



ECO SLC

Sustainability

Report

2023

Ports moving towards sustainability

ECO SLC

Sustainable Logistics Chain

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PREFACE

ECOSLC Foundation started introducing EcoPorts in ports and terminals outside Europe in 2010. EcoPorts was specifically developed to assist ports and terminals with the special tasks related to environmental management and was seen as a strong option for introducing continuous improvements. The development of the global EcoPorts network for sharing knowledge and experience was seen as a real initiative for greening the port sector. Major international and national organizations and a widening group of stakeholders continue to support and recognize the network which has now extended to all continents. In September 2023 the network outside Europe has 42 ports and terminals in 20 countries of which 32 are certified to the international quality standard of EcoPorts PERS.

Since its inception a period of change and dynamic transition has followed. The number of interested port's stakeholders has expanded dramatically. The context in which environmental management is now applied has taken on a much broader remit. They are increasingly active in influencing the daily management of the transport and logistics process, including port operations.

Ports started therefore widening their scope of their strategic policies from port area orientation to port, transport and logistics process orientation. However, challenges for individual ports and terminals are increasingly too complex for an individual company to influence greening the entire process.

This view prompted options for cooperation between the many players so that the full operational process could be made more sustainable. This approach is now itself integrated into the port's business strategy which drives continuity of the valuable role of ports in world trade and global economy.

Many ports involve their stakeholders in the environmental management programme and seek continuous engagement from their stakeholders, with very positive results.

Recent trends seen in ports and terminals outside Europe indicate a shift towards sustainable operations through not only reduction of environmental impacts but also by the application of positive strategies and good practices related to economic and social initiatives.

This trend is one of several performance indicators demonstrated by the results of the analysis of implementation of the confidential environmental Self Diagnosis Method (SDM). SDM is the first step for ports to introduce the EcoPorts environmental and sustainable management system leading to a PERS Certification after a positive audit by LRQA, Netherlands.

The concepts of continuous improvement and sustainable development, for example, are now becoming practicable options of good practice with appropriate procedures and routines increasingly being applied in proactive environmental management programmes. More and more environmental reports are being set in the context of sustainability.

Furthermore, Ports are well-placed to both influence and facilitate green services to shipping by promoting appropriate policies and providing suitable infrastructure for decarbonization. For example, one of the three services monitored via EcoPorts SDM is Provision of Onshore Power Supply (OPS). Results of the 2023 survey show for example that more than half of the surveyed ports already provide OPS at one or more berths (55%).

As the remit of environmental management expands (in terms of liabilities and responsibilities, and the number of stakeholders involved) so the reporting perspective itself widens with considerations of environment, society and corporate governance becoming increasingly integrated into the approach.

Acknowledging the growth of the network, the ECOSLC Foundation remains dedicated to supporting ports and terminals outside Europe with the EcoPorts tools, methodology, certification process, and guidelines that will support their efforts and endeavours to achieve continuous improvement and sustainable development of their activities and operations.

Herman Journée, Chairman ECO Sustainable Logistics Chain Foundation, (ECOSLC).

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EXECUTIVE SUMMARY

Greening the process and network: a dynamic transition process

This is the first report of ECOSLC Foundation on the introduction of the EcoPorts environmental and sustainable management standard in ports and terminals outside Europe. It complements the Annual Environmental Report produced by the European Sea Ports Organization (ESPO) for its own members and adds new perspectives on the achievements and challenges faced by the wider port sector.

The development of the environmental management system and standard dedicated to the port sector, “EcoPorts”, was initiated in 1996 by a number of proactive European seaports. From 2010/2011 ESPO, the European Sea Ports Organisation organised its further introduction in Europe. At the same time the neutral non-profit ECOSLC Foundation was created, supported by these ports and by ESPO, to commence the introduction of EcoPorts in ports and terminals outside Europe.

EcoPorts consists of the following elements:

- i) A Network of membership to facilitate the exchange of knowledge and experience, and a host organization for administration and management of the database.
- ii) The Self-Diagnosis Methodology (SDM) which is a checklist of the components that may reasonably be expected in a credible Environmental Management System (EMS) and also serves as the first step towards the international standard (see following).
- iii) The international quality standard of EcoPorts PERS (Port Environmental Review for Sustainability) – the only standard dedicated to the port sector.

Analysis of the data within the SDM form the basis of this report (individual port responses are kept strictly confidential so that the environmental management performance marks and trends form a representative sample of the sector). Ports that start the introduction of EcoPorts are recognized as member of a global network of EcoPorts.

EcoPorts, is recognized by ESPO, AAPA, IAPH, WPSP, World Bank, the United Nations Environment Programme (UNEP), the African Ports Association, the Arab Sea Ports Federation, the Taiwan Ports International Corporation (TIPC) and the Inter American Committee for Ports (Organization of the American States). Independent auditing and validation for certification is conducted by Lloyd’s Register Quality Assurance (LRQA), Netherlands.

In the context of this report, Environmental Management is defined as the functional organization necessary to deliver environmental protection and sustainable development to the highest possible standards of compliance and accountability. Since its inception and following a period of change the number of interested stakeholders has expanded dramatically, and the context in which environmental management is now applied has taken on a much broader remit. Stakeholders of ports are increasingly active in influencing the daily management or the transport and logistics process, including port operations. Many ports involve their stakeholders in the environmental management programme and seek continuous engagement from their stakeholders, with very positive results. EcoPorts recognizes that each port or terminal is unique, but the Phase 1 SDM and the Phase 2 PERS formats provide the framework for the development and implementation of an EMS that reflects the special, local circumstances set within the expectations and requirements placed on the whole sector.

Results of the analysis of (SDM) demonstrate the current trends seen in ports and terminals outside Europe indicating a shift towards sustainable operations.

In parallel with the changing demands and expectations made of port authorities and terminal operators, the recent periodic review of SDM has added considerations of the U.N. Sustainable Development Goals (SDGs), Climate change and Sustainability to the checklist of good practice, procedures and processes.

Members of the EcoPorts Network outside Europe demonstrate implementation and operation of high standards of EMS and clear awareness of the priority environmental issues requiring control, monitoring, and reporting. Action plans are in place to encourage and facilitate green shipping, and stakeholder

involvement is increasingly recognized as a fundamental factor of the environmental management programme. A growing number of proactive ports are taking an integrated approach by addressing environment, society and corporate governance in their endeavour to achieve sustainable development.

The EcoPorts Network of member ports is growing as more ports and terminals adopt the Self Diagnosis Methodology (SDM) and work towards the EMS international quality standard of EcoPorts PERS.

By September 2023 the network section of ports and terminals outside Europe consists of 42 ports and terminals in 20 countries of which 32 are EcoPorts PERS Certified at that time.

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1. Introduction

This is the first report by ECOSLC on the environmental management performance of ports and terminals which are members of the EcoPorts Network from outside Europe.

