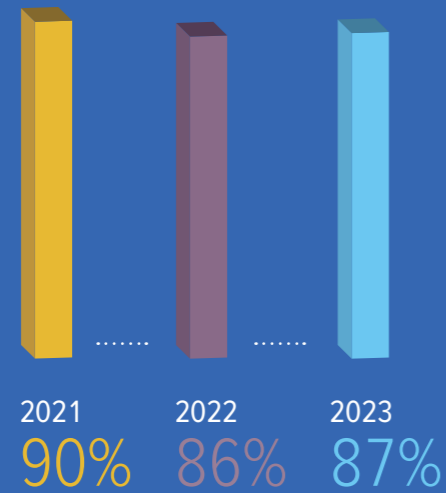
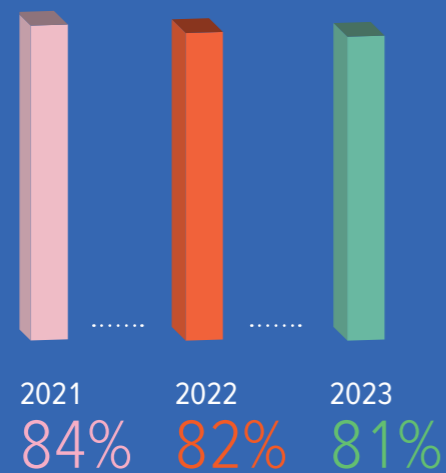


FIGURE 4
Availability of ports' environmental policy online



EXAMPLE

The Port of Valencia installed in 2021 its third cabin to monitor air quality and other environmental factors at the Port of Sagunto. The three booths can record up to eight different gases and particles which allows for a precise analysis of air quality around the port. Using the latest technology, the cabin can measure in real time the concentration of sulphur dioxide (SO₂), nitrogen oxides (NO₂/NO/NO_x), ozone (O₃), carbon monoxide (CO) and PM10 and PM2.5 particles.

TABLE 2

Percentage of positive responses to environmental monitoring indicators

B Environmental monitoring indicators

These indicators provide information on the percentage of ports that monitor selected environmental issues. Table 2 updates the percentages of positive responses based on the results obtained in 2023.

Monitoring environmental parameters allows ports to evaluate their own environmental performance over time. By collecting and analysing data, ports can assess the effectiveness of their environmental management practices, track progress towards sustainability goals, and identify areas for improvement. Regular monitoring provides a basis for evidence-based decision-making and supports the development of targeted strategies for environmental performance enhancement.

Indicators	2013 (%)	2018 (%)	2019 (%)	2020 (%)	2021 (%)	2022 (%)	2023 (%)	% CHANGE 2013–2023
Water quality	56	76	71	67	70	82	82	+26
Port waste	67	84	79	79	80	79	81	+14
Energy efficiency	65	80	76	75	77	76	76	+11
Sediment quality	56	58	54	59	60	71	73	+17
Water consumption	58	72	68	69	70	72	73	+15
Air quality	52	67	62	67	71	66	70	+18
Carbon Footprint	48	47	49	52	59	63	65	+17
Noise	52	68	57	54	64	64	64	+12
Marine ecosystems	35	40	40	46	46	52	53	+18
Soil quality	42	38	32	41	40	45	48	+6
Terrestrial habitats	38	38	37	41	40	45	43	+5

EXAMPLE

North Sea Port is actively involved in the 'Internet of Water' project, which was launched in 2019. Flanders is rolling out a dense network of smart sensors to monitor the water quality in the Ghent-Terneuzen canal. The goal is to continuously monitor parameters such as acidity (pH), salt concentration and temperature by 2023. Smart sensors have been placed at four locations on the Ghent-Terneuzen canal.

The data presented in the table indicates that in 2023 there has been a rise in the proportion of positive responses across various parameters that ports consider as part of their environmental monitoring processes.

Water quality remains as the top environmental issue being monitored by ports, with 82% of the current sample. Water quality monitoring helps to protect marine life, aquatic biodiversity, and the overall ecological balance by detecting changes in water quality parameters and addressing potential pollution sources. It is followed by the monitoring of port waste, with an 81% share of ports. Ports generate various types of waste, including solid waste, hazardous materials, oily waste, and wastewater. Monitoring waste allows ports to track the quantity and composition of waste generated, assess its potential environmental impact, and implement appropriate waste management practices to prevent pollution and minimise the ecological footprint.

Looking at the trend, monitoring water quality is the performance issue that increased the most in the last ten years (+26%), followed by air quality (+18%) and marine ecosystems (+18%). In contrast, terrestrial habitats is the issue that experienced a smaller increase, just about 5% since 2013.

Since 2018, three indicators related to climate change have been included in the ESPO Environmental Report. These indicators concern i) whether ports experience operational challenges related to climate change, ii) whether ports take steps to strengthen the resilience of its existing infrastructure in order to adapt to climate change, and iii) whether ports consider climate change adaptation as part of new infrastructure development projects.

The first question seeks to understand if the port has observed any climate-related challenges that may affect its operational efficiency, safety, or infrastructure, whereas the second is inquiring whether the port has taken proactive actions to prepare for, and adapt to, climate-related challenges, such as sea-level rise, increased storm intensity, or other climate change effects. The results demonstrate that although less than half of the ports (47%) experienced operational challenges, a significant percentage (76%) incorporates considerations related to climate change adaptation when planning and implementing new infrastructure projects.

