

ESPO Environmental Report 2021

EcoPortsinSights 2021



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FOREWORD

*By ESPO Chair
Annaleena Mäkilä*

I am delighted to present you the ESPO Environmental Report 2021. This 6th edition of the Report requires special attention, with environment and climate concerns increasingly becoming foundational pillars in the strategies of ports in Europe. Furthermore, the recently published climate proposals put forward by the European Commission in the Fit for 55-package set the scene for a transition of our economy and society towards a green European future. Let it be clear: ports, as central nodes in the supply chain, hubs of energy and industry and unique interfaces between sea and land, are and want to be part of this transition.

The special attention for the 2021 Report is also merited due to its findings. Since the monitoring of the environmental performance of Europe's ports started, there has been an annual improvement on most, if not all, key environmental management indicators. Over the last years, however, there has been some worrying signs of stagnation and even decrease in performance for certain indicators. With the 2021 Report, it seems that ports have curbed this negative trend and increased efforts to continuously improve their environmental management across the board. The trends are positive for critical indicators such as the general environmental management index and the certification through environmental management systems, in particular our own EcoPorts PERS certification system.

The representativeness of the data is also continuously improving, with 21 countries represented in the sample and 99 ports in the sample overall. While it is clear that the bottom-up engagement of ports towards greening is encouraging, we should not rest on our laurels. We must keep our finger on the pulse, progress further, and strengthen our monitoring efforts.

To this end, ESPO published a new Green Guide 2021, which sets out a vision for a green future¹. Its guidance should be seen as a companion for ports in Europe for how to develop a pathway to greening. A continuously updated online database of good green practices accompanies the Green Guide². Gathering over 70 good practices from ports all over Europe, the database shows that every port, small, big, located in the north, south, east or west, can lead the way in greening efforts and set a good example to others.

I am sure that the Green Guide 2021 will assist ports further decrease their environmental footprint and enable sustainable development in the port sector. By combining the concrete guidance provided in the Guide with the EcoPorts monitoring and evaluation, I do hope we can present an even more promising environmental report next year.

I would like to thank all who have contributed to this report, first of all the EcoPorts members who submitted their data, Dr Martí Puig who drafted the report together with academic colleagues Dr Chris Wooldridge and Dr Rosa Mari Darbra, the ESPO EcoPorts coordinator Valter Selén, as well as the ESPO secretariat for the good work on this report.

1. www.espo.be/media/ESPO%20Green%20Guide%202021%20-%20FINAL.pdf

2. www.espo.be/practices

*The positive trends
in this ESPO 2021
Environmental Report
are a very powerful
message to the ESPO
membership that the
efforts of European
ports are paying off.
These positive results
give us a shot in the arm
in our work in ESPO and
EcoPorts to encourage
ports to further
engage in greening.*

Isabelle RYCKBOST
Secretary General
ESPO

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INTRODUCTION

After close to 25 years of the EcoPorts Network, ESPO presents the 6th Annual Environmental Report. The ESPO Environmental Report is part of EcoPorts, which is the environmental flagship initiative of European Ports. The Environmental Report provides ESPO and European policymakers with insights on the environmental issues that European ports are working on, and informs the initiatives taken by ESPO.

With climate change and environmental issues high on the agenda, it is well-timed. The 2021 Report demonstrates that ports are stepping up their environmental management, with improvements in the Environmental Management Index in 2021. Together with the ESPO Green Guide 2021, the ESPO Environmental Report strengthens the long-standing efforts of European ports to monitor and address high priority environmental issues.

The indicators also 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 governance data³.

The 2021 Report considers:

- I. Management performance indicators (MPI) that provide information about the management's efforts to influence an organisation's environmental performance,
- II. Operational performance indicators (OPI) that provide information about the environmental performance of port operations, and,
- III. Environmental condition indicators (ECI) that provide information about the local, regional, national or global condition of the environment.

Executive Summary

For 2021, the report shows a number of positive trends amongst key indicators. It is based on a slightly larger sample compared to 2020, with the Top 10 priorities of surveyed ports remaining almost the same as last year. The five top priorities are identical to the 2020 priorities, with air quality, climate change, and energy efficiency as the top three priorities.

The 2021 Report shows that ports continue to focus on "green" priorities. Air quality has been the top environmental priority since 2013 and is followed by climate change, which is the second priority for ports for the second year in a row. Energy efficiency is the third priority of ports.

For this year, the report finds that ports are improving their environmental management to address their top priorities. The Environmental Management Index (ranging from 0 to 10), which provides an indication of the extent to which ports in the EcoPorts Network are engaged in environmental management, has increased for the first time in several years. In 2021, the score is 7,86, compared to 7,80 in 2020. This improvement is largely due to a growing share of ports providing environmental management programmes and training.

Close to 40% of responding ports have become certified with the Port Environmental Review System (PERS). This is a significant increase compared to 2020, when 33% of ports had a PERS certificate.

3. www.portinsights.eu

The findings of the report demonstrate that ports have improved their performance in key indicators. 86% of ports have set up an environmental monitoring programme, with port waste being the most monitored issue. An increasing share of responding ports view climate change as a threat to their operations, with 53% of ports experiencing operational challenges that could be related to climate change. However, ports are also increasingly taking steps to improve their resilience to climate change, with 78% of ports considering climate change adaptation as part of new infrastructure projects. Transparency also continues to be very important to ports, with 68% of ports publishing their environmental report and 90% of ports communicating their policy to key stakeholders.

With regard to services to shipping, more than half of the responding ports are offering to some extent Onshore Power Supply (OPS), and around a third of them has made LNG bunkering available.

The sample used for the Environmental Report is growing (by 2% compared to 2020), and is steadily becoming more representative of the sector as a result.

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 five observer members: Albania, Iceland, Israel, Ukraine and the 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. EcoPorts 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 their environmental liabilities and responsibilities. EcoPorts increases awareness of environmental challenges, facilitates regulatory compliance, and demonstrates a high standard of environmental management amongst its 119 members from 26 countries.

The improving performance of ports is demonstrated in this report, as well as through the prevalence of international environmental management systems (EMS). Such systems include the EcoPorts PERS, which is an independently verified international standard developed specifically for ports.