It complements the Annual Environmental Report produced by the European Sea Ports Organization (ESPO) for its own members and adds new perspectives on the achievements and challenges faced by the wider port sector.

The contents of the report include explanation of the context and background within which real-world environmental management programmes are being operated, explanation of the drivers and influencing events that are shaping response options, and perspectives on the latest and near-future developments currently drawing attention.

The results of the environmental performance are based on data and information obtained from the responses of 33 ports representing 20 countries outside Europe in the EcoPorts Network to the Self-Diagnosis Method (SDM). The analysis, carried out and reported in strict confidence, indicates baseline and benchmark performance along with significant trends in terms of environmental management.

Recognition of EcoPorts PERS

The SDM retains its crucial role as a stepping-stone towards the only international quality standard of EMS dedicated to the port sector, namely EcoPorts PERS (**Port Environmental Review for Sustainability**). As the only international, port sector-specific environmental management quality standard available, EcoPorts PERS is becoming increasingly recognised and adopted throughout the sector as reported in the Introduction. Representatives from major insurance companies state that a port's environmental performance and especially its risk prevention policy is factored-in to calculations of premiums; and those standards such as PERS are recognised components of a responsible approach. Such certification may also be a condition for funding to assist port- and terminal development.

For ports outside Europe, administration, review/audit procedures and training options are provided by ECOSLC through a Memorandum of Understanding between ECOSLC and the respective port organisations (see www.ECOSLC.eu). For ports inside Europe, the EcoPorts Network is organized and administered by ESPO via www.ecoport.com

The international standard for port environmental management, EcoPorts, is recognized by ESPO, AAPA, IAPH, WPSP, World Bank, the United Nations Environment Programme (UNEP), the African Ports Association, the Arab Sea Ports Federation, the Taiwan Ports International Corporation (TIPC) and the Inter American Committee for Ports (Organization of the American States).

Independent auditing and validation for certification is conducted by Lloyd's Register, LRQA, Netherlands.

EcoPorts recognizes that each port or terminal is unique, but the Phase 1 SDM and the Phase 2 PERS format provide the framework for the development and implementation of an EMS that reflects the special, local circumstances set within the expectations and requirements placed on the whole sector.

Environmental Self Diagnosis Method, SDM

The SDM was developed as part of an E.C. project some twenty-five years ago by port professionals in collaboration with academics and industry specialists and designed as a checklist of components that may reasonably be expected in a good practice example of an effective Environmental Management system (EMS). Its approach incorporates the 'Precautionary Principle', and seeks to assist the Port Authority, Corporation or Terminal Operator to demonstrate that it has 'taken all reasonable steps' in order to comply with its environmental liabilities and responsibilities. The method has undergone periodic updating and modification in line with changes in legislation, perceived priorities, and the ever more demanding expectations of the widening group of interested stakeholders.

The SDM was also specifically designed to provide guidelines and recommendations for Port Authorities and Terminal Operators that wish to achieve the International Quality Standard of EMS, EcoPorts PERS (**P**ort **E**nvironmental **R**eview for **S**ustainability) through a step-by-step approach. PERS remains the only quality standard of EMS dedicated to the port sector.

Use of SDM results analysis

Supportive data from analysis of SDM responses is presented in terms of:

- A. Environmental management indicators
- B. Environmental monitoring indicators.
- C. Top-10 environmental priorities.
- D. Green services to shipping.
- E. Continuous improvement and sustainability.
- F. Annex: Sample of ports.

It is acknowledged that the sample of ports varies year-on-year, as new ports join the EcoPorts Network and therefore the results are analysed and interpreted with this in mind. However, it is generally recognized that in this context, trends are more significant and representative than absolute values. 2023 is effectively the baseline year for the EcoPorts ECOSLC network.

SDM update 2023

The EcoPorts ECOSLC SDM has been updated in order to retain its purpose of serving the busy port professional manager as a comprehensive checklist of headline components and considerations that may reasonably be expected in a credible EMS, and the application of which continues to function as a practical steppingstone towards certification to the international quality standard of EcoPorts PERS, itself. New sections include those relating to UN Sustainable Development Goals, Impacts of Climate change and Environmental sustainability (See section D).

2. ECOSLC Foundation

EcoPorts Initiative

A number of proactive European ports initiated in 1996/97 the development of a specific port and terminals related environmental management system and global standard, EcoPorts. In 2010/11 ESPO included the organization and administration of EcoPorts in Europe in its organization. At the same time the ECO Sustainable Logistics Chain (ECOSLC) Foundation was established in The Netherlands, with the support of this group of ports and ESPO to expand the EcoPorts network to include ports and terminals in countries outside Europe.

ECOSLC Foundation

ECOSLC Foundation is an independent non-profit foundation based in the Netherlands. It was established in 2010 and started the introduction of the EcoPorts environmental and sustainable management system and global standard in ports and port terminals in countries outside Europe from 2010/11, supported by the European Seaports Organisation, ESPO.

Its website, www.ECOSLC.eu, is the gateway for ports and terminals outside Europe to start implementing EcoPorts SDM, EcoPorts PERS and Certification





ECO SUSTAINABLE LOGISTICS CHAIN FOUNDATION

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October 2023

Google maps 2023Maps

EcoPorts PERS

The result of the EcoPorts initiative was an environmental management system designed for ports, by port professionals in collaboration with academic and industry specialists. Since 1997 updating is developed in line with significant changes in legislation, stakeholder expectations, climate change and business models.

Certification to the International Quality Standard of EcoPorts PERS is organized on a step-by-step basis making it user friendly with guidelines and assistance available.