FIGURE 5
Share of ports experiencing operational challenges related to climate change

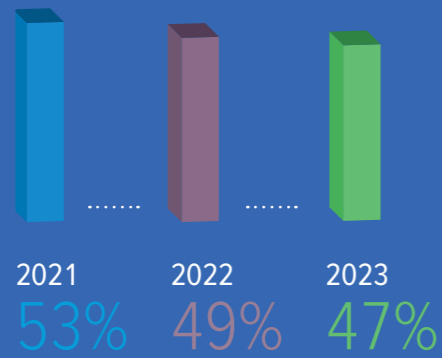


FIGURE 6
Share of ports adapting existing infrastructure to increase resilience

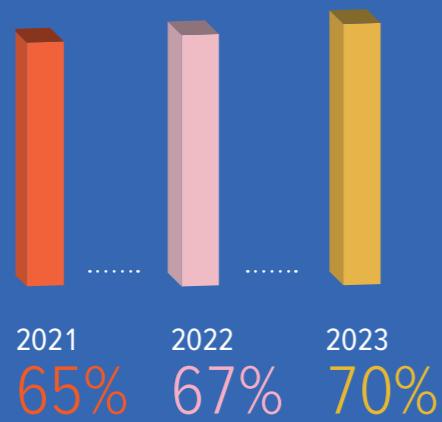
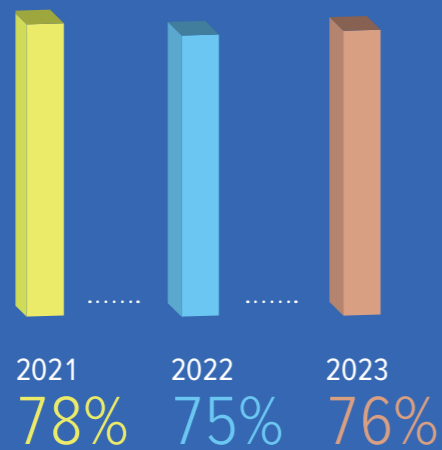


FIGURE 7
Share of ports considering climate adaptation for new infrastructure



C Top 10 Environmental priorities

This section provides an update of the **Top 10 environmental priorities** of the European port authorities, which has been monitored since 1996. The Top 10 ranking is crucial to the port sector and to other relevant stakeholders, since it shows what ports themselves prioritise when it comes to environmental issues. The environmental priorities also inform the work of ESPO, guiding advocacy work and capacity-building efforts amongst European ports.

The results provided in Table 3 show the environmental priorities of European ports in 2023 along with the results of the previous years. This year's Top 10 marks a new entrant, water related Port development, which replaces Dredging operations (in place since 1996). The issues that appear consistently over time are shown with the same colour in the table, which makes it easier to identify trends over time.

TABLE 3
Top 10
environmental
priorities of the
port sector over
the years

	1996	2004	2009	2013	2019	2020	2021	2022	2023
1	Port development (water related)	Garbage/ Port waste	Noise	Air quality	Air quality	Air quality	Air quality	Climate change	Climate change
2	Water quality	Dredging: operations	Air quality	Garbage/ Port waste	Energy consumption	Climate change	Climate change	Air quality	Air quality
3	Dredging disposal	Dredging disposal	Garbage/ Port waste	Energy consumption	Climate change	Energy efficiency	Energy efficiency	Energy efficiency	Energy efficiency
4	Dredging operations	Dust	Dredging operations	Noise	Noise	Noise	Noise	Noise	Noise
5	Dust	Noise	Dredging disposal	Ship waste	Relationship with the local community	Relationship with the local community	Relationship with the local community	Water quality	Water quality
6	Port development (land related)	Air quality	Relationship with the local community	Relationship with the local community	Ship waste	Ship waste	Water quality	Relationship with the local community	Ship waste
7	Contaminated land	Hazardous cargo	Energy consumption	Dredging operations	Garbage/ Port waste	Water quality	Ship waste	Ship waste	Relationship with the local community
8	Habitat loss/ degradation	Bunkering	Dust	Dust	Port development (land related)	Garbage/ Port waste	Dredging operations	Garbage/ Port waste	Port development (land related)
9	Traffic volume	Port Development (land related)	Port development (water related)	Port development (land related)	Dredging operations	Dredging operations	Port development (land related)	Port development (land related)	Garbage/ Port waste
10	Industrial effluent	Ship discharge (bilge)	Port development (land related)	Water quality	Water quality	Port development (land related)	Garbage/ Port waste	Dredging operations	Port Development (water related)

In the current analysis, the first Top 5 issues maintain the same position as last year, namely Climate change, Air quality, Energy efficiency, Noise, and Water quality, whereas the other issues have changed in their priority ranking.

Climate change has risen in the priority ranking since 2017 when it appeared for the first time. In 2022, it became the top environmental concern of the sector and remained there in 2023. Climate change refers to the long-term alteration of Earth's climate patterns and characteristics, primarily driven by human activities that release greenhouse gases into the atmosphere. Climate change has emerged as a global challenge, drawing increasing political and social focus and apprehension. European ports have for a long time considered compliance with climate legislation, the reduction of carbon emissions, and the climate-resilient design of port infrastructure as top priorities. Increasingly, collaborative efforts are being applied as industrial and community stakeholders seek to develop a low-carbon economy and to become carbon-neutral.

Related to the priority issue of climate change, it is worthy of note that 76% of participant ports monitor energy efficiency and that 65% of ports monitor carbon footprint. According to the results provided in Table 2, the monitoring of these issues is consistently increasing year over year. Furthermore, as identified in Figure 7, 76% of surveyed ports take into account the potential impacts of climate change, such as sea-level rise, increased storm frequency, or changing weather patterns, when designing and constructing new infrastructure.

Air quality, which used to be the first priority for ports from 2013 to 2021, continues in the second position in 2023. Air quality is a critical priority issue that focuses on the condition of the air in our environment, particularly in terms of its composition and the presence of pollutants. Emissions in the air are generated mainly by vessels, but also by port operations, industrial activities and other related traffic. These emissions may be of interest not only related to environmental quality issues but also to health-related issues.

This issue has been identified as a priority action by ports since 70% of them monitor air quality parameters, an increase of 18% since 2013. The measurement of air quality at ports, through real-time monitoring using low-cost sensors may be seen as an efficient measure to control this issue. Since ports are locations where a lot of transport modes and industrial activities come together, air quality has become a key determinant of public "acceptance" of port activity. It therefore remains a key concern for European ports.

