ESPO Environmental Report 2022

EcoPortsinSights 2022

PREPARED BY
Dr Martí Puig,
(Polytechnical University of Catalunya)
Dr Chris Wooldridge,
(Honorary Research Fellow, Cardiff University, UK)
Associate Professor Rosa Mari Darbra,
(Polytechnical University of Catalonia)

TOGETHER WITH
Valter Selén, EcoPorts Coordinator,
European Sea Ports Organisation, ESPO

PREPARED FOR
ESPO Secretariat, October 2022

FOREWORD

By ESPO Chair
Annaleena Mäkilä

The publication of the seventh ESPO Environmental Report 2022 takes place with the backdrop of the 25-year anniversary of the EcoPorts Network. This anniversary provides an opportunity to reflect on the good work done by European ports to engage in environmental monitoring since the launch of EcoPorts back in 1996. As mission driven entities, ports in Europe have always been trying to lead the way in the green transition of the sector.

The aim of these annual reports is to showcase the commitment of European ports to address environmental issues. Over the years we have seen significant progress in ports, sometimes moving quickly and sometimes less so, but always moving forwards. This year is no different. With climate change becoming the top environmental priority of ports for the first time, the need for reliable analysis of port performance through the annual Environmental Reports has never been greater. By making the findings available to ports, policymakers, and the general public alike, the port sector is open about its greening efforts and the various successes and setbacks associated with this continuous work.

After 25 years of ports carrying out environmental monitoring through the EcoPorts Network, it is also a good time to look ahead.

Since 2020 we seem to go from one crisis to another. We all realise, and ports more than ever before, that the only way forward for the maritime sector and the EU economy lies in sustainable development with decarbonisation as the most urgent aim. Both the pandemic and the Russian invasion in Ukraine might complicate progress towards these goals, with a long, bumpy, and unpredictable road to greening ahead. Long-term strategies with solid investment and financing plans must adapt to short-term changing realities and volatile markets. But as Churchill said: “Never let a good crisis go to waste.” The crisis can act as a game changer, pushing us forward on our green pathways.

In any case, it is in these challenging times more than ever important for ports to have a network to rely on, to discuss with and to help maintain steady course towards realising the Green Deal and overall sustainability ambitions.

I am very happy to see the EcoPorts Network growing in size and relevance. We must now build on that momentum. We will continue to develop the tools provided by the EcoPorts, making sure that it is fit for the future needs and challenges facing ports in Europe and beyond.

That includes continuously updating and revising the environmental indicators included in EcoPorts, so that they reflect the changing priorities and realities facing European ports. Staying in tune with the needs of ports has been the key to the enduring relevance of the EcoPorts Network, and this is not about to change.

The EcoPorts Network will continue to provide ports with the tools they need to monitor and improve their environmental performance, promoting sustainable port management and the greening of the maritime sector. Through continued efforts to grow the EcoPorts Network, the principles of EcoPorts can become the new standard for European ports involved in environmental monitoring.

I would like to thank the port academics involved in drafting this report, specifically Martí Puig, Chris Wooldridge and Rosa Mari Darbra for their expertise and analysis. I would also like to thank Valter Selén for his work on the report and for coordinating the EcoPorts Network, and the ESPO secretariat for all the support with this work.

This year marks the 25th anniversary of the EcoPorts Network, the first and most important pillar of ESPO's work as a knowledge network. With this 7th edition of the Annual Environmental Report, which is based on data provided by Europe's ports, we find the Network in rude good health. Encouraged by the clear and ambitious goals at EU level towards a zero carbon and zero pollution future, the EcoPorts Network continues to play a key role helping ports in monitoring their environmental performance over time. For the first time this year, climate change is the top environmental priority of European ports. In these current challenging geo-political and economic times, the Ecoports' monitoring tools will more than ever help ports in moving forward in their greening efforts, and help maintain this green focus in the years to come.

Isabelle RYCKBOST
Secretary General
ESPO

Valter SELÉN
EcoPorts
Coordinator
ESPO

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.

As the EcoPorts Network celebrates its 25-year anniversary, climate change has become the top environmental priority for ports for the first time. The urgency of the climate challenge is matched by a commitment amongst European ports to increasingly engage in greening efforts, including through environmental monitoring and reporting as part of the EcoPorts Network. Based on the responses from 92 European ports in the EcoPorts Network, representing 20 countries, the 2022 Report finds that ports continue to improve their overall environmental management.

In 2016, ESPO decided to publish an environmental report each year. It serves to increase the transparency and accountability of the European port sector, and further enhances the relationship between ports and local communities. The ESPO Environmental Report is therefore part of long-standing efforts of European ports to monitor and address high priority environmental issues.

The findings of the Environmental Report are based on data from the **EcoPorts Self-Diagnosis Method** (SDM). The SDM methodology is a concise checklist of relevant components in an effective Environmental Management System (EMS) programme.

Through the SDM, 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 also provides the starting point for certification with the **EcoPorts Port Environmental Review System** (PERS), the only international standard of environmental management focused specifically on ports.

The structure of the ESPO Environmental Report 2022 follows the established pattern of past years, facilitating the identification of trends. The report includes the benchmark results of more than 60 environmental management indicators, along with the results of previous years. The results are based on a sample of ports that varies slightly year-on-year, as new ports join the EcoPorts Network. As with other similar surveys, overarching trends are more significant than the absolute values found for a specific year.

The ESPO Environmental Report 2022 consists of five sections:

I. Environmental management indicators
II. Environmental monitoring indicators
III. Top environmental priorities
IV. Services to shipping
V. Annex: Sample of ports

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

Executive Summary

The ESPO Environmental Report 2022 contains a number of positive trends amongst key indicators based on a slightly smaller sample compared to 2021.

For the first time since the start of monitoring, climate change has become the top environmental priority of ports. Whilst this is significant, the other Top 10 priorities remain almost the same as last year, with air quality and energy efficiency joining climate change in the top three of port priorities.

In 2022, the report finds that ports continue to improve their environmental management, addressing their top priorities to a greater degree than in the past.

The Environmental Management Index (which provides a score ranging from 0 to 10, with 10 being excellent), provides an indication of the extent to which ports in the EcoPorts Network are engaged in environmental management.

With a score of 7,98 in 2022, surveyed ports are approaching the peak levels seen in 2017–2018, and are close to the goal set out in the ESPO Green Guide 2021 for ports to achieve an EMI score of 8 by 2025.

90% of respondent ports have an environmental monitoring programme in place, with water quality (82%), port waste (79%), and energy efficiency (76%) being the most monitored indicators.

A growing share of ports are also getting certified with PERS, the only port-specific environmental standard on the market developed by ports, for ports. In 2022, close to half of surveyed ports (44,9%) are PERS-certified, making PERS one of the most popular standards in the sector next to ISO 14001.

