



## Sustainability in Canary Islands Ports Challenges and Progress Toward Decarbonization

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### ABSTRACT

This paper analyzes the state of sustainability and decarbonization in the ports of the Canary Islands, focusing on initiatives carried out by the Port Authorities of Las Palmas, Santa Cruz de Tenerife, and Puertos Canarios. Using a documentary and comparative approach, it examines key projects such as **RENMARINAS** and **SILEX** in Las Palmas, **ENEPORIS** and **Tenerife Port ZERO** in Tenerife, and the **EcoPorts** strategy by Puertos Canarios.

In light of the results examined, there has been significant progress in improving energy efficiency, in the progressive electrification of berthing alignments and in the incorporation of renewable sources into port operations. However, such progress coexists with limitations that continue to condition the pace of the transition, mainly the high costs of implementing infrastructure with a lower environmental impact, the dispersion of competences that hinders decision-making with an overall vision, and the still insufficient specific technical qualifications available to meet the new operational requirements.

Thus, although the overall balance sheet shows that significant progress has been made, the current scenario requires the intensification of inter-institutional coordination mechanisms and the securing of sustained and stable financing channels over time, so that the ecological transformation of the Canary Islands port system can be accelerated and aligned with the objectives set out in the European regulatory framework and with the sustainable development commitments formulated in the 2030 Agenda.

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## 1. Introduction.

### 1.1. Port Sustainability.

Port sustainability can be defined as an integrated framework of actions, planning criteria and technological solutions that enable port activity to be organised efficiently, ensuring that the performance of its essential functions does not compromise environmental conservation or alter the social welfare conditions of the communities that, in one way or another, have a direct relationship with the port and the services it provides in its immediate and island environment..

It seeks to balance economic growth, environmental protection, and social responsibility.

Within each pillar, a series of actions can be developed:

#### Environmental:

- Reduction of pollutant emissions.
- Use of renewable energy sources.
- Efficient water and waste management.
- Protection of marine and coastal ecosystems.
- Noise and light pollution control.

#### Economic:

- Optimization of maritime transport.

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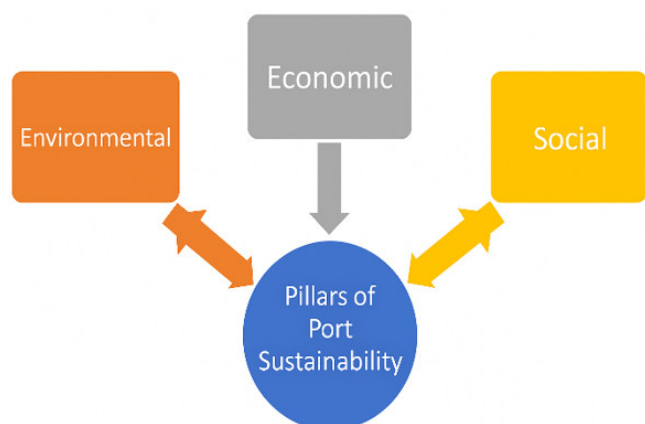
- Digitalization to improve logistics.
- Attractiveness for new sustainable investments.
- Enhancing competitiveness without harming the environment.

#### **Social:**

- Creation of green jobs.
- Integration and Port-City planning.
- Environmental education and corporate responsibility.

On this conceptual basis, port authorities and the various administrations with jurisdiction in this area formulate projects and establish objectives that guide their actions, adapting their lines of work to the commitments made in supranational programmatic frameworks —such as the 2030 Agenda— and to the strategic plans that each entity has defined to organise its priorities for intervention in the port sector.

Figure 1: Pillars of Sustainability.



Source: Authors.

#### *1.2. The Port Authority of Las Palmas.*

The Port Authority of Las Palmas is responsible for managing the state-owned ports of general interest in the eastern province of the Canary Islands. It oversees five ports, with Puerto de La Luz and Las Palmas being the most important due to the volume of traffic it handles and the economic activity it generates.

Based on the information available for 2025, it can be seen that historical records for port traffic continue to be broken, with bunkering operations playing a particularly prominent role. Their sustained performance confirms both the economic importance of this service and the additional demands it places on the environmental and operational management of the port system as a whole.