Energy efficiency, which is also strongly related to climate change remains the third highest priority issue. Energy efficiency refers to the practice of using less energy to achieve the same or improved level of output or service. It is a critical issue in the context of sustainable development, environmental conservation, and economic viability. Energy efficiency measures aim to optimize energy consumption, reduce waste, and mitigate the environmental impacts associated with energy production and consumption. A significant number of ports and terminals are actively striving to improve energy efficiency due to the urgent need for climate change mitigation, exacerbated by the current energy crisis. The port industry has made sustainability a top priority, making energy efficiency essential for reducing energy consumption, lowering emissions, and transitioning towards greener operations.

The use of innovative technology appears as a significant option in terms of achieving the transition from a carbon-intensive maritime industry and port environment to a low-carbon model by using renewable energy sources, electrification of port equipment, facilitation of the use of alternative fuels for shipping, such as LNG, hydrogen, or biofuel, smarter power distribution systems, and energy consumption measurement systems.

Noise is considered a significant concern for the port sector, ranking as the fourth priority. This includes both ambient and underwater noise. In ports, ambient noise primarily arises from machinery, cranes, and trucks involved in cargo loading and unloading activities. Meanwhile, underwater noise primarily originates from auxiliary engines of vessels. The impacts of noise are not limited to port personnel and nearby wildlife; they also disrupt the lives of residents residing in close proximity to the port, causing potential disturbances and annoyance.

EXAMPLE

As part of the port's work to improve waste management performance, the **Port of Dover** in the UK introduced its Safety Environment Awareness (SEA) Award in 2017 to acknowledge outstanding performance on recycling rates and waste procedure compliance. Within just one year, the percentage of recycling of cruise ship waste increased from 23% to 40%.

EXAMPLE

The **Port of Amsterdam** will be the location for the new biofuel plant Advanced Methanol Amsterdam (AMA) of GIDARA Energy. The plant will produce around 87,5 kilotons per annum of renewable methanol each year, which amounts to the waste produced by 290,000 households. This renewable methanol, which is a sustainable alternative to methanol produced from fossil fuels, will contribute to reducing carbon emissions. The plant, which should be operational in 2023, will be located in BioPark, a development site in the Port of Amsterdam for producers of renewable fuels. The Port of Amsterdam wants to expand sustainable fuels within the port, and is committed to circular production, with the aim of reducing carbon emissions by 55% by 2030.

ESPO AWARD

The theme of the 15th edition of the ESPO Award is "Nature restoration projects in ports benefitting the local community" and will be handed out during a ceremony in Brussels in November 2023.

Water quality maintains its position as the fifth priority for the port sector, monitored by 82% of surveyed ports. Water quality refers to the chemical, physical, biological, and radiological characteristics of water bodies, such as rivers, lakes, oceans, and groundwater. Since ports are situated in water bodies such as rivers, estuaries, and coastal areas, water quality is an environmental priority due to the ports' crucial role in preserving marine ecosystems and supporting aquatic life.

Ship waste gains one position in the Top 10 environmental priorities in 2023, becoming sixth in the ranking. Ship waste refers to the various types of waste generated by ships during their operations. It encompasses a range of materials, substances, and byproducts that can have significant environmental and public health implications if not managed properly. The review of the Directive on port reception facilities, last revised in 2019 and applicable since 2021, prevents marine pollution from ships by ensuring that waste generated on ships is not thrown into the sea but returned to land and adequately managed.

The **relationship with the local community** is crucial for Europe's ports (seventh position in the ranking). Over the last 15 years, this priority has remained in the middle of the Top 10. The relationship with the local community is a critical and multi-faceted issue that involves building and maintaining positive interactions, understanding, and collaborating with the residents and stakeholders in the immediate vicinity of the port. Ensuring a strong and cooperative relationship is essential for the sustainable growth and success of both the port and the community it serves. Indeed, an increasing number of port authorities are undertaking initiatives aimed at dealing with local issues and concerns, promoting port activities, and flagging benefits to the local community. In order to incorporate this issue on the ports' agenda, ESPO published its Code of Practice on Societal Integration of Ports in 2010. In addition, the ESPO Award on Social Integration of Ports was established in 2009 to promote innovative projects of port authorities that improve social integration of ports, especially with the city or wider community in which they are located. ESPO acknowledges the importance of considering the dynamic interactions between ports and the cities they serve. ESPO emphasises the significance of fostering positive port-city relations, addressing shared challenges, and promoting collaborative approaches to sustainability, environmental protection, and social well-being.

Port development (land related) and **Port development (water related)** are ranked eighth and tenth respectively. Port development refers to the process of expanding, modernising, and improving the infrastructure, facilities, and services of a port in order to meet the evolving needs of maritime trade and transportation. Land related development focusses on the port development done onshore, such as expanding a port terminal or developing a new one, developing improved road and rail connectivity, creating logistics parks near the port area or constructing modern warehouses. Water related development focusses on the port development realised offshore, such as dredging and deepening navigational channels, gaining space on the water side, extending existing berths or constructing new ones, building breakwaters or seawalls. Spatial planning of the port also increases in complexity due to the integration of future energy plans, infrastructure, and requirements. Port development remains important since ports continue to develop, but more so, their increasingly important role in the supply, production and storage of new energies comes with an increasing need for space, as shown in the Royal Haskoning DHV report on the new energy landscape in European ports¹.

Garbage/port waste, ranking in the ninth position, aims at monitoring the waste generated by port-based activities. In accordance with the Waste Framework Directive 2018/851, its management adheres to the "waste hierarchy", which establishes a preferred sequence of actions for waste reduction and management. The hierarchy prioritises waste prevention, minimisation, reuse, recycling, energy recovery, and, as a last resort, landfill disposal. The ultimate objective is to establish a circular economy in society, wherein materials previously considered waste can be reused as new resources, thus avoiding a throwaway economy. The effective implementation of waste management practices contributes not only to cost reduction but also to environmental quality. Port waste stands out as one of the most closely monitored indicators among ports since 2013, highlighting its significance in terms of both financial implications and environmental impact.

¹ Royal Haskoning DHV report "The new energy landscape: Impact on and implications for European ports", June 2022, accessible at <https://www.espo.be/media/The%20new%20energy%20landscape%20v20221018.pdf>

EXAMPLE

The **Port of Gothenburg** has started plans to construct a hydrogen production facility in the port area. The Port expects the facility to start operating in 2024. With a capacity of 4 MW, up to 2 tonnes of hydrogen will be produced every day in the new facility. Hydrogen could replace fossil-based fuels of different equipment in the port, and there is already a high demand for hydrogen-powered equipment in and around the port.