It is on this basis that EcoPorts helps European ports to be at the frontline of environmental management. The EcoPorts Network facilitates initiatives aiming to protect the environment, improve public health, and address 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 form 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 port's 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. Over a quarter 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 is available at the following websites:

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

The first section of the ESPO Environmental Report presents the results of the environmental management indicators. Environmental management consists of the organised efforts necessary to deliver environmental protection and sustainable development to the highest possible standards. It is the process of dealing with, or controlling impacts on, the environment arising from port activities and operations.

TABLE 1 presents the **10 most important environmental management indicators** that have been consistently reported over time. The indicators show the environmental performance of the port. The table shows the trends in indicators over time, and how they have changed compared to the start of measurements in 2013.

TABLE 1
Percentage of
positive responses
to the environmental
management indicators

Indicators	2013 (%)	2016 (%)	2017 (%)	2018 (%)	2019 (%)	2020 (%)	2021 (%)	% CHANGE 13-21
A Existence of a certified Environmental Management System (EMS) – ISO, EMAS or PERS	54	70	70	73	71	65	75	+21
B Existence of an Environmental Policy	90	92	97	96	95	96	93	+3
C Environmental Policy makes reference to ESPO's guideline documents	38	34	35	36	38	43	39	+1
D Existence of an inventory of relevant environmental legislation	90	90	93	97	96	91	88	-2
E Existence of an inventory of Significant Environmental Aspects (SEA)	84	89	93	93	89	92	92	+8
F Definition of objectives and targets for environmental improvement	84	89	93	93	90	88	87	+3
G Existence of an environmental training programme for port employees	66	55	68	58	53	55	56	-10
H Existence of an environmental monitoring programme	79	82	89	89	82	81	86	+7
I Environmental responsibilities of key personnel are documented	71	85	86	86	85	85	82	+11
J Publication of a publicly available environmental report	62	66	68	68	65	69	68	+6

In 2021, the existence of an Environmental Policy continues to be the indicator with the highest positive response (93%). This is highly significant, since it contains the priorities of the port, highlighting issues and demonstrating port environmental commitment at port level.

In terms of positive responses, this indicator is followed by the existence of an inventory of Significant Environmental Aspects (SEA) (92%), which is another highly significant indicator. The SEAs contain those activities, products and services that have a direct or indirect impact on the environment. Accordingly, it is a key element of any credible environmental management regime, as it pinpoints which activities need to be monitored and managed.

The existence of an inventory of relevant environmental legislation (88%) continues to have a large share of positive responses, even if there has been a slight decrease in the implementation of this element. The inventory continues to be a major requirement of international quality standards of EMS and a key component in ESPO's EcoPorts PERS certification.

The definition of objectives and targets for environmental improvement (87%) is an essential element for the improvement of port environmental performance, which has increased compared to 2013. The fact that objectives and targets are defined by the port is proof that the port intends to improve its environmental management. By setting targets for environmental improvement, the port commits to taking action, and such target-setting can act as a catalyst focusing attention and resources towards reaching the target. In order to encourage and facilitate target-setting, the ESPO Green Guide 2021 provides ports with guidance on how to set such targets by developing a port-specific roadmap for greening.

In 2021, 86% of responding ports reported the existence of an environmental monitoring programme. This is a significant increase of 5 percentage points compared to the share of ports that reported having such a programme in 2020. The increase shows that ports place a growing emphasis on environmental monitoring as a precondition for delivering on environmental priorities and as a means to demonstrate legal compliance through evidence-based data.

The indicator that has seen the largest increase compared to 2020 is the existence of a certified Environmental Management System (EMS). In 2021, 75% of the surveyed ports are certified with one or several environmental certificates, which is the highest share since launching the ESPO Environmental Report in 2013. The certified EMS can include ISO 14001, EMAS or EcoPorts PERS. The increase demonstrates the ports' awareness of achieving high standards of Environmental Management as a key component of attaining and demonstrating sustainable development.

The increase in the overall share of ports which reported having an EMS in place is largely due to a growth in ports certified with EcoPorts PERS (+10 percentage points compared to 2020). The increase of environmental certification in 2021 can be seen as curbing the trend for 2020, which saw a decrease in such certification partly attributable to the impact of COVID-19 on port operations and environmental programmes.

Becoming EcoPorts PERS-certified is a clear indicator of competent environmental management. When a port becomes PERS-certified, it sends a strong signal to key stakeholders that the certified port is a front runner in excellent environmental management, engaging in voluntary self-regulation.

As the only international, port sector-specific environmental management standard on the market, EcoPorts PERS is recognised and well-known globally. It is currently listed as a source of Good International Industry Practices (GIIP) in the World Bank Group Environmental, Health and Safety Guidelines for Ports, Harbours and Terminals. Moreover, it is officially recognised by several other port organisations and associations including the American Association of Port Authorities (AAPA), the Taiwan International Port Corporation (TIPC), the Port Management Association of West and Central Africa (PMAWCA) and the Arab Sea Ports Federation (ASPF). As one of the key tools in the EcoPorts Network, it is also mentioned in the European Commission Sustainable and Smart Mobility Strategy.

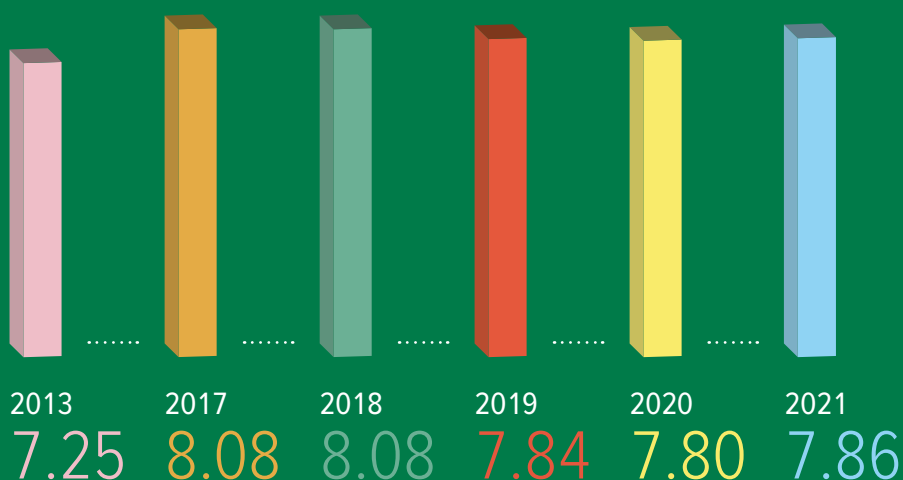
Summarising the findings in **TABLE 1**, the positive trends from previous years continue in 2021, with European ports demonstrating progress and continuous improvement in terms of bottom-up initiatives and the implementation of good practices. This is evident in the improved performance in indicators such as the existence of a certified EMS and the environmental monitoring programme. The overall positive trend also means an improvement in the **Environmental Management Index (EMI)** compared to 2020 (see **FIGURE 1**).