At the same time, and with the aim of moving towards more sustainable port environments, various priority lines of action are being developed, including, but not limited to, the following:

- Silex Project: Aimed at reducing greenhouse gas emissions. It involves the implementation of a filtering system that absorbs combustion gases from ship engines and transforms them into environmentally neutral salts.
- Prestamar Project: The Prestamar Project is conceived as an initiative aimed at strengthening security and optimizing the efficiency of operations carried out in port facilities, aligning its objectives with the principles that inform the Smart Port 4.0 concept; that is, the progressive incorporation of digital solutions and advanced management systems that improve operational responsiveness, reduce uncertainty in processes, and promote decision-making based on reliable information available in real time.
- Development of an in-situ detection system for pollutants in port environments.

The Port Authority of Las Palmas has established a series of mandatory environmental management objectives. For this purpose, it has created an Environmental Monitoring Plan, designed to oversee the environmental quality of the Ports of Las Palmas. This plan monitors the following environmental aspects:

- Air quality.
- Water and sediment quality.
- Acoustic quality.
- Waste management.

#### *1.3. The Port Authority of Santa Cruz de Tenerife.*

The Port Authority of Santa Cruz de Tenerife manages six port facilities belonging to the western province and located on the islands of Tenerife (3), La Gomera (1), La Palma (1) and El Hierro (1), although Tenerife accounts for most of the port activity of the four islands.

With regard to the guidelines proposed by the port administration with the aim of gradually decarbonising the infrastructure it manages, the port authority has been implementing a series of measures over recent years, which seek, on the one hand, to reduce polluting emissions into the atmosphere from its own activity and, on the other hand, and no less importantly, to improve the energy efficiency of its facilities.

One of the most important measures implemented is the introduction of the Cold-Ironing system, which consists of a ship-to-shore electrical connection (also known as Onshore Power Supply, OPS). The implementation of this measure allows regular line vessels calling at these ports to use the electricity supplied from land while they are moored at the quay and therefore do not have to use their auxiliary generators, which means a significant reduction in atmospheric emissions, as well as virtually eliminating the noise impact on the immediate port environment, which has been the subject of numerous complaints from local residents (since mid-2024, the Port of Santa Cruz has been carrying out noise checks at its facilities).

Currently, the Port of Santa Cruz de Tenerife is involved in several projects:

- Dock Electrification: As mentioned above.
- Tenerife Port Zero is working to ensure that all port activity on the islands is carried out without polluting emissions, committing to a mix of renewable energies and alternative fuels, increasingly moving away from the use of conventional combustion engines and achieving a drastic reduction in emissions.
- On the other hand, there are plans to build a liquefied natural gas and green hydrogen plant in the Cueva Bermeja area, near the port. This plant will be responsible for supplying cleaner fuels to ships, which would help mitigate their environmental impact in the area.
- Finally, we can mention the Santa Cruz Verde 2030 Plan, which is a major undertaking that seeks to completely transform the space occupied by the refinery. To this end, the first phase will involve completely dismantling the current facility, reclaiming the land and finally expanding the city into this space, with new residential areas, parks and leisure areas, given that this is currently the only place where the city of Santa Cruz de Tenerife can grow.

#### 1.4. Puertos Canarios.

On the other hand, we find the entity Puertos Canarios, which is public in nature and depends on the Government of the Canary Islands. Puertos Canarios is responsible for managing the sixteen ports of public interest in the archipelago, where, apart from the ports of the respective provincial capitals, others of enormous strategic importance such as Agaete, Los Cristianos, Playa Blanca, Corralejo and Valle Gran Rey stand out for their volume of activity. In recent decades, all these ports have undergone major improvement and modernisation works, with the incorporation of innovative equipment and the implementation of technological improvements to enhance their efficiency and operability, while keeping the facilities up to date with the new needs of island maritime traffic, such as the enormous growth in the number of cruise ships from the world's leading companies (Carnival, Aida, etc.), which have made the Canary Islands' ports one of their most important destinations.