EXAMPLE

The NEPTUNES (Noise Exploration Program To Understand Noise Emitted by Seagoing ships) project was initiated in order to tackle noise pollution from moored vessels in cooperation with ports from all over the world. Some of the participating ports are in the EcoPorts Network, e.g. **Port of Rotterdam**, **Port of Turku**, **Port of Copenhagen Malmö**, **Port of Cork**, and **Port of Gothenburg**.

Although it is not in the Top 10 this year, another priority issue identified by surveyed ports refers to nature restoration. ESPO recognises the paramount importance of preserving and restoring natural ecosystems and habitats, fostering sustainable development, and safeguarding biodiversity in coastal and port areas. Examples of natural restoration includes the revitalization of degraded habitats with ports actively undertaking initiatives to breathe new life into ecosystems within their premises. By removing invasive species, engaging in reforestation projects, stabilising shorelines, and remediating soils, ports contribute to the recovery and resilience of natural ecosystems. Collaboration with environmental organisations and experts is actively promoted as a means to foster collective efforts towards nature restoration. By partnering with such entities, ports can leverage expertise and resources to implement impactful projects that benefit both the environment and the port industry.

D Green services to shipping

Ports are not only areas where the emissions from various maritime and industrial activities come together. Ports can also act as facilitators of the greening of shipping and other port stakeholders, promoting ambitious policies for decarbonisation and leading by example.

The provision of green services to shipping show the efforts made by ports to enable greener shipping, and provides ports with opportunities to address their Top 10 environmental priorities. The ESPO Environmental Reports monitor three key green services:

- I the provision of **Onshore Power Supply (OPS)**,
- II the provision of **Liquefied Natural Gas (LNG)** bunkering facilities,
- III the provision of **environmentally differentiated port fees**, which reward ships that go beyond regulatory standards for greening.

The monitoring of green services to shipping was introduced in 2016 as part of the EcoPorts SDM.

The **provision of Onshore Power Supply (OPS)** offers to ships the option to connect to the grid and power down their auxiliary engines while at berth. OPS has gained recognition as a highly effective solution for reducing ship exhaust emissions, particulate matter, noise pollution, and vibrations at berth. By connecting to the electricity grid, ships can eliminate these pollutants, resulting in both positive environmental and social impacts. To maximize the environmental benefits, it is essential that the electricity consumed through OPS is primarily sourced from renewable energy sources. Although often relying on national grids, port authorities aim to prioritise where possible the consideration of solar, onshore, and offshore wind resources to meet the energy demands of OPS. While solar resources are important, it is crucial to give special attention to wind resources, as they offer significant potential for generating clean energy.

As shown in Figure 8, more than half of the surveyed ports provide OPS at one or more berths (57%). Surveyed ports having OPS at one or more berths have increased from 32 (in 2016) to 51 ports (in 2023). In 2023, 86% of these ports are offering low voltage OPS, which mainly relates to inland and domestic vessels, and auxiliary vessels such as tugs and other port authority vessels; whereas 49% of them offer high voltage, associated to commercial seagoing vessels.

Regarding the types of installations providing OPS, all ports offering OPS use fixed installations (100%), and 18% of ports are also providing OPS through mobile installations, representing an increase of 4% compared to last year.

In this category of indicators, it is also interesting to analyse the willingness of ports for future actions. The percentage of ports planning to offer OPS in the next two years has increased significantly from 27% in 2018 to 52% in 2023. This means that, counting the 57% of ports that already provide OPS and the 52% that is planning to offer it in the coming years, all the respondent ports have the willingness to use or promote OPS. OPS will only meet its environmental objective when used by ships calling at ports.

The recently adopted Alternative Fuels Infrastructure Regulation (AFIR) requires Member States to ensure that by 2030, OPS for seagoing container ships and seagoing passenger ships above 5000 gross tonnes is provided in TEN-T maritime ports exceeding a certain amount of calls of the respective ship categories. Although it is widely agreed that electrification is the path towards “zero emissions at berth” in ports, the truth is that electrification of the docks involves major challenges for the sector, including important investments without a guaranteed return on investment, low demand from ships, insufficient grid capacity and grid availability, and need for additional funding. These challenges make it necessary to prioritise OPS deployment at the quays where it can maximise emission reductions from ships at berth.

Figure 9 shows the current **availability of LNG bunkering** in the surveyed ports, which corresponds to 37 port authorities in 2023 (42% of participant ports). Looking at the trends in recent years, it is evident that the bunkering infrastructure to support LNG as a marine fuel is steadily expanding in ports. Along with OPS and other alternative fuels, the growth of LNG bunkering infrastructure plays a crucial role in facilitating the transition towards a decarbonised shipping industry. This development aligns with the objectives of the recently adopted Alternative Fuels Infrastructure Regulation (AFIR), which aims to ensure that, by 2025, an appropriate number of refuelling points for LNG are deployed at maritime ports connected to the TEN-T Core Network.