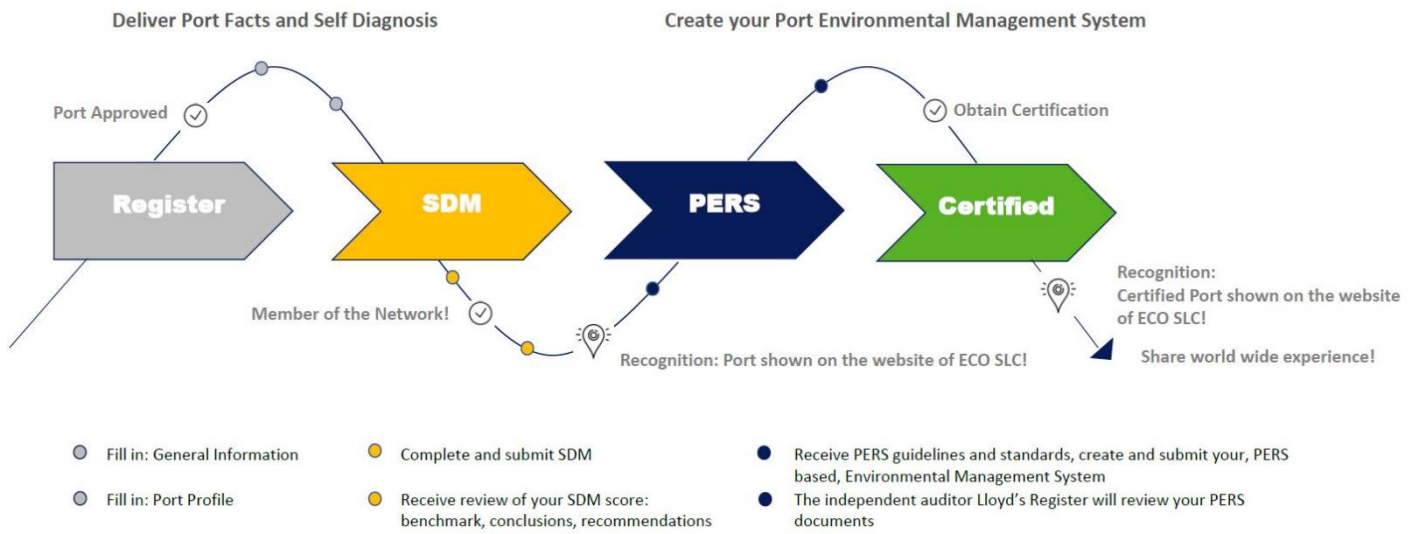
The Phase 1 application of the SDM (Self Diagnosis Method) provides the port with:

- i) a measure of any GAP between the provisions of its existing environmental management programme and the requirements of the international standard.
- ii) a confidential list of the Strengths, Weaknesses, Opportunities, and Threats of its current management processes and procedures.

The Phase 2 compilation of PERS documentation prior to certification is supported by guidelines to assist with:

- Port profile
- Environmental policy statement
- Inventory of environmental aspects, legal requirements, and performance indicators
- Documented responsibilities
- Conformity review on requirements
- Environmental report
- Selected examples of best practice

ECOSLC/ECOPOINTS CERTIFICATION: STEPS IN THE PROCESS



3. Port Environmental management – in a process of dynamic transition

Environmental Management may be defined as the functional organization necessary to deliver environmental protection and sustainable development to the highest possible standards of compliance and accountability. The whole concept has evolved markedly from the just the conservation imperative and local environmental protection, through greater control of impacts at quayside and then port area, and on to a far wider, integrated approach that attempts to consider the sum total of impacts including those arising from the operation of the logistics chain. Throughout this period of change, the number of interested stakeholders has expanded dramatically, and the context in which environmental management is now applied has taken on a much broader remit.

Historically, it was the impact of weather on shipping and navigation that concentrated minds in terms of day-to-day operations and the supply of goods for industry and society. Now, it is the influence of industry and society on the World's climate that is the focus of global attention. The drive for net-zero, and the concept of sustainability are now well-established policies with objectives, targets and timelines being key components of political, economic, and social agendas. It may be argued that a sense of proportion will increasingly be required given the range of causes and effects that interact to produce such a plethora of impacts on the quality of the environment and society's living conditions. Arguably, the phrase "Think global, act local" (attributed to Patrick Geddes, a Scottish town planner in 1915) has never been more pertinent. It is within this overall context that ports and terminals have to continue to play their key roles in sustaining world trade and industry.

Both through effective responses and proactive initiatives, the environmental management programmes of member ports and terminals are increasingly applying an integrated approach to their liabilities and responsibilities by incorporating considerations of environment, society, and governance into their overall policy on sustainability and associated reporting procedures. The latest version of ECOSLC SDM includes related components (See Section 5 for further details).



First EcoPorts PERS Certified Port Taiwan: TIPC Kaohsiung, 2014

4. Context for port operations

Over 80% of the volume of international trade in goods is carried by sea, and the percentage is even higher for most developing countries. Ports continue to form an important part of many transport and logistics chains worldwide. The prime value add of ports in these chains is to:

- Facilitate cargo and passenger handling operations by specialized terminals in the port, with sufficient handling capacity and transfer connections for pre- and on-carriage of goods and passengers.
- Enable port-related industries to develop and expand production facilities in the port area and hence to create added value to product flows.
- Provide all services and facilities required for smooth, safe, and efficient operations in the port area.

In addition, the ‘port community’ comprising of terminals, logistics providers, industries, port service providers and many more operators and companies related to the maritime sector, is generally speaking an important economic motor for the regional or national economy, creating many jobs and employment for the social community living in and around the port area.

Ports are crucial ‘hubs’ in a regional or worldwide network of transport connections, both maritime and on land. This results in a strong network of co-operating ports and hence an effective network of people. Obviously, various ports particularly within a region are operating in competition with each other. However, through this network, frontrunner ports can still lead the way for other ports in developing policies aiming at exploiting their own strengths or reducing their own weaknesses, as well as making maximum use of external (business) opportunities and countering (potential) external threats to their basic operations. They can set trends for future port development, influence changes legislation and regulations, take investment risks by introducing new approaches, and often share their experience and knowledge in order to stimulate other ports or port users towards increased efficiency.

As noted above, port operations involve many stakeholders, directly and indirectly. Direct stakeholders are companies and organisations which are actively involved in the transport and logistics process, such as shipping companies, terminals, industries, (logistics) service providers, *etc.* Indirect stakeholders are companies and organisations which play an important role in enabling and facilitating the entire process, *e.g.* (local) governments and regulators, banks and investors, law firms, *etc.* Indirect stakeholders also comprise parties which are (potentially) affected by the impacts of the process, such as local communities, environmental protection organisations, and labour unions.

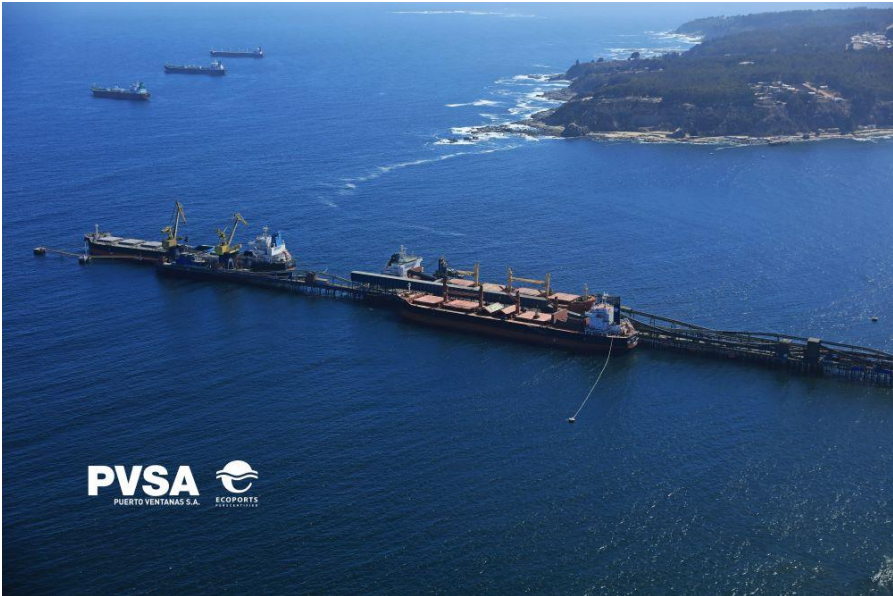
Stakeholders of ports are increasingly active in influencing the daily management or the transport and logistics process, including port operations. Most of them have a large influence and much knowledge of problems and solutions. Many ports involve their stakeholders in the environmental management programme and seek continuous engagement from their stakeholders, with very positive results.

