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PIONEERS

Portable Innovation Open Network for Efficiency and Emissions Reduction Solutions

D10.2 Cross cooperation & synergies plan

MAGELLAN

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PIONEERS

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Acronyms and Abbreviations	
Acronym/Abbreviation	Meaning
WP	Work Package
PoAB	Port of Antwerp-Bruges
PoB	Port of Barcelona
CEF 2	Connecting Europe Facility
EU	European Union
DAC	Dynamic Automatic Coupler
ODP	Operational Digital Platforms
RIA	Research and Innovation Actions
IA	Innovation Actions
DCSA	Digital Container Shipping Association
IPCSA	International Port Community Systems Association
IDSA	International Data Spaces Association
TMS	Transport Management System
TRL	Technology Readiness Level
IPR	Intellectual Property Rights
SUMP	Sustainable Urban Mobility Plan
SULP	Sustainable Urban Logistics Plan
RES	Renewable Energy Sources
ML	Machine Learning
RD&I	Research Development & Innovation

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1 - Executive Summary

One of the objectives of PIONEERS is to maximise the impact of the technologies, innovations and proposals that are developed in the project. This maximisation can only be achieved by creating a strong community of supporters, interested parties and stakeholders. The creation of a such a community will be accomplished by putting together a solid communication strategy. This will not only create widespread awareness but will keep the initial interest high by maintaining a continuous cooperation with relevant and related stakeholders.

This deliverable on cross-cooperation and prospective synergies not only reflects on the environment surrounding the PIONEERS project but also on the cooperation between work packages and the consortium partners. Relevant projects and initiatives to the PIONEERS project will be mapped, studying how to better exchange know-how (e.g. technical) between funded projects and the overall impact of communication/dissemination. This study will be complemented with a cross-border analysis of how the EU funding programmes that support a new green port vision can benefit PIONEERS and its vision.

As a result of the potential synergies and initiatives studies, this document drafts a plan for cross-cooperation activities to further evaluate the actions' impact. This deliverable also serves as a reference document among consortium partners to manage future relations and learn how they can profit from such a network. Considering the purpose of the report, the document registers the efforts made and planned towards ensuring the best possible communication and dissemination of the Green Ports Master Plan while creating new synergies with organisations, consortia and projects, which will result in new ideas and joint actions.

Recognising that maintaining a cooperative relationship is a two-sided task and takes multiple resources (e.g. time, money), it is crucial that the PIONEERS project documents the process and steps as well as the aims of the established synergies – which, in the last instance, will promote the Green Ports Master Plan, while enhancing the stakeholders' participation.

This deliverable contributes to the development of collaborative relationships between entities - from an initial stage, where it is necessary to identify opportunities for cross-fertilization and collaboration, to a later stage, when it will become crucial to communicate the results of such

synergies. The main outcomes of this document are the 1) definition of different types of prolific cooperation for the project (internal and external), 2) approach to promote these relations, and 3) delineation of EU programmes, complementary projects/initiatives and entities that will ensure, at a later stage, the continuation of the Green Port Master Plan developments carried out by PIONEERS.

2 - Methodology

The main objective of this deliverable is to identify potential partnerships and synergies that can occur across themes such as Clean Energy Production and Supply, Sustainable Port Design, Modal Shift and Flows Optimisation, and Digital Transformation. To conduct this analysis, it is important to understand relevant projects. This understanding is crucial in order to create a concrete and in-depth plan, and to identify synergies from which the PIONEERS project can benefit in order to boost interaction and cross-cooperation. This investigation is predominantly carried out by desk-based research (desktop study method) as well as lessons learned from (joint) events held in the project's first year. Being a preliminary study, this method allows the deliverable to provide an initial understanding of how to increase collaboration, identifying the main benefits of taking advantage of the synergies created and setting the tone for subsequent activities.

As mentioned previously, the theme of cross-cooperation and synergies crosses several key Work Packages (WP), being particularly relevant in defining the content that needs to be communicated as well as the target audience and stakeholders that the PIONEERS consortium wants to collaborate with. In this regard, figure 1 depicts the interrelation between deliverables managing the stakeholders and their interaction. The role of this deliverable is to delineate such actions supporting solutions to address project challenges and undesired silos.

This document, complementary to the WP10 monthly meetings, is the product of the inputs of the consortium members, who provided insightful information about the synergies that their work has been building and relying on.

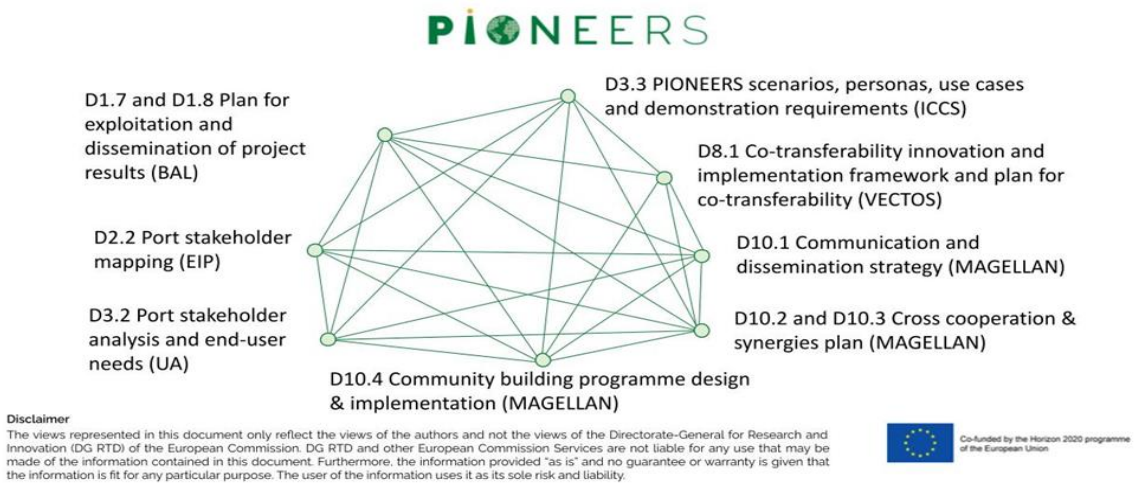


Figure 1 Work packages interrelation

3 - Mapping relevant projects & initiatives in PIONEERS Pillars

A first excercise to map relevant projects and initiatives was already completed at the initial stages of the project as it was deemed necessary to capture the progress made in PIONEERS' relevant areas and build upon this. The results of this research were documented in Chapter 7 of D3.1, where 36 EU-funded projects that had some degree of relevance with at least one of the four PIONEERS pillars were identified. Moreover, seven collaborative communities were identified that could be approached to broaden the stakeholder community of PIONEERS.

In order to build on the findings described in D3.1, PIONEERS liaised with the BOOSTLOG (BOOSTing impact generation from research and innovation on integrated freight transport and LOGistics system) Coordination and Support Action that seeks to increase visibility and support valorisation of R&I project results, outcomes and implementation cases in the freight transport and logistics field. As a result, the BOOSTLOG project has, so far, analysed 299 already completed projects.

Table 1: Additional projects identified via BOOSTLOG liaison applicable to Green Ports

Project Acronym	Project Name	Main focus
CITYLAB	City Logistics in Living Laboratories	Emission-free city logistics in urban centres by 2030
GREEN EFFORTS	Green and Effective operations at Terminals and in Ports	Reduction of energy consumption and a cleaner energy mix at ports to be controlled in a standardised way
NEXTRUST	Building sustainable logistics through trusted collaborative networks across the entire supply chain	Interconnected trusted collaborative networks along the SC.
NOVELOG	New cooperative business models and guidance for sustainable city logistics	Policies and measures for freight distribution and service trips
SUCCESS	Sustainable Urban Consolidation CentrES for conStruction	Collaborative approach and business model among construction supply chain actors
U-TURN	Rethinking Urban Transportation through advanced tools and supply chain collaboration	Freight distribution in urban areas

Benefiting from the work of BOOSTLOG and the findings of PIONEERS' WP3, further analysis of identified projects were carried out in order to map the results of these projects to at least one of the four pillars of PIONEERS:

- P1 - Clean energy production and supply
- P2 - Sustainable port design
- P3 - Modal shift and flows optimisation
- P4 - Digital transformation

The table below presents the relevance of the identified projects with the four pillars of PIONEERS.

Table 2: Relevance of European Projects with the PIONEERS' pillars

	P1	P2	P3	P4
AEGIS		X	X	X
AUTOSHIP			X	X
AVATAR			X	X
BCLink		X		
CarEsmatic		X		
CITYLAB			X	X
Clinsh	X	X		
Core LNGas Hive	X	X		
COREALIS		X	X	X
Creators		X		
DATAPORTS				X
DISpATch		X	X	X
DocksTheFuture			X	X
Ealing	X	X		
enerPort II	X	X		
ePIcenter			X	X
Federated			X	X
FENIX			X	X
GREEN EFFORTS		X	X	X
H2SHIPS	X	X		
IMMERSE				X
iNGENIOUS		X		X
ISOLA		X		X
LNGHIVE2	X	X		
LOGIMATIC		X		X
MAGPIE	X	X	X	X
MiRO 2			X	X
MOSES			X	X
NEXTRUST			X	X
NOVELOG			X	X
PIF building Energy improvement	X	X		

PILL		X	X	X
PIXEL		X	X	X
PLANET	X	X	X	X
PLATINE	X	X	X	X
PortForward		X	X	X
RePort		X		X
Smart Ports Entrepreneurial Ecosystem (SPEED)		X		X
SUCCESS			X	X
SWARMPORT		X		X
Synchronet			X	X
U-TURN			X	X

The applicability of the above projects in relation to P1-P4 serves as an inspiration for WP and Pillar leaders to leverage complementary solutions that have been, or are being, established. This will streamline solution-seeking and decrease delays in resolving problems that have already been addressed in other projects. Further analysis of Pioneers synergies and valorisation opportunities with the above will be carried out in the second version of this deliverable planned by M60 via affiliated projects and initiatives. Additional EU funding programs and recently granted projects with Green Port synergies are addressed in Chapter 7, which focuses on the mid- and long-term outlook. Finally, PIONEERS demonstrators are developed in parallel with several Linked Actions that have been identified early on at the proposal phase of the project. Therefore, the Linked Actions are interdependent with the project demonstrators, and their progress is monitored continuously to ensure progress according to the project plan.

The following table presents the Linked Actions of PIONEERS to further develop and closely monitor during the project lifetime through each demo:

Table 3: Linked Actions

PIONEERS Linked Actions
Onshore wind production (PoAB): PoAB is home to the largest onshore wind park in Belgium, with 67 wind turbines currently operating or being built. These are presently producing 158 Mw of wind energy per year, equivalent to the yearly energy consumption of 111,000 families.