With regard to services to shipping, over half of the responding ports are offering Onshore Power Supply (OPS) at least one berth, with a similar share planning to deploy OPS in the coming two years. This means that OPS deployment is increasing in Europe with ports committed to reducing emissions at berth and to comply with EU legislation. Around a third of ports provide LNG bunkering, with an additional 24% planning to develop LNG bunkering facilities during the next 2 years. Around 60% of ports provide differentiated dues for ships that go beyond regulatory standards.

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 six observer members: Albania, Iceland, Israel, Montenegro, Ukraine and United Kingdom. Serving as the first port of call for European transport policy makers in Brussels, ESPO is 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 in 1997 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.

The Ecoports Network is the flagship initiative of the European port sector developed by ports, for ports. It was specifically developed to deliver compliance on the basis of voluntary self-regulation, allowing ports to demonstrate how they 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 103 members from 25 countries.

The environmental performance is demonstrated in the following report, as well as through the prevalence of international EMS standards of EMS, including its own, independently verified international standard of EcoPorts PERS.

It is on this basis that EcoPorts helps European ports to be at the frontline of environmental management. It facilitates initiatives aimed at protecting the environment, improving public health, and addressing climate change. 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).

Aggregated data from the SDM forms the basis of the annual environmental report. SDM is a concise checklist against which port managers can self-assess the environmental management programme of the port in relation to the performance of both the sector and international standards. 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.

Developed by ports themselves, PERS has firmly established its reputation as the only port sector-specific international environmental management standard. PERS certification is voluntary and provides evidence of compliance that is independently audited by Lloyd's Register. Around a third 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 Europe, EU Member States and countries neighbouring Europe: *www.ecoports.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. Simply put, it is the process of dealing with, or controlling impacts on, the environment arising from port activities and operations.

TABLE 1 presents the **10 environmental management indicators** that have been consistently reported in ESPO Environmental Reports. The indicators provide information about the management efforts that impact the overall environmental performance of a port. In order to analyse the trends over time, the table includes the percentage of positive responses to these indicators over time.

TABLE 1
Percentage of positive responses to the environmental management indicators

	Indicators	2013 (%)	2017 (%)	2018 (%)	2019 (%)	2020 (%)	2021 (%)	2022 (%)	% CHANGE 13 – 22
A	Existence of a certified Environmental Management System (EMS) – ISO, EMAS or PERS	54	70	73	71	65	75	75	+21
B	Existence of an Environmental Policy	90	97	96	95	96	93	90	–
C	Environmental Policy makes reference to ESPO's guideline documents	38	35	36	38	43	39	46	+8
D	Existence of an inventory of relevant environmental legislation	90	93	97	96	91	88	90	–
E	Existence of an inventory of Significant Environmental Aspects (SEA)	84	93	93	89	92	92	90	+6
F	Definition of objectives and targets for environmental improvement	84	93	93	90	88	87	88	+4
G	Existence of an environmental training programme for port employees	66	68	58	53	55	56	49	-17
H	Existence of an environmental monitoring programme	79	89	89	82	81	86	90	+11
I	Environmental responsibilities of key personnel are documented	71	86	86	85	85	82	88	+17
J	Publication of a publicly available environmental report	62	68	68	65	69	68	74	+12

In 2022, the results shows the overall continuation of the positive trends from past years. A higher share of surveyed ports refer to ESPO's guideline documents in their environmental policy (46% in 2022), whilst a greater percentage of ports have an inventory of relevant environmental legislation in place compared to last year. A greater share of ports (74%) publish environmental reports compared to 2021 (68%), and almost 9 out of 10 ports document the environmental responsibilities of key personnel. Producing an Environmental Report is an excellent way to communicate relevant information to stakeholders and to monitor the port's environmental progress. The publication of environmental information on the port websites is becoming good practice among the most pro-active and progressive port authorities in the sector.

Four management indicators achieve a very high rate of positive responses at 90%; B) Existence of an Environmental Policy, D) Evidence of an inventory of relevant environmental legislation, E) Compilation of an inventory of Significant Environmental Aspects (SEA), and H) Application of an environmental monitoring program. Crucially, these four indicators are the key components of an effective environmental management, demonstrating the commitment of European ports in this regard.

The Environmental Policy of the port sets out the approach of the port to mitigate environmental externalities and to contribute to greening, making it a crucial part of addressing environmental and climate issues in the port. The inventory of relevant environmental legislation is an absolute requirement for ports to have an overview of applicable rules and regulations, which in turns enables compliance. The results for these two indicators have remained steady over the years, suggesting that this is a good practice adopted by most surveyed ports.

The inventory of Significant Environmental Aspects (SEA) contains the main environmental elements that affects an individual port, allowing the port to identify their priority actions, to set out objectives and action plans to deliver on these priorities, and to monitor the progress. Over the past nine years, surveyed ports have significantly improved their performance on this indicator, with a 6-percentage point increase in 2022 compared to 2016.

Environmental monitoring is an increasingly important activity given the need to demonstrate compliance by reference to science-based evidence and appropriate Environmental Performance Indicators (EPIs). This indicator has seen a continuous increase since 2013.

Other indicators with a significant share of positive responses in 2022 include the definition of objectives and targets for environmental improvement. 88% of surveyed ports confirmed that they have such objectives in place. This is evidence that ports are committed to continuous improvement. Such targets and objectives act as a catalyst for action.

Of the surveyed ports in 2022, 75% have a current, certified Environmental Management System (EMS), either EcoPorts PERS, ISO 14001, or EMAS in place. This is the same share as in 2021. Nonetheless, this indicator has seen the highest percentage point increase in the last nine years with 21%. This demonstrates that the sector values being able to prove and demonstrate excellent environmental management that has been independently audited against international quality standards.

Finally, the indicator for the existence of an environmental training programme for port employees performs significantly worse compared to last year, decreasing by 7 percentage points compared to 2021. Whilst a lower share of surveyed ports has had such training programmes in place since the start of monitoring in 2013, it is nonetheless a worrying finding to see such a significant drop this year. This indicator will therefore receive additional attention in the coming years to establish whether this is part of a larger trend, or if it is the result of the specific sample and timing of this year's report, in the aftermath of the COVID-19 pandemic.

Based on these findings, it is clear that most of the positive trends from past years have been sustained in 2022, with surveyed ports demonstrating progress and continuous improvement in terms of compliance and the implementation of good practice. There are also clear improvements on several key indicators this year compared to 2021.