Figure 1.

Is the Port’s Policy communicated to all relevant stakeholders such as terminals, service providers, industry, NGOs, research institutes and local communities?	88.6% YES
Does the Environmental Policy refer to the following issues: Needs and expectations of the relevant port stakeholders?	91.4% YES
is funding from the budget allocated to: Stakeholder engagement and outreach activities?	88.6% YES

Stakeholders may also include societal pressure groups of persons or organizations with specific interests that exercise demands on ports to reduce the environmental impact of their activities and operations. This can have a negative influence on the port’s reputation and public opinion may be a major consideration in port development and planning.

It is therefore crucial that port managers (port authorities or commercial port operators) develop new policies or amend existing ones in respect of reducing the environmental impacts of the entire port process to meet the increasingly firm requirements of many stakeholders on this topic.



First EcoPorts PERS Certified Port Chile: Puerto Ventanas S.A., 2016



Image supplied by Port of Newcastle

First EcoPorts PERS Certified Port Australia: Port of Newcastle, 2019

5. Environmental management of the impact of port operations

This section presents the results of the analysis of the responses of ports outside Europe to the selected SDM questions as measures of overall environmental management performance.

Use of SDM results analysis

Supportive data from analysis of SDM responses is presented in terms of:

- A. Environmental management indicators
- B. Environmental monitoring indicators.
- C. Top-10 environmental priorities.
- D. Green services to shipping.
- E. Continuous improvement and sustainability.

It is acknowledged that the sample of ports varies year-on-year, as new ports join the EcoPorts Network and therefore the results are analysed and interpreted with this in mind. However, it is generally recognized that in this context, trends are more significant and representative than absolute values. 2023 is effectively the baseline year for the EcoPorts ECOSLC network.



First EcoPorts PERS Certified Colombia:

Terminal de Contenedores de Cartagena S.A., 2019

Sociedad Portuaria Regional de Cartagena S.A., 2019

A. Environmental management indicators.

Applied environmental management of ports or terminals involves taking all necessary steps to deal with, or control, impacts that may arise from activities and operations in the port area. Table 1 presents the 10 selected environmental management indicators that provide information about the management efforts that influence the environmental performance of the port. Reference is made to responses using 2023 as the baseline year.

Table 1. Percentage of positive responses to the environmental management indicators

Indicators		2018 (%)	2020 (%)	2023 (%)
A	Existence of a certified Environmental Management System (EMS) – ISO, EMAS or PERS	92	100	94
B	Existence of an Environmental Policy	100	100	100
C	Environmental Policy makes reference to international and/or national port environmental policy guidelines	75	84	76
D	Existence of an inventory of relevant environmental legislation	100	100	100
E	Existence of an inventory of Significant Environmental Aspects (SEA)	100	100	97
F	Definition of objectives for environmental improvement	92	95	91
G	Existence of an environmental training program for port employees	100	100	100
H	Existence of an environmental monitoring program	100	100	100
I	Environmental responsibilities of key personnel are documented	100	100	100
J	Publication of a publicly available environmental report	100	95	79

- The existence of an **Environmental Policy** (100%) is arguably, the most significant Strength because the policy statement drives the whole environmental management programme and the associated Environmental Management System (EMS). It is the lead statement in terms of identifying priorities, highlighting issues, and developing objectives and action plans.
- In the review process, advice is given that the Environmental Policy makes **reference to international and/or national port environmental policy guidelines** (76%) – this is becoming increasingly important as global, cross-boundary issues become more significant and where a sectoral approach is more efficient.
- Similar, to policy, the existence of an **Inventory of legislation and regulation** (100%) that govern the protection and preservation of the environment is essential for compliance which in itself is non-negotiable.
- The existence of an **Inventory of Significant Environmental Aspects** (97%), those activities, products and services that may impact on the environment directly, or indirectly is critically important for effective management processes and procedures. The impacts themselves may be beneficial or adverse.
- Port Associations and Organizations, worldwide, recommend that ports and terminals produce a periodic, **Environmental Report** (79%) and, or incorporate information on progress in environmental management in its Annual (Business) report, or equivalent document. Member ports are actively encouraged and recommended to make such a report readily accessible on their website.

The Environmental Management Index (EMI) is a formula that was established in the ESPO Environmental Report that measures the whole environmental performance of the port by aggregating the ten environmental indicators presented in Figure 1. The indicators are weighted in accordance with their perceived significance for environmental management. The EMI is calculated by multiplying the weighting of each indicator (see Figure 1 and formula below) with the percentage of positive responses. The final score is calculated using the following formula: Environmental Management Index = $A*1,5 + B*1,25 + C*0,75 + D*1 + E*1 + F*1 + G*0,75 + H*1 + I*1 + J*0,75$.

Figure 2.

	2018	2020	2023
Environmental Management Index	9.61	9.79	9.45

The EMI values reflect the generally pro-active status and profile of the ports and terminals that have volunteered to join the network to enhance further their positive environmental management programmes.

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

Figure 3.

EMS Certificate	2023 (%)
ISO	29.0
EcoPorts PERS	35.5
ISO & EcoPorts PERS	35.5

EcoPorts PERS: increasingly recognized

As the only international, port sector-specific environmental management quality standard available, EcoPorts PERS is becoming increasingly recognised and adopted throughout the sector as reported in the Introduction. Representatives from major insurance companies state that a port’s environmental performance and especially its risk prevention policy is factored-in to calculations of premiums; and those standards such as PERS are recognised components of a responsible approach. Such certification may also be a condition for funding to assist port- and terminal development. For ports outside Europe, administration, review/audit procedures and training options are provided by ECOSLC through a Memorandum of Understanding between ECOSLC and the respective port organisations (see www.ECOSLC.eu). For ports inside Europe, the EcoPorts Network is organized and administered by ESPO via www.ecoport.com (See Section 2 ECOSLC Foundation).

From policy to practice – the business case

Effective environmental management is now becoming a fundamental component of the port's business plan. Newly developed or amended environmental policies increasingly aim at stopping pollution and depletion of raw materials as it may occur within the current port activities and operations.