The EMI is a measure of the overall environmental management performance of the port based on aggregation of the ten environmental indicators presented in **TABLE 1**. It gives an indication of the average environmental performance of ports, grading it on a scale from 0 (no environmental management) to 10 (excellent environmental management). The indicators are weighted in accordance to 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:

$$\text{Environmental Management Index} = A*1.5 + B*1.25 + C*0.75 + D*1 + E*1 + F*1 + G*0.75 + H*1 + I*1 + J*0.75.$$

The numerical value of each letter is the percentage of positive responses divided by 100 (e.g., A is 0.75 in the results of 2021 as shown in **TABLE 1**).

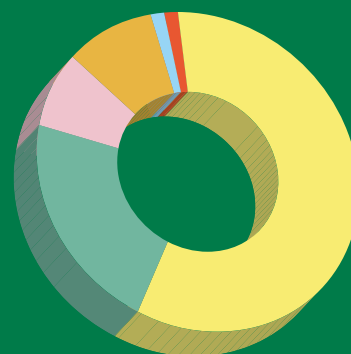
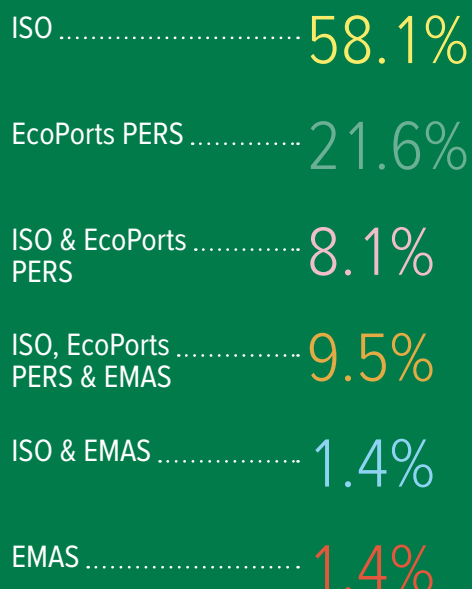
FIGURE 1
Evolution of the
Environmental
Management Index
over the years



Based on the three main internationally recognised Environmental Management System (EMS) standards, EcoPorts' Port Environmental Review System (PERS), ISO 14001 and Eco-Management and Audit Scheme (EMAS), **FIGURE 2** shows the distribution of certified ports in the sample.

Out of the 75% of ports with a certified EMS, more than half of these have opted for ISO 14001 (58.11%) followed by EcoPorts PERS (21.62%), making ISO and PERS the most popular standards in the sector. Some ports are certified with more than one standard, such as ports with ISO and EcoPorts PERS (8.11%), or with the three certificates (9.46%). It is interesting to note that the share of ports that use EcoPorts PERS on its own or in combination with other certificates has increased by 7 percentage points to 40% in 2021. The combination of all three certification schemes by ports has increased the most in recent years.

FIGURE 2
Breakdown of
the EMS certificates



Since 2018, the ESPO Environmental Report has also analysed **communication** indicators, which are key to societal acceptance and the accountability of ports. The results provided in **FIGURES 3** and **4** demonstrate that since then, the levels of communication are relatively stable amongst the surveyed ports. Most ports communicate their policy to relevant stakeholders (90%) and make their policy public on their websites (84%), indicating that ports are taking steps to maintain and improve their relationship with the local community and other stakeholders through transparent communication.

FIGURE 3
Communication of
environmental policy to
relevant stakeholders

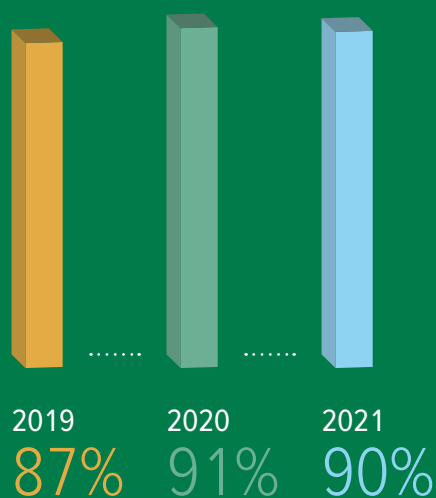
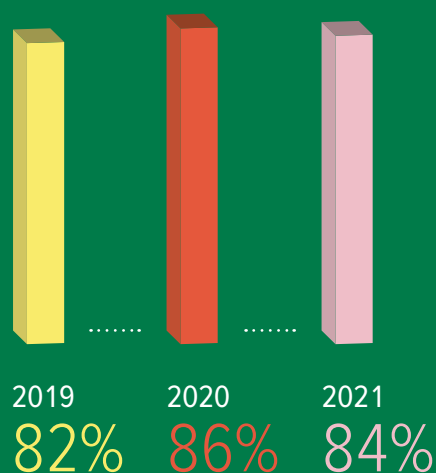


FIGURE 4
Availability of ports'
environmental
policy online



B Environmental monitoring indicators

Indicators for the **environmental monitoring programmes** of European ports show the environmental issues monitored by ports. **TABLE 2** presents the percentages of positive responses listed in their order of positive response rates in 2021.

TABLE 2
Percentage of
positive responses
to environmental
monitoring indicators

Indicators	2013 (%)	2016 (%)	2017 (%)	2018 (%)	2019 (%)	2020 (%)	2021 (%)	% CHANGE 2013 – 2021
Port waste	67	79	88	84	79	79	80	+13
Energy efficiency	65	73	80	80	76	75	77	+12
Air quality	52	65	69	67	62	67	71	+19
Water consumption	58	62	71	72	68	69	70	+12
Water quality	56	70	75	76	71	67	70	+14
Noise	52	57	64	68	57	54	64	+12
Sediment quality	56	63	65	58	54	59	60	+4
Carbon footprint	48	47	49	47	49	52	59	+11
Marine ecosystems	35	36	44	40	40	46	46	+11
Terrestrial habitats	38	30	37	38	37	41	40	+2
Soil quality	42	44	48	38	32	41	40	-2

The table shows that in 2021, there has been an increase in the share of positive responses to most parameters that can be looked at by ports as part of environmental monitoring. Corresponding to the Top 10 priorities of European ports in 2021, monitoring of energy efficiency, air and water quality, and carbon footprint has increased. Interestingly, the monitoring of noise has increased with 10 percentage points compared to 2020, suggesting that this issue is of growing importance to ports.

