FRAMESPORT Toolbox

Final Version of 29/06/2023

D.5.4.2

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Project Full Title	Framework initiative fostering the sustainable development of Adriatic small ports
Project Acronym	FRAMESPORT
Project ID	10253074
Project Website	https://www.italy-croatia.eu/web/FRAMESPORT
Priority Axis	4 – Maritime Transport
Specific Objective	4.1
Work Package	5
Work Package title	INNOVATIVE TOOLS AND SERVICES BOOSTING STRATEGIC DEVELOPMENT OF SMALL PORTS
Deliverable Nr.	5.4.2
Status	~~Draft/Revised/~~Final
Partner in charge	ITL
Dissemination Level	Public~~/Partnership~~

ACKNOWLEDGEMENT

The work described in this document was supported by the INTERREG V-A IT-HR CBC Programme - "Strategic" Subsidy Contract - Project: "Framework initiative fostering the sustainable development of Adriatic small ports, FRAMESPORT" (Project ID: 10253074).

DISCLAIMER

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1 Introduction

The FRAMESPORT toolbox (D5.4.2) represents the synthesis of the effort of partners involved in WP5, as it resumes the main results of the pilot actions translating them in a collection of tools with instructions on how to scale up the practical experiences made in FRAMESPORT. The main key messages from the pilot actions converged in the toolbox, contributing to underpinning the backbone of the FRAMESPORT strategy.

D5.4.2 illustrates firstly the process of analysis and systematisation of the outcomes from the 25 pilot actions carried out during the project and then presents the ultimate outcome of the activity 5.4 “Pilot actions resume and scale-up”, which is the FRAMESPORT toolbox itself. The toolbox comprises 21 complementary tools that are fully described in Chapter 3 "The FRAMESPORT toolbox,", through dedicated summary sheets, also including references and links to useful additional resources.

After having outlined the process of analysing and systematising the outcomes obtained from the 25 pilot actions, these have been translated into tools that are categorised according to three macro-topics: three priority axes on which the approach followed by the small ports involved in pilot actions is converging: **Sustainable Growth, Business Development and System Management**. In addition, the tools have been categorised based on their utility by three main planning phases: **Scoping and framing, Strategic planning phase, Operational design and implementation phase**.

The document then presents the final output of activity 5.4 "Pilot actions resume and scale-up".

Of particular interest are the final reports from WP5, specifically:

- D.5.4.1 – Reports on pilot actions replicability (one for each pilot actions + one overview)
- D.5.3.2 ‑ Pilot action final reports (one for each pilot actions + one overview).

These documents represent the initial source of practical knowledge for the implementation of the FRAMESPORT tools and are frequently referenced as primary resources to be consulted for a deeper understanding of the use of the tools in the toolbox summary sheets (Chapter 3).

2 From pilot actions to tools

During the project 14 partners have run 25 pilot actions working together with local stakeholders, to test and validate practical solutions in the real context of their territories. Several stakeholders have been involved, ranging from local authorities to educational institutions.

The pilot actions have been developed following a common methodology, and along five macro-themes, preliminarily identified in the preparation phase to cover the main requirements arising from the small ports and the surrounding territories:

- Environment and energy aspects (E&E)
- ICT application and service development (ICT)*
    - Promotion of ports' resources and territory (ICT – Promotion)
    - Harbour and navigation safety (ICT – Safety)
    - Management of port operations and services (ICT - Mgt/services)
    - Monitoring of seaside and landside port areas (ICT – Monitoring)
- Spatial planning and management (P&M)
- Training and knowledge aspects (T&K)
- Business oriented aspects (BIZ)

**The macro-theme ICT has been further split in four sub-topics, to better focus on the different areas that ICT faces, as a cross-cutting theme.*

All partners could benefit from the transnational approach of the project; thanks to the continuous exchange of practices and know-how during planning and implementation of the actions and to the project-level supervision applied to monitor advancements, they did ensure a comprehensive approach to the different experiences and full complementarity.

All pilot actions were successfully completed, resulting in significant achievements in terms of lessons learned and tangible outcomes, that contribute and will continue in the future to the development of small ports on both sides of the Adriatic coast of Italy and Croatia and, most importantly, to setting the basis for the creation of a common strategy for the transnational area.

The outcomes of the pilot actions were analysed together by applying a comparative approach that highlighted common features and possible beneficial synergies, and, above all, their potential to

become widespread, useful and usable tools to be scaled up and transferred to other contexts and territories wishing to follow the same sustainable development direction.

The resulting synthesis of the pilot experiences is a collection of 21 tools, including guidelines, models, learning materials, IT applications, and successful case studies. These tools are designed to support the sustainable development of small ports throughout the entire Adriatic area, ensuring the replicability and transferability of the outcomes achieved.

In the following sections, the process of analysis of the outcomes of the pilot actions is summarised, focusing on the three identified Macro-topics and planning Phases used for the systematisation of the tools in a consistent toolbox. Again, the description of the tools, including their links to the specific pilot actions outcomes, is fully reported in the chapter 3 “The FRAMESPORT Toolbox”.

The macro-topics

As aforementioned, the final analysis carried out by macro-themes and relevant resulting tools made it possible to recognise three main directions of development, three priority axes on which the approach followed by the small ports involved in pilot actions is converging: sustainable growth, business development and system management. The backbone of the FRAMESPORT strategy has therefore emerged from the systematisation of the toolbox around these tree macro-topics. The 21 tools have been thus clustered accordingly to these three macro topics, overcoming the original assignment of pilot actions into the 5 macro-themes, which have been associated and even mixed up, as the analysis of the results has shown significant synergies between tools developed from different themes.

- The macro topic **Sustainable growth** gathers tools developed from all pilot actions focusing on the macro-themes Energy and Environment and Training and Knowledge and from two (out of four) pilot actions under Planning and management. The focus of this macro-topic is to reduce the environmental impact of the ports, to develop territorial strategies, and foster awareness among the younger generation about port activities and cultural identity. Port authorities and regional and local administrations can refer to these tools to implement solutions towards a sustainable growth of the small ports of their territory.

- The macro topic **Business development** gathers tools developed from the pilot action focusing on the macro-theme Business aspects and from 8 pilot actions addressing ICT (3 from sub-topic Management and Services, 3 from Promotion and 2 under Safety). This second macro topic refers to business development and increasing the attractiveness of ports and surrounding areas, particularly in terms of tourism. Tools and guidelines are provided to port authorities and public administration to strengthen their services and increase the range of opportunities for the port users.

- The macro topic **System management** gathers tools developed from 5 pilot actions focusing on macro-theme ICT (2 under sub-topic Monitoring, 3 under sub-topic Management and services) and from 2 pilot actions under Planning and management. It centres around improving the overall level of efficiency of small ports management through planning instruments, in particular Masterplan, and IT system.