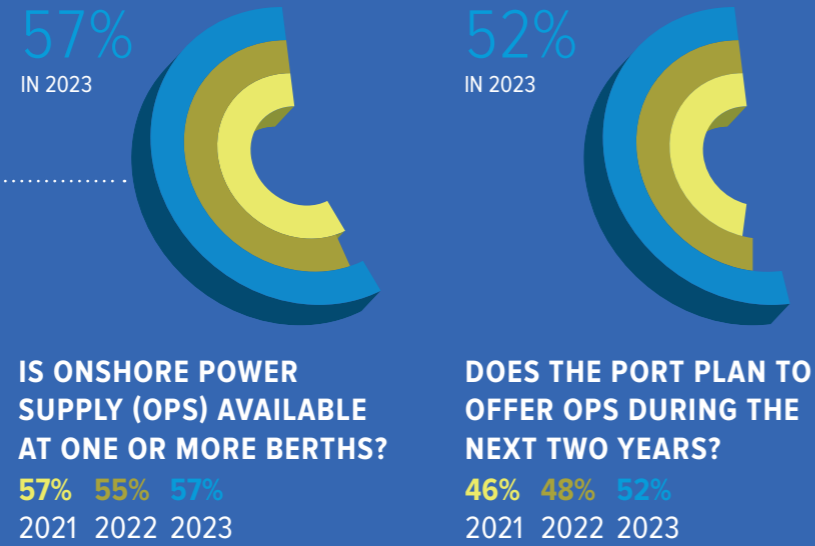
As LNG is considered a transitional fuel, its availability as a bunkering option allows for reduced greenhouse gas (GHG) emissions and improved environmental sustainability in the shipping sector. The ongoing development of LNG bunkering facilities in ports demonstrates the commitment and progress towards establishing the necessary infrastructure to support the use of LNG as a transitional marine fuel.

Out of the 42% of surveyed ports providing LNG in 2023, the vast majority can provide it by truck (86%), a value that remains stable year-by-year. However, the provision through non-mobile installation (8%) has suffered a decrease in 2023, whereas provision by barge (51%) has significantly increased recently.

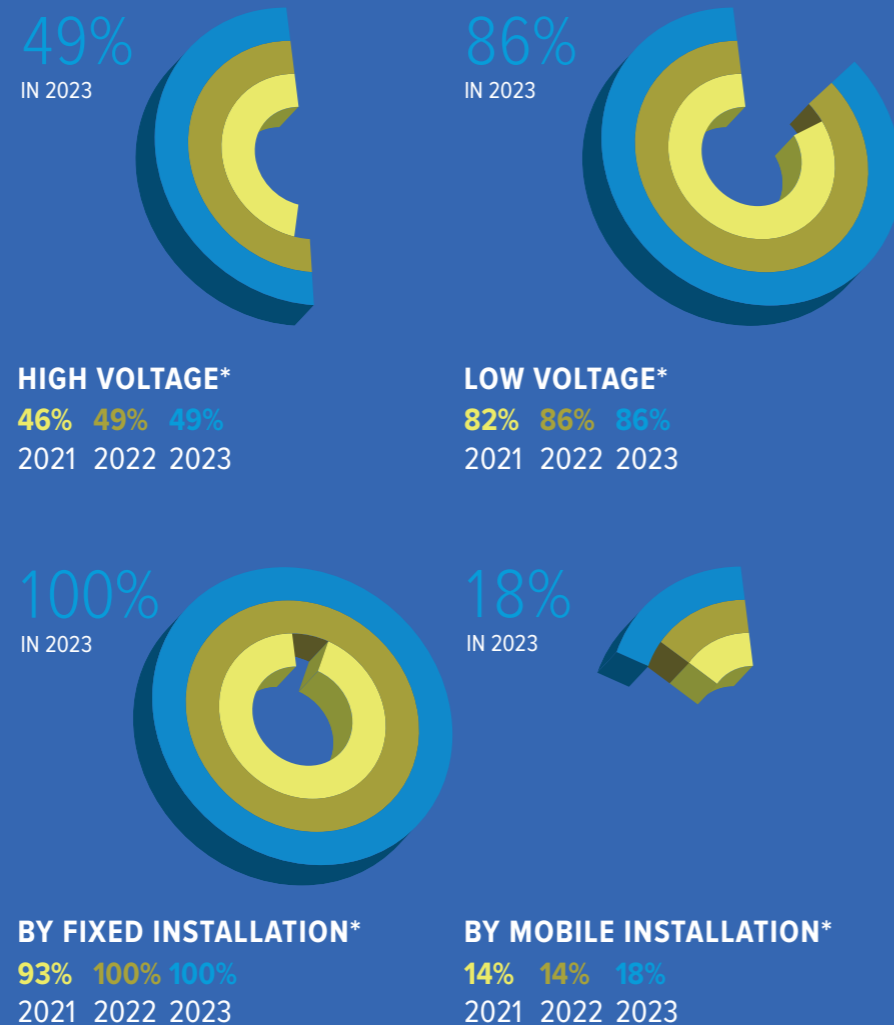
15% of ports are currently undertaking LNG bunkering infrastructure projects and a significant 21% of the respondents are planning to install LNG bunkering in the port during the next two years.

FIGURE 8
Positive responses to Onshore Power Supply (OPS) indicators

* The percentages of these indicators are calculated based on the 51 ports offering OPS, not out of the total number of participating ports.



AMONG OPS-EQUIPPED PORTS



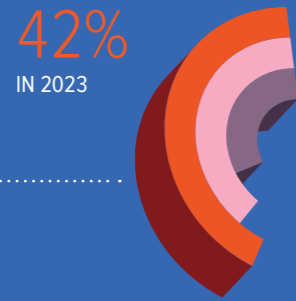
The third category of green services provided by European ports consists of **environmentally differentiated fees** for “green” ships that go beyond regulatory standards. The concept of environmentally differentiated port dues involves incentivising and rewarding environmentally friendly practices and technologies within the port sector by giving a reduction on the usual port infrastructure charge applied to ships calling at a port. Ports implementing such schemes aim to encourage and promote sustainable operations while discouraging activities that have a greater environmental impact. By introducing environmentally differentiated port dues, ports can provide financial incentives to shipping companies and vessels that comply with or exceed environmental standards. This can include factors such as reducing emissions, utilizing cleaner fuels, adopting energy-efficient technologies, or implementing effective waste management practices. The increasing interest and commitment among ports to implement such schemes signify a growing recognition of the importance of environmental sustainability within the maritime industry. By incentivising greener practices, ports can indirectly contribute to mitigating environmental impacts, improving air and water quality, and fostering the overall transition to a more sustainable and eco-friendly port sector.