Hydrogen refuelling infrastructure (PoB): The action to be developed consists of constructing a new hydrogen refuelling station in the port surroundings to feed trucks and buses of the metropolitan area.
Battery Energy Storage (PoB): PoB is working on energy island development, exploring the RES generation and consumption, and storage of energy inside port areas. The first pilot will take place in the fishermen's wharf and will be scaled up to other port areas.
Multi-fuel port (PoAB): Aims to become a Multi-Fuel Port by 2025, a port where in addition to conventional fuels, alternative, more sustainable fuels can also be made available. Specifically, PoAB will achieve this by: including methanol, hydrogen gas and electrical energy in the bunkering market; and further expanding LNG bunkering.
Zero emissions at berth (PoAB & PoB): By using shore-side power, ships can turn off their diesel generators and switch to electricity when they're tied up at the quayside. Using shore-side power means that emissions (NOx, SOx and fine particulates) from ships in the port can be reduced to a minimum. In the Antwerp port area, 27 shore-side power cabinets are currently available to inland vessels. The PoAB's fleet (tugboats, inspection vessels, etc.) has been using shore-side power for some time now. In PoB, the ships moored at the berthing line use diesel engine generators. To reduce the emissions caused by these engines, the wharfs' electrification has been approved by installing Onshore Power Supply (OPS) systems fed with renewable energy sources. This would allow ships to be connected to the local network powered by green energy.
Tugboats on H_2 and methanol (PoAB): The "Hydrotug" is driven by combustion engines that burn hydrogen in combination with diesel. The motors also comply with the very strictest standard, making them the lowest rated for emissions on the market. Compagnie Maritime Belge, a pioneer in the field of hydrogen power for shipping, is building this ultra-low-emission tug. Additionally, under the H2020-funded FASTWATER project, one of PoAB's tugboats is being retrofitted to sail on methanol.
Energy efficient buildings (PoB): PoB is incorporating active energy measures in buildings, mainly installing PV to generate energy in buildings with attractive surfaces for RES generation, whilst having partial utilisation due to their operation schedule, making potential energy surplus available.
Sustainable asphalt pavement (PoB): Use metallurgy slag for pavement from the steel industry to apply circular economy material strategies to reduce embodied carbon.

Power-to-methanol (PoAB): This project replaces methanol produced using fossil raw materials with sustainably produced methanol. This methanol will be made from captured CO2 and sustainably generated hydrogen. The CO2 is captured through Carbon Capture and Utilisation, through which CO2 emissions are partially recovered and combined with hydrogen generated based on green energy produced from renewable electricity.
Steam and waste heat (PoAB): ECLUSE, the port's first green heat distribution network, has been operational since 2019. The network transports steam originating from the incineration of waste materials to six chemical companies at the port. As a result, they no longer need to create steam in separate steam boilers for their production processes. On an annual basis, this represents a reduction of no less than 100,000 tonnes of CO2 emissions at the companies using the steam. The project also supplies at least 5 per cent of all green heat produced in Flanders.
NextGen District (PoAB): Provides three different innovation zones with their own specifications. NextGen Demo provides the space to allow start-ups to test innovative projects within the framework of circular energy. NextGen Park allows scale-ups or smaller companies to carry out their projects on a larger scale. Finally, NextGen Lots mainly offers opportunities for industry leaders who are still looking for extra space and will have the same scope as other sites within the port area.
Zero pellet loss & plastic catcher (PoAB):. Plastic catcher aiming to reduce the loss of pellets to the absolute minimum and keep the port docks and inland waterways clean. PoAB launched a plastic catcher in 2019 that consists of 75% recycled materials and is modularly attached to the quay.
Antwerp@C, partnership for CO_2 capturing and utilisation (PoAB): Antwerp@C is a partnership between 6 of the port's largest emitters, gas TSO Fluxys and PoAB, with the ambition to realise cross-border infrastructure for CO2 capture, transport, storage, and utilisation. It investigates the technical and economic feasibility of building CO2 infrastructure to support future Carbon Capture Utilisation & Storage applications.
Cargo Flow Prediction (PoB): Aims to improve the efficiency and planning of container terminal operations using ML based on the relationship between sea and land operations. Two complementary services are proposed: (i) Forecast the number of collections and deliveries of containers for import and export. (ii) Prediction of the day of collection of an import container.
Vessel traffic optimisation (PoB): This project monitors vessel traffic and predict the effects of arrivals and mooring based on AI and big data. The objective is to develop a digital tool supported by positioning technologies (e.g., sensors, drones, geolocation) to provide the maritime control

tower with accurate and precise information about the ship's position and efficiently manage the mooring capacity.

4 - Exchange of technical information between the RDI projects and initiatives

The goal of work package 1, "Market uptake of PIONEERS PORTable Innovations", is to create a documentary of all implemented innovations within PIONEERS and other green port innovations. The innovations outside of PIONEERS are identified by through technology scouting and assessed in the WP 1 innovation forum. Hereby, the identification and mapping of relevant RD&I projects as described in Chapter 3 is one of the sources for the technology scouting and will facilitate the technical information exchange between RD&I projects and PIONEERS. The following chapter describes the main work streams in WP 1 that touch upon innovation scouting (4.1) and innovation forum (4.2) that will consequently lead to the portfolio of portable innovations (4.3).

4.1 - Innovation scouting

In order to create the PORTfolio of PORTable innovations as an informative and helpful online repository for both the consortium and stakeholders, WP1 will scan, discuss, assess and post-process all innovations within PIONEERS as well as all green port innovations identified by the technology scouting. Therefore, the technology scouting (Task 1.1) is an important activity, and foresees scanning a wide range of topic areas as presented in Table 4. The aim is to identify promising technologies for green port activities outside of PIONEERS.

Table 4: Areas of interest for the technology scouting

Area	Examples
Identifying best practise examples from other ports	ESPO and EFIP news section, general maritime media (Schiff&Hafen)

National and International R&DI projects for ports	Relevant projects & initiatives to PIONEERS Pillars (see list in Chapter 3)
Visiting port conferences	Green ports conference, ESPO annual conference, World ports conference
Review relevant publications for green port technologies	ESPO environmental report, ESPO annual report, EFIP annual report, etc.
Visiting port-related fairs	Smart ports fair, SMM
Investigate (technology) trends in other industries	TRA, Conferences of other transport modes like Stargate-conference (H2020 research project)
Seek cooperation with associations and networks	ESPO, EFIP, BOOTLEG

Once a promising technology outside PIONEERS is identified, WP1 contacts the responsible organisation or project to investigate its technological potential, and to determine if any transferability is possible, and further liaise where necessary. If the technological potential is demonstrated, the technology provider will be invited to the PIONEERS Innovation Forum. This will be an event in which technologies are presented and assessed by the Innovation Forum expert team in terms of environmental footprint reduction potential and economic viability in collaboration with WP 9, as well as transferability potential with the support of WP 8, which is especially relevant for technologies developed in other RDI projects.

4.2 - Innovation forum

An Innovation Forum is an event open to all European port stakeholders. The main objective of this event is to present, discuss and assess promising technologies supporting the green transition of ports. In this regard, the innovation forum also serves as a platform for cross-cooperation between stakeholders. The assessment of the promising technologies will be carried out by an expert group consisting of PIONEERS internal and external experts.

Table 5 shows a list of the planned expert group composition.

Table 5: Planned members of the innovation forum expert group

Organisation	Field of expertise
BALance Technology Consulting	Innovation management
Vectos	Transferability experts
University of Antwerp	Assessment experts
Port of Antwerp-Bruges	Port green innovation manager
Port of Barcelona	Port green innovation manager
Port of Constanta	Port green innovation manager
Port of Venlo	Port green innovation manager
PoAB	WP-leader of PIONEERS pillar "Clean Energy Production, Storage & Supply."
PSAA	WP-leader of PIONEERS pillar "Sustainable port design."
MOSAIC	WP-leader of PIONEERS pillar "Modal shift and flow optimisation."
AKKA	WP-leader of PIONEERS pillar "Digital port transformation."
ESPO	Expert of European Seaport organisation
EFIP	Expert of European Seaport organisation

The expert group will assess the introduced technologies according to a common criterion catalogue. If the assessment is positive, the technology passes the gate of the innovation forum. It will be further assessed within WP1 with regards to its innovation and business potential with the following working steps:

1. SWOT analysis
2. PESTLE analysis
3. Economic and environmental assessment (LCPA)
4. Development of business models

The results of the business potential assessment, especially the development of business models, will serve as an excellent starting point for developing the PIONEERS exploitation plans.

Ultimately, a second assessment gate must be passed before the new technologies become part of the PORTfolio of PORTable innovations.

4.3 - The PORTfolio of Portable Innovations

The PORTfolio of PORTable innovations is a repository of all implemented innovations within PIONEERS, and all green port innovations identified by the technology scouting, assessed in the WP1 innovation forum. This also includes the implementation plan, IPR directory and recommendations (see Figure 2). WP 1 envisions implementing the repository as an online platform, which contains and visualizes all relevant data obtained in WP 1, WP 8 and WP 9 filtered and targeted to different stakeholder groups, like other European ports, shipping companies, port technology suppliers, port staff, city authorities, energy providers, citizens, etc., and therewith foster the cross-cooperation between PIONEERS and these stakeholder groups.

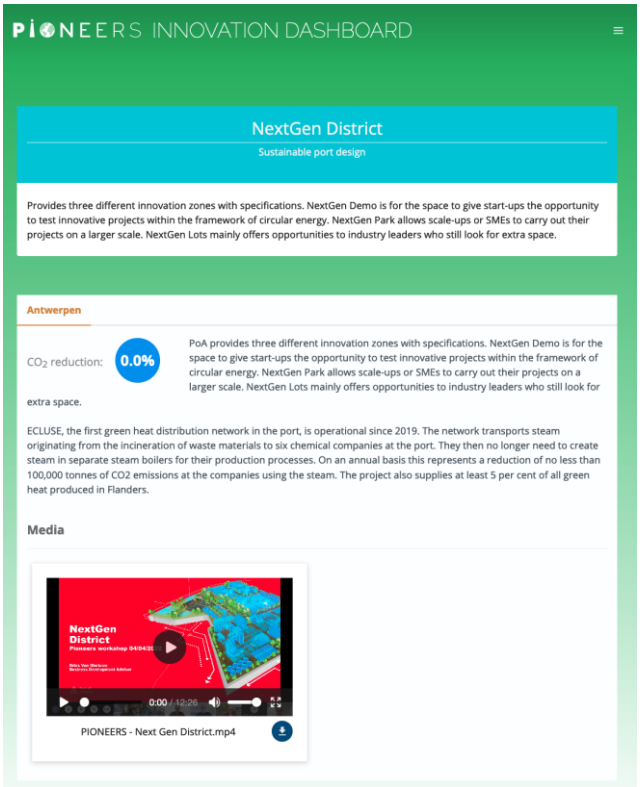


Figure 2: Screenshot of the first version of the PORTfolio of Portable Innovations

5 - PIONEERS Building blocks for Cross cooperation

The PIONEERS' project is segmented into twelve work packages, each helping the consortium partners to better schedule and monitor their actions. Given that multiple work packages carry out work simultaneously on different components of the project, a strong cooperation among them is required. This will aid in building the foundation needed for achieving the ambitious project objectives, externally replicating the collaboration model made at an internal level. Hence, this chapter briefly explains each WP's main objectives that provide a base for identifying gaps and complementarities on which to build long-term cross-cooperation.