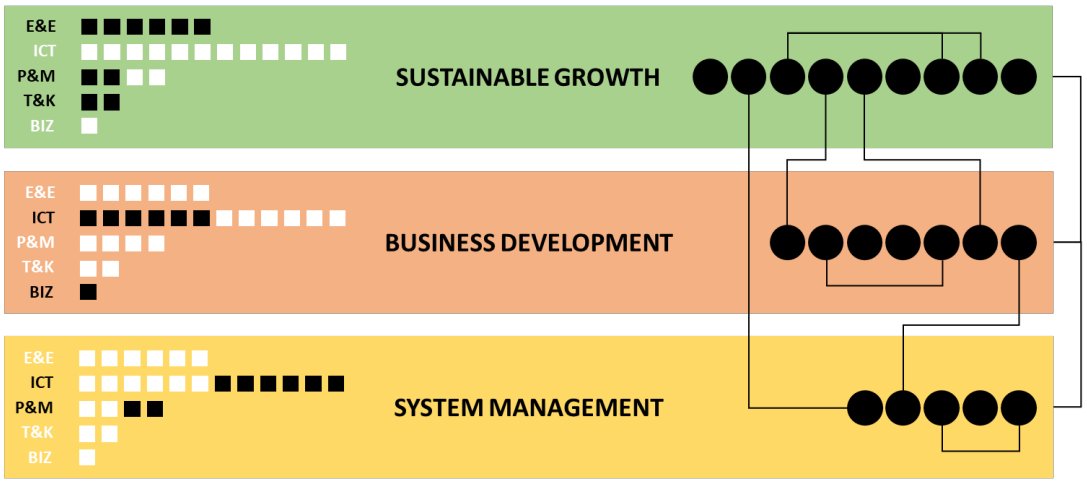


Figure 1. The FRAMESPORT macro-topics.

The planning phases of the toolbox

The FRAMESPORT toolbox covers all phases of the planning process for the sustainable development of small ports: it supports the initial preparatory phases, which may require analytical methods and sectoral knowledge, as well as the design and implementation phases, which may need practical guidance and technical methodologies, and even specific operational solutions. As a

result, the toolbox can provide support to various stakeholders, whether they are approaching sustainability on a large or small scale, at a policy or operational level and at any stage of their sustainability journey, based on their respective roles.

This internal synergy and comprehensiveness have been made possible thanks to the integrated approach of the FRAMESPORT project, which has enabled effective cooperation among partners and the exchange of relevant experiences and expertise. Synergies between tools reflect synergies and complementarity between partners.

The tools have been therefore categorised based on their utility by planning phase, also to facilitate their selection by users and the consultation of the toolbox as a whole, by highlighting the potential vertical synergies among different tools throughout the process. The identified phases are:

- **Scoping and framing phase**: tools belonging to this category help to identify goals (vision) and requirements (context), supporting decision-making whenever a (re-)planning process is initiated; this can involve ex-ante and ex-post assessment of current/project scenarios.
- **Strategic planning**: tools belonging to this category help to outline goal-oriented plans based on sustainability-driven, participatory processes, ensuring feasibility and adequacy of development roadmaps.
- **Operational design and implementation phase**: tools belonging to this category help to develop topics from roadmaps into concrete actions to be implemented in practice, transferring operational know-how and making available real operational applications.

After the phase where planned actions are in place and running ("**sailing phase**"), the toolbox can facilitate the assessment of results and be exploited again for integrating new ideas, plans and solutions in the changed scenario, in a continuous virtuous circle of planning, assessment and re-planning towards more and more ambitious objectives of sustainable development.

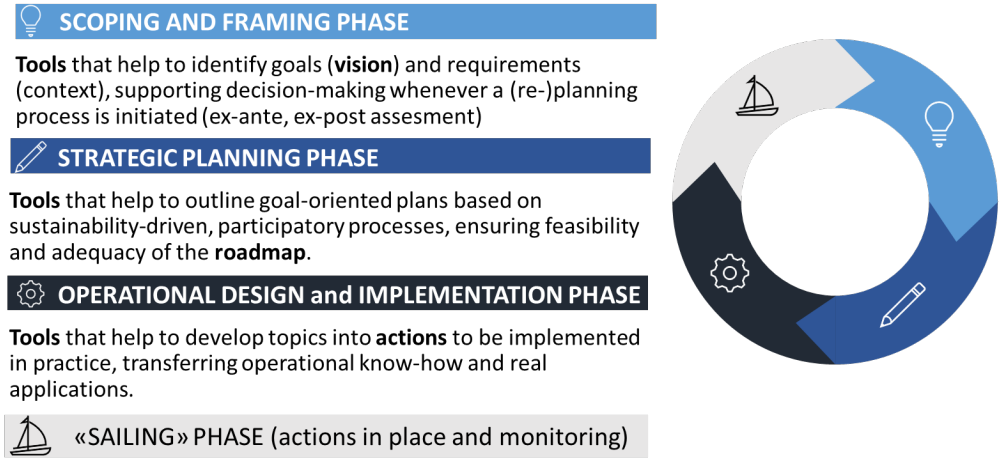


Figure 2. The FRAMESPORT toolbox planning phases.

3 The FRAMESPORT toolbox

The final FRAMESPORT toolbox consists of 21 tools that resulted from the implementation of 25 pilot actions. In fact, some tools derive from the direct contribution of more than one pilot actions, the results of which could be merged into one tool as they addressed the same need and approach. In other cases, it was possible to identify more than one tool from one single pilot action.

It is important to highlight that, although tools are presented as linked to specific pilot actions, each one is the result of the cooperation within the Consortium: the outcomes of the pilot actions should be seen as an integrated toolbox of compliant solutions, rather than stand-alone experiences.

The "Toolbox summary table" below lists all tools according to their macro-topic: Sustainable Growth, Business Development and System Management. The last column on the right indicates the planning phase in which each tool is suggested to be applied. The table also shows the pilot actions directly contributing to each tool and the respective FRAMESPORT macro-themes they addressed.

In the following sections, each tool is described in detail. Additionally, references and links to further resources – such as the relevant case studies derived from the pilot actions, supplementary technical or communication materials - and/or any operational web applications, are provided whenever they are deemed useful to facilitate the practical application of the tool.

The toolbox and the relevant resources associated with each tool are available in the “TOOLS4YOU” section of the FRAMESPORT portal (https://framesport.eu/tools4you), which includes:

- The link to download the current document “toolbox”;
- the sub-section “FRAMESPORT toolbox resources”, which includes the complete list of all documents, videos, digital services, and any other supporting materials associated with each tool present in the toolbox, with direct links to access or download them;
- The sub-section “FRAMESPORT digital services”, which collects all direct links to IT solutions such as web and mobile applications, web portals, and thematic websites resulting from the FRAMESPORT pilot actions.