The improved performance has produced an improvement in the **Environmental Management Index (EMI)** compared to 2021 (see **FIGURE 1).** The EMI is an established formula that measures the whole environmental performance of the port by aggregating the ten environmental indicators presented in **TABLE 1**, grading port performance on a scale from 0 (no environmental management) to 10 (excellent environmental management). The indicators are weighted in accordance with their significance for environmental management. The EMI is calculated by multiplying the weighting of each indicator (see **TABLE 1** and formula below) with the percentage of positive responses. The indicators are weighted in accordance with their significance for environmental management.

The EMI is calculated by multiplying the weighting of each indicator (see **TABLE 1** and formula below) with the percentage of positive responses. The final score is calculated using the following formula:

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.

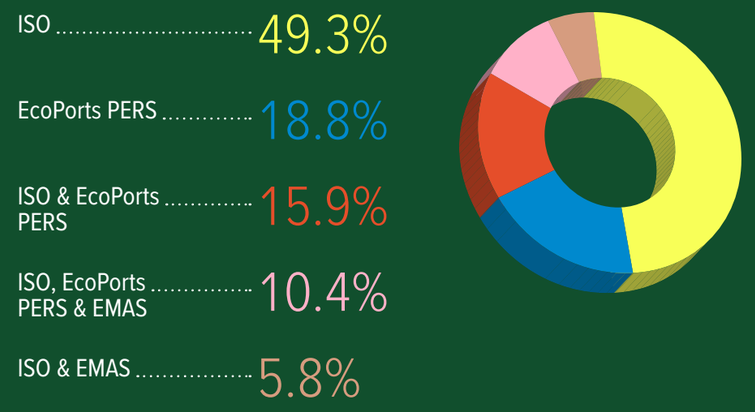
The numerical value of each letter is the percentage of positive responses divided by 100 (e.g., A is 0.75 based on the results for 2022 as shown in **TABLE 1**).

FIGURE 1
Evolution of the Environmental Management Index over the years

The EMI score for 2022 is a significant increase compared to the past three years, and continues the positive trend started in 2021. With a score of 7,98 in 2022, surveyed ports are approaching the peak levels seen in 2017–2018, and are delivering on the ambition set out in the ESPO Green Guide 2021 for ports to achieve an EMI score of 8 by 2025.

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 environmental standards ports favour, with a significant share of ports combining two or more standards.

FIGURE 2
Breakdown of the EMS certificates



Out of the 75% of ports with a certified EMS, almost half of them have opted for ISO 14001 (49,28%) followed by the EcoPorts PERS (18,84%). If we consider the percentage of ports combining a PERS-certification with other available standards, close to half of surveyed ports (44,9%) are PERS-certified in 2022. This represents a 5-percentage point increase in the share of ports getting PERS-certified compared to 2021, making PERS one of the most popular standards in the sector next to ISO 14001.

As the only international, port sector-specific environmental management standard available, EcoPorts PERS is gaining increasing recognition and prominence in the maritime sector globally. The international quality EMS standard EcoPorts PERS is recognised by ESPO, AAPA, IAPH, WPSP, the World Bank (European Investment Bank, and European Bank for Reconstruction & 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 (Organization 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 that 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.

Since 2018, the ESPO Environmental Review has also analysed indicators on **communication**. The results provided in **FIGURE 3 – 4** demonstrate that the trends remain stable for these indicators, with slight downturns in both indicators. Most ports communicate their environmental policy to relevant stakeholders (86%) and make their policy public on their websites (82%). We note a small decreasing trend in both indicators, and will closely monitor the development of these indicators over the coming years. However, the findings are still positive, suggesting that transparency and the relationship with the local community and other stakeholders remains a high priority for European ports.

FIGURE 3
Communication of environmental policy to relevant stakeholders

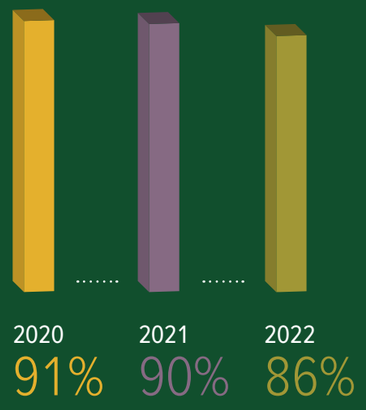
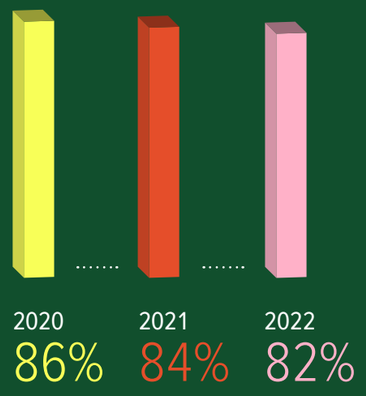


FIGURE 4
Availability of ports' environmental policy online



B Environmental monitoring indicators

These indicators provide information on the percentage of ports that monitor key environmental issues. **TABLE 2** shows the share of positive responses amongst surveyed ports in 2022. The findings continue the positive trends amongst European ports this year, with significant increases in monitoring of all key environmental indicators compared to the start of monitoring in 2013, with some indicators seeing a substantial increase since last year.

TABLE 2
Percentage of positive responses to environmental monitoring indicators

Indicators	2013 (%)	2017 (%)	2018 (%)	2019 (%)	2020 (%)	2021 (%)	2022 (%)	% CHANGE 2013 – 2022
Water quality	56	75	76	71	67	70	82	+26
Port waste	67	88	84	79	79	80	79	+12
Energy efficiency	65	80	80	76	75	77	76	+11
Sediment quality	56	65	58	54	59	60	71	+15
Water consumption	58	71	72	68	69	70	72	+14
Air quality	52	69	67	62	67	71	66	+14
Noise	52	64	68	57	54	64	64	+12
Carbon Footprint	48	49	47	49	52	59	63	+15
Marine ecosystems	35	44	40	40	46	46	52	+17
Terrestrial habitats	38	37	38	37	41	40	45	+7
Soil quality	42	48	38	32	41	40	45	+3

Looking at the various indicators in 2022, monitoring of **water quality** has increased the most with a 12-percentage point increase compared to last year. Monitoring of this indicator has increased by 26 percentage points compared to the start of monitoring in 2013. The significant increases suggests that this issue is a key priority for ports. Monitoring of sediment quality has increased almost as much, with 71% of ports monitoring this indicator in 2022.

The 2022 data show a clear continuation of the positive trend in monitoring of **carbon footprint** amongst surveyed ports with close to two-thirds of ports (63%) engaging in such monitoring. Key environmental indicators related to habitats and ecosystems also see a significant uptick in monitoring amongst ports, with increased monitoring of terrestrial habitats, marine ecosystems, and soil quality.