As a matter of fact, most of the work packages described below include a set of documents to produce and deliver. These deliverables may be public to the community or may have dissemination restrictions. However, those that concern project conclusions can be shared and will be valuable tools to help the transferability of results in line with the work carried out by WP8.

Internally, as mentioned before in Table 3, there are work packages that complement each other. For example, WP10 cooperates with all work packages to guarantee that the developments are well communicated in a uniform way through PIONEERS' official communication channels. One of the main tools to communicate the overall achievements and activities of the WPs is the PIONEERS newsletter – a quarterly tool for internal and external communication. The newsletter is distributed through consortium and stakeholder community members and contains two different sections – one focused on upcoming and past events and the second related to the project's technical achievements linked to the demonstrations. This way of communicating the project's developments encourages and improves cross-cooperation by engaging both internal and external stakeholders and reinforcing the importance of synergies.

The capability of working together and sharing knowledge with the project partners and WPs is proving useful, resulting in more concrete and well-rounded deliverables and findings.

In terms of internal communication, this ease of communicating with other work packages results from thorough work, organising multiple meetings to exchange knowledge and developments. These restricted meetings, scheduled in advance, are a great tool to foster cross-cooperation

and often result in opportunities for capitalising events where partners may be present (General Assemblies, targeted events, etc.). Additionally, this is enhanced by a common platform/project management tool for all the consortium members (Bal.pm). The decision to use a single platform for sharing knowledge allows the creation of a single data container and a faster exchange of information.

Since one of the priorities of the project is to move beyond theoretical models and make a real and positive impact, the stakeholders outside the project must recognise that its developments, actions, and efforts to create a Master Plan are valuable, not only for the project partners but for all the ports committed to the (European) Green Deal. This interest in applying PIONEERS' conclusions to the daily functioning of ports worldwide is the connecting bridge to building a strong, proactive, and helpful community, which can and should be used for the sake of PIONEERS to collect more information on the stakeholders' necessities.

Table 6: Work packages description

Work Package	Description/Objectives
WP1 - Market uptake of PIONEERS PORTable Innovations	WP 1 aims to strengthen the market uptake with the PORTfolio of PORTable innovations and exploitation plans.
WP2 - PIONEERS Master Plan	The goal of WP2 is to deliver a MasterPlan for the future GreenPort, reconciling the economy, planet and people.
WP3 - PIONEERS Actions: requirements co-definition, specifications, cross-action alignment and deployment monitoring	The main objective of WP3 is to define the state-of-the-art enablers, barriers and challenges while identifying the stakeholder/user needs for the PIONEERS innovations. It also describes the specifications and requirements for the PIONEERS demonstrations and develops processes and tools to monitor the technical progress and provide feedback to evaluate the impact of the differente demonstrators.
WP4 - Clean Energy Production, Storage & Supply	The main aim of WP4 is to demonstrate in real port environments various solutions and innovations related to green energy production, distribution, and supply.

WP5 - Sustainable port design	The main goal of WP5 is to increase efficiency and sustainability by demonstrating green logistics operations and circular/low-emission building solutions in a real port environment.
WP6 - Modal Shift and Flows Optimization	The main objective of WP6 is to demonstrate in a real port environment the solutions and innovations related to multimodal mobility and flows optimisation of passenger and freight.
WP7 - Digital Transformation	The main purpose is to demonstrate the solutions and innovations related to digitalisation in a real port environment.
WP8 - Co-transferability of PIONEERS innovations	This deliverable aims to drive accelerated transfer and deployment of green port solutions amongst PIONEERS partner ports, resulting in measurable progress and commitments during and beyond the project timeframe and maximising the transfer potential of the innovations.
WP9 - Impact assessment and process evaluation	The main objective of WP9 is to develop an impact assessment method that should quantify both the net benefits and transferability of the Lighthouse port innovations implemented in the fellow ports.
WP10 - Cross-cooperation, Communication and Dissemination	The primary purpose of this deliverable is to create clear messages highlighting the strategic importance and added value of the greening potential of the ports' ecosystems, creating widespread awareness, promoting the lighthouse and fellow ports' demonstrations, and strengthening the visibility of the research and innovation competitiveness in Europe.
WP11 - Project Management, Legal and Ethical Compliance	WP11's purpose is to ensure the project's proper management, day-to-day coordination, and the achievement of its objectives on schedule and budget.
WP12 - Ethics requirements	The objective of this WP is to ensure compliance with the ethics requirements set out in this work package.

5.1 - Actions for managing the community

In D10.4 Community building programme design & implementation, a community model based on the project's main interests, needs and gaps was built at a conceptual level. For this purpose,

the Stakeholders community was launched digitally as a tool to foster cross cooperation with players outside the consortium and is available here: https://pioneers-ports.eu/stakeholder-community/. To ensure that the community remains beneficial and attractive to new members, it is crucial to carefully plan how to lead and develop new activities and actions to better manage such a community. Table 7 shows the activities that form the building blocks for cooperation.

Table 7: Building blocks for cooperation

Activity	Purpose	Description
1. Attend events related to PIONEERS' actions	Attract	Human contact is the best way to understand and analyse the openness of potential stakeholders to participate in a community. Additionally, this contact will be beneficial to know and understand the motivation behind their possible contributions to PIONEERS. On top of that, it will gather immediate feedback on the project, its aims and developments. For this purpose, an event calendar is prepared for 2023 to ensure proper coverage of all the PIONEERS' developed topics.
2. Organise Workshops/Events	Attract and Maintain/Involve	Organising events is a good way to enrich PIONEERS' database but also a way to gather interest in the project. These events may be in the public domain or reserved for community members – creating a sense of exclusivity and belonging to a small group in which the members feel comfortable sharing their experiences, knowledge and doubts. This knowledge exchange is significant for PIONEERS since the insights may help find the real needs

		and expectations of the stakeholders. The Innovation Forum organized under WP1 represents a first cross-action among WPs.
3. Recontact the members often	Maintain/Involve	Building networks is one of the best ways to promote developments and anticipate future collaborations. Capable of helping the project predict the market necessities, networks need to be maintained in order to retain periodically as much information as possible to facilitate PIONEERS' actions. Contacting members frequently will keep interest in the project high and create more opportunities to gather information.
4. Give helpful first-hand announcements	Maintain/Involve	First-hand announcements are one of the best ways to make the community feel unique and involved. The reward of communicating results ahead of their general release will make the community feel exclusive and differentiate them from the competition since they will have exclusive content that they can apply before anyone else. This will not only maintain the members already signed on but will also be a selling point for new members to register and be active in the community.
5. Networking events	Maintain/Involve	Participating in events organised by external entities will widen the project scope, and is crucial to promoting the project and its results. With the right approach, networking can provide an

		excellent opportunity for the participants and the project. This will create mutually beneficial relationships that will add value to the community and will be crucial to retaining members/prevent them from losing interest. The relationship of trust and support created by networking will be key to inviting community members to give insights and actively join the conversation - which is a plus for the project. Additionally, this idea of belonging to a community will help captivate the members and make them want to participate in the events.
6. New Partnerships	Attract	For PIONEERS, partnerships are a powerful tool to increase knowledge, resources, and expertise available, to make a better Green Port Master Plan and, in the implementation phase, to reach a greater audience. For the community members, the partnerships/relations with companies and other projects that PIONEERS has can be alluring, as they can expect a gain from that. Channelling PIONEERS partnerships to their businesses/projects and realities can be profitable and one of the main reasons to join the community.

The mentioned actions in this chapter can be maximised through the previous exploration of activities that stakeholders find important and value the most. The activities will be successful as they add substantial value to the target audience – listening and keeping track of the feedback

given is essential. Additionally, PIONEERS will distribute surveys to PIONEERS partners and external stakeholders to identify their specific needs and requirements regarding knowledge sharing and/or tools to do so. This bottom-up approach to getting input from the stakeholders will enhance cross-cooperation and the added value attributed to the project by the stakeholders.

6 - Impact of communication & dissemination results when stakeholders join forces

This chapter aims to provide concrete answers to the following: 1. how to establish cooperation between projects, 2. how to make the consortium members aware of the cooperation benefits, and 3. what tools PIONEERS uses to enable this coordination between entities. Following on from the previous chapter, where new ways of involving community members were identified, this chapter will reflect on the project's external collaborations (both existing and future collaborations). While one is able to reflect on the lessons learned from the events already occurred, it is important to define, in parallel, a future strategy taking into considerations the successful elements from the past e.g. the first PIONEERS International Conference. The benefits of such a future strategy are twofold. It intends to identify all relevant events where PIONEERS' can actively contribute as standalone or joint actions making the project visible to targeted audiences. Such events are listed in an interactive excel file and shared among the Consortium, for constant and mutual feedback. In parallel, WP10 will make sure to align in the preparation of any event – workshop, seminar, conference – organised by the Consortium partners under the umbrella of a specific WPs, i.e., WP1 and WP8, ports and demos workshops at a local level.

6.1 - Overview of past events

The past events were a huge opportunity for PIONEERS to spread the word about the project, its aims, and its main developments. Mainly represented by its lighthouse port, the Port of Antwerp-Bruges, the project was present in most of the relevant events in the area of transport and mobility

in Europe, reinforcing the ambitions of the project. According to the project's course, in future events, the focus will be on disseminating the technical results of the demonstrators and the related inputs for the Green Port Master Plan. For example, the organisation of joint sessions with multiple PIONEERS partners will reinforce the cross-cooperation benefits.

In Table 8, a brief description of PIONEERS' past events can be found, briefly describing the aim and the main outcomes.