TOOLBOX SUMMARY TABLE

In the column “pilot actions” the code of the partner that has implemented the action is reported. Please refer to the note below the table for the full name of each of the partners.

MACRO-THEMES	PILOT ACTIONS	TOOLS		PHASES
MACRO-TOPIC: SUSTAINABLE GROWTH (SG)				
E&E	LP1_Development of an Ecolabel criteria proposal for small ports to be submitted to the EU Ecolabelling Board (EUEB)	SG-T1	LIFE CYCLE ASSESSMENT (LCA) GUIDELINES	Scoping and framing
E&E	PP5.1_INNOVATION LAB: best solutions of sustainability in the ports’ spaces	SG-T2	SUSTAINABILITY CHECKLIST	Scoping and framing
P&M	PP4.3_Strategic analysis aimed at supporting the growth of the small tourist ports network of the Marche Region	SG-T3	STRATEGIC GUIDELINES FOR THE DEVELOPMENT OF TOURISTIC PORTS	Strategic planning
P&M	PP2.1_Project proposal for the renewal of Rimini canal Port	SG-T4	PLANNING GUIDE FOR REGENERATION OF URBAN PORT AREAS	Strategic planning
E&E	PP3.1_Implementation of Port sustainability best-practices	SG-T5	SENSITISATION CAMPAIGNS CHECKLIST	Operational design and implementation
E&E	PP4.1_Sustainable and local mobility interventions in Vallugola (electric bus)	SG-T6	PRACTICAL GUIDANCE ON E-MOBILITY CONNECTION SERVICES	Operational design and implementation
E&E	PP4.2_Sustainable and local mobility interventions in Numana (e-bike service)			
E&E	PP10.2_Testing IT system for the forecast of possible geographical dispersion of the pollutants in case of accident	SG-T7	MODEL FRAMEWORK FOR A POLLUTANT DISPERSION FORECASTING SYSTEM	Operational design and implementation

MACRO-THEMES	PILOT ACTIONS	TOOLS		PHASES
T&K	PP1.1_Develop / refine professional skills for refitters and shipwrights for the classic and historical boat sector	SG-T8	TRAINING PLAN ON TRADITIONAL MARITIME ACTIVITIES AND CRAFTMANSHIP	Operational design and implementation
T&K	PP5.4_Innovation Lab: training and learning events			
T&K	PP1.1_Develop / refine professional skills for refitters and shipwrights for the classic and historical boat sector	SG-T9	DATABASE OF CLASSIC AND VINTAGE BOATS	Operational design and implementation
MACRO-TOPIC: BUSINESS DEVELOPMENT (BD)				
BIZ	PP12.1_Development of small port prototype. Identification of opportunities to be taken in order to develop a single port and convey outcomes to stakeholders for the future development and investment plans	BD-T1	BEST PRACTICES GUIDE TO INCREASE THE PORTS' ATTRACTIVENESS	Strategic planning
ICT - Mgt/services	LP2_STEADFAST System fosTEring sustAinable Development oF Adriatic Small porTs (through a Q-GIS tool where data previously collected will be visualized)	BD-T2	DECISION SUPPORT SYSTEM STEADFAST	Operational design and implementation
ICT - Promotion	PP1.2_Promotion of the territory linked to Nautical clubs through development of extended reality application (through a web platform reachable through QR Code)	BD-T3	MODEL FRAMEWORK FOR A TERRITORIAL TOURISM MANAGEMENT SYSTEM	Operational design and implementation
ICT - Mgt/services	PP3.2_Regional ports networking and their connections: Promotion of the territory, ICT app for boat berth booking services, marine connectivity (sailboat)			
ICT - Promotion	PP2.3_Realization of initiatives for the promotion of the canal port activities	BD-T4	PROMOTIONAL EVENT PLANNING CHECKLIST	Operational design and implementation
ICT - Promotion	PP5.2_Innovation Lab: valorizing natural and cultural unexploited capital of the ports' areas			
ICT - Safety	PP13.1_Development of a meteo-oceanographic forecasting system for sea shipping activities	BD-T5	METEO-OCEANOGRAPHIC FORECASTING MODEL TO SUPPORT NAVIGATION	Operational design and implementation

MACRO-THEMES	PILOT ACTIONS	TOOLS		PHASES
		BD-T6	WEATHER ROUTING AND NAVIGATION IT APPLICATION	Operational design and implementation
ICT - Mgt/services	PP6.1_Development of a prototype of a software application for the identification, booking and payment of available spots at Adriatic small ports. Testing phase at Port of Termoli	BD-T7	IT APPLICATION FOR BOOKING BERTHS	Operational design and implementation
MACRO-TOPIC: SYSTEM MANAGEMENT (SM)				
P&M	PP9.1_Development of Master Plan for the development of a county-level port system in Zadar County	SM-T1	SMALL PORTS SYSTEM MASTER PLANNING GUIDELINES	Strategic planning
P&M	PP14.1_Development of Master Plan for the development of a county-level port system in Ličko-Senjska County			
ICT - Monitoring	PP2.2_Development of monitoring system for port operations and public events in the canal port's area	SM-T2	MODEL FRAMEWORK FOR A VIDEO SURVEILLANCE MONITORING SYSTEM	Operational design and implementation
ICT - Monitoring	PP5.3_Innovation Lab: ICT Platform for monitoring and supervision of freights/passenger	SM-T3	MODEL FRAMEWORK FOR GATE ACCESS CONTROL SYSTEM	Operational design and implementation
ICT - Mgt/services	PP7.1_Improvement of the available technologies for port management (berths booking system, service payment, information on users' service)	SM-T4	MODEL FRAMEWORK FOR SYSTEM MANAGEMENT PLATFORM	Operational design and implementation
ICT - Mgt/services	PP8.1_Improvement of the small ports monitoring system (mooring management, billing system, analysis of customer habits) through real time data collection and delivery			
ICT - Mgt/services	PP10.1_Feasibility Studies on alternative moorings for ship and on the use of electric ro-ro passenger ships	SM-T5	ALTERNATIVE MOORING SYSTEMS GUIDANCE	Strategic planning

The following table presents the full name of the FRAMESPORT partners who developed pilot actions and tools, along with the corresponding codes used int the toolbox description (LP for the Lead Partner, PP#, for the Project Partners).