At the same time, the Canary Islands Government, as the body responsible for management, is currently developing a strategic plan whose main objectives are to define the guidelines, priority objectives and lines of action that will guide the sustainable management of Canary Islands Ports in the coming years. The aim is to ensure the balanced development of the port's infrastructure and services, in accordance with regional and community sustainability policies. This strategic plan is structured around four strategic pillars, one of which—central to this study—is environmental sustainability. Its objectives include the following challenges:

- Smart EcoPorts seeks to achieve the gradual transformation of the aforementioned ports, so that more advanced technological solutions can be integrated and management systems implemented to facilitate decision-making

by those responsible, analysing accurate data and at the same time articulating mechanisms to optimise resources, all with a view to improving the operational efficiency of the facilities and ensuring that the environmental impact of the facilities and port activity is as minimal as possible..

- Renewable energy on port premises.
- Decarbonization of maritime-port activities.
- Pollution reduction.
- Implementation of sustainable traceability systems in waste management.

## 2. Methodology.

### Documentary Review:

For this work, we have reviewed documentation belonging to organisations such as the Port Authority of Las Palmas, the Port Authority of Santa Cruz de Tenerife and Puertos Canarios. We also considered the various regulatory frameworks promulgated by the International Maritime Organisation (IMO), the European Union, the Government of Spain, and the Government of the Canary Islands, so that we could have a comparative documentary basis that would allow us to contextualise each of the actions that have been developed and are to be developed in the Canary Islands port system: It is also important in our work to assess the degree of consistency of these actions with both current international and national guidelines.

### Analysis of Environmental Indicators:

CO<sub>2</sub> emissions, energy consumption, and various certifications.

### Case Studies:

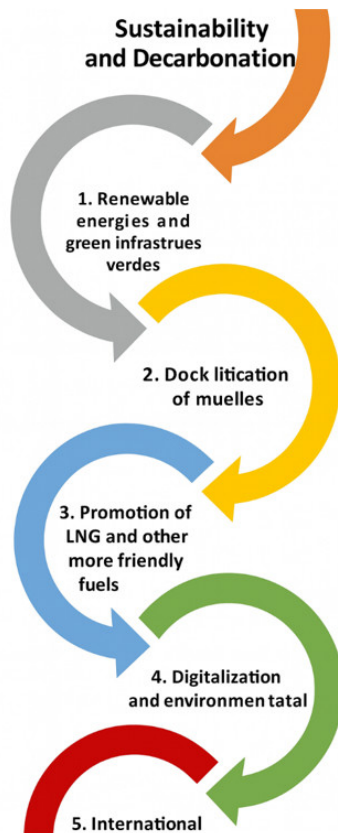
Analysis of specific projects by the Port Authorities:

- Dock electrification.
- Waste management.
- Energy sources.

## 3. Results.

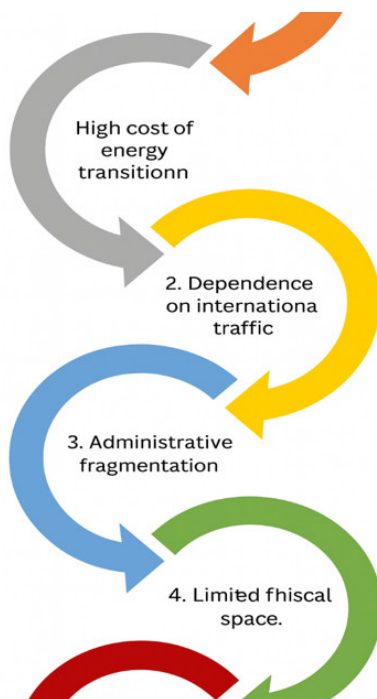
One of the main pillars of the environmental, economic and logistical agenda for the Canary Islands' ports is sustainability. We must not forget that the Canary Islands are strategically located, with more than 40,000 ships passing through their waters each year, including those bound for the islands and those simply passing through. This makes the Canary Islands' ports extremely important both in terms of decarbonizing the sector and in all activities related to maritime traffic and optimizing the archipelago's logistics chain.

Figure 2: Progress Toward Sustainability and Decarbonization.



Source: Authors.

Figure 3: Pending Challenges.



Source: Authors.