Table 8: Events

Event	Data	Organisers	Main outcomes	Aim
Smart Ports: Piers of the Future	16-17 November 2021	Port of Barcelona, Port of Antwerp-Bruges, Port of Busan, Hamburg Port Authority, Port of Los Angeles, Port of Montreal, Port of Rotterdam	The Port of Antwerp-Bruges and the Port of Barcelona presented the project.	Create awareness about PIONEERS' goals and ambitions
TomorrowPorts connect session: building resilience in smart ports	25 November 2021	SPEED - The European Smart Port Eco System, co-organised by the Port of Antwerp-Bruges	The workshop focused on topics related to resilience in small & large ports and what digital technology can do for ports' resilience.	Knowledge exchange
Motorways of the Sea Forum	26 November 2021	DG Move	The Port of Antwerp-Bruges presented its strategy and the PIONEERS project in the session regarding "Energy transition and ports as energy hubs".	Create awareness about PIONEERS' goals and ambitions

Antwerp Stakeholder Workshop	2 December 2021	Port of Antwerp-Bruges / PIONEERS	The workshop had the following structure: (1) Synopsis of PIONEERS, (2) Presentation of demonstrators, (3) Interactive session to get to know the potential effect on the participant's business, the level of interest and the exchange of the participants' contact details, (4) Q&A session, followed by a survey to identify the high-level needs of the participants. The event counted 50 participants.	Knowledge exchange
Barcelona Stakeholder Workshop	2 December 2021	Port of Barcelona / PIONEERS	The workshop had the following structure: (1) Synopsis of PIONEERS, (2) Presentation of demonstrators, (3) Interactive session to get to know the potential effect on the participant's business, the level of interest and the exchange of the participants' contact details, (4) Q&A session, followed by a survey to identify the high-level needs of the participants.	Knowledge exchange

			The physical event counted more than 30 participants.	
Connecting EU Insights: Energy Transition in Ports and Logistics	15 December 2021	Connecting EU / Presence of Port of Antwerp-Bruges and Port of Barcelona	The webinar covered topics ranging from the new infrastructural needs of Ports & Terminals, the energetic role of Ports, and the challenges for multimodal supply chains.	Create awareness about PIONEERS' goals and ambitions
Constanta Stakeholder Workshop	20 January 2022	Port of Constanta, European Integrated Projects (EIP) / PIONEERS	The workshop focused on identifying, together with representatives of the port community and specialists in the field of innovation and environmental protection, the most effective environmental practices to be implemented or transferred to the port platform. The event counted 80 participants.	Knowledge exchange
Venlo Pioneers Workshop	22 February 2022	Municipality of Venlo / PIONEERS	The hybrid workshop presented and identified the most effective and innovative environmental practices to be implemented or transferred into the participating port communities. During the	Knowledge exchange

			event, several demonstrations of green innovation solutions were presented and discussed in detail regarding their implementation and transferability to the port communities while identifying possible barriers that may appear throughout the process.	
MAGPIE Conference	10 March 2022	MAGPIE / Presence of Port of Antwerp-Bruges	The event gathered 120 physical attendees and more than 100 online participants. The event promoted a round table with the title "Fellow ports and PIONEERS ports share their views", with the presence of multiple ports, including the Port of Antwerp-Bruges.	Create awareness about PIONEERS' goals and ambitions
AIVP World Conference Cities & Ports	10-13 May 2022	AIVP / Presence of ICCS	PIONEERS participated in the session dedicated to "Ports and Cities for the Energy Transition. Giannis Kannellopoulos (ICCS) – scientific and technical manager within the PIONEERS project – took part in the round table of the session, deepening	Create awareness about PIONEERS' goals and ambitions

			with the other top-tier speakers the role of ports as energy hubs and community builders to design and implement a sustainable development for port cities.	
ESPO Conference 2022	2-3 June 2022	Port of Valencia / Presence of PIONEERS and MAGPIE	The Horizon2020 Green Deal winning "Green Port" projects, PIONEERS & MAGPIE, took part in the ESPO Conference by organising a joint session. Both project coordinators, Inge de Wolf – PIONEERS, and Arne-Jan Polman – MAGPIE, shared insightful information about each project, describing the objectives and the innovative solutions implemented so far.	Create awareness about PIONEERS' goals and ambitions
Connecting Europe Days 2022	28-30 June 2022	European Commission	Both PIONEERS and its sister project, MAGPIE, led by the Port of Antwerp-Bruges and Port of Rotterdam, respectively, have their common ambition to scale up the current state-of-the-art of ports through demonstrating and	Create awareness about PIONEERS' goals and ambitions

			implementing smart solutions to reduce ports' environmental footprint and move towards GHG-neutral shipping by introducing clean energy production, storage and supply. In this context, PIONEERS and MAGPIE made a joint pitch during the event to present the path to the European Green Port of the Future.	
Green Port Master plan workshop in Bucharest	29-30 September 2022	Internal event: European Integrated Projects/ PIONEERS	European Integrated Projects, PIONEERS partner, familiarised the ports during a two-day workshop in Bucharest with various techniques that will support engaging with complex port systems and their actors.	Knowledge exchange
Green Deal Arena	4 October 2022	Shared Green Deal	Christian Norden, Innovation Manager within the PIONEERS project and Consultant at BAL, and Manuela Flachi, Senior Transport Manager at Magellan Circle, gather both online and in person (Brussels), respectively, with high-level	Knowledge exchange

			participants from diverse local movements, policy groups, and research institutes working on just sustainability transitions across Europe.	
NVB congress 2022	6 October 2022	Dutch Association of Inland Ports / Presence of PIONEERS and MAGPIE	With over 250 attendees, the event had the presence of PIONEERS and its sister project, MAGPIE. PIONEERS was represented at the Market Place by Peter van Wijlick (Municipality of Venlo), Gerwin Zomer (BISCI), Adriana Saraceni (Maastricht University) & Arnaud Burgess (Panteia).	Create awareness about PIONEERS' goals and ambitions
PIONEERS International Conference	19 October 2022	PIONEERS Consortium	The event hosted in Antwerp has been a powerful opportunity to set the basis of the continuous dialogue among the PIONEERS Stakeholders Community for the coming years, focusing on accelerating the transition to climate neutrality for EU ports. With plenary sessions, interactive breakouts, round tables and inspiring	Create awareness about PIONEERS' goals and ambitions Knowledge exchange

			speeches, PIONEERS confirmed the ambition to make green ports the norm for our sustainable future.	
Transport Research Arena 2022	14-17 November 2022	European Commission/Host Country (Portugal)	The project presented its innovations to the stakeholders' community by attending the largest European research and technology conference on transport and mobility. Thierry Vanelslander (University of Antwerp) presented the PIONEERS project's aims and developments towards the environmental impact reduction alongside Maarten Flikkema, who represented MAGPIE, Inge de Wolf, PIONEERS Project Coordinator, discussed the integration of PIONEERS' ambition and innovations in the EU strategic policy and the implementation of the roadmap at Strategic Session 3.2 which was chaired and organized by ETP-ALICE. Bart Paijmans	Create awareness about PIONEERS goals and ambitions

			presented PIONEERS at the ET-ALICE booth in the Logistics Innovation Theatre. Valeria Burlando, PIONEERS Communication Manager, answered the questions on how PIONEERS will achieve its objectives during the four days at the ALICE booth.	

PIONEERS is especially active in disseminating the project through events and workshop sessions. These events are organised by the project itself or by relevant entities and players active in the EU ecosystem.

6.2 - The satellite projects & EU initiatives

In the last round of the Horizon 2020 programme, which was focused on Green Deal policies, 73 projects have been financed under the Green Deal Calls (GDC). Such projects are supported by the Green Deal Projects Support Office (GD-SO) whose objective is to enhance synergies, ensuring collaboration and sharing of project results among them but also with relevant policy units at the Commission.

The projects have been grouped into five working groups (WGs), to explore potential similarities and shared interests. PIONEERS has been invited to take part in the Urban Mobility WG. Two meetings have already taken place and another one is foreseen at the beginning of 2023.

PIONEERS sister projects

A special mention goes to the other EU Green Deal project funded together with PIONEERS under the Port section - MAGPIE - whose aim is similar to PIONEERS. Their ambition is to reach a breakthrough in the supply and use of green carriers in transport to, from and within ports by creating energy efficiency solutions and supporting developments that make green energy

carriers available to the users. The main outcome for both projects is to create a Masterplan for European Ports to help them in the greening transition.

The similarities between PIONEERS and MAGPIE are a great opportunity to exchange ideas and knowledge about priorities and developments and an excellent chance to build a stronger database and a stakeholder community that can be complemented through a solid and continuous collaboration, as shown in Table 8. The synergies that can arise from the collaboration between both projects are:

- Goal setting;
- Strategy development and alignment;
- Stakeholder involvement;
- Developing roadmap;
- Implementing the roadmap;
- Addressing non-technical barriers in projects and strategies (organisational, government, taxes, social, etc.);
- Knowledge exchange with the Green Airport Project Tulips, Olga and Stargate.

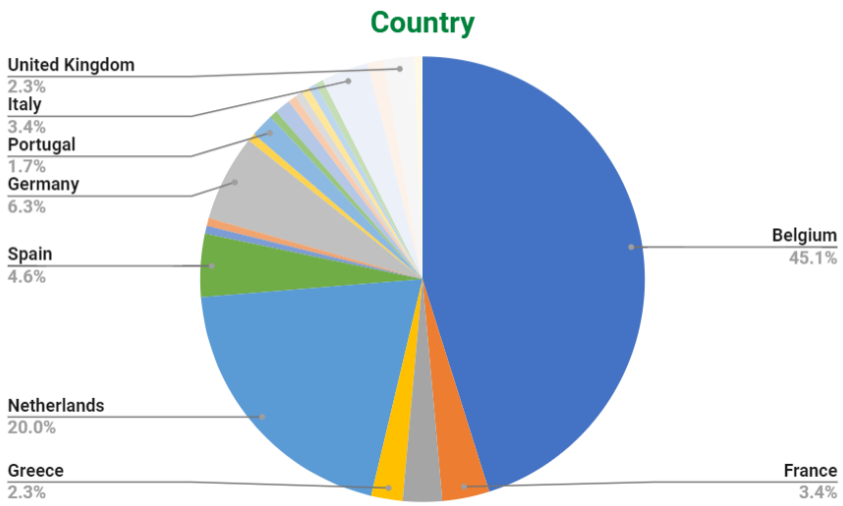
In the future, PIONEERS will continue to work together with MAGPIE in order to complement PIONEERS' mission and developments as well as optimising the financial efforts for maximising the results. Cross-cooperation with other projects is foreseen, for example, with the Aviation section of the EU Green Deal call, extending PIONEERS' scope of action and building a specific community for Green Deal projects' stakeholders. The first official (air) ports projects gathering (OLGA, STARGATE & TULIPS) is expected in January 2023.

6.3 – PIONEERS International Conference proceedings

The project's one year anniversary was celebrated at the first International Conference on October 19th 2022. Themed "Shaping the Green Port of the Future", the conference (held in Antwerp) was the perfect occasion to bring together ports, policymakers, industry players, academics, and technology providers to engage them in an intense and open discussion about how to make the process of transition to the envisioned desired sustainable future a reality, and starting the foundation of the change process.

With plenary sessions, interactive breakouts, round tables and inspiring speeches, PIONEERS confirmed the ambition to make green ports the norm of our sustainable future. The event was also a great opportunity to showcase most of the 19 demonstrators of the project. Their aim is not only to develop and demonstrate greening technology, but the lessons learned from these demonstrators will feed the Green Port Master Plan – one of the project's overarching deliverables.