Sharing Good Practice Experience

Ports can draw on existing solutions and the development of new, innovative options using the latest technologies and approaches. Collaborative and networked approaches involving the exchange of knowledge and experience may well yield benefits to mutual advantage. Successful plans also require that port managers as well as operators themselves invest in environmental improvements of their processes. Failing to do so can lead to heavy fines imposed by local or national authorities and can eventually even lead to closing the operations concerned.

The EcoPorts network is created to facilitate sharing good practices. All ports that start the EcoPorts certification process are asked to share some of their good practices.

ESPO regularly publishes a document on good practices and stimulates sharing them via awards. The World Port Sustainability Program (WPSP) also shares good practices via its awards program.

Creating Awareness

However, it may be suggested that the whole programme of compliance, control, and efficiency starts with creating awareness of the absolute need for reducing the negative impacts of the entire port process on the environment, both locally and worldwide. Over the past thirty years, or more, many international research and development initiatives have led to an increase in awareness of impacts and positive response options so that the sector may draw on practicable solutions to deal with its environmental liabilities and responsibilities.

Some challenges for introduction of good practices

Nevertheless, the actual implementation of appropriate good practices or remedial actions means that a range of challenges and problems may need to be overcome. Considerations include, amongst others:

- Availability of financing facilities including new sources from such foundations as pension funds.
- Internal decision-making systems to invest in improvements (often, longer term revenues are not considered, and innovations are not accepted).
- Tender procedures (cheapest and short term offers carry the most weight) and the social effects of innovations increasingly require assessment and integration into the whole process.
- Existing regulations and laws.

An integrated approach to Environmental management

The situation is therefore that environmental policies should not be developed in isolation but should form an integral part of the longer-term strategic plans for the development of the port and all its participants in the port process, with focus on (at least) the following three components:

- Business (financial) results
- Reduction of environmental impacts
- Social values of the company, in relation to all relevant communities and stakeholders.

An integrated approach means selecting or developing solutions for environmental impact reduction that at the same time can contribute to procedural improvements resulting in lower processing costs. In several cases, however, redefinition of the financial decision-making process is required because some investments are earned back on a longer term that is included in the requirements of the financial decision making. Financiers, in particular, press ports to invest in environmental risk prevention, such as from climate change,

because these can be risks of continuity to the port and therefore of paying back capital, for example to, pension funds.

It is widely seen that the introduction of measures aimed at reducing the environmental impacts of certain processes in the port can lead to resistance from financiers of the port as well as from the public. New approaches are evolving to include both groups in solutions that are acceptable to both ((88.6% communicate their policy to all relevant stakeholders such as terminals, service providers, industry, NGOs, research institutes and local communities).

Some up-coming solutions

Many ports and companies in the transport and logistics chain try to find solutions for adapting their internal financial decision-making systems by considering costs required for taking environmental impact reduction measures as investment rather than as a component of operational expenditure. They also start accepting longer investment payback periods for certain elements and innovations. In some cases, large companies create a separate organization for financing and introducing innovations in their operational process. This is particularly important for developing an effective environmental policy as well as suitable solutions to be implemented in the port area concerned. There is a growing trend of ports and companies in the transport and logistics chain starting cooperating with competitors in fields of common interest, such as environmental policies. This is not always a straightforward or easy approach but if successful it may lead to important and cost-effective improvements of the management of environmental impacts as well as to the business case (88.6% have funding from the budget allocated to stakeholder engagement and outreach activities).



First EcoPorts PERS Certified Brasil: Puerto do Açú, 2021

Environmental monitoring indicators.

Decision-making on all aspects of port and terminal activities and operations requires accurate data and information. Whether it relates to financial investment (as described, above), planning, commerce, local communities, or the environment itself, evidence-based material of facts and figures are essential if practicable, cost- and time-effective management strategies are to be deployed to achieve well-defined targets.

The adage of “If you cannot measure it, you cannot manage it” is a popular saying though not necessarily accurate in the workplace. Measuring key metrics (a quantifiable measure used to track progress and evaluate success) is essential for focusing attention and achieving results and can be beneficial to a port’s growth, economics, and sustainability.

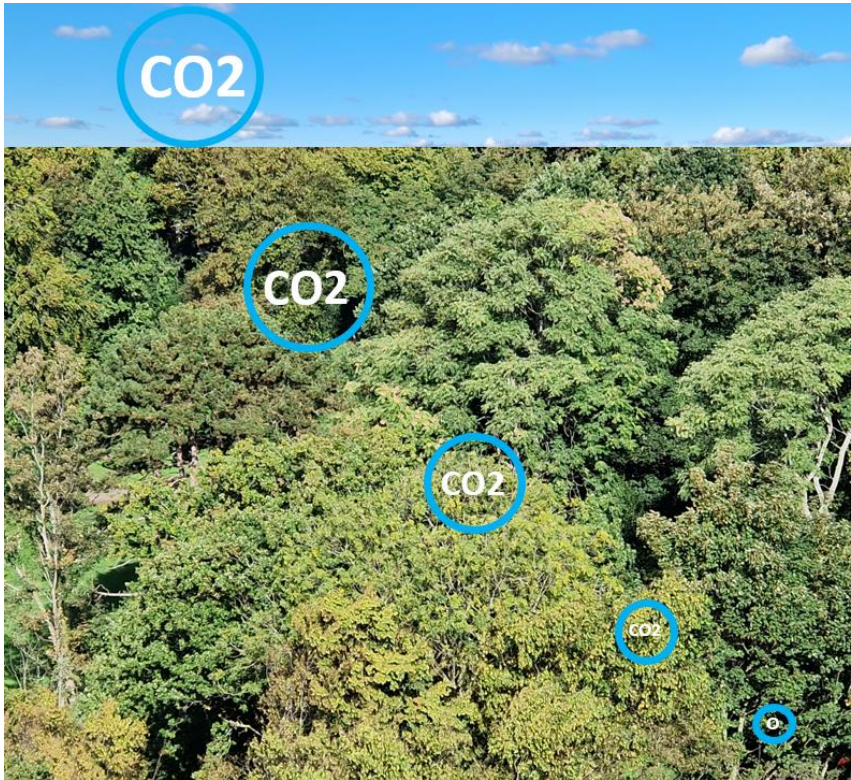
The following table shows the percentage of ports that monitor selected environmental indicators. Monitoring environmental parameters allows ports to evaluate their own environmental performance over time. By collecting and analysing data, ports can assess the effectiveness of their environmental management practices, track progress towards sustainability goals, and identify areas for improvement. Regular monitoring provides a basis for evidence-based decision-making and supports the development of targeted strategies for continuous improvement of the quality of the environment.