Even though close to all parameters show a positive trend, the crucial indicator air quality has seen a drop of 5 percentage points compared to last year. Since air quality remains one of the top priorities of ports, this development will require further attention in the coming years. Nonetheless, two-thirds of surveyed ports still monitor air quality, which is an increase of 14 percentage points compared to 2013. Fluctuations in the exact percentages can reflect changes in the composition of each year's sample and in the priorities and relevancies perceived by individual port authorities. The priorities are the result of various pressures including port development projects, environmental accidents and incidents, and stakeholder interests influencing monitoring efforts.

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

The results show that close to half of surveyed ports (49%) experienced operational challenges related to climate change in 2021, which is a slight decrease from 2021. This could be the result of the number of extreme weather events this year. However, the slight increase in ports taking steps to increase the resilience of port infrastructure suggests that ports are also becoming better at dealing with extreme weather events, as well as general changes in climatic conditions. Interestingly, there is no clear trend regarding the consideration of climate change adaptation when ports are developing new infrastructure.

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

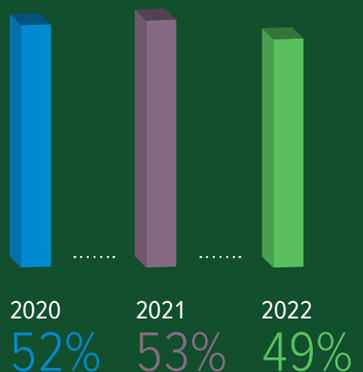


FIGURE 6
Share of ports adapting existing infrastructure to increase resilience

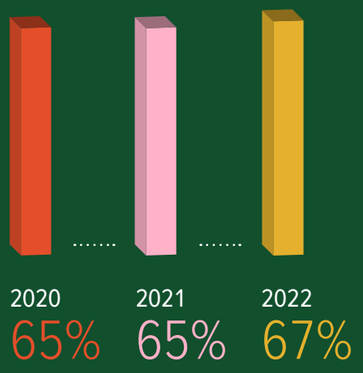
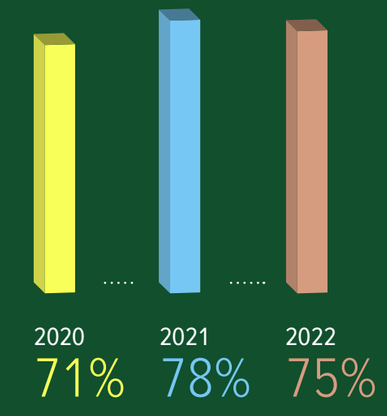


FIGURE 7
Share of ports considering climate adaptation for new infrastructure



C Top 10 Environmental priorities

This section provides an update of the **Top 10 environmental priorities** of European port authorities, which have been monitored since 1996. The Top 10 ranking provides a snapshot of the key issues facing the port sector, giving policymakers and other stakeholders an idea of what ports 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 2022 results provided in **TABLE 3** show the environmental priorities of European port in the past three years. No new issues have entered the Top 10 in recent years, with the issues currently included in the Top 10 having been the same since 2017. The issues that appear consistently over time are shown with the same colour in the table to make it easier to identify trends.

For the first time this year, climate change is the top environmental priority of European ports. Whilst the top priority has changed this year, the top three priorities for European ports remain the same since 2019, with air quality and energy efficiency now in second and third place respectively.

Looking at the other priorities in the list, three issues maintain the same position as in 2021, namely energy efficiency (3rd), noise (4th), and ship waste (7th), whereas the ranking of other priorities has changed.

Climate change is the top environmental concern for ports in 2022. This marks the culmination of a longer trend, with climate change steadily rising in the ranking of priorities since it entered the Top 10 in 2017. It reflects a general trend in ongoing EU and national policy discussions, as the issue of climate change is a growing cause for concern that attracts growing political and societal attention, including amongst ports. The increasingly noticeable effects of climate change as well as the inclusion of shipping in EU climate policy proposed in the European Commission's Fit for 55-package is likely to have made the issue even more of a priority for ports this year. This makes compliance with climate legislation, the reduction of carbon emissions and the climate-proofing of port infrastructure key for European ports.

Even though ports have a restricted role in the mitigation of negative externalities beyond the port area, they make significant contributions to addressing climate change. The high importance placed on climate change is reflected in the growing share of ports monitoring their carbon footprint and energy efficiency, as well as the investments made to climate-proof existing port infrastructure. It is also evidenced by the fact that close to all surveyed ports have an environmental policy in place.

With port-specific mitigation efforts well underway, ports are increasingly playing important roles as hubs of energy and nodes for the blue economy. The ESPO Trends in Port Governance 2022 Report [1] finds that energy is increasingly part of the port business, with ports as the main entry points of energy commodities, locations for energy production, as well as acting as enablers of the energy transition.

A growing number of ports are involved in collaborative initiatives, where they seek to help facilitate the greening efforts of other port stakeholders such as shipping and industry. ESPO provides ports with tools for launching and monitoring efforts to reduce greenhouse gas emissions through the EcoPorts Network, as well as through the ESPO Green Guide 2021 and the good green practices database.

1. ESPO: Trends in EU Ports' Governance 2022

Air quality is the second environmental priority for ports in 2022, moving down one spot in favour of climate change. Air quality was the top priority for ports between 2013–2021. Emissions in the air in ports are generated mainly by vessels, but also by port operations, industrial activities and other related traffic, and include emissions of SO_x, NO_x and particulate matter. These emissions have negative effects negative effects, creating poor air quality that affects the environment as well as port stakeholders and local communities. 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.

The findings of the Environmental Report clearly show that ports still consider air quality a top concern. Two-thirds of ports monitor air quality in other key environmental priorities such as soil and water quality are also negative affected by poor air quality. Port authorities are also involved in mitigating air pollution in port areas, with a growing number of port authorities providing incentives for ships that go beyond regulatory standards via differentiated port fees.

Energy efficiency is the third environmental priority for ports. It is an issue that is closely related to the other two top priorities, since increased energy efficiency in vessels, port operations and industries would also yield emission reductions in ports. In addition to the need to address climate change, rising energy prices caused by the Russian invasion in Ukraine has also increased the pressure on ports to improve energy efficiency. With 76% of ports monitoring energy efficiency, ports are taking the potential of improving energy efficiency seriously.

The introduction of new technologies combined with the optimisation of existing operations would provide a feasible transition path away from a carbon-intensive port industry (dependent on fossil fuels) to a low-carbon port model that relies on renewable energy sources, electrified equipment, alternative fuels, smarter power distribution systems, and energy consumption measurement systems.