LP	CORILA - Consortium for coordination of research activities concerning the Venice lagoon system
PP1	MMON - Municipality of MONFALCONE
PP2	ITL - Institute for Transport and Logistics
PP3	ASSET - Agenzia regionale Strategica per lo Sviluppo Ecosostenibile del Territorio
PP4	SVIM - Sviluppo Marche Srl
PP5	ARAP - Azienda Regionale Attività Produttive
PP6	AAST - Azienda Autonoma di Soggiorno e Turismo Termoli
PP7	LUUN - Lučka Uprava Umag Novigrad
PP8	PGZ - Primorsko-goranska županija
PP9	ZLUZ - Županijska lučka uprava zadar
PP10	LUS - Lučka uprava Šibenik
PP12	LOGO - Logoteam Ltd.
PP13	CMCC - Euro-Mediterranean Center on Climate Change
PP14	LUSE - Lucka Uprava Senj

3.1 Sustainable growth

3.1.1 SG-T1 - Life Cycle Assessment (LCA) Guidelines

SG-T1	Life Cycle Assessment (LCA) Guidelines
Overview and purpose The tool offers methodological guidelines and recommendations to carry out a LCA study on the potential environmental impacts of small ports and their activities from a life cycle perspective. The tool is based on and complemented by the LCA Study carried out to support the definition of what are the environmental criteria that small ports need to meet to obtain the Ecolabel, and it is indeed attached to the Ecolabel proposal that the FRAMESPORT Lead partner CORILA together with University of Padova will submit to EU Ecolabelling Board (EUEB). The Study reports on the LCA performed as part of the LP1 pilot action involving two Italian and two Croatian small ports representative of the Adriatic basin environment: Marina Fiorita (Cavallino Treporti, VE) and Marina Uno (Lignano Sabbiadoro, UD) in Italy; Port of Rabac and Port of Rovinj in Croatia.	
Planning Phase	Scoping and framing phase
Linked Pilot Actions	LP.1 “Development of an Ecolabel criteria proposal for small ports to be submitted to the EU Ecolabelling Board (EUEB)” - CORILA
Resources (links, annexes…)	Life Cycle Assessment study for the Small Ports Ecolabel proposal - Annex A
Description LCA allows analysing the input and output of resources, energy and waste associated with each life cycle step of a certain organization and defines the environmental hot-spots, the main impacts on the environment and the opportunities for improvement. In FRAMESPORT, the LCA methodology has been adopted to perform the study on small ports. The detailed LCA methodology, including scientific references, details on processes and results of the assessment carried out in the four selected (two Italian and two Croatian) small ports, can be found in the document “Life Cycle Assessment study for the Small Ports Ecolabel proposal”, while the resulting Guidelines are summarised below. The underlying methodology is based on the principles and requirements of the following International Standards: ● ISO 14040: 2006 Environmental management - Life cycle assessment - Principles and framework ● ISO 14044: 2006 Environmental management - Life cycle assessment - Requirements and guidelines.	

However, it is important to underline that the FRAMESPORT LCA guidelines are tailored specifically to the context of small ports.

Phase 1: Study scope.

- Define the **functional unit** as the single person arriving at the small port: in fact, this choice has proven effective in identifying the activities that contribute the most to the overall environmental impact within the specific system (the small port) under analysis.
- Include the following **environmental aspects**:
    a. Energy: Resource usage for heat production and electricity consumption.
    b. Fuels: Petrol and diesel consumption for boats used by the small ports.
    c. Water: Usage and management of water for various activities, including wastewater.
    d. Waste: Management of waste produced by the small ports and their activities.
    e. Chemical use: Consumption of fertilizers, pesticides, and other substances for gardening purposes, including pool maintenance within health and safety thresholds.

***Point of Attention**: the contribution to the environmental impact of construction, maintenance, decommissioning of infrastructure, buildings, and equipment, as well as land occupation is negligible relating to the declared unit.*

- Define the reference **period of analysis**.
- Include the following **impact categories** (from EPD 2015 methodology):
    - Acidification (kg SO2 equiv)
    - Eutrophication (kg PO43- equiv)
    - Global Warming (kg CO2 equiv)
    - Photochemical oxidation (kg ethene equiv)
    - Ozone layer depletion (kg CFC 11 equiv)
    - Depletion of abiotic resources-elements (kg Sb equiv)
    - Depletion of abiotic resources-fossil fuels (MJ)
- Ensure that the data collected for the study comply with the following **data quality requirements**:
    - Time Coverage:
        - Data used for the LCA study should cover the activities of the ports over a 12-month period.
        - If primary data or models are unavailable, use the most recent secondary data from internationally recognized databases.
    - Geographical Coverage:
        - Origin data can be sourced from different geographical regions, including Italy, Croatia, Europe, or even globally, depending on the origin of the “inputs” involved. On the other hand, the process data, which pertains to the activities within the small ports, must refer to the geographical area where the port is located.

- Technological Coverage:
  - Collect data that reflects the state-of-the-art technologies used in the port activities.
- Accuracy:
  - Ensure that the collected data accurately represents actual resource and energy consumption measurements for the specified period.
- Completeness:
  - Aim for the percentage of mass flow measured or estimated should be equal to 99%.
- Representativeness:
  - The collected data sets should precisely reflect the population by being collected directly from the sites of interest.
- Consistency:
  - Apply the study methodology uniformly throughout the entire analysis.
- Reproducibility:
  - Collect data using data collection sheets containing all the necessary information to allow independent performers to reproduce the reported study results.
- Sources of Data:
  - Prioritize the use of primary data for the study.
  - When primary data is unavailable, rely on secondary data obtained from internationally recognized databases and relevant publications in the field to define the reference datasets (e.g., Ecoinvent v3.4 database (Frischknecht R. 2005), giving preference to the most updated sources.
- Information Uncertainty:
  - Test the uncertainty related to data and hypotheses through an uncertainty analysis.
- Estimated Data:
  - highlight any estimated data coming from specific sites or averages in the inventory description.

Phase 2 Inventory analysis

- **<u>Data Collection</u>**
  - collect primary and, if necessary to complement the gathering, secondary data.

Recommendation*: verify and check the primary data collected against mass balances, ensuring that any reporting inconsistencies are clarified and resolved*

- **<u>Unitary processes</u>**
  - Identify the process units that enable the small ports to perform their daily activities and quantify their inputs and outputs. You can consider as a starting point the following units:
    - Energy supply from the grid or renewable sources.
    - Heat production using gas burnt in boilers.

- Fuel consumption of the boats used to provide the various services to the customers.

***Point of Attention**: for the consumption of fuels of boats used by small ports, you can assume an emission factor equivalent to that of a small car. This assumption, due to the lack of specific dataset for these small boats, helps prevent an underestimation of the environmental impacts.*

- Water usage for the various activities of the small port, e.g., toilets, showers, swimming-pool.
- Waste management activities, both from the small port infrastructures and from the boats that stop there.
- Chemical usage related to maintain the green areas and to keep the pool under acceptable health and safety conditions.