Table 2. Percentage of positive responses to environmental monitoring indicators

Indicators	2018 (%)	2020 (%)	2023 (%)
Water quality	100	100	97
Port waste	100	100	100
Energy efficiency	100	89	88
Sediment quality	100	84	79
Water consumption	100	95	94
Air quality	100	100	97
Carbon Footprint	67	68	73
Noise	100	100	88
Marine ecosystems	75	74	76
Soil quality	67	68	67
Terrestrial habitats	58	63	58
Ship waste	91	84	85
Waste recycling	91	100	85

With 2023 being considered the baseline year in terms of the number of ports in the network, it is noted that garbage and port waste is a major consideration (100%) that has implications for both environmental quality and economics. It will be interesting to track the trend of waste recycling (currently 85%). Although climate change *per se* is not currently monitored (see Table 2, above), energy efficiency (88%), air quality (97%) and carbon footprint (73%) may be considered relevant components and again, it will be interesting to track future responses. The fundamental constituents of the environment water (97%), Air (97%), sediment (79%) and soil (67%) are in the priority list along with marine ecosystems (76%) and terrestrial habitats (58%).

The impacts of climate change are in fact being considered as ports are becoming more aware of challenges that may be related to climate change that may affect operational efficiency, safety, or infrastructure. In some cases, ports are already taking proactive actions to prepare for, and adapt to, climate-related challenges, such as sea-level rise, increased intensity of storms, or other climate change effects. The results demonstrate that although less than half of the ports (40%) experienced operational challenges, 60% are already adapting existing infrastructure to increase resilience, and 65.7% are incorporating considerations related to climate change adaptation when planning and implementing new infrastructure projects. Climate change is now acknowledged as a high priority consideration, see Table 3, following.



B. Top-10 Priority issues

Table 3. Perceived environmental priorities of the port sector over the years.

	2018	2020	2023
1	Air quality	Air quality	Air quality
2	Dust	Dust	Garbage/port waste
3	Garbage/Port waste	Climate change	Dust
4	Energy consumption	Garbage/Port waste	Climate change
5	Hazardous cargo	Local community	Energy consumption
6	Local community	Energy consumption	Water quality
7	Climate change	Ship exhausts	Local community
8	Water quality	Hazardous cargo	Cargo spillage
9	Port development Land	Cargo spillage	Hazardous cargo
10	Port development Water	Water quality	Noise

Air quality is an established and widely recognized issue that has a wide range of cross-boundary implications for personnel, local communities, industry, and general port activities. There is a reasonable correlation between priority issues and the indicators selected for monitoring. It is apparent that several of the key issues are directly related to the day-to-day aspects of port operations (see issues ranked 2nd, 3rd, 5th, 8th, 9th and 10th in the above table). Throughout the sector it is important to note that perceived priority issues for the sector change with time, and therefore at local, national, and international scales, policies, programmes, and individual EMS should be mindful of such variations and differences.



First EcoPorts PERS Certified Nigeria: NLNG Terminal, 2022

C. Green services to shipping

By their very nature in terms of purpose, activities and operations, ports are well-placed to both influence and facilitate green services to shipping by promoting appropriate policies and providing suitable infrastructure for decarbonization. The three services monitored via EcoPorts SDM are:

- i) Provision of Onshore Power Supply (OPS)
- ii) Establishment of the provision of Liquefied Natural Gas (LNG) bunkering facilities
- iii) Option of environmentally differentiated port fees, which reward ships that go beyond regulatory standards for greening.

The monitoring of green services to shipping was introduced in 2016 as part of the EcoPorts SDM. The provision of Onshore Power Supply (OPS) offers ships the option to connect to the grid and power down their auxiliary engines while at berth. OPS has gained recognition as a highly effective solution for reducing ship exhaust emissions, particulate matter, noise pollution, and vibrations at berth. By connecting to the electricity grid, ships can eliminate these pollutants, resulting in both positive environmental and social impacts.

To maximize the environmental benefits, it is essential that the electricity consumed through OPS is primarily sourced from renewable energy sources. Although often relying on national grids, port authorities aim to prioritise where possible the consideration of solar, onshore, and offshore wind resources to meet the energy demands of OPS. While solar resources are important, it is crucial to give special attention to wind resources, as they offer significant potential for generating clean energy. The sector is well aware of the role that ports can play in new energy supply chains but is mindful that the deployment of facilities should be accompanied by obligations concerning use of the infrastructure, and that green transition should include protecting competitiveness along the pathway to net zero GHG emissions.

Figure 4 Percentage of positive responses to Onshore Power Supply indicators

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

Indicator	2018 (%)	2020 (%)	2023 (%)
Is Onshore Power Supply (OPS) available at one or more berths?	83	63	55
High voltage*	70	50	56
Low voltage*	70	83	78
By fixed installation*	100	100	100
By mobile installation*	20	8	17
Does the port plan to offer OPS during the next two years?	33	32	39

As shown in Figure 4 using 2023 as baseline, just over more than half of the surveyed ports provide OPS at one or more berths (55%). 78% of these ports are offering low voltage OPS, which mainly relates to inland and domestic vessels, and auxiliary vessels such as tugs and other port authority vessels. 56% of them offer high voltage, associated with commercial, seagoing vessels. Regarding the types of installations providing OPS, all ports offering OPS use fixed installations (100%), and 17% of ports are also providing OPS through mobile installations.

Figure 5. Percentage of positive responses to Liquefied Natural Gas (LNG) indicators.

Indicator	2018 (%)	2020 (%)	2023 (%)
Is Liquefied Natural Gas (LNG) bunkering available in the port today?	0	0	0
By non-mobile installation*	0	0	0
By truck*	0	0	0
By barge*	0	0	0
Are there currently ongoing LNG bunkering infrastructure projects in the port?	0	5	3
Do plans exist for the development of LNG bunkering facilities during the next two years?	0	11	9

Within the network sample there is no current provision of LNG bunkering though there are some plans to implement facilities during the next two years.

Figure 6. Percentage of positive responses to Differentiated dues for “Greener vessels” indicators.

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

Indicator	2018 (%)	2020 (%)	2023 (%)
Does the port offer differentiated dues for “Greener vessels”?	8	11	6
Waste management/segregation*	0	0	50
Air emissions (NO _x , SO _x , PM) reduction*	100	100	100
GHG emissions reduction*	100	50	50
Noise reduction*	0	0	50
Environmental certification*	0	0	50
Ships with wind assisted	0	0	0
Does the port plan to introduce environmentally differentiated port dues during the next two years?	8	11	21

As with LNG bunkering, the percentage of network members currently providing the option of differentiated fees is small, although 21% indicate plan to introduce such options during the next two years.