With more than 170 registrations, PIONEERS was able to gather people with qualified skills from all around the world, from different backgrounds and organisations. In Graphic 1, the diversity of countries is portrayed. Moreover, the overall analysis of the registrants will be reflected in Annex 1.



Graphic 1: Participant's country

Due to the proximity to the event venue, and as expected, most of the registrants were from Belgium (45,1%), followed by the Netherlands (20%). As a consequence of travel restrictions from the pandemic, the number of participants outside of Europe was residual. Regarding the diversity of represented organisations, most participants belonged to the PIONEERS consortium. However,

the event also gathered the interest of representatives from other Horizon 2020 projects, public entities, ports organisations and entities in the ports and energy sector.

The detailed programme can be downloaded from the website https://pioneers-ports.eu/portfolio-item/pioneers-international-conference-download-the-programme/ . The plenary sessions in the morning were complemented by 4 breakout sessions in accordance with the 4 projects pillars. As seen in Table 9 below, delegates registered homogenously with a peak in the first 2 groups for the breakout session regarding pillar 1, clean energy production and supply, and pillar 2, sustainable port design.

Table 9: Registrants (Breakout sessions)

Name of the session	Number registered participants	Number missing participants
Clean Energy Production and Supply	49	12
Sustainable Port Design	45	14
Modal Shift and Flows Optimisation	34	9
Digital Transformation	39	13
No breakout session assigned	9	0
TOTAL	176	48
FINAL NUMBER ATTENDEES	128	

PIONEERS 1st International Conference gathered many interested external participants besides the large representation of the Consortium. Meeting physically for the first time, it is excellent news for the organisation and the communication team, who were hoping that PIONEERS would attract a broad and diverse audience. Additionally, the International Conference was an unmissable opportunity to gather feedback about the PIONEERS agenda & focus to later feed communication channels, such as social media. The interviews with some of the spokespersons are being used to maximise the impact of the involvement of external stakeholders, and to reinforce the effect of the communication, reaching out to external communities (e.g., ESPO, EFIP, etc.). A survey was conducted a posteriori to understand and analyse participants' feedback. Unfortunately, the response rate was too low to draw any definite conclusions. It does put into question the efficiency and attractiveness of such traditional method of poling for people's feedback. Nevertheless, the majority of people that did respond was satisfied with the

Conference, stating that it contributed to improve the knowledge about the project, and considered the event helpful and relevant for their job. The success of the event contributes to the transferability of the project's findings, as well as the preparation of upcoming PIONEERS conferences.

Figure 3: Communication of the International Conference in PIONEERS' social media

As an overall lesson learned, the International Conference was a fruitful opportunity to gather feedback from the Consortium partners and the remaining stakeholders about how they see PIONEERS in the near future. This feedback is crucial to adapt the communication strategy and adjust the activities organised by the project to the stakeholders' needs and interests. One of the topics pointed out by the participants was the necessity of an in-depth approach to the themes that are in the scope of the PIONEERS activity. The project communication after this first year of work, as mentioned previously, will be more focused on promoting the technical progress made by the project, which is of interest to the stakeholders. Activities like technical workshops will also be organised so that the PIONEERS community can be aware of the value that the innovations

will add, and so that PIONEERS can gather the feedback of external partners about the project's technical progress.

6.4 - Digital campaigns impact

PIONEERS is active on two leading social media, LinkedIn and Twitter. The engagement rate is quite high (Figure 4), with two (or more) posts per week published. The website section of the news is also fed regularly.

On Twitter there are 109 followers and 690 on LinkedIn (Figure 5). This means that the target of reaching 700 followers (goal at the end of the project) is almost reached. PIONEERS' official video, launched on October 20th, has been viewed 243 times (unique views, dated December 2022).

The two main campaigns on LinkedIn are the Meet the Partners segment, in which PIONEERS partners are presented, and, the PIONEERS Spoke Person segment, with brief interviews of five relevant stakeholders which attended the PIONEERS 1st International Conference.

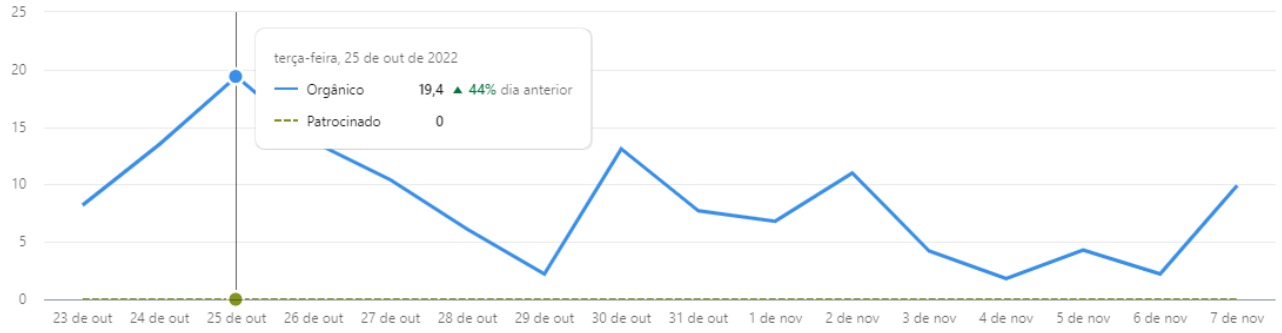


Figure 4: Engagement rate

6	PIONEERS Ports	649	120

Figure 5: Number of followers

In conclusion, exploring how to establish cooperation between projects and how the benefits of the cooperation can be communicated was until now fulfilled both digitally and physically. Additionally, the results from this cooperation need to be continuously promoted through network events, social media, stating clear communication of results and benefits. About the latter, it is crucial to create moments of debate and to share the conclusions of those partnerships, using for example common tools such as Teams or BAL.PM internally as well as the Stakeholders community platform externally.

7 - EU funding programmes supporting a new Green Ports vision

After elaborating on past relevant projects and initiatives (Chapter 3), portable innovations connected to WP1 (Chapter 4), internal consortium alignment in terms of WPs (Chapter 5) and engaging the broader community of stakeholders (Chapter 6), this chapter builds further on the existing WP10 activities by exploring and assessing future steps to ensure the relevance of the PIONEERS outcomes during/after the completion. Ports are centroids where various activities come together, integrate, interoperate, or co-exist. To facilitate the complex nature of stakeholders that are embodied in a port, several channels need to be explored to account for greening the ports, such as multimodal freight transport (intermodal and synchromodal), digitalisation of ports as well as directives and regulations that complement EU funding programs. This is to ensure that funded projects and strategies comply with directives and regulations in order to allow for executable outcomes and market uptake. The objective of this chapter is to provide an overview of EU funding programs and initiatives that can further accommodate the continuation of ongoing PIONEERS efforts.

The chapter focuses on current and future opportunities and funding schemes, and is structured as follows; firstly, the 1) railway connection to ports is addressed, secondly 2) Inland waterway transport (IWT) is described in relation to hubs and ports, followed by 3) the digitalisation and data sharing landscape in Europe and beyond. This setting in Sections 7.1-7.3 will form a basis for future steps and EU funding programs applicable to green ports in Section 7.4.

7.1 - Railways and connections to ports

Europe's Rail joint Undertaking (EU-Rail) is the successor of Shift2Rail, established in 2014. This new partnership between the European Commission and Rail partners was established recently (in 2021) and its aim is to deliver a high capacity, flexible, sustainable, multimodal, and, most importantly, integrated EU railway network. The integrated system approach forms an imperative pillar applicable to green ports as they represent the main nodes that are connected by roads, inland waterways, and rails. Therefore, assessing funding channels targeting rail freight is complementary in nature due to its overarching applications. In other words, port processes are connected to the hinterland which further supports modal shift to rails above a certain break-even distance (300-1200km, depending on different conditions). EU-rail aims to accelerate integrated, interoperable and standardised technological innovations, and these innovations should build on data strategies and existing standards for data exchange that will be described later in this chapter. The below EU-rail funding channel provides an overview of relevant rail-based innovations, with a focus on potential links to green ports. Calls that do not concern any links to ports (such as rail value chains for raw materials oversees during COVID-19, specific dynamic automatic coupler (DAC) deployment roadmaps, the feasibility of operational procedures of maglev-derived systems, bridge dynamics and rail-based moving infrastructure (PODs)), are excluded. In terms of rail-funding areas that overlap with ports, the EU-Rail funding channel has provided financial means via calls related to:

Network management planning and control & Mobility Management in a multimodal environment and Digital Enablers: they research and develop a European Traffic management layer that enables automatic management of cross-border train traffic by migrating legacy TMSs (Transport Management Systems). Ports can benefit from such developments by streamlining planning processes and reducing delays outside ports at borders.

Intelligent & Integrated asset management: Introducing innovating concepts and techniques such as Digital Twins and AI solutions to manage and optimise assets and integrate them with TMSs. Besides decreasing construction times, optimising life-cycle costs of assets and many more, the foreseen impact is to reduce CO_2 emissions from the maintenance of existing lines. In this regard, similar activities can be coupled with the port digital twins and AI solutions being developed in PIONEERS.

A sustainable and green rail system: aimed at innovative solutions focusing on energy consumption. Impacts are related to lower energy consumption, accelerating activities towards zero CO2 emissions in rail, greening the mode and considering hydrogen storage. The carbon footprint reduction via energy storage in PIONEERS can thus be linked to more sustainable green rail systems by encapsulating a more holistic approach to ports (viewing the rail network as green arteries connecting green ports).

Sustainable Competitive Digital Green Rail Freight Services: also emphasises an integrated sector systemic approach linked to digitalisation and automation of freight operations to induce modal shift and meet EU green deal targets, as well as supporting interoperability and integration with European networks that interact with other businesses; transport handling, intermodal operators etc. These focus points demonstrate the need to connect and interoperate with terminals and nodes, which green ports can represent.

Regional rail services / Innovative rail services to revitalise capillary lines: is aimed at regional rail services for passengers and freight. The local solutions should become scalable and interoperable at the EU level concerning system architectures and operations by demonstrating an integrated operations control centre covering radio blocking, interlocking and traffic management for regional lines. Such aspects are relevant to the vicinity of ports and their surrounding clusters of activities.

Digital & Automated and Autonomous Train Operations: A clear connection to ports and their greening can also be observed via various enablers of this call; self-driving freight wagons with cooperative awareness, autonomous route setting in terminals and depots, remote operation for shunting etc.