- **Modelling**
  - Build the model of the activities performed by the port, performing calculation procedures to quantify the input and output of resources and energy related to the activities of the port, for each unitary process.

***TIP**: possible tools to be used are the Simapro software v.9.1.1.1 and the Ecoinvent v3.4 dataset for the various inputs and outputs).*

The specific datasets, values, and calculations vary depending on the individual characteristics and data availability for each port. For a selection of reference datasets used in the LCA study carried out in four ports—Marina Fiorita and Marina Uno (Italy), as well as Port of Rabac and Port of Rovinj (Croatia)—please refer to the document "Life Cycle Assessment study for the Small Ports Ecolabel proposal" (Annex A).

Phase 3: Evaluation of impacts and interpretation of results

- **evaluate potential environmental effects** of the investigated systems using the results of the inventory analysis to

***Point of Attention**: following ISO 14040 and ISO 14044 Standards, the evaluation should be limited to mandatory elements: impact category definition, classification, and characterization; the results are relative expressions according to the Reference Standards for LCA studies (ISO 2006a, b), without considering thresholds, safety margins, or risks.*

- **present the results** obtained providing a complete view of the main sources of impact per each environmental aspect.
- **interpret the results** of the inventory analysis (LCI) and impact assessment including the following elements:
  - Identification of the most relevant life cycle stages.
  - Assessment.
  - Conclusions, limitations, recommendations.

***Recommendation**: when interpreting the results of an LCA study, it is necessary to consider what estimates and assumptions were made that potentially introduce uncertainties into the final results, such as, for example, an inappropriate modelling of inputs and outputs due to limited data in the databases. In order to consolidate the results and conclusions of the LCA study, it is therefore necessary to carry out sensitivity and uncertainty analyses.*

3.1.2 SG-T2 - Sustainability Checklist

SG-T2	**Sustainability Checklist**
Overview and purpose The tool offers a set of criteria, consisting of guidelines and requirements, that small ports should fulfil to ensure the sustainable management of their operations. This set of criteria has been developed with the aim of drafting a proposal of Ecolabel criteria specifically tailored to small ports, that will be submitted to the EU Ecolabelling Board (EUEB). Even before becoming the official requirements for EU Ecolabel certification, these criteria can serve as a sustainability checklist for small ports undergoing a green transition. In fact, the tool enables small ports to self-assess their sustainability level, scoping their current scenario, and provides recommendations and targets to enhance its operations in a more environmentally efficient manner. The tool is complemented by the proposal "Criteria for awarding the EU Ecolabel to small ports", output of the relevant FRAMESPORT pilot action led by CORILA-University of Padova, and by the Sustainability Report resulting from the FRAMESPORT pilot action on the Port of Vasto (in Abruzzo region), for its focus on Port Authorities requirements and on ESPO Green guide 2021.	
Planning Phase	Scoping and framing phase
Linked Pilot Actions	- LP.1 "Development of an Ecolabel criteria proposal for small ports to be submitted to the EU Ecolabelling Board (EUEB)" – CORILA - PP5.1 "INNOVATION LAB: best solutions of sustainability in the ports' spaces" - ARAP
Resources (links, annexes…)	- Criteria for awarding the EU Ecolabel to small ports - Annex B - Report on environmental sustainability in the port of Vasto
Description Small ports have significant environmental impacts mainly related to energy, water and waste management. One of the possible ways to set requirements and guidelines for their sustainable management is making available a European Ecolabel, an instrument aimed at improving and certifying the operations of the port, making it more sustainable and less harmful for the environment.	

An Ecolabel is composed of a set of mandatory and optional criteria that need to be satisfied to get the label. Since this FRAMESPORT tool defines a set of possible Ecolabel criteria, they are divided in “minimum” (mandatory, representing the basic processes, activities and features that a small port should fulfil) and “excellence” (optional, additional criteria that small ports can meet to achieve outstanding environmental performances). This set of criteria was created combining the outcome of a LCA study (see SG-T1) with data from a literature review on sustainable small port management and international recognized standards (e.g., Gold Anchor, Blue Flag, ISO 13687-1/2/3-2017, Ecolabel for touristic activities). Furthermore, the experience, know-how, tools and methodologies developed by the other pilot actions of the FRAMESPORT project have been used to further improve the criteria.

The “Report on environmental sustainability in the port of Vasto” focuses on some of these requirements in suggesting possible tools, methodologies and recommendations to improve the state of the art of a small port from the point of view of a Port Authority. Specifically, the report emphasizes the importance of creating a "**roadmap for greening activities of ports**" based on **the ESPO Green Guide**, which the Ecolabel Criterion 1 references to set “an action programme establishing targets on environmental performance”. It must be highlighted that all minimum and excellence criteria from the Ecolabel proposal can serve as valuable input for such a roadmap, adapting them to specificities and needs of each small port. [*ESPO GREEN GUIDE 2021 A MANUAL FOR EUROPEAN PORTS TOWARDS A GREEN FUTURE. 2021. https://www.espo.be/media/ESPO%20Green%20Guide%202021%20-%20FINAL.pdf*]

CHECKLIST

The checklist consists of a series of questions designed for port owners/managers who wish to conduct a self-assessment of their sustainability performance and seek guidance for potential actions to pursue the achievement of the primary goal of sustainability. The questions below align with the set of mandatory criteria of the Ecolabel proposal (from Criterion 1 to 13); additional questions arising from optional criteria have also been included under each mandatory criterion, when relevant to the topic (highlighted in italics). For a comprehensive overview of all requirements, it is recommended to refer to the complete Ecolabel proposal; if approved, ports would also be able to streamline the certification process.

Criterion 1. **Basis of an Environmental Management System**. Is there an environmental policy in place that identifies relevant aspects for energy, water, waste, health and safety, and use of chemical products? Did the port set an action programme with targets for environmental performance and an internal process to assess performance against targets and take corrective actions if needed?
Is the port registered under the Eco-Management and Audit Scheme (EMAS) of the Union? Or certified according to the ISO 14001 standard? Or to the Blue Flag or to the Gold Anchor standard? (Optional criterion 14). Are at least two of the main suppliers or service providers of the small port local and registered

with EMAS or certified according to ISO 14001 or certified according to ISO 50001 standard? (Optional criterion 15).

Criterion 2. Staff training. Is all staff regularly informed and adequately trained about the application of environmental measures and made well-aware of environmentally responsible behaviour?