D. Continuous improvement and sustainability

Inherent requirements of credible quality standards of EMS include those of continuous improvement and increasingly, evidence of sustainability. As legislative, regulatory, stakeholder, investor and societal expectations have changed and become more demanding, so EMS has had to adapt through phased transition in order to comply and respond positively. It should be noted, however, that the port sector is not just reactive. Indeed, in terms of policies, the development of good practices, singular initiatives and collaborative innovation, the sector has been demonstrably pro-active in setting standards and bringing influence to bear on critically sensitive issues involving environmental protection, climate change, alternative energy, and overall responsibilities (The policy of 100% include reference to continuous improvement, and 97.1% include reference to Improvement of environmental standards beyond those required under legislation).

Implementing an environmental policy requires a transition process in which existing procedures, requirements and common practices are gradually changing towards a new approach for “greening” the entire transport and logistics chains and in particular the port processes. Experience suggests that a step-by-step approach of continuous improvement within an established but flexible framework of EMS is an effective way forward.

At each step an ambitious but realistic set of targets may be set in respect of reducing the environmental impacts of various parts of the entire port process. The targets should be explicit, measurable, and linked to a timeline, so that at each milestone it can determine whether, or not, the targets have been met, if not completely, then at least to what extent. An increasing number of stakeholders are requiring such planned approach in order to be able to monitor the progress by ports and port companies towards a completely “green” operation.

Network approach

To achieve a common approach for greening the entire transport and logistics process worldwide, setting global standards for environmental management of ports and port companies may be considered as being crucial. It is arguable that global standards should be based on international good practices and be based on a networked approach of efficient and cost-effective processes of collaboration.

Implementing credible, international quality standards requires an independent assessment of the entire approach as well as results, by a globally acknowledged standards organization. In the case of EcoPorts PERS, this is provided by Lloyds Register Quality Assurance (LRQA). Following a successful audit, LRQA issues a certificate of confirmation which remains valid for two years after which time the re-certification process is required in order to retain the standard.

Moving towards sustainability

As with other, major international quality standards (such as ISO 14001), the EcoPorts PERS Environmental Management System (EMS) standard is specifically designed to ensure that the Port operates and develops in a sustainable way, and that it complies with all relevant legislation and regulation, both international and national.

As noted above, the demands made on a port’s EMS are developing rapidly and the need to be able to demonstrate continuous improvement and sustainability is becoming daily more important in terms of political, legislative, commercial stakeholder and public expectations. Evidence of competence is increasingly required by investors and public bodies, and a general ‘licence to operate’ is often sought by local communities and Non-Governmental Organizations (NGO).

Environmental sustainability acknowledges that sustainable development cannot be achieved – without development. EcoPorts SDM and PERS recognize the delicate balance between green objectives and economic growth that allows ports to operate as multimodal nodes by controlling the impacts of their activities.

In order to assist both individual ports and terminals, and the sector as a whole to deal with its expanding environmental liabilities and responsibilities in a time- and cost-effective manner, the EcoPorts SDM phase of PERS certification administered by ECOSLC has recently been up-to-dated. New sections comprise of:

United Nations Sustainable Development Goals (SDGs).

- The European Sea Ports Organisation (ESPO), The American Association of Port Authorities (AAPA), the International Association of Cities and Ports (AIWP) and the World Association for Waterborne Transport Infrastructure (PIANC) are signed up as strategic partners of the World Ports Sustainability Program which, guided by the 17 UN SDGs, wants to enhance and coordinate future sustainability efforts of ports worldwide and foster international cooperation with partners in the supply chain.
- Many of most proactive and progressive ports are now including their consideration of relevant SDGs within the port's Environmental Report. Such acknowledgement confirms awareness of the 'big picture' approach and the wide context within which environmental management is set given the range of cultures, circumstances and living conditions experienced by port communities throughout the global sector.
- Recognition of SDGs appropriate to the profile and situations of individual ports flags awareness and assists in focussing on priority issues and selection of best options for effective management of environmental and socio-economic factors.

Effects of Climate Change.

- Given the profound impacts of climate change it is now firmly recognized that it is no longer a single issue but a complex of multifactorial components that requires detailed research, analysis, and interpretation to deal effectively with of cause and effects.
- Extreme weather events and acute changes in seasonal occurrences are having intense impacts on 'life on Earth' including day-to-day and, under some circumstances, even hour-by-hour operation of port activities.
- It is important that port environmental management programmes consider all the actual and potential impacts in their location.
- The challenges of greenhouse gas emissions and energy efficiency are recognized as significant components of considerations related to climate change. The monitoring programmes of 42.9% address the Carbon footprint counting port authority's and port stakeholders' emissions (including terminals, tenants, and contractors). 82.9% consider energy efficiency.



Part of large windmill Parc in the North Sea, to be connected with a Hydrogen plant for green energy

Environmental Sustainability.

- Sustainability is now widely recognized as a business opportunity. While financial profit is a key objective for any business and necessary for survival, a broader focus on people and environment is required for long-term resilience and prosperity. Disclosure of non-financial performance, including Environment, social and Governance (ESG) factors, are increasingly being required by investors and becoming a mandatory requirement for many companies.
- A major component of sustainability is materiality which means that the port can identify the major Environmental, Social and Governance issues (ESG) significant to their business and operational programme, and therefore determine which factors could lead to negative consequences requiring effective monitoring and reporting. Dealt with in a transparent

manner, the port can formulate strategies that will demonstrate the key requirements of compliance, continuous improvement, and sustainability.

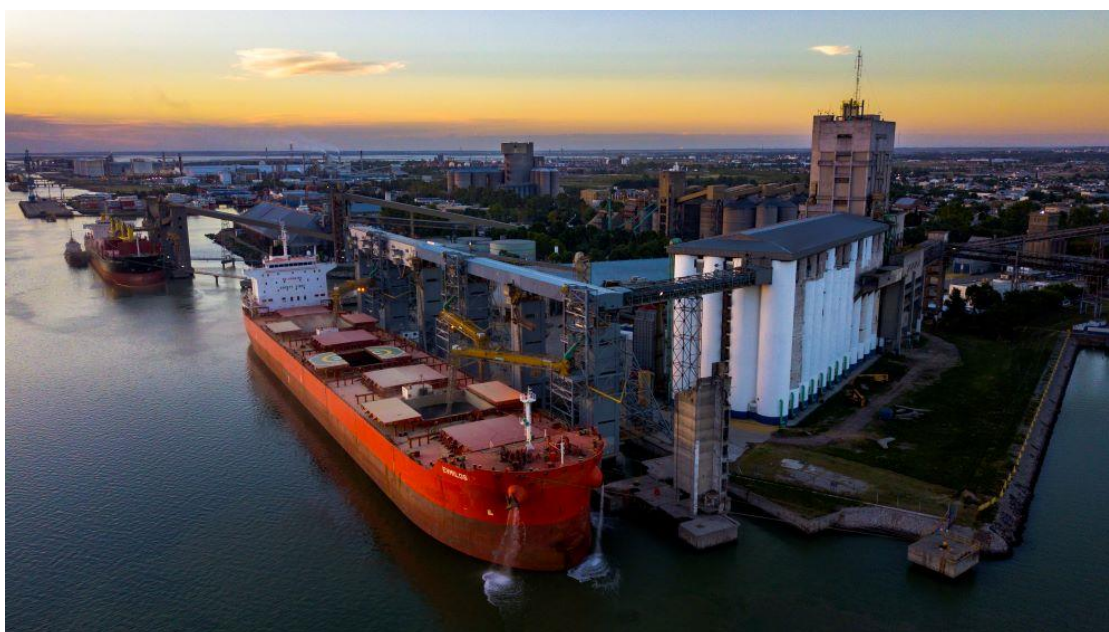
- This new section considers issues relating to sustainability including policy, stakeholders, organization, EPIs, and risk assessment.