Since 2013, port waste has been the most monitored issue by ports, with energy efficiency consistently in second place. Both indicators show a positive trend in terms of uptake and implementation. Overall, air quality is the issue that had the greatest increase in monitoring since 2013 (19%), reflecting its status as the top environmental priority of ports.

Even though most of the environmental issues have increased their share of positive responses, the monitoring of terrestrial habitats and soil quality have decreased very slightly compared to last year. Whilst this change could be attributed to the changes in the underlying sample of surveyed ports, it should also be noted that the significance of these indicators for ports depends on the phases of port development. Various pressures including port development projects, environmental accidents and incidents, and stakeholder interests influence monitoring priorities and activity schedules. When ports are about to develop the port area, for instance when constructing new infrastructure, they monitor these indicators more closely. As such, this is an instance where longer-term trends are more significant than minor fluctuations on a year-on-year basis.

In 2018, three specific indicators related to **climate change** were included in the annual reporting. Over time, the indicators show that the ports' prioritisation of climate change also translates to concrete efforts by ports to adapt to, and address, climate change. The results for 2021 shown in **FIGURES 5 – 7** consider climate change. **FIGURE 5** demonstrates that a growing share of ports face operational challenges that may be associated to climate change (53%). As shown in **FIGURE 6**, the share of ports that are taking steps to strengthen the resilience of their existing infrastructure in order to adapt to climate change remains stable compared to last year (65%). **FIGURE 7** shows that ports give greater consideration to climate change adaptation as part of new infrastructure development projects in ports compared to last year. This is clear in the 7 percentage-point increase for this indicator in 2021 compared to 2020.

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

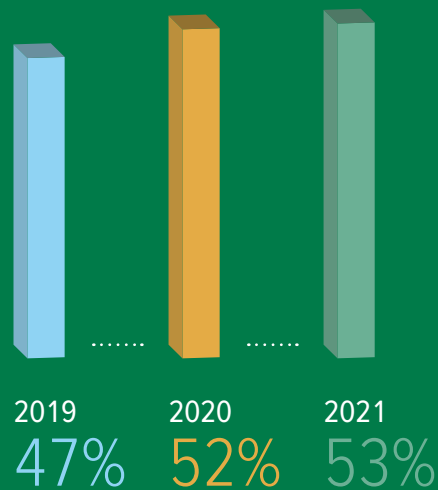


FIGURE 6
Share of ports adapting
existing infrastructure to
increase resilience

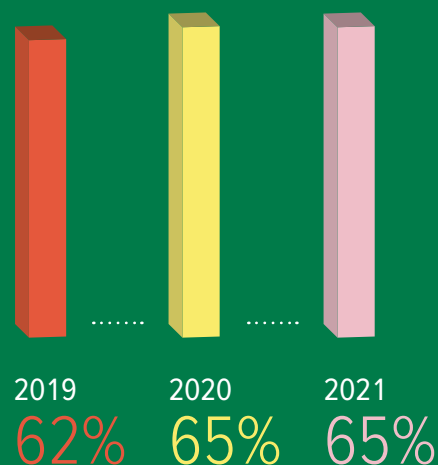
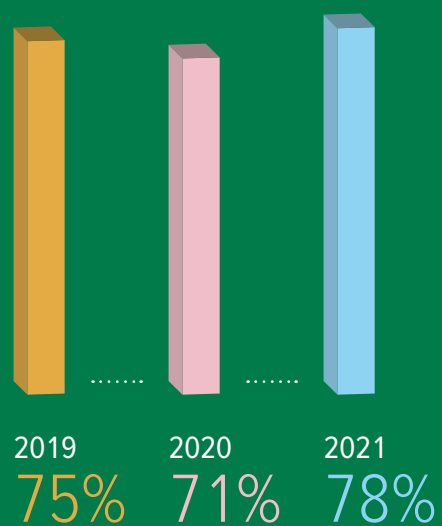


FIGURE 7
Share of ports
considering climate
adaptation for new
infrastructure



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 prioritise when it comes to environmental issues. It also informs the political and policy priorities of ESPO, and provides context to European policymakers working with ports.

The 2021 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 over time.

For 2021, **TABLE 3** shows that the top five priorities of ports remain the same compared to last year. On the other hand, the last five priorities have seen some changes in their internal ranking.

Air quality is undoubtedly the top environmental concern of the sector, having been the first environmental priority for ports since 2013. Air pollution in port areas can come from vessels navigating in the port or at berth, port operations, and related land traffic within the port area. Furthermore, ports are often sites of industrial activities and clusters, which also contribute to air quality concerns. Since the majority of European ports are located in or near urban areas, air quality is not only an environmental concern, but also important to safeguard the health of the port workers and the citizens around the port. This makes good air quality fundamental to a port's license to operate in urban areas.

The importance of air quality to ports is shown both by its status as top priority, but also through ports taking action to monitor and improve air quality in ports. As shown in **TABLE 2**, 71% of surveyed European ports monitor air quality, which is an increase of 19 percentage points since 2013.

Climate Change remains the second top priority of the sector in 2021. It entered the Top 10 in 2017, and it has grown in importance since then, in line with the growing focus on climate change in political and social arenas. As ports increasingly face operational challenges as a result of climate change, addressing this issue is an imperative for ports, placing reductions of carbon emissions and climate-proofing port infrastructure front and centre. Increasingly, collaborative efforts are being undertaken as European ports work with industrial and community stakeholders to develop a low-carbon economy and to become carbon-neutral.

In a sign that ports are striving to go beyond compliance with existing and forthcoming climate legislation, the ESPO Green Guide 2021 outlines a vision of ports as part of a green future, and sets climate mitigation targets for ports. Together with the dedicated database of good green practices, the Guide shows that ports are already involved in bottom-up climate initiatives all over Europe.

The third top priority is **Energy efficiency**, which is critical for ports and terminals seeking to reduce energy consumption and consequently their emissions (Iris & Lam, 2019). Improved energy efficiency is therefore a means to both reduce operational costs and contribute to greening efforts. Accordingly, a large number of ports and terminals are working to improve their energy efficiency.