The above describes funding channels and the scope of Europe's rail program with closed calls in the year 2022. The envisioned scope and targets will materialise via funded projects and initiatives that should be tracked within PIONEERS to ensure broader connectivity and interoperability with green ports. As far as late 2022 funding calls are concerned (still open during the writing of this deliverable), more complementary elements are yet to come in the railway sector that can be leveraged within the 5-year PIONEERS project. The EU-Rail funding channel will further support the following:

New railway station concept for green and socially inclusive smart cities: converting rail stations to multimodal terminals, energy hubs, telecommunication nodes etc., to create more resilient networks adaptable to natural disasters and health crises. Such developments connected to SUMPs can lead to SULPs in close collaboration with green ports and satellite stations that are integrated within urban nodes.

Digitalisation and automation enabling new railway services for passengers and freight: innovative business models concerning digital solutions related to automation. The business case, user needs and expectations innovations in related sectors; hence, connectivity with green ports can be seen as a further opportunity to digitalise and interoperate rails with port processes.

Hyperloop Industrial Roadmap and pilots: setting up an industrial roadmap in parallel with a regulatory framework for hyperloop proof of concepts and market analysis. This relates to the identification of new corridors and lines where hyperloop solutions could pose a viable alternative. Such concepts have also been considered for ideation by the Port of Valencia and Port of Antwerp-Bruges in the hyperloop ALICE webinar[1].

Standardised offer/contract management for agile access to Rail Freight and multimodal services in the EU: mapping commercial and legal conditions to allow for shifting freight flows to other modes with a focus on the physical internet for logistics. Cooperation among various stakeholders, for instance inland waterways, the rail freight industry and terminal operators, is strongly encouraged. Green ports may thus present confluence points where all the stakeholders need to interact, sign and shift (electronically as well as physically).

The above calls present the current state-of-play within railways and EU funding programs. As pointed out above, there are various opportunities to interconnect and cross-fertilise with upcoming projects that have complementary elements with railway research, nodes, cities and digital elements, such as holistic interoperability.

7.2 - Inland waterways and connections to ports

As far as Inland Waterway Transport (IWT) is concerned, The European Commission has put forward a policy to promote the use of the mode via NAIADES 3 program that is in line with the

[1] » Hyperloop initiatives: state of play and perspectives for cargo (etp-logistics.eu)

EU green Deal and Sustainable and Smart Mobility strategy. The NAIADES 3 actions support further investment in the sector to better integrate inland hubs and ports within the TEN-T network. The current revision of the Combined Transport Directive also aims at including IWT in the action areas for incentives linked to eFTI developments; to facilitate emission measurements and reporting.

In terms of EU programs and financing, the Connecting Europe Facility (CEF 2) covering 2021-2027, will increase its budget for IWT studies and works by 50% and 88% (the latter percentage in cohesion countries). Besides studies and works, bottlenecks, cross-border issues and RIS (River Information Services) are also covered by the CEF 2 envelope. The total amount sums up to 25.81 billion for transport.

Alongside CEF and its successor CEF2, the Horizon Europe program has financed several IWT projects that are currently 1) closed such as Prominent, Energy Barge, DANTE, EMMA, RIS COMEX, GRENDEL, FAIRway works, FAIRway Danube, STEERER or 2) ongoing such as PLATINA3, DIWA, MOSES, AIGIS, IW-NET etc. The most recent funding program that focused on IWT, and hubs was framed under the call "Climate resilient and environmentally sustainable transport infrastructure with a focus on inland waterways (Horizon-CL5-D6-01-09)" out of which 3 projects relevant for further green port synergies came out:

1) Climate resilient and environmentally friendly transport infrastructure (Cristal): Applied in Italy, Poland and France, the Cristal project addresses the co-creation of integrated, cooperative and innovative solutions by considering aspects such as technological innovation, development and digitalization of processes towards the Physical Internet.

2) Deployment and Assessment of predictive modelling, environmentally sustainable and emerging digital technologies and tools for improving the resilience of IWT (PLOTO): Covering pilot sites in Belgium, Hungary and Romania, the project will tackle resilience of waterway infrastructure and land infrastructures by leveraging simulation tools and actual data to reduce climatic risks.

3) Resilience-centric, Smart, Green, Networked EU Inland waterways (ReNEW): Targeting infrastructure, synchromodal transport and resilience together with IWT dataspaces and digital twins in Gent (Belgium), Douro (Portugal) and the Netherlands.

As the above EU funding programs support 3 Innovation Action projects related to networks and infrastructures, it is imperative to transpose such learnings to green ports in order to assess delays and bottlenecks within networks that affect nodes (ports) and vice-versa. As a matter of fact, data spaces, digital twins, physical internet and overall integrative solutions are also part of the PIONEERS endeavour.

Another IWT example is the "Clean and competitive solutions for all transport modes (HORIZON-CL5-2022-D5-01)" call that has financed a recent SEAMLESS project (continuation of MOSES and AIGIS) which will develop building blocks and enablers for waterborne freight feeder services for Short Sea Shipping (SSS) and IWT. Crucial integrative parts that connect IWT and SSS are green ports. These connections will further enhance the TEN-T network by providing services of autonomous cargo shuttles with remote operating centres.

7.3 - Digitalisation and data sharing

Over the past years many initiatives have been developed at EU level focusing on data and data sharing (EU Data Strategy & Data Act). Important legislation around handling and sharing of data has been created and is (almost) implemented. A significant number of initiatives has been started in order to create architectures and operational processes in line with the general EU philosophy: data should be easily shared and a level playing field should be created in which all stakeholders can benefit from the added value data sharing can deliver.

The EU intends to create "Data spaces" in which stakeholders in specific processes can easily exchange data. The European Mobility Data Space (also for logistics) will benefit from new architectural designs like GAIA-X that are all built on the principles the EU maintains: safe and secure data sharing.

These developments will also have a significant impact on logistics, supply chains and port processes. Some examples stemming from the Digital Transport and logistics Forum (DTLF) are the electronic Freight Transport Information regulation: eFTI, and EMSWe initiatives and related projects (e.g FENIX and FEDERATED that aim to improve the exchange of data in the field of logistics. Additionally, there are several industry led initiatives in different sectors to support digital standardisation: Digital Container Shipping Association (DCSA), International Port Community Systems Association (IPCSA), Terminals TIC4.0, Open Logistics Foundation, GS1, International Data Spaces Association (IDSA).

Given the high pace of developments and the relationship between legislation, new data space initiatives, technology and industry developments, data sharing and data spaces have become the main focal points in EU strategy (as indicated in the next section). Many aspects of the digital developments are relevant for supply chains and green ports' processes, such as:

1. EU legislation and its consequences for supply chain and port operations in Europe.
2. New legislation that will be implemented in the coming years, like eFTI and EMSWe.
3. Mobility Data spaces, their design, architecture and applications.
4. The role of technology in this rapidly developing world aims at the holistic interoperability of modes.
5. Value proposition of new companies and orientations from big companies on requirements for data sharing.
6. Specific initiatives of research or governmental organisations in Europe that try to define and implement new processes in the digital world.

The following section brings together digital developments at different technological maturity levels in comparison with EU funding programs that cover Horizon Europe, Digital Europe and CEF2. Furthermore, it will explore ongoing funding opportunities for 2023.

7.4 - Future EU funding opportunities related to research, data spaces deployment and infrastructure

The previous section provided an overview of rail, IWT and data-sharing initiatives and calls. As rail and inland waterway modes point out the need for interoperability and digitalisation in multiple calls and projects in relation to ports, Section 7.4 addresses EU programs that are to facilitate such developments. Figure 7 provides an overview of general EU funding programs between 2020 until 2026. The plot reflects maturity levels on the left and their corresponding actions.

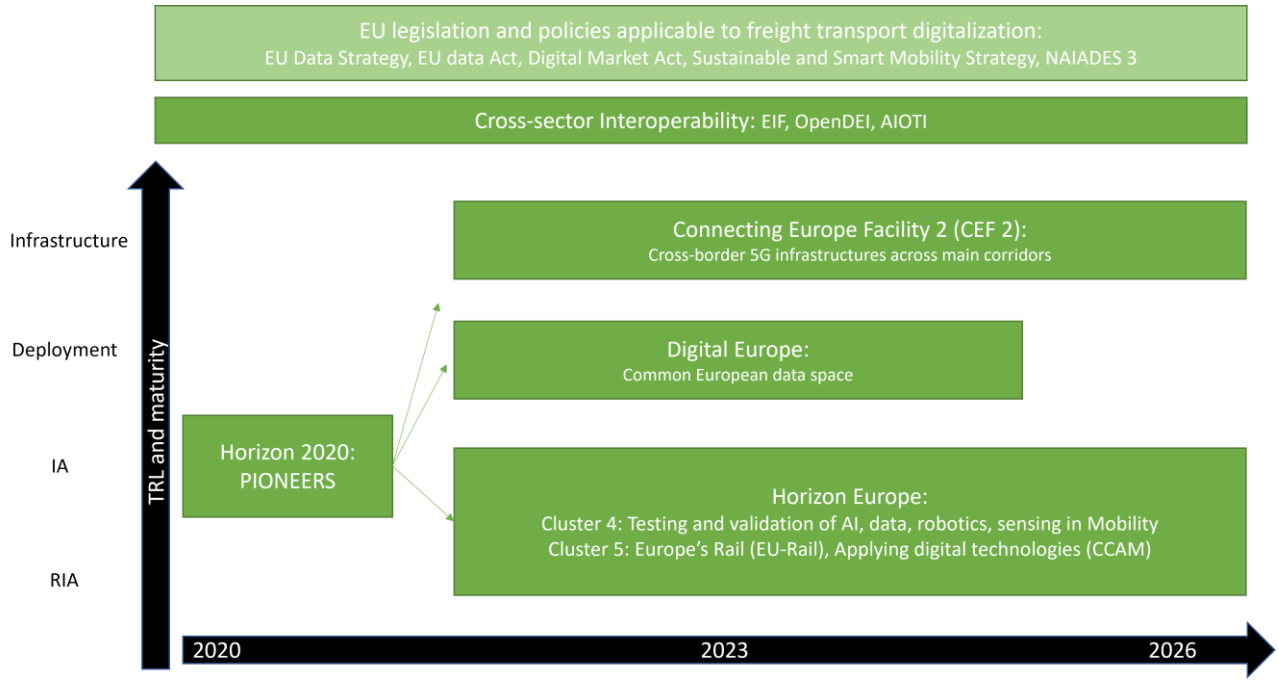


Figure 6: Overview of general EU funding programs over time in relation to Research and Innovation Actions (RIA), innovation Actions (IA), Deployment and Infrastructure. Source: adapted from the European Commission

The bottom rectangle (Horizon Europe) concerns Research and Innovation Actions (RIA) and Innovation Actions (IA) that are more research oriented with lower TRL, while deployment and infrastructure are connected to high TRL and market uptake, embodied by Digital Europe and CEF2. The figure sets the structure of the following sub-sections starting with opportunities linked to CEF2, followed by Digital Europe and Horizon Europe programs with deadlines in 2023.