The database shows that 56 ports offer differentiated dues, accounting for 63% of the surveyed ports. Vessels ensuring waste management and segregation and vessels ensuring air emissions reduction are the two schemes that are the most applied in port areas, with a share of 57% and 55% respectively. It is followed by vessels with an environmental certification (54%). Other sustainable practices by vessels such as reduced GHG emissions and noise reduction are rewarded by 43% and 23% of ports respectively. Sustainable waste management in vessels follows the new legal framework of the port reception facilities Directive 2019/883 which obliges ports, since 2021, to apply a reduced fee to “green” ships that can demonstrate reduced quantities of waste and sustainable on-board waste management.

Positive trends can be observed in the willingness of ports to introduce environmentally differentiated port dues within the next two years (38%). This approach is gaining momentum and increasing steadily year by year, reaching a share of 63% of ports. This is quite noteworthy knowing that every reduction of the port infrastructure charges directly impacts the income of the port.

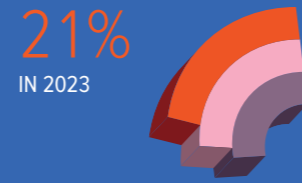
FIGURE 9
Positive responses to Liquefied Natural Gas (LNG) indicators

*The percentages of these indicators are calculated on the basis of the 37 ports offering LNG bunkering, not out of the total of participating ports.



IS LIQUEFIED NATURAL GAS (LNG) BUNKERING AVAILABLE IN THE PORT TODAY?

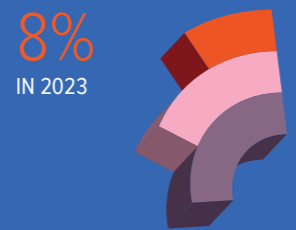
31% 38% 42%
2021 2022 2023



DO PLANS EXIST FOR THE DEVELOPMENT OF LNG BUNKERING FACILITIES DURING THE NEXT TWO YEARS?

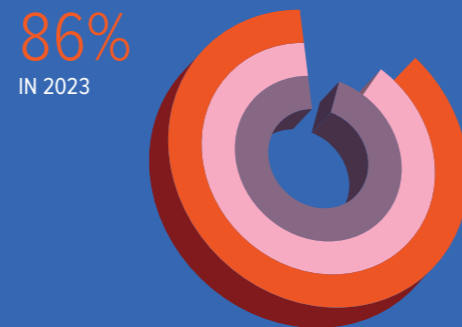
26% 24% 21%
2021 2022 2023

AMONG PORTS WITH LNG BUNKERING FACILITIES



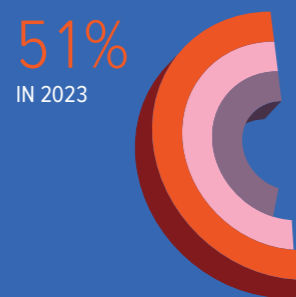
BY NON-MOBILE INSTALLATION*

26% 17% 8%
2021 2022 2023



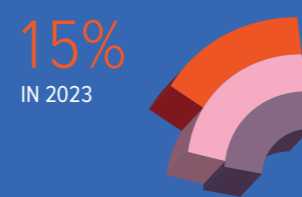
BY TRUCK*

94% 89% 86%
2021 2022 2023



BY BARGE*

45% 49% 51%
2021 2022 2023

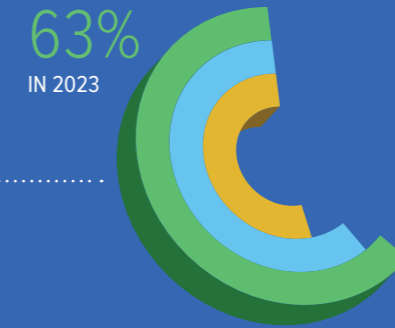


ARE THERE CURRENTLY ONGOING LNG BUNKERING INFRASTRUCTURE PROJECTS IN THE PORT?

22% 21% 15%
2021 2022 2023

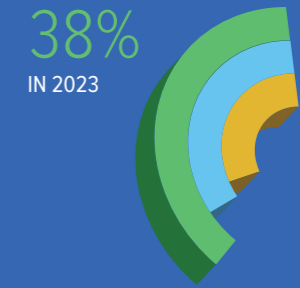
FIGURE 10
Share of ports providing differentiated dues to "Greener vessels"

*The percentage of the different initiatives are calculated on the basis of the 56 ports offering differentiated dues for "Greener Vessels", not out of the total of participating ports.



DOES THE PORT OFFER DIFFERENTIATED DUES FOR "GREENER" VESSELS?

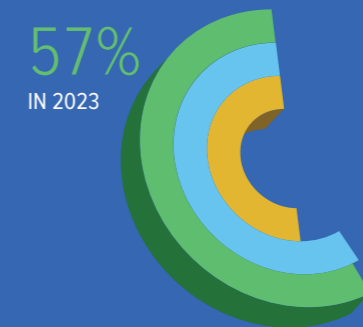
53% 60% 63%
2021 2022 2023



DOES THE PORT PLAN TO INTRODUCE ENVIRONMENTALLY DIFFERENTIATED PORT DUES DURING THE NEXT TWO YEARS?

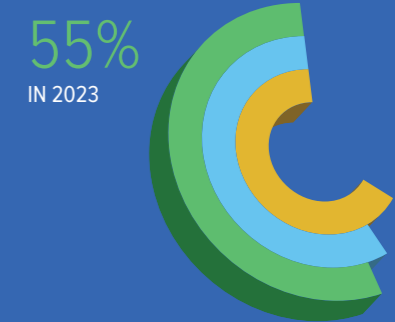
30% 33% 38%
2021 2022 2023

AMONG PORTS PROVIDING DIFFERENTIATED DUES



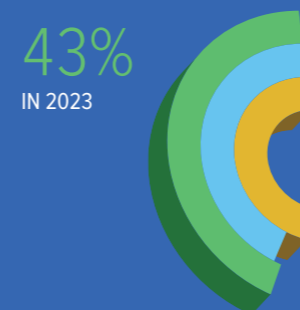
WASTE MANAGEMENT/ SEGREGATION*

50% 58% 57%
2021 2022 2023



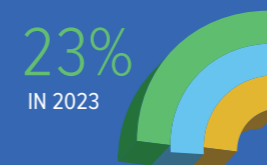
AIR EMISSIONS (NO_x, SO_x, PM) REDUCTION*