There are many ways to improve energy efficiency. Many ports rely on a combination of the optimisation of vessel arrival planning and port operations, and the use of innovative technologies. These technologies can include promoting electrification of equipment, smarter power distribution systems, and energy consumption measurement systems (Iris & Lam, 2019).

Noise is the fourth priority for the port sector. There are many potential sources of noise in the port area, which can be ambient, underwater, or a combination of the two. For instance, noise can come from machinery and cranes used for loading and unloading cargo, but also from the use of auxiliary engines from vessels in ports. Discussions on the negative impacts of noise have gained prominence in the past years, as noise may disturb residents living near ports, alongside wildlife in the port or in surrounding habitats. It is clear that ports are increasingly taking action to help address noise concerns, with close to two thirds (64%) of surveyed ports monitoring noise levels in 2021. This is an increase of 10 percentage points compared to last year.

Relationship with the local community retains fifth position in the Top 10 priorities. The vast majority of European ports are located in, or very close to, an urban area, where ports tend to be perceived as representatives of the larger maritime sector by the local population. This means that ports need to address the general concerns of citizens, and ensure that the port is viewed as a positive force in the local community.

To achieve this, ports strive to increase transparency as demonstrated by their continued communication efforts, especially in reaching out and involving the local community in their initiatives. The ESPO Environmental Report is part of this push for greater transparency. Port-city relations have also been high on the agenda of ESPO since 2009, when a Code of Good Practice was published⁴ and the ESPO Award for social integration was set up. The 13th edition of the ESPO Award will be taking place this year, rewarding ports for their efforts to strengthen the relationship between port and city. Environment has been at the core of several editions of the Award.

Water quality and **Ship waste** have swapped positions in the current Top 10 ranking compared to last year. In 2021, water quality is the sixth priority, and ship waste is the seventh. Ports are intrinsically linked and dependent on water, making water management and water quality fundamental to their operations, environmental responsibility, and licence to operate. This is reflected in the fact that water quality has continued to rise in the ranking of top priorities for ports, with 70% of the surveyed European ports monitoring water quality in 2021. On the European level, discussions are ongoing to revise existing water legislation.

There are two main sources of waste in Europe's ports: the waste generated by port-based activities, and the waste delivered by ships calling at the port. Reflecting the priority that European ports place on waste management from ships, the ESPO secretariat is Vice-Chair of the European Sustainable Shipping Forum subgroup on Waste from Ships, which is an expert group set up by the European Commission to assist in the implementation of the Port Reception Facilities Directive (2019/883).

Dredging operations and **Port development (land-related)** occupy rankings eight and nine, respectively. The operation of dredging consists in the removal of sediments, which could introduce sediments into the water column affecting habitats and ecosystems. Most ports need to dredge maritime access lanes, canals, and port areas regularly. The continued importance of this activity and its potential impact on the environment helps explain why dredging remains part of the Top 10.

Port development becomes an important priority in connection to construction works undertaken within the port area. Since these activities are often cyclical, varying between different years, the prioritisation of port development tends to fluctuate between years.

Garbage/port waste concludes the list of Top 10 priority issues for the sector. Preventing waste from being created, and avoiding it spreading, are key to addressing waste from port-based activities. The more waste that can be reused and recycled, the better. Therefore, waste management is a key component of the positive contribution of ports to climate and environmental management. As a result of its importance, port waste has continuously been the most monitored indicator among EcoPorts members.

4. www.espo.be/media/espopublications/ESPOCodeofPracticeonSocietalIntegrationofPorts2010.pdf

TABLE 3

Top 10
environmental
priorities of the
port sector over
the years

*Starting with the fifth iteration of the Annual Environmental Report, the name of the environmental monitoring indicator has been updated from “energy consumption” to “energy efficiency”. This has been done to improve the specificity and accuracy of the answers provided by ports.

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

2017

2018

2019

2020

2021

Air
qualityAir
qualityAir
qualityAir
qualityAir
qualityEnergy
consumptionEnergy
consumptionEnergy
consumptionClimate
changeClimate
change

Noise

Noise

Climate
changeEnergy
efficiency*Energy
efficiencyWater
qualityRelationship
with the local
community

Noise

Noise

Noise

Dredging
operationsShip
wasteRelationship
with the local
communityRelationship
with the local
communityRelationship
with the local
communityGarbage/
Port wastePort
development
(land related)Ship
wasteShip
wasteWater
qualityPort
development
(land related)Climate
changeGarbage/
Port wasteWater
qualityShip
wasteRelationship
with the local
communityWater
qualityPort
development
(land related)Garbage/
Port wasteDredging
operationsShip
wasteDredging
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operationsDredging
operationsPort
development
(land related)Climate
changeGarbage/
Port wasteWater
qualityPort
development
(land related)Garbage/
Port waste

D Green services to shipping

Ports are not only areas where the emissions from various maritime and industrial activities come together; they also play a pivotal role in bringing their stakeholders closer to their decarbonisation and zero pollution targets. 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 front-runners going beyond regulatory standards.

The monitoring of green services to shipping was introduced in 2016 as part of the EcoPorts SDM. **FIGURES 9 – 10** provided 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.

Even if emissions at berth are only a small fraction of total maritime transport emissions, they need to be addressed. OPS is an important tool for many ports to lower emissions from vessels at berth. The provision of Onshore Power Supply (OPS) to ships ensures that most of their energy needs at berth are met via the electricity grid, meaning that vessels do not need to use their auxiliary engines when at berth. To ensure effective emission reductions from OPS, the installations need to be connected to the grid and preferably rely on electricity from renewable energy sources.

Many ports in Europe are stepping up their efforts to deploy more OPS in their port. Together with the use of equivalent alternative technologies, OPS can be an important instrument to reach the aim of reducing greenhouse emissions, air pollution, and noise.

As shown in **FIGURE 8**, more than half of the surveyed ports provide OPS at one or more berths (57%). In absolute figures, the ports offering OPS have increased from 32 at the start of monitoring to 56 ports in 2021. In 2021, 82% of ports offering OPS provide low voltage OPS, which mainly serves inland and domestic vessels, and auxiliary vessels such as tugs and other port authority vessels. For this reporting year, 46% of responding ports provide OPS high voltage connections at one or more berths, which are needed to meet the energy needs for commercial seagoing vessels. Out of the surveyed ports providing OPS, 93% of these provide electricity through fixed installations, whereas 14% of respondents provide it through mobile installations. It should be noted that ports can provide OPS through both fixed and mobile installations.