7.4.1 Connecting Europe Facility 2 (CEF digital)

Operational Digital Platforms (ODPs):

Preparation of works for Operational Digital Platforms (ODPs) under coordination and support action. ODPs intend to support the EU's environmental, energy and transport targets by providing both technologies and connectivity to enable a cyber-secure Internet. This is to optimise transport systems along the major TEN-T networks. The call will help "retrofit" existing energy and transport infrastructures with the required cross-border digital infrastructure linked to 5G objectives. Works funded by this call will seek to identify the most appropriate cases to be funded by subsequent calls and deliver the building blocks required for the timely deployment of the

identified cases. The call is also complementary to the previously mentioned data spaces that further connect to the federation of European cloud and edge services.

Backbone Networks for Pan-European Cloud Federations:

This call is designed to co-finance feasibility studies to explore the needs and requirements for future deployment of cross-border and national cloud infrastructure interconnections at both the physical (very high-capacity networks) and functional levels (management systems, software-defined infrastructures). The call is relevant for transport and mobility stakeholders, as it sets the scene for investigating topics such as supporting cloud infrastructure between transport authorities and operators. This CEF2 call is also complementary to the Digital Europe program (addressed below), which is focused on interoperability between data service providers. It should thus define the needed 1) investment roadmap for an EU cloud federation, 2) technological roadmap to process data via common EU dataspaces and 3) definitions of large-scale green deployment of such infrastructures.

5G Coverage Along Transport Corridors:

As far as 5G corridors are concerned, they present key enablers for connected and automated mobility, and the EU is supporting the deployment of 5G corridors along major transport paths (TEN-Ts). This is a preparatory action that builds on previous studies that addressed testing and validation when there were no operational 5G corridors back in 2021. The call is linked to both inception studies that will prepare the works of the next big waves of deployment planned to start in 2023 as well as the implementation works themselves. It will continue to support the deployment of 5G infrastructure along transport paths for connected and automated mobility, including roads, rail, and inland waterways, and a combination of the above to ensure interoperability of ports and modes discussed in previous sections.

7.4.2 Digital Europe program

Common European mobility data space: launch of the preparatory action:

The preparatory action on the common European mobility data space started on 1 October 2022, running under the name 'PrepDSpace4Mobility'. While CEF2 supports coordination mechanisms to federate national access points, this data space preparatory action intends to create an inventory of existing solutions, platforms and ecosystems to assess a common data-sharing

framework. It is currently being conducted by the German National Academy of Science and Engineering and will run until September 2023[2].

Deployment of the data space for mobility:

The primary focus of this call lies in identifying and supporting the deployment of mobility data-sharing use cases in the area of urban mobility based on data space building blocks. This will allow the deployment of an operational data space enabling participants to make available and share data in a controlled, simple and secure way amongst cities, public transport authorities, industry and SMEs. Building on SUMI (sustainable urban mobility indicators), machine-readable formats will be used (to enable and support AI solutions) in order to gather data and information on emissions, congestion levels, modal split etc. Since most ports embody cities and vice-versa, opportunities for interoperable solutions that monitor wider agglomerations are applicable to green ports.

Data space for smart communities:

This call seeks to pilot and apply the principles of the data space for smart communities on a large scale and with extensive geographical coverage. Following sectorial legislation, appropriate standards will have to be used to enable a green transition and compatibility with the new European Bauhaus. Synergies should be exploited with the common European mobility data space and with the data available on transport National Access Points and make use of the earlier mentioned SUMI indicators. To this end, an alignment with the Smart Middleware Platform and other data spaces will be facilitated by the Data Spaces Support Centre, semantics, standards, reference architectures, and interoperability protocols.

7.4.3 Horizon Europe program

The last EU program depicted in Figure 8 is Horizon Europe, which has direct links to ports:

Integrated real-time digital solutions to optimise navigation and port calls to reduce emissions from shipping: Involving at least three ports and two shipping lines, the call addresses interoperable port call and voyage optimisation. This is to reduce GHG emissions and increase

[2] Interested parties can contact kirstein@acatech.de) or (monica.castaneda@eiturbanmobility.eu) to received updates and invitations

fuel savings. Developing harmonised collaborative standards for communication between stakeholders for interoperable optimisation clearly links to our previous interoperability initiatives, data spaces, and digital funding schemes discussed earlier.

Developing small, flexible, zero-emission and automated vessels to support shifting cargo from road to sustainable Waterborne Transport: to increase waterborne freight in coastal and inland or congested urban regions. Focusing on the use of less developed ports which are not accessible to larger vessels, the green ports master plan can pave the way to showcase the transferability and generalizability of the PIONEERS' Master Plan.

Climate resilient and safe maritime ports: to ensure resilience of infrastructure of a) seaports, b) connected inland waterways infrastructure, and c) connected hinterland infrastructure against extreme weather events by assuring at least 80% operability during the disruptions. As the call points out, the need for port and waterway operations to take action to strengthen adaptation and resilience, solution areas such as the Destination Earth digital twins can align with digital twin developments in PIONEERS and other green ports initiatives.

8 - Conclusions

The present document underlines the importance of cross-cooperation and synergies with European projects and initiatives. Actions for achieving such objectives have been thoroughly reported.

From a communication point of view, this deliverable mapped all relevant projects and initiatives that are and will be approached to broaden the stakeholder community of PIONEERS. Furthermore, it also reflected on the work done in other work packages, pointing out the importance of internal collaborative work for replicating afterwards at the external level.

Strategies to improve and promote cross-cooperation - internal and external - were identified to attract new stakeholders for the project and maintain and involve the members collaborating with PIONEERS. These strategies will be continuously monitored and coordinated by WP10, which is responsible for measuring the impact of the activities from a communication and dissemination point of view, especially when stakeholders join forces.

The document also points out the importance of using internal and external events as tools to receive input from the consortium and remaining stakeholders. Therefore, it considers events and social media as two of the most important channels to promote the project and to build connections that will be useful for the project's outcomes and transferability.

Finally, this deliverable encourages the discussion of the EU funding programmes, pointing out future opportunities for creating fruitful synergies that will accommodate the continuation of ongoing PIONEERS efforts during and after the project.

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10 - Annexes

PIONEERS first International Conference 19 October 2022 - List of participants:

	Country	Position	Organisation
1	Belgium	adviseur milieu en duurzaamheid	Alfaport Voka
2	France	Dissemination leader	MAGPIE
3	Romania	Managing Director	European Integrated Projects
4	Belgium	Comms	Magellan Circle
5	Greece	Undergraduate student	Naval Architecture and Marine Engineering
6	Netherlands	Transport economist Team Manager	Panteia
7	Netherlands	CEO	DANSER GROUP
8	Netherlands	Projectmanager Pioneers POV	City of Venlo
9	Romania	Legal Advisor	National Company "Maritime Ports Administration" - PoC
10	Belgium	Business Developer & Product Manager	Sensata Technologies
11	Belgium	Managing Director	Antwerp Euroterminal
12	Netherlands	Researcher	University of Maastricht
13	Belgium	EU coordinator	Flemish Ministry of Mobility and Public Works
14	Netherlands	Project Lead	Macomi
15	France	pt	anef
16	Spain	Responsible of Infrastructures	Port Authority of Las Palmas
17	Netherlands	Partner	Macomi B.V.
18	Greece	Assoc. Professor	National Technical University of Athens
19	Belgium	Secretary-General	CEDR
20	France	Consultant	M2B Solutions
21	Italia	Scientist researcher	CNR-INM - Institute for Marine Engineering
22	Taiwan	Distinguished Professor	National Kaohsiung University of Science and Technology
23	Germany	Managing Partner	PLANCO Consulting GmbH
24	Belgium	Manager Sustainable Solutions	Antwerp Terminal Services
25	Belgium	Group QHSe Director	Euroports Group
26	Netherlands	Advisor clean inland navigation and port	City of Nijmegen

27	Spain	CEO	Mosaic Factor
28	Spain	Professor	University of Cádiz
29	Belgium	Responsable des Affaires Européennes	HAROPA PORT
30	Belgium	Chargée de Mission Affaires Européennes	HAROPA PORT
31	Netherlands	EU Affairs Manager	Hezelburcht (grant support)
32	Belgium	EU Affairs Director	AKKA Technologies (now Akkodis)
33	Belgium	General Manager	BCTN Belgium
34	Belgium	liaisonofficer	VLEVA
35	Greece	Civil & Transportation Engineer M.Sc, PhDc.	Volos Municipality / p. Volos Port Authority
36	Belgium	Projects & Policy Manager Sustainable Shipping	Port Of Antwerp - Bruges
37	Netherlands	Marine Decarbonisation Account Manager	Shell Marine
38	France	Industrial Environment Manager	HAROPA PORT
39	Belgium	Project Manager ePIcenter	Port of Antwerp-Bruges
40	Belgium	port area planning officer	Department of environmental and spatial planning
41	Indonesia	Lecturer	Universitas Pasundan
42	Netherlands	ext. adviseur	Gemeente Venlo
43	Netherlands	Vice President Hydrogen Energy NEC	Air Liquide Group
44	France	Director Solution Development	Air Liquide
45	Greece	Unit Leader, Logistics & Maritime	ICCS
46	Spain	PMO Manager	Mosaic Factor
47	Spain	Head of Innovation	Port de Barcelona
48	Belgium	PIONEERS Employee	University of Antwerp
49	Germany	R&D Project Manager	AKKA
50	Belgium	Green Ports Master Planner	Port of Antwerp-Bruges
51	Netherlands	Project Manager	VDL Steelweld
52	Netherlands	Project Manager	VDL Steelweld
53	Netherlands	Office Manager & Project Management	Supply Chain Valley
54	Germany	Tech Line Leader – Automation	AKKA Technologies
55	Netherlands	CEO	Pharox B.V.
56	Belgium	CTO	AKKA BELGIUM - Akkodis
57	Belgium	Communication Officer	Airport Regions Council
58	Germany	Head of Corporate Development	duisport - Duisburger Hafen AG
59	Belgium	Senior Project Manager	Airport Regions Council
60	Belgium	Founder, Lead Business Development & Partnerships	CLEANconnect