Criterion 3. Information to users. Is information actively provided to users to ensure the application of environmental measures and raise awareness of responsible behaviour? Is information available about local ecosystems and environmental elements, including sensitive areas and a code of conduct within those areas? Are environmental services and signage integrated into the overall port's presentation? Is there a procedure in place to record customer feedback and to use that to improve services and facilities? *Does the port provide environmental communication and education notices on local biodiversity, landscape, and nature conservation measures to users and staff (1 point)? b) Does the user entertainment include elements of environmental education? (Optional criterion 17). Does the port provide differentiated fees as a reward to ships that go beyond regulatory standards, such as ships that demonstrate reduced air or GHG emissions or hold an environmental certification? (Optional criterion 18).*

Criterion 4. General maintenance. Is preventive maintenance conducted annually for appliances/devices, including inspection for leakage and ensuring proper functioning of energy, fuel, and water equipment? Are port buildings/facilities clean, safe, well-maintained, and compliant with relevant regulations? Are green areas maintained without excessive use of chemical pesticides and fertilizers? Is the port well-integrated with the surrounding natural and built environment? Are regular energy control visits performed? Are maintenance activities organized and scheduled systematically? Is there a replacement/reinvestment plan to support the maintenance system?

Criterion 5. Consumption monitoring. Are procedures in place for collecting and monitoring data on the following aspects at least yearly: a) Electric and thermal energy use. b) Percentage of final energy use met by renewable energy generated on-site. c) Water consumption. d) Waste generation by port-based activities and ships at the port. e) Consumption of chemical products, including cleaning products.

Criterion 6. Energy efficient lighting. Is energy-efficient lighting used both indoors and outdoors (meeting at least Class A as determined in accordance with Annex VI to Commission Delegated Regulation (EU) No 874/2012)? If not, is there a plan substitution of bulbs in place? Have sensors been installed to prevent unnecessary illumination where useful?

Criterion 7. Procurement of electricity from a renewable electricity supplier. Does the port contract at least 50% of its electricity from renewable energy sources, as defined in Directive 2009/28/EC of the European Parliament and of the Council?

Does the port have on-site electricity generation from renewable energy sources as defined in Article 2(a) of Directive 2009/28/EC? This may include photovoltaic (solar panel) or local hydroelectric systems, geothermal, local biomass, or wind power electricity generation. (Optional criterion 22). Does the port have on-site heat generation through a solar thermal system to heat water? (Optional criterion 23). Does the

small port provide cold ironing (technologies that supply energy to boats during their stop in the port through an electrical connection with the mainland, allowing for the elimination of pollution and emissions by the boats while in port)? (Optional criterion 24).

Criterion 8. Efficient water fittings. Have measures been implemented to minimize water consumption in sanitary facilities, including showers? Is continuous flushing prohibited in any urinal at the port? Do toilets have an effective toilet flush of ≤ 4.5 L?

Has the port installed an industrial water production plant from seawater, such as a reverse osmosis desalination equipment, to minimize water uptake from wells and/or aqueducts? (Optional criterion 25).

Does the port utilize alternative water sources (such as rainwater, reclaimed water or greywater from showers and/or lavatory sinks, condensate from HVAC systems for non-sanitary and non-drinking purposes in the facility? (Optional criterion 27). Are there procedures/systems in place for efficient irrigation that optimizes watering times and water consumption for outside areas/plants? (Optional criterion 28).

Criterion 9. Waste prevention. Disposable items. Are disposable food service items (crockery, cutlery, glasses, and water jugs) avoided for use in restaurant/bar services? IF not, is an agreement in place with a recycler for such items?

Criterion 10. Waste sorting and sending for treatment. Are there adequate containers available for waste separation by users? Are they segregated, well labelled in different languages? Are waste disposal areas tidy and secure, with appropriate measures in place (e.g., solid floor material, child safety, hazardous waste storage distance from port basin or watercourse)? Is the signage obvious, clear, and compliant with international symbols? Is waste separated into categories required/suggested by local waste management facilities? Are toilet tank waste reception facilities provided? Are bilge water pumping facilities available and capable of separating oily bilge water or water extraction from oily residues? Are the sanitary facilities connected to a licensed sewage treatment system complying with the EU Urban Wastewater Directive? Is there a dedicated washdown and boat repairing/maintenance area with a filtration system to prevent contaminated water from entering the sewage system or port basin? Is the water in the port visually clean without evidence of pollution?

Is the sediment generated in the process of dredging maritime access lanes, canals, or port areas directly reused within the port boundaries for infrastructure or maintenance projects or sent to a local recycling activity (Optional criterion 34)?

Criterion 11. Promotion of environmentally preferable products. Does at least 30% of the purchased cleaning agents, gardening products, lubricants, and personal care products used by the port bear ISO type I labels?

Do the following categories of paper products used in the port have the EU Ecolabel or other ISO type I label (at least 90%): Toilet, Tissue, Office, Printed, Converted paper. (Optional criterion 31).

Criterion 12. Promotion of environmentally preferable means of transport. Is information available at least on-site for users and staff regarding environmentally preferable means of local transportation for

sightseeing, arrival/departure from the small port (e.g., public transportation, bicycles)? Are there any special offers or agreements with transport agencies that the small port may provide to users and staff (e.g., pick-up service, electric cars) if available? *Does the port offer users bikes and/or electric vehicles for pick-up service or leisure and plugs (charging stations) for them? Are there active partnerships with companies providing electric vehicles or bikes? (Optional criterion 38).*

3.1.3 SG-T3 - Strategic Guidelines for the development of touristic ports

SG-T3	**Strategic Guidelines for the development of touristic ports**
Overview and purpose The tool offers strategic guidelines for the development of touristic ports as part of regional plans for ports, and related regional policy on tourism, providing policymakers and linked stakeholders with a methodological approach to define the vision, the objectives, the strategies and possible actions framing the strategic scenario of the regional tourism system. The tool is based and complemented by the "Strategic Guidelines for the Development of Touristic Ports in the Marche Region" developed by SVEM as a result of the FRAMESPORT pilot action which focused on the potential of 9 touristic ports (Gabicce Mare, Pesaro, Fano, Senigallia, Ancona, Numana, Civitanova Marche, Porto San Giorgio and San Benedetto del Tronto) integrated in the surrounding regional tourism system of Marche.	
Planning Phase	Strategic planning phase
Linked Pilot Actions	PP4.3 "Strategic analysis aimed at supporting the growth of the small tourist ports network of the Marche Region" – SVEM
Resources (links, annexes…)	Strategic guidelines for the development of tourist ports in the Marche Region.
Description Regional policy instruments play a vital role in fostering the sustainable development and enhancement of small ports and marinas for achieving quality nautical tourism objectives within the broader framework of socio-economic growth of the entire territorial tourist system. Strategic guidelines, supporting the formulation and updating of regulations, plans, and effective management models, aim to promote the tourism potential of these ports by orienting small-scale, short-term interventions into a comprehensive, long-term and dynamic vision, through a plan-process approach. The present guidelines provide a starting point to implement such a methodological approach for regional planning and can be read as the preliminary phase of a port master planning process as the ones illustrated in SM-T1.	