The share of ports planning to offer OPS in the next two years has increased significantly over time, accounting for 46% of surveyed ports in 2021. This can partly be attributed to the requirements for OPS in the current Alternative Fuel Infrastructure Directive (2014) and the emphasis on increasing the deployment and use of OPS at berth in legislative proposals in the European Green Deal.

FIGURE 8
Percentage of positive responses to Onshore Power Supply (OPS) indicators

* The percentages of these indicators are calculated on the basis of the 56 ports offering OPS, not out of the total of participating ports.

57%
IN 2021



IS ONSHORE POWER SUPPLY (OPS) AVAILABLE AT ONE OR MORE BERTHS?

53% 58% 57%
2019 2020 2021

46%
IN 2021



DOES THE PORT PLAN TO OFFER OPS DURING THE NEXT 2 YEARS?

29% 40% 46%
2019 2020 2021

AMONG OPS-EQUIPPED PORTS

46%
IN 2021



HIGH VOLTAGE*

48% 46% 46%
2019 2020 2021

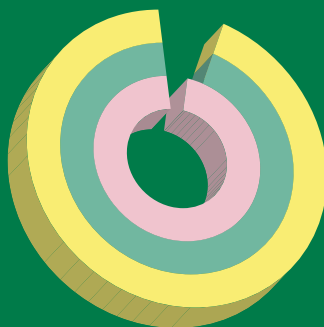
82%
IN 2021



LOW VOLTAGE*

86% 88% 82%
2019 2020 2021

93%
IN 2021



BY FIXED INSTALLATION*

96% 93% 93%
2019 2020 2021

14%
IN 2021



BY MOBILE INSTALLATION*

16% 16% 14%
2019 2020 2021

Even though many European port authorities are willing to deploy OPS to facilitate the greening of shipping, they face many barriers in doing so. The apparent lack of economic viability for OPS is the most prevalent barrier. The cost for developing OPS in ports varies from port to port, and from location to location in the port, but overall, the cost is high, with almost no return on investment for the investing party. So far there are no cases known where OPS has been deployed on a commercial basis, not even in countries where renewable electricity is cheaper than the fuel used on board. To this day, every OPS facility installed in Europe has been supported by up to 50% of public financing.

FIGURE 9 shows the current **availability of LNG bunkering** amongst the surveyed ports, with 31 ports providing LNG in 2021. Looking at the trend for LNG deployment in recent years, it is clear that the share of ports providing LNG remains relatively stable. The provision of LNG in TEN-T core ports by 2025 is set out in the Alternative Fuels Infrastructure Directive (2014/94/EU). Developments of alternative solutions with regard to decarbonising shipping will be important to complement OPS efforts, mainly on locations where it is not suitable. It is in that perspective important to consider LNG in the short run, where LNG bunkering infrastructure can also be used to enable the transition to a decarbonised shipping industry.

Almost all ports that offer LNG can provide it through trucks (94%). A larger share of ports can also provide LNG bunkering either by barge (45%), fixed installation (26%), or both.

In terms of the prevalence of LNG bunkering in European ports, 22% of surveyed ports have LNG bunkering infrastructure projects ongoing, and 26% of the respondents are planning to install LNG bunkering in the port in the next two years.

Environmentally differentiated fees are provided to “green” ships that go beyond regulatory standards. ESPO encourages European ports to introduce such environmental rebates on port infrastructure charges as part of their own port roadmaps. While such rebates will not be able in themselves to influence the shipping line to invest in greening, such voluntary schemes can be an important support to reward front runners 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 arm’s length to give such rebates might be different for each port.

As shown in **FIGURE 10** below, 53% of responding ports offer differentiated dues. Differentiated fees are often offered to vessels that can prove that they reduce air emissions (65%), followed by vessels that hold some kind of environmental certification (54%). Half of the ports that provide green discounts aim to encourage better waste management, and 46% of respondents incentivise vessels with reduced GHG emissions.

Looking ahead, close to a third (30%) of responding ports are planning to introduce environmentally differentiated port dues in the next two years.

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

* The percentages of these indicators are calculated on the basis of the 31 ports offering LNG bunkering, not out of the total of participating ports.

**The question on development of LNG in the next two years was added in the current format for the first time in 2021.

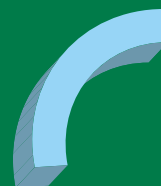
31%
IN 2021



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

32% 33% 31%
2019 2020 2021

26%
IN 2021



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

— — 26%
2019 2020 2021

**AMONG PORTS WITH
LNG BUNKERING
FACILITIES**

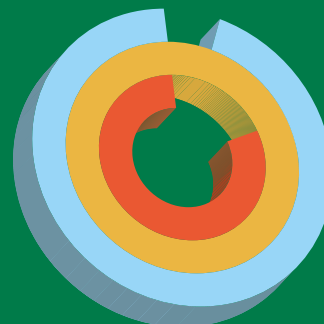
26%
IN 2021



**BY NON-MOBILE
INSTALLATION***

13% 22% 26%
2019 2020 2021

94%
IN 2021



BY TRUCK*

90% 100% 94%
2019 2020 2021

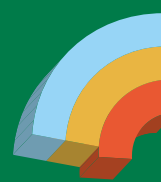
45%
IN 2021



BY BARGE*

20% 34% 45%
2019 2020 2021

22%
IN 2021

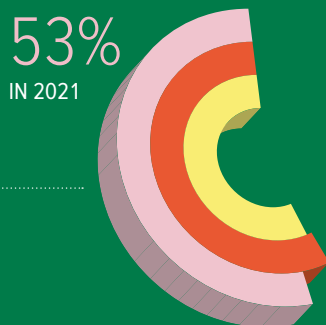


**ARE THERE CURRENTLY
ONGOING LNG BUNKERING
INFRASTRUCTURE
PROJECTS IN THE PORT?**

24% 22% 22%
2019 2020 2021

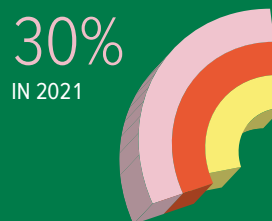
FIGURE 10
Share of ports providing differentiated dues to greener vessels

*The percentage of the different initiatives are calculated on the basis of the 52 ports offering differentiated dues for "Greener Vessels", not out of the total of participating ports.