61	Portugal	Dr	ADSA - Academia de Saberes de Aveiro
62	Germany	Senior Project Manager – Research and Innovation	duisport - Duisburger Hafen AG
63	Norge	CEO	NUAer
64	Netherlands	Project coordinator MAGPIE	Port of Rotterdam
65	NIGERIA	MANAGING DIRECTOR/ CEO	LAWRENCE OLANREWAJU
66	NIGERIA	PERSONAL ASSISTANT	LAWRENCE OLANREWAJU
67	Germany	Junior Project Manager Corporate Development	duisport - Duisburger Hafen AG
68	Germany	Consultant	BALance Technology Consulting GmbH
69	Netherlands	executive director	Experion Global
70	Belgium	R&D Engineer	Seafar
71	Netherlands	Project Manager	Envision Digital
72	Netherlands	Director	Envision Digital
73	Belgium	Project Manager AKKODIS Research	AKKODIS
74	Sweden	CEO	Elonroad AB
75	Belgium	Project manager	Bond Beter Leefmilieu
76	Belgium	Account Manager	PoAB
77	Belgium	Beleidsmedewerker rond duurzame havens	Departement MOW - Vlaamse Overheid
78	Spain	Chief Operating Officer International	Prodevelop
79	Netherlands	Master Student	University of Maastricht
80	Belgium	Project manager - Concrete technology	Belgian Building Research Institute (BBRI)
81	Belgium	Project manager - Concrete technology	Belgian Building Research Institute (BBRI)
82	Spain	R&D Engineer	Prodevelop
83	Belgium	Finance Manager	Antwerp Euroterminal NV (AET)
84	Belgium	Senior Researcher	imec - IDLab -UAntwerpen
85	Belgium	Professor	University of Antwerp
86	Netherlands	Strategy Advisor	Port of Rotterdam
87	Belgium	Terminal Manager	Antwerp EuroTerminal
88	Belgium	Maintenance specialist	Port Of Antwerp Bruges
89	Belgium	Communications and Project Manager	IWT
90	Georgia	N.miminoshvili@mta.gov.ge	MARITIME transport Angecy of Georgia
91	Netherlands	Innovation manager	FIMC
92	Belgium	PIONEERS Project Coordinator	Port of Antwerp Bruges

93	Belgium	Controller	Port of Antwerp-Bruges
94	Belgium	Head Of Controlling	Port Of Antwerp-Bruges
95	Netherlands	Project manager	FIER
96	Netherlands	Project mnager	FIER
97	Belgium	Phd student PIONEERS	University of Antwerp
98	Belgium	Beleidsmedewerker	MOW - Beleid
99	Netherlands	Developer Docking Infrastructure	Zero Emission Services (ZES)
100	Belgium	Business Analyst	Infrabel ICT
101	Netherlands	Master student	Maastricht University
102	Netherlands	Master thesis intern	Macomi
103	Portugal	Senior Transport Manager	MagellanCircle
104	Singapore	Regional Marketing Specialist	Infineon
105	Canada	Head of energy transition	Port of Montreal
106	Danmark	public advisor	Danish Civil Aviation and Railway Authority
107	Portugal	Consultant	Magellan Circle
108	Belgium	Coordinator	EU IWT Platform
109	Belgium	Business Development Advisor	Port of Antwerp-Bruges
110	Italy	Masters student	Tor Vergata University of Rome
111	Turkey	G. Manager	IWROBOTX Autonomous Ship Technologies Inc
112	Belgium	Hoofdadviseur	Vlaamse overheid
113	Netherlands	Program Director	City of Venlo
114	Turkey	Lecturer	Beykoz University
115	Belgium	Investments Advisor	Schot Investments
116	Belgium	Project Development Manager	CMB.TECH NV
117	Netherlands	General Manager Operations & Projects	Danser Group
118	Belgium	PhD Researcher	University of Antwerp
119	Belgium	PhD researcher	University of Antwerp
120	Belgium	Innovation & Business development	De Meyer NV
121	Belgium	CEO	De Meyer NV
122	Belgium	Professor	University of Antwerp and Ghent University
123	Italy	Associate Professor	University of Genova
124	Belgium	Key Account Manager Invest & Development	Port of Antwerp-Bruges
125	Belgium	Thought Leader & Program Manager	Lineas
126	Italy	Professor	University of Genoa
127	Belgium	Researcher	VITO

128	Belgium	Researcher	VITO
129	Italy	Senior Consultant	Magellan Circle
130	Netherlands	Consultant	Panteia
131	Belgium	Btm	Port of Antwerp-Bruges
132	Belgium	Business Development Advisor	Port of Antwerp-Bruges
133	Belgium	R&D Team Lead	IMEC
134	Spain	Technical Director	RACC
135	Germany	Development Engineer	AKKA
136	Belgium	Mobility advisor	City of Antwerp
137	United Kingdom	Environment Manager	RS
138	Belgium	Senior researcher	VUB
139	Belgium	Secretary General	Veltha
140	Belgium	Secretary General	ESPO
141	Belgium	Vice President	PoAB
142	Belgium	Project advisor	CINEA
143	Romania	Pioneers Project Manager in Eng Environment Office	Port of Constanta
144	Romania	Head of Foreign Affairs	Port of Constanta
145	Romania	Sef Compartiment Energie Electrica Sucursala Energetica Port	Port of Constanta
146	France	Director of Development and Innovation	Grand Port Maritime de Bordeaux
147	Switzerland	Head of Supply Chain & Transport Industries	World Economic Forum
149	Netherlands	Verduurzaming binnenvaart Programmacoördinator RH2INE PZH Coördinator Internationale corridors / EGTC	Provincie Zuid-Holland
150	Belgium	Externe medewerker – Program Management DI/DBExterne medewerker – Program Management DI/DB	PoAB
151	Belgium	Research Fellow, Fabric & Home Care Open Innovation	Procter & Gamble
152	Germany	Associate Director	Vectos
153	United Kingdom	Senior International Project Officer	Vectos
154	United Kingdom	Business Development Manager	Rightship

155	United Kingdom	Business Development Manager EMEA	Rightship
156	Belgium	Head of Benelux - Public Sector & Infrastructure Unit	European Investment Bank
157	Belgium	funding desk assistant	PoaB
158	Belgium	Sustainability Engineer	PSA
159	Belgium	public affairs advisor EU	PoaB
160	Belgium	Public Affairs Manager	PoaB
161	Germany	Researcher	Technische Hochschule Ingolstadt
162	Germany	Secretary General	ALICE
163	Netherlands	Business Developer	Zero Emission Services
164	Belgium	Technical Manager Building Technology	PoAB
165	Netherlands	Product Manager	VDL
166	Netherlands	Project Engineer	VDL
167	Belgium	Project engineer	De Meyer NV
168	Belgium	Business solutions architect	PoAB
169	Belgium	Director	EFIP
170	Belgium	Policy Officer EU	Flemish Government
171	Italy	Student	University of Genova
172	Italy	Student	University of Genova
173	Belgium	Director at CITBO & Secretary of the EU-IWT Innovation & Greening committee	CITBO & IWT
174	Belgium	Journalist	
175	Netherlands	Programme Director Logistics	Brightlands Institute for Supply Chain Innovations (BISCI)
176	Belgium	Researcher	Antwerp Management School

11 - Annex II

EU-funded projects related with PIONEERS Pillars:

Project	Port	Keywords
AEGIS	Port of Aalborg, Vordingborg Port, Trondheim Port Authority	Marine automation, green intermodal systems
AUTOSHIP	Norway	Automation, next gen port, supply chain, shortsea shipping transport
AVATAR		Zero-emission, automated vessels, autonomous ship units
BCLink	Port of Barcelona	Motorways of the Seas (MoS)
CarEsmatic	Port of Barcelona	Motorways of the Seas (MoS), electric and hybrid vehicles
CITYLAB	City Logistics in Living Laboratories	Emission-free city logistics in urban centres by 2030
Clinsh	Port of Antwerp-Bruges, North Sea Port	Greening measures, air quality
Core LNGas Hive	Port of Barcelona	LNG, RO/RO vessel, Straddle Carriers, clean energy
COREALIS	Port of Antwerp, Valencia Port, Port System Authority of Northern Tyrrhenian Sea	Cargo flow optimized, 5G, IoT, Energy assessment
Creators	Port of Barcelona	Smart energy, Community Energy Systems
DISpATch		Digital twin. Synchro modal transport
DocksTheFuture		Digitalization, sustainability
Ealing	Port of Barcelona	Alternative fuels, Onshore Power Supply, Cold Ironing
enerPort II		
ePIcenter	Port of Antwerp-Bruges, Port of Montreal, Algeciras Port	AI driven logistic software solutions,
ePIcenter	Port of Antwerp-Bruges	Digital transformation, containers, connectivity
FENIX		Data sharing, Transport network

GREEN EFFORTS	Green and Effective operations at Terminals and in Ports	Reduction of energy consumption, clean energy mix
H2SHIPS	Amsterdam port authority	Hydrogen bunkering, vessels, hydrogen power and refueling system
IMMERSE	Port of Antwerp Bruges	Sustainable management
iNGENIOUS		IoT, 5G
ISOLA		Ship security, automation
LNGHIVE2 Barcelona	Port of Barcelona	LNG bunker barge, reduction of polluting emissions in maritime transport
MAGPIE	Port of Rotterdam, Port of Sines, HAROPA Port, Fellow ports DeltaPort	Multimodal hubs, green energy containers, inland shipping, smart energy systems
MiRO 2	Port of Barcelona	Multimodal combined transport, interoperability, reduce environmental impact, carbon footprint and greenhouse gas emissions.
MOSES	Port of Valencia, Port Authority of Mykonos	System automation, supply chain optimization, sustainability
NEXTRUST	Building sustainable logistics through trusted collaborative networks across the entire supply chain	Interconnected trusted collaborative networks.
NOVELOG	New cooperative business models and guidance for sustainable city logistics	Policies and measures for freight distribution and service trips
PIF building Energy improvement[26]	Port of Barcelona	Energy efficiency, renewable energy, photovoltaic systems
PILL	Port of Antwerp-Bruges	Autonomous operations, digital twin, IoT
PIXEL	Port of Piraeus, Thessaloniki Port Authority, Port Network Authority of the Eastern Adriatic Sea, Grand Port Maritime de Bordeaux	IoT, multimodal transport
PLANET		Energy flows, synergies, reduced emission

PLATINE3		Inland navigation, zero emissions, automation, clean energy hubs, fleets
PortForward	Port of Vigo, Port de Balears, Port System Authority of Northern Tyrrhenian Sea, Port of Kristiansand, Port of Magdeburg	Green ports, sustainable ports
RePort	Port of Barcelona	Reduce emissions, LNG, CNG
SANTANA	Port of Hamburg	Digital infrastructures, transport network
Smart Ports Entrepreneurial Ecosystem (SPEED)	Port of Antwerp-Bruges	Sustainable maritime transport, smart port, port logistics
SUCCESS	Sustainable Urban Consolidation CentrES for conStruction	Construction, supply chain actors
SWARMPORT	Port of Rotterdam	Automation, nautical traffic management
U-TURN	Rethinking Urban Transportation through advanced tools and supply chain collaboration	Freight distribution in urban areas
enerPort II	Port of Duisburg	Sustainability. Hydrogen, energy storage, renewable energy
DATAPORTS	Port of Valencia, Port of Thessaloniki	Data Platform, Cognitive Ports, AI, IoT, PCS