Sustainability and decarbonization are strategic priorities for the various port authorities under analysis. Below, we present some of the main advancements and challenges in this area:

### 3.1. Port Authority of Las Palmas.

#### Main advancements:

- Firstly, we can mention the RENMARINAS Las Palmas project, developed by the Canary Islands Institute of Technology (ITC), which is related to the creation of test platforms from which marine renewable energy solutions can be developed, mainly floating photovoltaic systems or, for example, wave energy applications and exploitation. This makes it one of the most important test beds in the region for the research and development of technologies that will enable the diversification of the energy mix, especially in the port environment.
- In terms of emissions reduction, the Port Authority has managed to reduce its carbon footprint by approximately 36% through the implementation of progressive and relatively low-cost measures. Notable examples include the replacement of conventional lighting systems with LED technology, the implementation of mechanisms for remote lighting management and, finally, the improvement of energy efficiency in both the buildings and the fleet of vehicles owned by the Port Authority. This has enabled progress towards more rational and less emission-intensive consumption.
- There is also the SILEX project. SILEX aims to develop a filtering system capable of absorbing the combustion gases generated by ship engines, transforming them into environmentally neutral saline compounds, which effectively reduces greenhouse gas (GHG) emissions and improves the purification processes derived from maritime and port activity.

#### Challenges:

- Port Electrification: This project, which has received €109 million in funding, aims to lessen the noise and environmental damage caused by ships and port operations in cities.
- Implementation of Clean Energy: The Port Authority of Las Palmas aims to lead the adoption of renewable energies. Currently, it is planning the installation of a hydrogen refueling station to supply green hydrogen to vehicles and support R&D activities in the maritime sector.

### 3.2. Port Authority of Santa Cruz de Tenerife.

#### Main advancements:

- The ENEPORTS Project works with ITER (Institute for Renewable Energies) and ITG (Technological Institute of Galicia) to make the Port of Granadilla less carbon-intensive and more digital by using energy monitoring and cutting-edge technologies..

- Tenerife Port ZERO: This plan calls for making vehicles and ships electric, using biofuels, and starting projects to offset carbon footprints in order to reach carbon neutrality by 2035.
- Port Electrification: The project is still moving forward, and regular line vessels can already connect to shore power at the ports of Santa Cruz de Tenerife and Santa Cruz de La Palma.

### **Challenges:**

- Building infrastructure for clean energy: Plans are being made for projects like an LNG storage plant or an offshore wind farm at the Port of Granadilla. To do these things, a lot of money and planning are needed, not just between institutions but also with public-private partnerships.
- Integrating new technologies: Using new technologies, like AI for managing energy, can be hard because it requires training and adapting to new technologies.

### *3.3. Puertos Canarios.*

#### **Main advancements:**

- Commitment to sustainability: Puertos Canarios is working on a strategic plan to make its ports more environmentally friendly and to promote sustainable development. The plan includes projects that will help run the port more efficiently and in a way that is better for the environment.
- The Government of the Canary Islands, through Puertos Canarios, is in charge of turning its ports into smart, eco-friendly, and energy-independent places. This change will make it easier to manage resources and infrastructure more effectively.

### **Challenges:**

- Implementation of sustainable projects: There is an ongoing need to develop infrastructure and technologies that will enable Canarian ports to become more sustainable.
- Adaptation to environmental regulations: Despite temporary exemptions from certain European Union directives, it is crucial that Canarian ports make progress in adopting these standards to avoid falling behind in the EU's decarbonization plans.

The different port authorities and ports in the Canary Islands are taking significant steps toward sustainability and decarbonization, with innovative projects and a clear focus on the energy transition. However, they still face major challenges that require investment, inter-institutional collaboration, and adaptation to new technologies and environmental regulations.

Below, we present a summary table comparing the three port authorities in the Canary Islands regarding their progress in sustainability and decarbonization:

Table 1: Comparison Among the Different Organizations.