First EcoPorts PERS Certified Kazakhstan: JSC NC Aktau Commercial Sea port, 2022

6. Conclusion

- i) The EcoPorts Network of member ports is growing as more ports and terminals adopt the Self Diagnosis Methodology (SDM) and work towards the EMS international quality standard of EcoPorts PERS. In September 2023 the network of ports and terminals outside Europe consists of 42 ports and terminals in 20 countries of which 32 are EcoPorts PERS Certified at that time.
- ii) Analysis of the SDM responses identifies the significant performance levels of key components of port environmental management in terms of applied procedures and processes.
- iii) Policies, an inventory of legislation, training, monitoring, and designated responsibilities are firmly established elements of current programmes.
- iv) Port garbage and waste, air and water quality, and water consumption are major considerations of monitoring schedules.
- v) There is a good correlation between monitoring and perceived priority issues with air quality and waste being recognized as urgent topics. It is noted that that climate change and energy consumption are ranked 4th and 5th respectively in the top-10, and it will be interesting to see future developments in the apparent ranking.
- vi) The concepts of continuous improvement and sustainable development are now becoming practicable options of good practice with appropriate procedures and routines increasingly being applied in proactive environmental management programmes. More and more environmental reports are being set in the context of sustainability.
- vii) As the remit of environmental management expands (in terms of liabilities and responsibilities, and the number of stakeholders involved) so the reporting perspective itself widens with considerations of environment, society and corporate governance becoming increasingly integrated into the approach.
- viii) The EcoPorts ECOSLC methodology has recently to be reviewed and updated in terms of its roles as a checklist of good environmental management practice and stepping-stone towards the international quality standard of EcoPorts PERS. Network members are adapting readily to the upgraded version.



First EcoPorts PERS Certified Argentina: Consorcio de gestión del Puerto de Bahía Blanca, 2023

Annex

List of 32 EcoPorts PERS certified ports and terminals outside Europe

Table 4.

Port/Terminal	Country
Port of Devonport, Tasmanian Ports Corporation	Australia
Port of Newcastle	Australia
Consortio de gestión del Puerto de Bahía Blanca	Argentina
Port Autonome de Cotonou	Benin
Porto do Açú	Brasil
Port of Paranaguá	Brasil
Empresa Portuaria Antofagasta	Chile
Port of Tocopilla, SQM	Chile
Puerto Ventanas	Chile
Sociedad Portuaria Regional de Cartagena S.A.	Colombia
Terminal de Contenedores de Cartagena S.A.	Colombia
Riverport Sociedad Portuaria S.A.	Colombia
Andipuerto Terminal Andipuerto Quayaquil S.A.	Ecuador
Jordan Industrial Ports Company	Jordan
JSC NC Aktau Commercial Port	Kazachstan
Port of Kuryk LLP	Kazachstan
Administracion Portuaria Integral de Ensenada, S.C. De C.V.	Mexico
Administracion Portuaria Integral de Lázaro Cárdenas	Mexico
Nigeria LNG Terminal. Bonny	Nigeria
Port of Montevideo	Uruguay
Terminal Internacional del Sur S.A. Port of Matarani	Peru
Ho-Ping Industrial Port Corporation	Taiwan
Mailiao Industrial Harbor/Mailiao Harbor Administration Corp.	Taiwan
Port of Anping	Taiwan
TIPC-Kaoshiung	Taiwan
TIPC- Keelung	Taiwan
TIPC- Suao	Taiwan

TIPC-Taichung	Taiwan
TIPC-Taipei Port	Taiwan
TIPC-Hualien	Taiwan
Ortadogu Antalya Liman Isletmeleri A.S.	Turkey
Turkmenbashi International Seaport	Turkmenistan

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List of 42 EcoPorts ports and terminals outside Europe that started the certification process

Table 5.

Port/Terminal	Country
Port of Bell Bay, Tasmanian Ports Corporation	Australia
Port of Burnie, Tasmanian Ports Corporation	Australia
Port of Devonport, Tasmanian Ports Corporation	Australia
Port of Hobart, Tasmanian Ports Corporation	Australia
Geelong Port	Australia
Port of Gladstone	Australia
Port of Newcastle	Australia
Consorcio de gestión del Puerto de Bahía Blanca	Argentina
Port Autonome de Cotonou	Benin
Porto do Açu	Brasil
Port of Paranaguá	Brasil
Empresa Portuaria Antofagasta	Chile
Port of Tocopilla, SQM	Chile
Puerto Ventanas	Chile
Palermo Sociedad Portuaria S.A.	Colombia
Sociedad Portuaria Regional de Cartagena S.A.	Colombia
Terminal de Contenedores de Cartagena S.A.	Colombia
Riverport Sociedad Portuaria S.A.	Colombia
Andipuerto Terminal Andipuerto Quayaquil S.A.	Ecuador
Batumi Sea Port LLC	Georgia
Tema Port	Ghana
PT Krakatau Bandar Samudera	Indonesia
Jordan Industrial Ports Company	Jordan
JSC NC Aktau Commercial Port	Kazachstan
Port of Kuryk LLP	Kazachstan
Administracion Portuaria Integral de Ensenada, S.C. De C.V.	Mexico
Administracion Portuaria Integral de Lázaro Cárdenas	Mexico
Nigeria LNG Terminal. Bonny	Nigeria

Port of Montevideo	Uruguay
Terminal Internacional del Sur S.A. Port of Matarani	Peru
Hamad Port	Qatar
Ho-Ping Industrial Port Corporation	Taiwan
Mailiao Industrial Harbor/Mailiao Harbor Administration Corp.	Taiwan
Port of Anping	Taiwan
TIPC-Kaoshiung	Taiwan
TIPC- Keelung	Taiwan
TIPC- Suao	Taiwan
TIPC-Taichung	Taiwan
TIPC-Taipei Port	Taiwan
TIPC-Hualien	Taiwan
Ortadogu Antalya Liman Isletmeleri A.S.	Turkey
Turkmenbashi International Seaport	Turkmenistan

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