Noise maintains its position as the fourth priority for the port sector, which includes both ambient and underwater noise. Noise levels are under various pressures from everyday port and logistic operations, industrial activity, and port development projects, which all require managing by the port authority and port stakeholders. Ambient noise may be generated in ports in loading and unloading cargo mainly by machinery, cranes and trucks. Underwater noise in ports is generated mainly by the auxiliary engines onboard vessels. Noise has a negative impact not only on port personnel and surrounding fauna, but also create potential disturbances for local port communities.

Noise management is therefore an important priority for ports in their relationship with the cities they are placed in, which is reflected in the fact that close to two-thirds of surveyed ports monitor noise in 2022.

Water quality and **relationship with the local community** have swapped positions in this year's ranking, coming in fifth and sixth, respectively. Ports are intrinsically linked and dependent on water, making water management and water quality fundamental to their operations, environmental responsibility, and licence to operate. Good water quality is key to protect terrestrial and marine habitats and ecosystems. As discussed in the previous section, water quality is currently the most monitored issue by the surveyed ports at 82%.

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

	1996	2009	2013	2018	2019	2020	2021	2022
1	Port development (water)	Noise	Air quality	Air quality	Air quality	Air quality	Air quality	Climate change
2	Water quality	Air quality	Garbage/ Port waste	Energy consumption	Energy consumption	Climate change	Climate change	Air quality
3	Dredging disposal	Garbage/ Port waste	Energy consumption	Noise	Climate change	Energy efficiency	Energy efficiency	Energy efficiency
4	Dredging operations	Dredging operations	Noise	Relationship with the local community	Noise	Noise	Noise	Noise
5	Dust	Dredging disposal	Ship waste	Ship waste	Relationship with the local community	Relationship with the local community	Relationship with the local community	Water quality
6	Port development (land related)	Relationship with the local community	Relationship with the local community	Port development (land related)	Ship waste	Ship waste	Water quality	Relationship with the local community
7	Contaminated land	Energy consumption	Dredging operations	Climate change	Garbage/ Port waste	Water quality	Ship waste	Ship waste
8	Habitat loss/ degradation	Dust	Dust	Water quality	Port development (land related)	Garbage/ Port waste	Dredging operations	Garbage/ Port waste
9	Traffic volume	Port development (water)	Port development (land related)	Dredging operations	Dredging operations	Dredging operations	Port development (land related)	Port development (land related)
10	Industrial effluent	Port development (land related)	Water quality	Garbage/ Port waste	Water quality	Port development (land related)	Garbage/ Port waste	Dredging operations

The relationship with the local community is crucial for Europe's ports, as ports are very often situated next to or in big urban agglomerations, and tend to be perceived as representatives of the larger maritime sector by the local population. Ports increasingly seek to improve their relationship with local stakeholders through increased communication and transparency efforts, which this report is an example of.

In order to provide ports with guidance on how to improve port-city relationships, 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. The theme of the 14th edition of the award is "Role of maritime passenger transport in enhancing the city connectivity and bringing added value to the local community" and will be handed out during a ceremony in Brussels in November 2022.

Ship waste remains in the seventh position of the Top 10 priorities, and concerns the waste delivered by ships calling at ports. Waste from ships is addressed in the Port Reception Facilities (PRF) Directive, which requires that all ships pay a flat fee to ports, irrespective of the waste they generate under the system. The Directive also includes rebates for ships that engage in sustainable waste management onboard, and produce reduced quantities of waste. ESPO has been closely involved in the implementation of the Directive in the capacity of Vice Chair of the European Sustainable Shipping Forum subgroup on waste from ships.

Garbage/port waste, which occupies the 8th position in the ranking, concerns the waste generated by port-based activities. As shown in Table 5, port waste is one of the most monitored indicators among European ports with 79% of surveyed ports monitoring port waste in 2022. The importance of port waste is also evidenced by the fact that this priority has moved up the ranking in 2022 compared to last year.

The Waste Framework Directive 2018/851 sets the legal framework for treating and managing waste in the EU, and introduces a system of waste management called the "waste hierarchy". Together with the Circular Economy Action Plan presented by the Commission in 2020, the emphasis is on preventing, reusing, and minimizing waste to the greatest degree possible. The actions, from highest to lowest preference, are prevention of waste from being created, minimisation, reuse, recycling, energy recovery and, finally, disposal to landfill. The final objective is making the circular economy a reality, in other words, reusing a majority of waste material.

Port development (land related) occupies the 9th position in the Top 10 ranking of environmental priorities, which is the same position as in 2021. Port development is associated with the construction activities that may be undertaken within the port area. Although it is usually temporary, it can generate specific impacts on the environment, including particles emissions, disturbances to fauna, noise and light pollution. These disturbances are most often caused by construction equipment, truck traffic, work vessels and other similar sources. Since port areas may be renewing or extending their installations periodically, this issue appears recurrently on the top list.

The last priority in the ranking is **Dredging operations,** which consists in the removal of sediments from under the water. It has been found in the lower half of the Top 10 list in the past four years. Dredging operations are usually carried out in a port to maintain its navigation channels or to increase the port's capacity to handle larger ships. Most ports need to dredge maritime access lanes, canals, and port areas regularly.

Dredging operations may generate underwater noise and disturbances to fauna, and it can also have serious implications for the marine ecosystems and habitats. Dredging may lead to a loss of fishery resources since it involves changes in bathymetry (underwater depth), hydrography (tidal flow, currents, velocity, and waves), re-suspension of contaminants, turbidity, and light availability, and must therefore be carried out judiciously.

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. **FIGURES 8 – 10** below show the trends for these services in the last three years. It should be noted that the sample of ports reporting for these categories was much smaller in the first years compared to 2021.

The use of Onshore Power Supply (OPS) and alternative equivalent solutions, as well as Liquefied Natural Gas (LNG) can help reduce air pollution and greenhouse gas emissions.

The provision of Onshore Power Supply (OPS) in ports makes it possible for ships to rely less on their auxiliary engines by connecting to the electricity grid when securely moored at berth in the port. This can provide an effective means of reducing ship exhaust emissions and air pollution when the ship is at berth, as well as reducing levels of noise pollution and vibrations in the port. When consistently used by ships, OPS therefore provides environmental and social benefits.

Nonetheless, there are many challenges associated with the deployment of OPS in ports, including a lacking business case, low demand from ships, insufficient grid capacity and grid availability, and need for additional funding. These challenges make it necessary to prioritise OPS deployment where it can maximise emission reductions from ships at berth.

As shown in **FIGURE 8**, more than half of the surveyed European ports provide at one or more berths in 2022 (55%), which is a clear indication that OPS is increasinglt available in ports across Europe. In absolute figures, the number of ports offering OPS has increased from 32 in 2016 to 51 ports in 2022.