65% 58% 55%
2021 2022 2023



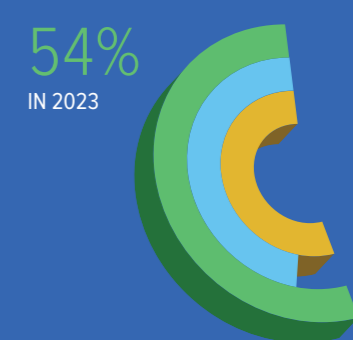
GHG EMISSIONS REDUCTION*

46% 42% 43%
2021 2022 2023



NOISE REDUCTION*

23% 24% 23%
2021 2022 2023



ENVIRONMENTAL CERTIFICATION*

54% 47% 54%
2021 2022 2023

Conclusions

This ESPO Environmental Report 2023 identifies the latest trends of European sea ports in environmental issues and their management response. The data presented were obtained from 90 ESPO members and observers, which completed the online EcoPorts Self-Diagnosis Method (SDM). A set of environmental indicators were selected from the SDM to assess the environmental management performance of EU ports. The SDM tool is a component of the EcoPorts pathway towards achievement of the port sector's own international standard of EMS, the EcoPorts Port Environmental Review System (PERS).

Based on the responses of surveyed ports, it is evident that EU ports are actively engaged in environmental protection and striving towards sustainable development. This positive trend has been established since 2013 and is exemplified by continuous improvements across various indicators over the period from 2013 to 2023.

Overall, the continuous improvement in various environmental management indicators reflects the active role and commitment of EU ports in promoting environmental sustainability. This dedication to protecting the environment and achieving sustainable development is a positive trend that is expected to persist and be further monitored in the future.

Due to the general increase in the results of environmental management indicators, the Environmental Management Index (EMI) has also experienced a rise of 0.83 points over the past ten years, demonstrating that EU ports continue to improve their environmental performance. ISO 14001 (49%) and PERS (23%) are the most common certificated standards of EMS adopted by port authorities.

The existence of an environmental monitoring program has also increased by 13% over the same 2013-2023 period. In general, water quality (82%), port waste (81%) and energy efficiency (76%) tend to be the most monitored issues by ports. Actually, monitoring water quality is the indicator that has raised the most in the reporting period (+26%).

Regarding the Top 10 environmental priorities of the sector, the top five issues maintain the same position as last year (Climate change, Air quality, Energy efficiency, Noise and Water quality), demonstrating their continued significance and focus within the industry.

Climate change remains at the forefront of environmental concerns for ports, as they recognise the urgent need to address greenhouse gas emissions and mitigate the impacts of climate change. This includes efforts to reduce carbon footprints, transition to cleaner energy sources, and implement sustainable practices.

Secondly, air quality is another key priority for ports, as they aim to minimise emissions of pollutants and improve the air quality in and around port areas. This involves the provision of cleaner fuels, stimulating the use of onshore power to reduce ship emissions while at berth, and the implementation of emission control technologies.

Thirdly, energy efficiency continues to be a critical focus for ports, driven by the desire to reduce energy consumption, lower operating costs, and decrease environmental impact. Ports strive to optimize their energy use through efficient operations, energy management systems, and the adoption of renewable energy sources.

Noise reduction remains an important concern for ports, by implementing noise mitigation measures and adopting best practices to minimise disturbances to port personnel, nearby communities, and wildlife.

Finally, water quality is another top priority, as ports recognise the importance of preserving marine ecosystems and safeguarding water resources. Ports actively manage and monitor their water treatment systems and discharge procedures to prevent pollution and protect water quality. It is interesting to point out the new entrance concerning Port development (water related), which displaces out of the Top 10 the issue of Dredging (operations).

The report also analyses the preparedness of ports concerning climate change. The results indicate that although less than half of the ports (47%) experienced climate-related operational challenges, 70% of respondent ports adapts existing infrastructure to increase resilience and 76% incorporates considerations related to climate change adaptation when planning and implementing new infrastructure projects.

The monitoring and reporting in the ESPO Environmental Review on the indicators of green services in ports was initiated in 2016, and, based on the results, it can be stated that there has been a global rise in the provision of LNG (+20%), and although there is a small increase in the provision of OPS (+4%), more than half of the ports make OPS available at one or more berths (57%) and 52% is planning to offer OPS during the next two years. Concerning differentiated dues for "greener vessels", 63% of respondent ports make the option available for ships that can demonstrate compliance with specified criteria. Discounts for ships that reduce their air emissions below specified limits and that provide waste management and segregation are the most common ones.

Based on the reported responses to the SDM, it can be reasonably concluded that representative ports in the sector are consistently improving their environmental management practices. This indicates that ports are either maintaining or further enhancing their compliance with policies related to risk reduction, environmental protection, and sustainable development.

The findings of this review highlight the effectiveness of the EcoPorts methodology in helping port authorities translate ESPO environmental policies into practical actions. This effectiveness is further supported by the collection of diverse green practices available on the continuously updated database developed by ESPO. Interested parties can access these practices through www.espo.be/practices.

In addition to the ESPO Green Guide and other environmental management tools, the EcoPorts Network actively encourages and facilitates the implementation of best practices across the sector. The expanding network of EcoPorts demonstrates the competence of its members and promotes a collaborative approach to addressing shared challenges, including climate change, and to ensuring that cross-boundary aspects and priority issues are effectively tackled throughout the industry.

The positive trends of continuous improvement by the sector in terms of the up-take and application of the various components of a systematic EMS throughout the EcoPorts Network (including independent verification to an international EMS standard) unequivocally demonstrate ESPO's achievement in terms of its policy of compliance with environmental liabilities and regulations through voluntary, self-regulation, and demonstrable competence in working towards sustainability of activities and operations.

E Annex: Sample of ports

The sample of ports that have participated in this assessment consists of 90 European ports from 20 countries which are ESPO members and observers. The sample includes ports from non-EU neighbouring countries applying EU legislation, such as Norway (as a member of the European Economic Area), the United Kingdom (as a former EU Member State with comparable legislation in place for the time being) and Albania (as an official candidate for accession to the EU and an ESPO observer member).