Criteria	Las Palmas Port Authority (APLP)	Santa Cruz de Tenerife Port Authority (APSCF)	Puertos Canarios
<b>Strategic Approach</b>	Carbon footprint reduction, innovation, offshore energy	Carbon neutrality by 2035, digitalization, electrification	Smart, sustainable, and energy self-sufficient ports
<b>Key Projects</b>	RENMARINAS, SILEX, electrification, renewable energy test platforms	ENEPORTS, Tenerife Port ZERO, Net Zero Sea Alliance	EcoPorts transformation, energy efficiency improvements
<b>Decarbonization</b>	36% emission reduction, gas absorption technologies	Carbon neutrality plans, renewable energy, electrification	Declared interest, but fewer visible actions
<b>Technological Innovation</b>	Emission capture system, smart energy management	Energy digitalization, smart sensors, AI for energy efficiency	Early stages of technological modernization
<b>Energy Infrastructure</b>	€109M electrification plan, space for offshore wind	Planned offshore wind farm, LNG and energy storage facilities	Under development, initial steps
<b>Key Collaborations</b>	ITC, UNCTAD, private sector (offshore)	ITER, ITG, Government of the Canary Islands, EU projects	Regional initiatives with the Canary Islands Government
<b>Main Challenges</b>	High costs and implementation of energy infrastructure, technical training	Technological implementation, integration of clean energy	Adaptation to EU regulations
<b>Operational Scope</b>	Ports of La Luz, Las Palmas, Arrecife, and Puerto del Rosario	Ports including Granadilla, Santa Cruz de Tenerife, and Santa Cruz de La Palma	Network of 16 regional ports across the archipelago
<b>Future Vision</b>	Hub for marine energy and sustainability leader	Leader in Atlantic decarbonization	Become a network of smart and sustainable ports

Source: Authors.

The decarbonization process in the archipelago's ports is not just a matter of technology or administrative will. It also requires overcoming a number of challenges that affect the speed, feasibility, and effectiveness of the move to sustainable port infrastructure. These barriers have certain traits that are shaped by things like being isolated, relying on energy from outside sources, the size of the port, and the complexity of the administrative system.

The port network in the Canary Islands is made up of three completely separate groups: the Port Authorities of Las Palmas and Santa Cruz de Tenerife, and Puertos Canarios. Each group has its own goals and ways of doing things.

We have grouped these barriers into three main categories:

#### **1) Technical Barriers.**

These have to do with how easy it is to get and change infrastructure, how advanced the technology is in the equipment, how digitalized the process is, and how well it works with ships that are already in the port.

- Outdated or inadequate infrastructure: Many ports don't have the right facilities for low-carbon technologies, like



charging stations for electric vehicles or onshore power supply (OPS) systems for ships that are docked.

- Lack of technological interoperability: The technological solutions implemented must be compatible with various types of vessels and logistics operators, which is not always the case.

## 2) Economic Barriers.

These include the costs of buying, maintaining, and using clean technologies, as well as the fact that it can be hard to justify these kinds of investments when short-term profits are low.

- High initial costs: Setting up infrastructure like OPS systems, solar panels, energy storage systems, or electrified port machinery costs a lot of money.
- Long-term return on investment: Improvements to the environment don't always lead to immediate financial gains, which makes them less appealing, especially when the economy is unstable or in crisis.
- Not all ports can get European funds, national programs, or sustainable financing mechanisms.
- Competition with other ports: If other ports aren't doing the same things to be more environmentally friendly, investments in sustainability may be seen as making the port less competitive.

## 3) Regulatory and Administrative Barriers.

These are related to how strict the law is, how there aren't many specific incentives, and how different levels of government don't work together very well.

- Lack of specific rules: Even though there are general goals for decarbonization, there aren't always clear laws that require or encourage ports to do certain things.
- Uncoordinated institutions: When local, regional, national, and EU governments don't work together, it takes longer to put coherent policies into action.
- Rigidity in government: Complicated bureaucratic processes make it take longer to get approval for projects to modernize infrastructure or use renewable energy.
- Lack of local incentive policies: Absence of tax benefits, direct subsidies, or market-based mechanisms to reward sustainable investments.

### 3.4. *Environmental Policies.*

The different port authorities in the Canary Islands have put in place a number of environmental policies to protect the environment and make their operations more sustainable.

#### 1) Las Palmas Port Authority.

The Port Authority of Las Palmas is committed to the environmental management of its ports, developing different lines of action to prevent impacts, improve energy efficiency and strengthen the response capacity in emergency situations that may affect the port environment and its surroundings.