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

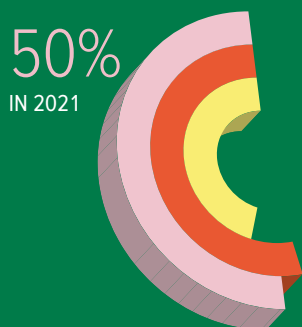
56% 57% 53%
2019 2020 2021



DOES THE PORT PLAN TO INTRODUCE ENVIRONMENTALLY DIFFERENTIATED PORT DUES DURING THE NEXT 2 YEARS?

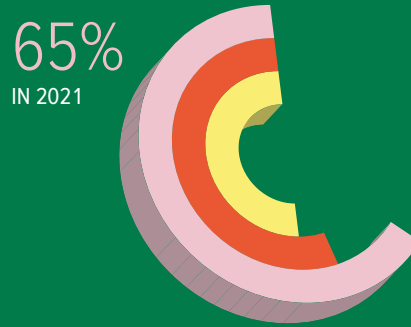
28% 30% 30%
2019 2020 2021

AMONG PORTS PROVIDING DIFFERENTIATED DUES



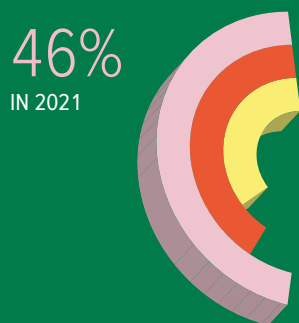
WASTE MANAGEMENT/ SEGREGATION*

45% 53% 50%
2019 2020 2021



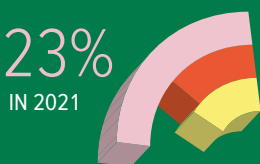
AIR EMISSIONS (NOX, SOX, PM) REDUCTION*

50% 55% 65%
2019 2020 2021



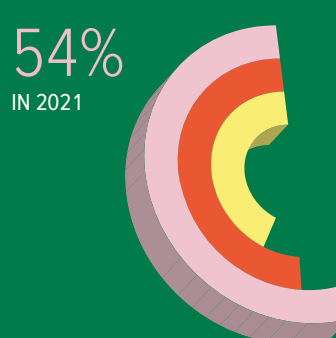
GHG EMISSIONS REDUCTION*

34% 40% 46%
2019 2020 2021



NOISE REDUCTION*

15% 13% 23%
2019 2020 2021



ENVIRONMENTAL CERTIFICATION*

42% 49% 54%
2019 2020 2021

Conclusions

The ESPO Environmental Report 2021 identifies the latest trends for environmental management amongst European seaports. The report is published annually, and relies on data from 99 members of the EcoPorts Network, which completed the EcoPorts Self-Diagnosis Method (SDM). 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). Small ports account for a third of the sample, with medium-sized and large ports each accounting for around a fifth of the sample. The majority of sampled ports (74%) are part of the TEN-T Network.

The SDM tool is the passport needed for a port to join the EcoPorts Network. Based on the SDM, EcoPorts members engaged in continuous improvement and voluntary self-regulation can become certified with the port-specific international environmental management standard EcoPorts PERS. Together with the recently published ESPO Green Guide 2021, this provides ports with the tools to improve their environmental management.

Based on the answers provided by surveyed ports in the SDM, a set of environmental indicators were selected to assess the environmental management performance of European ports. The selected indicators in 2021 remain the same as for 2020, allowing for analysis of key indicators over time.

The findings for 2021 confirm that European ports are actively and increasingly committed to environmental protection and sustainable development. Close to 40% of responding ports have become certified with the Port Environmental Review System (PERS). This is a significant increase compared to 2020, when 33% of ports had a PERS certificate.

Compared to the start of reporting in 2013, there has been a significant increase in the certification of environmental management systems by ports (+21%) and the documentation of environmental responsibilities of key personnel (+11%). In contrast, in the same period there has been a reduction in the existence of an environmental training programme for port employees (-10%) and in the existence of an inventory of relevant environmental legislation (-2%). It is therefore advisable to monitor the progress of these indicators in the next years, where a continued downward trend could require specific actions to reverse such a trend.

Due to the general increase in the results of environmental management indicators, the Environmental Management Index (EMI) has also experienced a rise of 0,61 points over the past 8 years. In 2021, the score is 7,86, compared to 7,80 in 2020, demonstrating that EU ports continue to improve their environmental performance. The existence of an environmental monitoring programme has also increased by 7% over the same 2013-2021 period.

In general, port waste and energy efficiency tend to be the issues most monitored by ports, whilst the monitoring of air quality is the indicator that has seen the largest increase in monitoring since the start of reporting in 2013.

Indicators related to climate change were introduced in 2018. Since then, there is a clear trend of ports prioritising these issues. For example, the growing share of ports facing operational challenges related to climate change is matched by a growing share of ports taking steps to strengthen the resilience of existing infrastructure to adapt to climate change.

With regard to the Top 10 environmental priorities of the sector, there are no new priorities introduced in the ranking for 2021. The five main environmental priorities of the European port sector have remained the same in 2021 as they were in 2020. These are air quality, climate change, energy efficiency, noise, and relationship with local community. The monitoring of air quality has increased rapidly in the recent years, and the monitoring of indicators relating to climate change is also increasing. All in all, it is clear that green topics are recognised as key considerations for European ports.

The monitoring and reporting in the ESPO Environmental Report 2021 of green services provided in ports was initiated in 2016. Compared to the start of reporting, there has been an overall rise in the provision of OPS (+4%) and LNG (+9%).

The findings show however a small decrease in the provision of differentiated fees for “green” vessels (- 9 percentage points), although more than half of the ports make the option available for ships that can demonstrate compliance with specified criteria. The decreasing prevalence of voluntarily differentiated dues can partly be attributed to the increased prevalence of mandatory fee reductions. An example of this is the mandatory indirect waste fee discounts under the Port Reception Facilities Directive that ports have to provide for ships engaged in sustainable waste management onboard. In terms of the voluntary discounts provided by ports, discounts for ships that reduce their air emissions below specified limits are the most common ones followed by rewards for vessels that hold environmental certification.

Based on the responses to the SDM, it is encouraging to see European ports moving in the right direction with a persistent trend of continuous improvement of environmental management. In practice this means that ports are maintaining or enhancing their declared policies of compliance, risk reduction, environmental protection and sustainable development.