These guidelines consist of strategies and possible actions resulting from the analyses carried out at regional level in Marche, investigating in depth all 9 ports through direct interview and data acquisition involving local stakeholders, and respond to the following **vision** and objectives:

A competitive, sustainable and territorial integration-oriented regional port system

- Optimise governance processes and create business cooperation.
- Promote competitiveness of local companies operating in the field of nautical tourism by implementing new regulations.
- Promote competitiveness of touristic ports by programmed measures.
- Increase the number of in-transit customers coming from abroad.
- Enhance integrated touristic services sea/territory.
- Environmental sustainability (land/sea side) and energy efficiency.
- Implements infrastructures and digital services.

A possible list of **guiding strategies and related actions** to frame the strategic scenario of development of small touristic ports integrated in regional ports planning and tourism systems is provided below.

1st Strategy. Optimisation of governance and business development processes for tourist ports.

Actions:

- Strengthening of Institutional Governance, to optimise the system of touristic ports management, to improve the cooperation among the different entities involved and the strategic planning of the entire territory.
- Promoting the development of business cooperation among ports managing entities and the settling of a unique representative on behalf of all of them.
- Updating the regional regulation in accordance with new phenomena of nautical tourism and focus on human resources.
- Pursuing international promotion and territorial valorisation, through working tables between region, marinas, regional tourism development agencies and local entities.

2nd Strategy. Reduction of the gap in infrastructure, services and equipment on the basis of new demand requirements and new port functions.

Possible actions:

- Planning and simplified regional regulation on excavation and dredging.
- Rationalization of berths and selective implementation of moorings.
- Definition of minimal services and equipment standards in marinas.
- Enhancement of local public transport services and development of soft mobility and sharing mobility to access ports.

3rd Strategy. Promotion of environmental sustainability and digitalization.

Possible actions:

- Regional Incentives Programme (even with EU funding) to implement energy efficiency and decarbonization of marinas.
- Drafting of a yearly report on sustainability of regional touristic marinas.
- Programme of regional incentives for the development of digital infrastructures and services in the marinas.

Cross-strategies action: Regional system for monitoring and release of information on market trends.

These possible strategies and actions can be used as a starting point for any European network of small ports integrated in tourist systems in the Italy-Croatia area and in Europe as well, yet they must be contextualised and tailored to specific needs. The **methodological approach for declining strategies and actions** stemming from a shared vision and policy objectives is summarised below in steps.

Step 1. Analysis of the strategical and planning framework: state of the art of the regulatory, programming and planning context.

- *focus on regional – national and transnational programmes, initiatives and formal acts related to planning context of ports and tourism plans as well.*

Step 2. Analysis of the socio-economic framework, role and functions of the touristic ports:

- *focus on the regional system and ports management models*

Step 3. Analysis of demand/supply trends, attractiveness and market positioning of the touristic ports of the regional system in the transregional/transnational context.

- *focus on current trends of demand for tourist ports, forecast of nautical needs, ports attractivity as "access doors" to regional territories and the cross-border area.*

Step 4. Persistent criticalities and analysis of the tourist port system needs,

- *focus on analysis of demand/supply of infrastructures and services of the regional nautical tourism, comparative analysis of the governance of tourist ports at national level.*

***Step 5**: Definition of the strategic scenario: vision, objectives, strategies and actions for guiding the development of the touristic ports in the system.*

Cross-cutting actions and tips:

- **stakeholders' engagement**: key stakeholders must be involved in all steps through meetings, interviews, surveys, focus groups, for data collection and analyses and for contributing to the debate about strategies and possible actions. A mapping of key stakeholders must be initiated while defining the framework context. They should include Port Companies/Concessionaires, Guard Coast local departments, Port Authorities, Municipalities, Nautical and Tourism Associations, nautical services managers and providers, tourist operators, etc.

***TIP**: an active engagement strategy, e.g., through itinerant events/meetings organised in the local ports, can facilitate participation and engagement of local key stakeholders and the collection of relevant*

data/insights.

- **data collection**: data are a key factor for strategic planning of the system, but fragmentation of actors and differences between management models lead to poor quantity, quality and coherence of data for small ports, it is necessary to start a collection campaign at the very start of the process and provide for tools ensuring a continuous collection of data for updating and monitoring objectives.

***TIP**: a structured online questionnaire, can be used to update data for review/monitoring of strategies/actions/plans.*

- **monitoring tools**: monitoring system and KPIs should be part of the defined plans to regularly assess their effectiveness and conformity of interventions. This provides inputs to examine mid-term target achievement, allows for reformulation of needs and strategies if the plan/process is adopted, and serves as an informative tool for private entities operating in this field regarding key market indicators.

The complete guidelines, including detailed strategies and actions developed for the ports belonging to the regional system of Marche according to the step-by-step approach summarised above, can be found in the "Strategic document for the development of tourist ports in Marche Region" (under publication).

3.1.4 SG-T4 - Planning Guide for regeneration of urban port areas

SG-T4	**Planning Guide for regeneration of urban port areas**
Overview and purpose The tool provides a Strategic Planning Guide illustrating the common methodological framework for drafting a system Master Plan, including criteria for the classification and development of small ports. The tool is based on the pilot action led by ITL and complemented by the resulting project proposal for the renewal of the Porto Canale of the city of Rimini, in Emilia-Romagna Region, Italy.	
Planning Phase	Strategic planning phase
Linked Pilot Actions	PP2.1 “Project proposal for the renewal of Rimini Canal Port” - ITL
Resources (links, annexes…)	- Project proposal for the renewal of Rimini Canal Port - Replicability report - FRAMESPORT_TAV.01 - FRAMESPORT_TAV.02 - FRAMESPORT_TAV.03 - FRAMESPORT_TAV.04

Description

This tool represents the output through which project partners and stakeholders may be able to scale up this methodological frame in other territorial contexts.