- In this context, the Environmental Monitoring Plan is the instrument for controlling environmental parameters in port areas, complying with legislation and allowing the early application of corrective measures to prevent pollution incidents.
- In addition, between 2019 and 2021, the carbon footprint has been reduced by approximately 36% thanks to the gradual implementation of energy efficiency measures and the replacement of equipment and facilities with lower consumption ones, significantly reducing emissions from port activity.
- To prevent spills, an early detection radar system for hydrocarbons has been installed, the first of its kind in Spain, capable of detecting any surface spills at an early stage and activating response protocols early, minimising the risk to the marine environment.
- Training is also provided to technical personnel and local authorities to strengthen their skills in preventing and responding to pollution incidents and to improve operational preparedness for emergencies in ports.
- Finally, environmental control of infrastructure is an ongoing line of work, with periodic reviews of port construction and expansion projects to minimise the impact of the works and ensure the protection of marine and terrestrial biodiversity in the port system's area of influence.

#### 2) Santa Cruz de Tenerife Port Authority.

The Port Authority of Santa Cruz de Tenerife has been taking a number of steps to make the facilities it manages more environmentally friendly. These steps include improving management systems, lowering emissions, and promoting renewable energy in the port area.

- First, environmental certifications stand out, and the PERS (Port Environmental Review System) certification for the six ports in the system is especially important. This award shows that the organization is dedicated to regularly checking how well it is doing environmentally and putting in place ways to keep getting better.
- To cut down on emissions, steps have been taken to make port activity less harmful to the environment. For example, recycling points have been set up on fishing docks, and waste management procedures have been improved. These changes have led to a gradual decrease in the negative effects of daily operations.

- The electrification of docks is also very important. For example, ports like Santa Cruz de La Palma and Santa Cruz de Tenerife are getting electricity supply systems for ships that are docked there. This will cut down on emissions from the use of auxiliary generators on board and lower noise pollution levels in nearby cities.
- The Port Authority is supporting strategic projects to promote the use of renewable energy. For example, they are building an offshore wind farm in the Port of Granadilla for more than 100 million euros. They are also building a green hydrogen hub to make low-emission alternative fuels more available for maritime traffic.
- Lastly, the group is involved in campaigns against littering in natural areas, like the LIBERA Project. This project aims to raise public awareness and encourage responsible behavior when using and enjoying the coastal and maritime-port environment.

### 3) Puertos Canarios.

As an entity under the Government of the Canary Islands, Puertos Canarios is developing a strategic plan focused on sustainability.

- **Strategic Objectives:** The plan includes 30 specific goals across four strategic pillars aimed at sustainable planning, operation, and management of the port system.
- **Sustainability Commitment:** Aspires to transform its ports into smart, sustainable, and energy self-sufficient facilities, ensuring more efficient and environmentally responsible operations.
- **Environmental Monitoring Programs:** Implementation of studies to assess the condition of seabeds and waters in commercial docks—e.g., at Puerto de Gran Tarajal—to support cleaning and maintenance efforts.

### 3.5. *Integrated Sustainability Strategy for Canarian Ports.*

#### 1) Energy and Climate Change.

##### Objectives:

- Reduce greenhouse gas emissions.
- Decarbonize port activities.
- Increase energy self-sufficiency.

##### Action Lines:

##### a) Green energy infrastructure:

- Installation of photovoltaic solar panels on warehouses and administrative buildings.
- Development of wind farms on operational port land.

- Exploration of other energy sources (e.g., wave energy).

##### b) Shore Power (OPS):

- Technical adaptation of the most frequently used docks.
- Agreements with shipping companies to adapt vessels.

##### c) Economic Incentives:

- Reduced port fees for ships using alternative fuels (LNG, hydrogen, biofuels).
- Discounts for shipowners using alternative systems like scrubbers.

##### d) Climate adaptation plan:

- Risk assessment for sea level rise and extreme weather events.
- Development of climate-resilient infrastructure (e.g., green coastal defenses, drainage systems)

#### 2) Environmental Protection.

##### Objectives:

- Minimize the impact of port operations on marine and terrestrial ecosystems.
- Preserve local biodiversity.

##### Action Lines:

##### a) Integrated waste management:

- On-site sorting and recycling plants.
- Automated systems to collect floating waste.
- Monitoring of vessel discharges using surveillance sensors.

##### b) Environmental quality:

- Real-time air and water quality monitoring stations.
- Public environmental data portals to ensure transparency.