As of this year, a growing share of ports (86%) are offering low voltage OPS, which mainly serves smaller vessels such as ferries, inland vessels, and auxiliary vessels such as tugs. In 2022, a growing share of European ports (49%) also offer high voltage OPS, meaning that close to half of surveyed ports can serve large seagoing vessels. All surveyed ports with OPS installed can provide electricity through fixed installations (100%), with 14% also capable of providing OPS through mobile installations. This entails that European ports are already flexible in the provision of OPS, taking steps to serve different ship types in different locations in the port to a reasonable extent.

The findings in **FIGURE 8** also show a clear commitment from ports to deploy OPS in the coming two years. In 2022, close to half (48%) of surveyed ports are planning to deploy OPS in the near future, which is more than double the share of ports planning to do so in 2018. With the continuation of the positive trend in ports planning to deploy OPS, we could expect OPS to be widely available in most ports where it is relevant in the coming years. When combining the 55% of surveyed ports that provide OPS and the 48% that are planning to offer it in the coming years, we can conclude that respondent ports have the willingness to promote the use and potential deployment of OPS.

FIGURE 8
Percentage of 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.

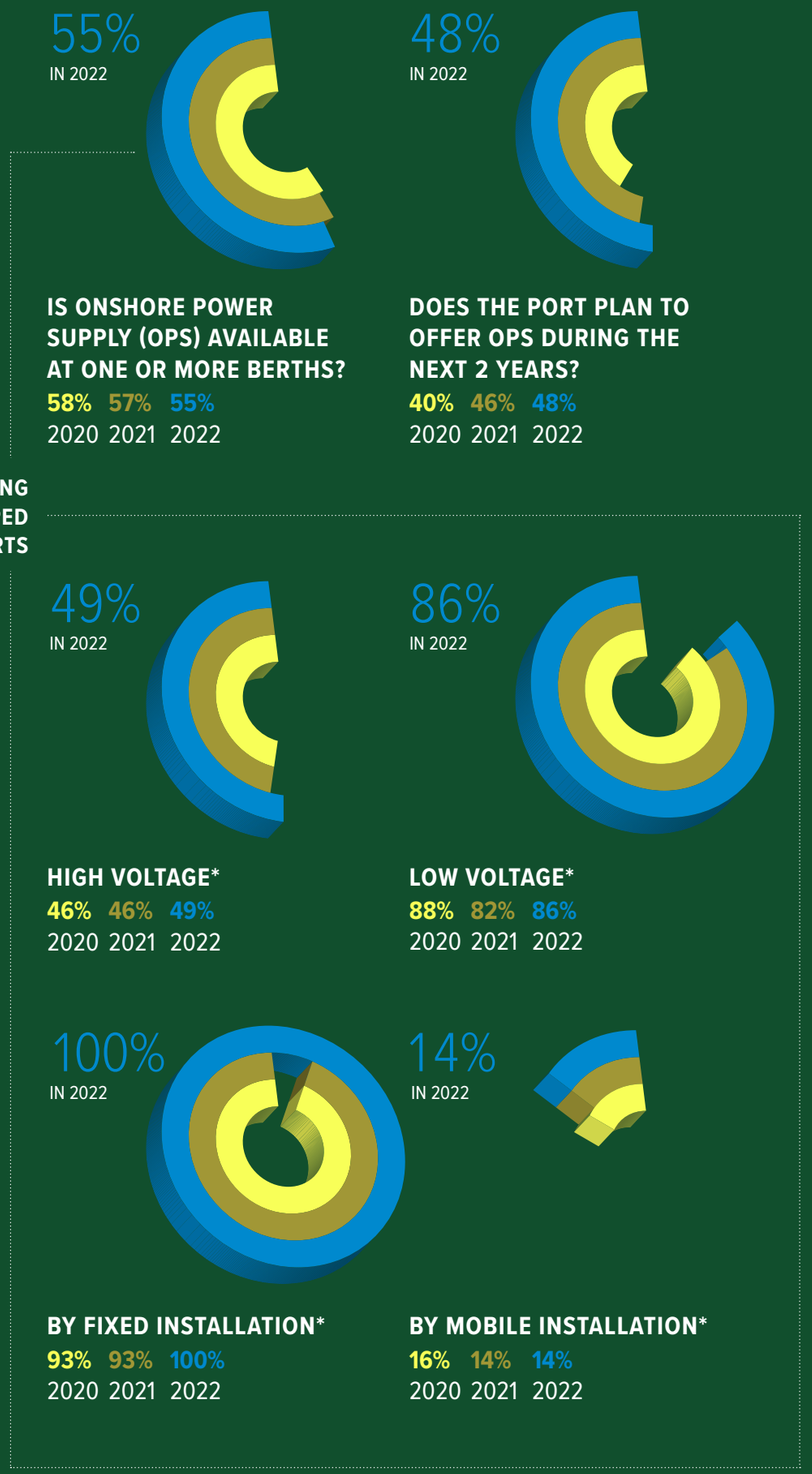


FIGURE 9 shows the current **availability of LNG bunkering** in the surveyed European ports, with 35 ports providing LNG in 2022. Looking at the trends in recent years, the availability of LNG bunkering facilities in ports is gradually increasing. Along with OPS and other alternative fuels, LNG bunkering infrastructure can be used to enable the green transition of shipping. Furthermore, the ongoing war in Ukraine has seen a new push for LNG in the EU, with new LNG terminals being constructed in some Member States. It is to be noted that this LNG is mainly used to replace gas for use in heating and industry, and is not always used for shipping. The impact of this will be monitored in the coming years.

Out of the 38% of surveyed ports providing LNG in 2022, the vast majority can provide it by truck (89%). This is in keeping with the general trend seen in the past few years. Notably, a growing share of ports (close to half) provide LNG by barge in 2022. At the same time, a smaller share of surveyed ports provide LNG by non-mobile installation this year (17%) compared to 2021 (26%). It is no yet clear what drives this development.

Looking ahead, it is clear that many of the surveyed ports continue to see LNG as an important transitional fuel, with 21% of ports currently undertaking LNG bunkering infrastructure projects and a quarter (24%) of the respondents planning to install LNG bunkering in the port in the next 2 years.

The third type of green service provided by European ports consists of **environmentally differentiated fees** for "green" ships that go beyond regulatory standards. These differentiated dues often consist of different types of discounts or rebates on port fees or other types of fees. While such rebates will not be able to influence the shipping line to invest in greening, such voluntary schemes can be an important support to reward frontrunners who assist ports in promoting their environmental priorities. It is important that the port managing body can decide on the level of the rebate and the green efforts it wants to reward, since the environmental concerns and the financial ability to give such rebates might be different for each port.