The 2021 Report also demonstrates that the EcoPorts Network assists port authorities in their environmental management, and in their greening efforts. This is further demonstrated by the over 70 green good practices available on the continuously updated database developed by ESPO⁵. Together with the ESPO Green Guide 2021 and other available environmental management tools, the EcoPorts Network continues to encourage and facilitate the implementation of such green good practices throughout the sector. The members of the growing EcoPorts Network demonstrate competence and commitment through bottom-up initiatives in individual ports. By sharing experiences and anonymised data through the Network, EcoPorts members also enable the exchange and dissemination of knowledge, and encourage a collaborative approach to environmental management.

5. www.espo.be/practices

E Annex: Sample of ports

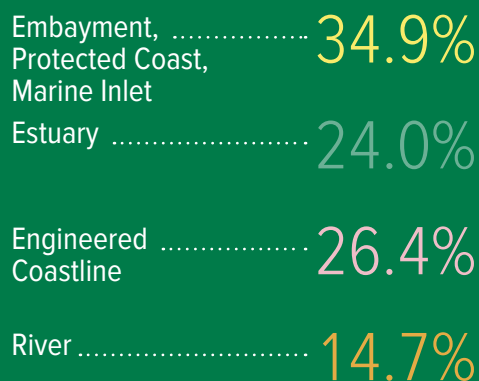
The sample for the 2021 Environmental Report includes **99 ports from 21 countries**, and contains ESPO members as well as ESPO observers from the European Union and other European countries. There are two more ports in the sample compared to 2020.

TABLE 4 provides the list of countries represented, the number of participating ports of each country and their percentage out of the total sample. As can be seen in the table, ports in the United Kingdom still dominates the sample together with Spanish ports. There are three additional countries represented in the 2021 sample compared to the sample from last year.

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

Country	Number of ports	Percentage (%)
United Kingdom	16	16.2
Spain	14	14.1
France	9	9.1
Netherlands	9	9.1
Germany	8	8.1
Denmark	8	8.1
Greece	5	5.1
Finland	5	5.1
Sweden	4	4.0
Italy	4	4.0
Norway	3	3.0
Ireland	2	2.0
Portugal	2	2.0
Bulgaria	2	2.0
Poland	2	2.0
Latvia	1	1.0
Estonia	1	1.0
Romania	1	1.0
Lithuania	1	1.0
Albania	1	1.0
Malta	1	1.0

FIGURE 11
Geographical
characteristics of
the sample



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 category is the most common geographic characteristic of the contributing ports (34.9%). This share is similar to that of 2020. In a change from last year, engineered coastline ports constitute a larger share in the 2021 sample (26.4%) compared to ports located in estuaries (24%). Finally, ports located along rivers constitute 14.7% of the sample.

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

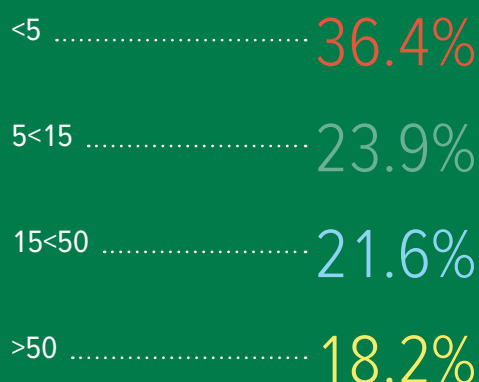
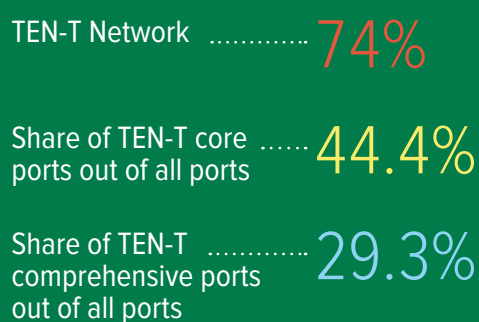


FIGURE 12 shows the tonnage characteristics of the sample. Small ports (<5 million tonnes/year) dominate the sample with a share of 36.4%, which has been the case for several years. Medium-sized ports handling between 5<15 million tonnes/year constitute close to a fourth of the sample (23.9%), and large ports (15<50 million tonnes/year) represent around a fifth of the total sample (21.6%). The ultra-large ports which handle more than 50 million tonnes per year constitute 18.2% of the surveyed ports.

FIGURE 13
Percentage of ports in
TEN-T Network



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**, the share of ports in the TEN-T Network in the overall sample (74%) is lower compared to 2020, when 83.5% of sampled ports were part of TEN-T. The decrease is largely due to the UK leaving the EU, meaning that 14 British ports are no longer part of the TEN-T Network. Following from this, 26% of surveyed ports are non-TEN-T ports in 2021.

Out of the TEN-T ports in the sample, 44% of surveyed ports are part of the Core Network, and 29% of them are part of the Comprehensive Network. Again, these shares are lower compared to 2020, where there was a higher share of TEN-T ports in the sample.

TABLE 5

List of ports certified with EcoPorts PERS in the sample

Port	Country
Peterhead Port Authority	United Kingdom
Shoreham Port Authority	United Kingdom
Port of Barcelona	Spain
Autoridad Portuaria de Valencia	Spain
Autoridad Portuaria de Castellón	Spain
Autoridad Portuaria de Vigo	Spain
Autoridad Portuaria de Huelva	Spain
Autoridad Portuaria de Melilla	Spain
Autoridad Portuaria de Ceuta	Spain
Autoridad Portuaria de la Bahía de Algeciras	Spain
Autoridad Portuaria de Cartagena	Spain
Grand Port Maritime de Dunkerque	France
Guadeloupe Port Authority	France
NV Port of Harlingen	Netherlands
Groningen Seaports	Netherlands
Port of Rotterdam Authority	Netherlands
Port of Moerdijk	Netherlands
Port of Den Helder	Netherlands
Exploitiemaatschappij Havencomplex Lauwersoog BV. (EHL)	Netherlands
Port of Den Oever-Hollands Kroon	Netherlands
North Sea Port SE	Netherlands
Ports of Bremen/Bremerhaven	Germany
DeltaPort GmbH & Co. KG	Germany
JadeWeserPort Realisierungs GmbH & Co. KG	Germany
Igoumenitsa Port Authority S.A.	Greece
Volos Port Authority S.A.	Greece
Port of Pori Ltd	Finland
Port of Oslo	Norway
Shannon Foynes Port Company	Ireland

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