##### c) Marine biodiversity:

- Ecological sensitivity mapping to define dredging exclusion zones.
- Pilot projects for the restoration of seagrass meadows.
- Installation of artificial reefs or bio-structures in degraded areas.

#### 3) Sustainable Mobility and Logistics.

##### Objectives:

- Reduce the carbon footprint of port-related transport.
- Improve the efficiency and sustainability of goods movement.

#### **Action Lines:**

##### **a) Port fleet electrification:**

- Gradual replacement of port vehicles and machinery with electric or hydrogen-powered models.
- Installation of fast-charging infrastructure and energy storage systems.

##### **b) Intermodality:**

- Improved connections between ports and logistics hubs/free zones via electric transport.
- Promotion of **short sea shipping**.

##### **c) Digital logistics:**

- Smart platforms to synchronize ship arrivals, cargo handling, and departures.
- Integration with weather and tide forecasting systems for operational optimization.

#### 4) Circular Economy and Resource Management.

#### **Objectives:**

- Close material loops and reduce waste generation.
- Promote innovation and business sustainability.

#### **Action Lines:**

##### **a) Material reuse:**

- Reuse of dredged material for beach regeneration or land reclamation.
- Recycling of rubble and construction waste from port works.

##### **b) Support for sustainable businesses:**

- Creation of an incubator for startups focused on clean technologies and maritime recycling.
- Rental discounts for circular economy companies.

##### **c) Environmental certification:**

- Adoption of **ISO 14001** and **EMAS** standards for port authorities and concessionaires.
- Ongoing environmental training for port workers and operators.

#### 5) Governance and Social Participation.

#### **Objectives:**

- Improve transparency, participation, and social responsibility.
- Turn ports into inclusive and sustainable development hubs.

#### **Action Lines:**

##### **a) Port Sustainability Observatory:**

1. Composed of government bodies, businesses, scientists, NGOs, and citizens.
2. Monitoring of key indicators: emissions, waste, biodiversity, green economy.

##### **b) Public participation:**

1. Public consultations on port expansion plans or new infrastructure.
2. Opening port spaces to the community (e.g., maritime parks, museums, cultural centers).

##### **c) Transparency & ESG (Environmental, Social and Governance):**

- Annual sustainability reports with ESG indicators.
- Corporate volunteering programs and environmental education in schools.

The plan suggests a broad approach to making the archipelago's ports more sustainable, resilient, and competitive. It will coordinate its actions with the European Union's climate goals and the 2030 Agenda's commitments to sustainable development.

#### **Conclusions.**

- The three port managers in the archipelago —Las Palmas Port Authority, Santa Cruz de Tenerife Port Authority and Puertos Canarios— have expressly incorporated sustainability as a core principle of their strategic planning, as demonstrated by the development of specific projects, the approval of action plans and the setting of medium- and long-term carbon neutrality targets.
- However, the level of development of these initiatives is advanced but uneven. While Las Palmas and Santa Cruz de Tenerife are more mature in terms of dock electrification, integration of renewable energies and emission capture and reduction technologies, progress in Puertos Canarios is more incipient, given the size and type of ports it manages.



- The energy transformation in the Canary Islands port is also subject to several structural challenges, such as the partial obsolescence of certain infrastructures, the high investment costs for decarbonisation and regulatory and administrative coordination restrictions. Added to this are the constraints inherent to the island's reality, such as the scarcity of port space and the saturation of the coastline, which limit the development of new energy infrastructures.
- Here, institutional coordination becomes key to moving forward in a coordinated manner. The presence of three separate port authorities prevents the articulation of common strategies and reinforces the need for governance mechanisms that allow priorities to be aligned, technological solutions to be shared and duplication to be avoided.
- New technologies and digitalisation — such as AI for operational data analysis, environmental sensorisation and OPS systems for shore-side electricity supply — have the potential to improve energy efficiency and reduce the environmental footprint of port operations.
- Finally, the geostrategic location of the archipelago and the growing implementation of initiatives such as RENMARINAS, ENEPORTS and the EcoPorts model open up an opportunity for Canary Islands ports to consolidate their position as Atlantic leaders in port sustainability, provided that the progress made is integrated into a coordinated, long-term strategy.

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