FIGURE 10 shows that an absolute number of 55 ports offer differentiated dues in 2022, accounting for 60% of the surveyed ports. The share of ports providing these incentives has grown significantly over time, with a 7-percentage point increase this year compared to 2021.

Differentiated fees for vessels that engage in sustainable waste management and waste segregation are provided by 58% of surveyed ports. The high and growing share of ports providing discounts can be attributed to the implementation of the Port Reception Facilities Directive, where it will become mandatory for ports to provide a discount for ships engaging in sustainable waste management.

A majority of ports provide discounts for ships that reduce their air pollution (58%), where there has been a decline compared to last year which saw an unusually high share of ports rewarding air pollution reductions by ships. Close to half of ports providing differentiated dues reward vessels that possess an environmental certification (47%). Other sustainable practices by vessels such as reduced GHG emissions and noise reduction are rewarded by 42% and 24% of ports respectively.

In 2022, a third of all surveyed ports are planning to introduce environmentally differentiated port dues in the next two years, continuing a positive trend towards more ports engaging in port-specific initiatives to promote the greening of shipping.

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

* The percentages of these indicators are calculated on the basis of the 35 ports offering LNG bunkering, not out of the total number of participating ports.

38%
IN 2022

IS LIQUEFIED NATURAL GAS (LNG) BUNKERING AVAILABLE IN THE PORT TODAY?
33% 31% 38%
2020 2021 2022

24%
IN 2022

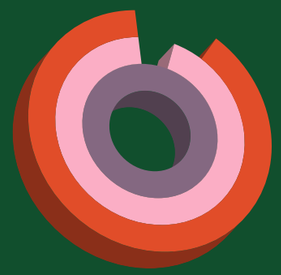
DO PLANS EXIST FOR THE DEVELOPMENT OF LNG BUNKERING FACILITIES DURING THE NEXT TWO YEARS?
– 26% 24%
2020 2021 2022

AMONG PORTS WITH LNG BUNKERING FACILITIES

17%
IN 2022

BY NON-MOBILE INSTALLATION*
22% 26% 17%
2020 2021 2022

89%
IN 2022



BY TRUCK*
100% 94% 89%
2020 2021 2022

49%
IN 2022

BY BARGE*
34% 45% 49%
2020 2021 2022

21%
IN 2022

ARE THERE CURRENTLY ONGOING LNG BUNKERING INFRASTRUCTURE PROJECTS IN THE PORT?
22% 22% 21%
2020 2021 2022

FIGURE 10
Share of ports providing differentiated dues to greener vessels

*The percentage of the different initiatives are calculated on the basis of the 55 ports offering differentiated dues for "Greener Vessels", not out of the total number of participating ports.

60%
IN 2022

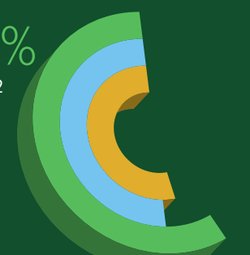
DOES THE PORT OFFER DIFFERENTIATED DUES FOR "GREENER" VESSELS?
57% 53% 60%
2020 2021 2022

33%
IN 2022

DOES THE PORT PLAN TO INTRODUCE ENVIRONMENTALLY DIFFERENTIATED PORT DUES DURING THE NEXT 2 YEARS?
30% 30% 33%
2020 2021 2022

AMONG PORTS PROVIDING DIFFERENTIATED DUES

58%
IN 2022



WASTE MANAGEMENT/ SEGREGATION*
53% 50% 58%
2020 2021 2022

58%
IN 2022

AIR EMISSIONS (NOX, SOX, PM) REDUCTION*
55% 65% 58%
2020 2021 2022

42%
IN 2022

GHG EMISSIONS REDUCTION*
40% 46% 42%
2020 2021 2022

24%
IN 2022

NOISE REDUCTION*
13% 23% 24%
2020 2021 2022

47%
IN 2022

ENVIRONMENTAL CERTIFICATION*
49% 54% 47%
2020 2021 2022

Conclusions

The ESPO Environmental Report 2022 identifies the latest trends in environmental management amongst European seaports. The findings of the report in 2022 confirm that Europe's ports remain actively and increasingly committed to environmental protection and sustainable development.

Based on the responses of surveyed ports, ports are maintaining the overall trend towards continuous improvement of their environmental management. In practice this involved maintaining or enhancing efforts to ensure compliance, risk reduction, environmental protection, and sustainable development. It is also clear that the EcoPorts Network is an effective means for port authorities to engage in greening efforts.

With climate change becoming the top environmental priority for ports for the first time this year, ports are increasingly aware of the necessity of robust and ambitious environmental management through the EcoPorts Network. Notably, for the second year in a row, close to half of surveyed ports (49%) experienced operational challenges related to climate change in 2022.

The findings from this year's report also demonstrate that European ports are taking action to address climate change and other environmental priorities together with other port stakeholders. The Environmental Management Index, which provides a rating of environmental management in European ports continues its positive trajectory. With a score of 7,98 in 2022, surveyed ports are approaching the peak levels seen in 2017-2018, and have almost delivered on the ambition set out in the ESPO Green Guide 2021 for ports to achieve an EMI score of 8 by 2025.

A growing share of ports are also getting certified with PERS, the only port-specific environmental standard on the market developed by ports, for ports. In 2022, close to half of surveyed ports (44,9%) are PERS-certified, making PERS one of the most popular standards in the sector next to ISO 14001.

Looking ahead, EcoPorts aims at growing and developing further to meet the needs for environmental management amongst European ports. This year, ESPO is working together with members on updating the Self-Diagnosis Method (SDM), which is the passport for ports wishing to join EcoPorts. With over 100 questions currently included in the SDM, the review will streamline the monitoring efforts of ports and address the changing environmental priorities of ports. Together with the EcoPorts PERS certification, which is the only port-specific environmental certification standard on the market, and the ESPO Green Guide 2021, there are several tools available for ports to continue to improve their environmental management in the years to come.

E Annex: Sample of ports

The sample for the 2022 Environmental Report includes **92 ports from 20 countries**, and contains ESPO members as well as ESPO observers from the European Union and other European countries. The sample includes ports from countries applying EU legislation, covering EU Member States, 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).

There are fewer ports in the sample compared to 2021, which can be attributed to several long-standing members working to renew their membership at the time of the sampling for the report.

TABLE 4 lists the countries represented in the sample for this report, including the number of participating ports of each country and the share of each country in the overall sample. The country with the largest share of ports in 2022 is the United Kingdom (15.2%), followed by Spain (14.1%) and Germany (12%). Seven ports in France and Netherlands each represent 7.6% of the total ports in the sample. Apart from these countries, ports in other European countries represent a few percent each of the total sample.