Table 4 provides the list of countries represented, the number of participating ports of each country and the percentage. The country with the highest percentage of participant ports is the United Kingdom (15,6%), followed by Spain (14,4%), Germany (11,1%) and the Netherlands (8,9%). Following them, there is the contribution of France and Finland, both with six ports, representing a 6,7% of the sample.

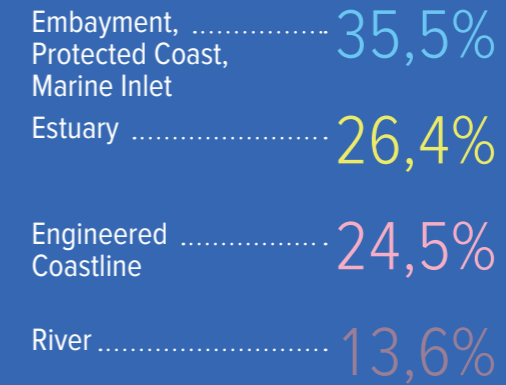
TABLE 4
List of countries represented in the sample and number of participating ports

Country	Number of ports	Percentage (%)
United Kingdom	14	15,6
Spain	13	14,4
Germany	10	11,1
Netherlands ²	8	8,9
France	6	6,7
Finland	6	6,7
Denmark	5	5,6
Greece	5	5,6
Sweden	4	4,4
Ireland	4	4,4
Norway	3	3,3
Portugal	3	3,3
Italy	2	2,2
Albania	1	1,1
Poland	1	1,1
Lithuania	1	1,1
Latvia	1	1,1
Romania	1	1,1
Estonia	1	1,1
Malta	1	1,1

² Ports in the Netherlands include North Sea Port, a cross-border port authority covering a 60-kilometer area in the Netherlands and Belgium.

As it can be seen in Figure 11, the geographical location of the participant ports is quite diverse. The embayment, protected coast and marine inlet tend to be the most common geographic settings of the contributing ports (35,5%). The estuaries and the engineered coastline ports occupy the second and third position with a similar percentage. Finally, the river ports are represented with 13,6%. It may be regarded as a strength of the EcoPorts database that the representative profile of the sector sample is balanced in terms of geographical characteristics and therefore responses and results are in context of real-world situation.

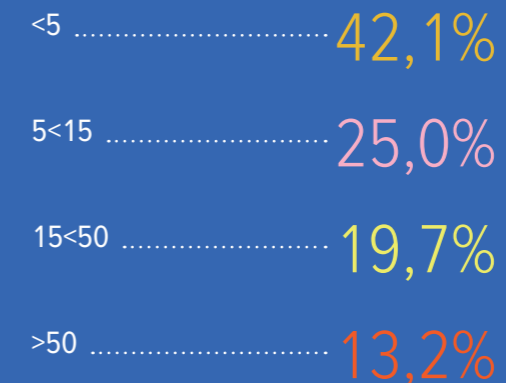
FIGURE 11
Geographical characteristics of the sample



With reference to the size of the contributing ports, small ports (<5 million tonnes/year) represent close to half of the overall sample (42,1%). This is in keeping with the sample characteristics in previous years. They are followed by medium-size ports (5<15 million tonnes/year) with 25% and large ports (15<50 million tonnes/year) with a share of 19,7%. Just around 13% of the ports handle more than 50 million tonnes per year. The active participation of small ports is worthy of note in terms of their representation in the Network and the range of good practices and innovative environmental projects (often collaborative) that they undertake.

Sometimes it may appear that large ports attract attention of the media, but the significance and contribution of small ports should not be underestimated.

FIGURE 12
Tonnage characteristics of the sample (million tonnes/year)



The TEN-T status of a port (Core, Comprehensive or non-TEN-T) often defines the scope of EU legislation that applies, making it relevant to assess the sample in that respect as well. As can be seen in Figure 13, the sample shows that 42,2% of the participating ports are part of the Core Network, and 33,3% of them are part of the Comprehensive Network.

FIGURE 13
Percentage of ports in TEN-T Network out of the sample

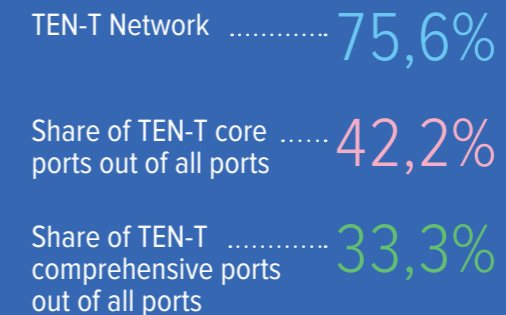


TABLE 5

List of 29 ESPO-member ports certified with EcoPorts PERS (as of August 2023)

Port	Country
Peterhead Port Authority	United Kingdom
Shoreham Port Authority	United Kingdom
Autoridad Portuaria de Ceuta	Spain
Autoridad Portuaria de Melilla	Spain
Autoridad Portuaria de Huelva	Spain
Santander Port Authority	Spain
Autoridad Portuaria de la Bahía de Algeciras	Spain
Autoridad Portuaria de Vigo	Spain
Port of Barcelona	Spain
Autoridad Portuaria de Sevilla	Spain
Autoridad Portuaria de Valencia	Spain
Autoridad Portuaria de Castellón	Spain
Niedersachsen Ports GmbH & Co. KG	Germany
JadeWeserPort Realisierungs GmbH & Co. KG	Germany
Ports of Bremen/Bremerhaven	Germany
Guadeloupe Port Authority	France
Grand Port Maritime de Dunkerque	France
Port of Den Helder	Netherlands
Port of Rotterdam Authority	Netherlands
North Sea Port	Netherlands/Belgium
Groningen Seaports	Netherlands
Port of Harlingen	Netherlands
Volos Port Authority	Greece
Igoumenitsa Port Authority	Greece
Port of Helsinki	Finland
Port of Rauma	Finland
Shannon Foynes Port Company	Ireland
Dublin Port Company	Ireland
Port of Cork	Ireland

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