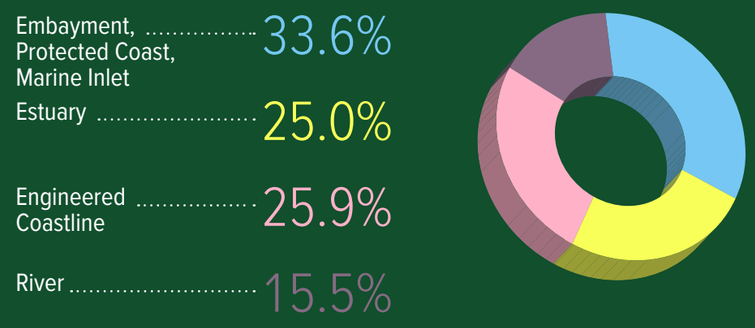
TABLE 4
List of countries represented in the sample and number of participating ports

Country	Number of ports	Percentage (%)
United Kingdom	14	15.2
Spain	13	14.1
Germany	11	12.0
France	7	7.6
Netherlands	7	7.6
Denmark	6	6.5
Greece	5	5.4
Finland	5	5.4
Ireland	4	4.3
Norway	3	3.3
Portugal	3	3.3
Italy	3	3.3
Poland	3	3.3
Sweden	2	2,2
Latvia	1	1.1
Estonia	1	1.1
Romania	1	1.1
Lithuania	1	1.1
Albania	1	1.1
Malta	1	1.1

As shown in **FIGURE 11**, the geographical location of the participating ports is quite diverse, which in keeping with previous years provides a representative sample of European ports at large. For that reason, the findings presented in this report could reasonably be expected to capture larger trends amongst European ports.

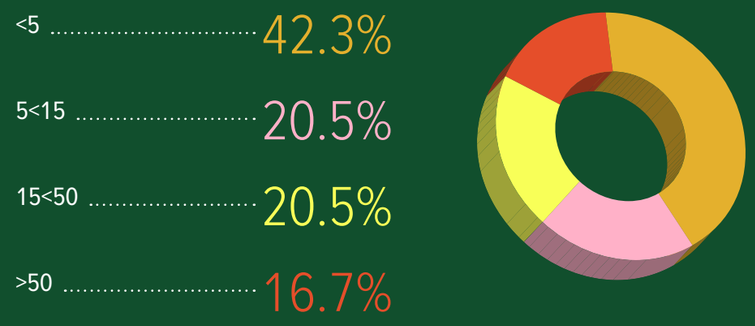
Ports contributing to this report are predominantly located in embayment, protected coast and marine inlet areas, with around a third of ports located in these areas in 2022 (33.6%). Ports located in estuaries and engineered coastlines each represent a quarter of the sample respectively. Finally, ports located along rivers constitute 15.5% of the total sample.

FIGURE 11
Geographical characteristics of the sample



In terms of the size of the ports in the sample, small ports (<5 million tons/year) represent close to half of the overall sample (42%). This is in keeping with the sample characteristics in previous years. Medium-size ports (5<15 million tonnes/year) represent a fifth of the total sample, as does large ports (15<50 million tonnes/year). Very large ports with tonnage of over 50 million tonnes per year make up around 17% of the total sample.

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 application of EU legislation, making it relevant to assess the sample in that respect as well. Norway and Albania are considered in line with Annex III of Regulation (EU) 1315/2013 on the extension of the TEN-T network to neighbouring countries. Accordingly, ports from these countries have been counted as TEN-T ports where applicable.

As shown in **FIGURE 13**, 76% of the sampled ports were part of the TEN-T Network (core and comprehensive). Out of the TEN-T ports, 44.6% are part of the TEN-T Core Network, whereas 31,5 % of sampled ports are part of the TEN-T Comprehensive Network. This entails that the sample is relatively similar to the sample for 2021, with a slightly higher share of TEN-T Network ports in the sample. The remaining 24% of ports in the sample are not part of the TEN-T Network.

FIGURE 13
Percentage of ports in TEN-T Network

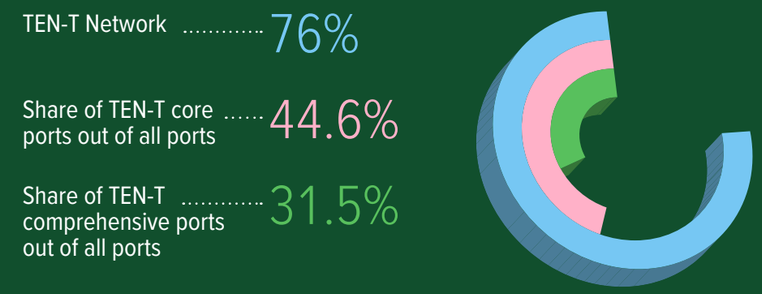


TABLE 5
List of ESPO-member ports certified with EcoPorts PERS

Port	Country
Ports of Jersey	United Kingdom
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
Autoridad Portuaria de la Bahía de Algeciras	Spain
Autoridad Portuaria de Cartagena	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, Norden Branch	Germany
Niedersachsen Ports GmbH & Co. KG	Germany
Niedersachsen Ports GmbH & Co. KG, Brake Branch	Germany
Niedersachsen Ports GmbH & Co. KG, Cuxhaven Branch	Germany
Niedersachsen Ports GmbH & Co. KG, Emden Branch	Germany
Niedersachsen Ports GmbH & Co. KG, Wilhelmshaven Branch	Germany
JadeWeserPort Realisierungs GmbH & Co. KG	Germany
Ports of Bremen/Bremerhaven	Germany
Guadeloupe Port Authority	France
Grand Port Maritime de Dunkerque	France
Port of Moerdijk	Netherlands
Port of Den Oever-Hollands Kroon	Netherlands
Groningen Seaports	Netherlands
NV Port of Harlingen	Netherlands
Volos Port Authority S.A.	Greece
Igoumenitsa Port Authority S.A.	Greece
Piraeus Port Authority S.A.	Greece
Port of Helsinki	Finland
Port of Pori Ltd	Finland
Shannon Foynes Port Company	Ireland
Dublin Port Company	Ireland
Port of Kristiansand	Norway
Port of Gdynia Authority S.A.	Poland

ACKNOWLEDGEMENTS

The authors would like to thank the ESPO Secretariat for their support, especially the EcoPorts Coordinator Mr. Valter Selén in the compilation of this report. The authors also acknowledge the invaluable input of the respondent ports and the helpful cooperation of members of the Sustainable Development Committee. Thanks also to Mr. Stavros Kokosioulis for his assistance with data extraction.

EDITING

Valter Selén, Petra Petropoulos

DESIGN

Catapult (*www.catapult.be*)


ESPO
WWW.ESPO.BE