The present guidance aims to describe the method used for the project proposals in the complex case of the regeneration of harbour areas. Moreover, the smaller ports, in the planning of the territory, demand and unitary vision, not only take the port into account but considers it inserted inside a multipurpose city. The study consists of a preliminary analysis, the participation of stakeholders, and deepening with indicators, thus giving an all-round picture of the reality of the Port. An important achievement of the present tool is that the set of indicators adopted can be used in similar contexts, encouraging local Authorities to adopt them. For this purpose, fixed parameters are easy to identify and calculate. This methodology, integrated with the ANP-BOCR analysis, evaluates the different possible scenarios considering the real needs of the territory as well as those of the stakeholders. The results of the previous analysis must be taken into account in the next designing phase to identify the best strategies and technical solutions. The method applied to the Canal Port of Rimini and the flexible solution studied for the specific case with its criticalities have given satisfactory results suggesting the priority interventions to be carried out to realize sustainability goals and the development of the whole area.

1. **Context analysis related to the regulatory framework, urban system, port system, and existing heritage**
   - Analysis of the existing institutional, regulatory, and environmental framework of the functional pole;
   - Analysis of the urban, territorial, and landscape system;
   - Analysis of the relation between among the port, the city, and the neighbouring territories;
   - Analysis of the existing heritage context;
   - Analysis of the existing functions and services with particular reference to ICT services;
   - Mapping of the socio-economic and cultural context;
   - Analysis of historic and cultural values.

2. **Stakeholders' consultation and co-design**
   - Involve all parties, private and public, from the early stages of the decision-making process in order to stimulate the awareness and interest of the key stakeholders as well as their willingness to work for change;
   - Set out an online multiple-choice questionnaire, not only for public or private bodies but also for all the principal actors who make daily use of the services of the Canal Port. The questionnaire includes three different sections:
     - Section 1 infrastructure and transport systems;

- Section 2 public space;
- Section 3: two open questions about the phenomena of urban and social degradation and the main shortcomings and/or criticalities of the area under consideration.

- Engage in the last phase of the project to discuss different solutions and overcome all critical issues.

***Recommendation**: in the FRAMESPORT case study, different stakeholders from associations (nautical, civil protection, etc.…) and institutions (mobility, infrastructure, public transport, environment…) were involved.*

3. **Data processing and evaluations**
   - Apply a SWOT analysis (Strengths - Weaknesses - Opportunities - Threats) based on the preliminary analysis results provided in the context study and in the stakeholder questionnaire;
   - Create graphic tables summarizing potentialities and criticalities of the Canal Port area;
   - Carry out an in-depth analysis of the criticalities identified by analyses and surveys;
   - Data collection to identify a set of significant indicators for the assessment of the urban and infrastructural quality of the Canal Port area. Indicators are divided into five different categories:
     - Environmental aspects;
     - Economic aspects;
     - Infrastructural aspects;
     - Urban aspects;
     - Social aspects.
   - Analysis of the data collected and identification of a proper set of indicators. The inclusion and exclusion criteria adopted in the selection of indicators are:
     - detectability and availability of information;
     - reliability and accuracy of data and sources;
     - comprehensibility and ease of reading and interpretation;
     - validity and completeness of output information;
     - relevance in relation to the objectives set.
   - Evaluation of the score of the set of indicators through the comparison of two macro areas of investigation: the area of the project - consisting of the area around the canal port - and the area of influence – a wider area that includes the urban areas surrounding the Canal Port. From this study, it is possible to derive some considerations to understand which functions and services are already available in the project area and which are missing.

4. **Project proposal and priority scale of interventions**

- Starting from the SWOT analysis, evaluate different design proposals to overcome the emerging critical issues. The general aspects of the project proposal could be summed up as follow:
  - Accesses and architectural barriers to the Canal Port;
  - Public spaces to be integrated to increase the attractiveness of the area;
  - Technological systems to be applied to the project (e.g., ICT services);
  - Soft mobility paths in the project area;
  - Drafting master plans and project boards.
- Apply a multi-criteria decision-making method BOCR analysis (Benefits - Opportunities - Costs - Risks) based on the set of indicators selected to identify the priority scale of the interventions to be carried out for the redevelopment of the Canal Port area. The analysis refers to two-time dimensions:
  - Benefits and Costs are measured in the present;
  - Opportunities and Risks are estimated on the basis of expectations of impacts of the intervention and in the long term.

  In detail, the BOCR identifies:
  - Benefits: favourable aspects identified in the analysis of the area;
  - Opportunities: potentially favourable aspects deriving from the planned project actions;
  - Costs: negative aspects identified in the analysis of the area;
  - Risks: potentially negative aspects that may be caused by the project actions.
- Elaboration of project concepts to be discussed with the Stakeholders involved.
- Verify the effectiveness of urban regeneration actions and the validity of the design choices made by using in the monitoring phase the same indicators as in Phase 2 in order to compare before-after the canal port regeneration.

3.1.5 SG-T5 - Sensitisation campaigns Checklist

SG-T5	Sensitisation campaigns Checklist

Overview and purpose

The tool offers a practical checklist, including recommendations and tips, to set-up a sensitisation campaign aimed at raising awareness among customers of touristic ports and marinas about the importance of responsible behaviours in relation to the environment.

The tool is based on and complemented by the case study resulting from the pilot action led by ASSET, that tested a plastic-free campaign in the real-world scenario of three Apulian ports (Vieste, Trani, Otranto) well-known for their high tourism vocation.

Planning Phase	Operational design and implementation phase
Linked Pilot Actions	PP3.1 “Implementation of Port sustainability best-practices” - ASSET
Resources (links, annexes…)	Implementation of Port sustainability best-practices – Final report

Description

The checklist presented below offers a starting point for implementing awareness-raising strategies based on best practices to reduce emissions and waste from port operations. Specifically, it focuses on concrete actions that immediately and directly involve stakeholders and target groups (e.g., port operators and staff, associations, tourists, citizens) without any mediation.

As such, the **underlying vision** of this sensitisation campaign tool can be summarized by the following principles:

- **Engaging communication**: to effectively reach the target groups and raise awareness about environmental issues, it is crucial to employ direct and non-conventional methods and concrete actions, rather than relying on lectures or traditional conferences.
- **Tangible means of communication**: to materialise the principle of environmental sustainability into something tangible, such as distributing eco-friendly products (e.g., everyday objects of common use, linked to life at sea and sailing), can convey the message in a simple and immediate way to personnel of small ports and recreational boaters.

***Point of Attention**: the checklist is intended for a large-scale campaign targeting multiple touristic ports and marinas, selected as stakeholders to involve as sponsor/partners of the actions aimed at their staff and customers (final target groups). However, the same types of actions can also be implemented on a smaller scale, such as through the initiative of a single port manager/owner; in this case, stakeholders to involve can be represented by companies and associations based in the port area.*

The **planning process** for implementing a sensitisation campaign based on the above principles can be structured in the following **steps**.

- **Mapping and selection of potential stakeholders.**
    - Conduct analyses (e.g., desk research and SWOT analysis) of stakeholders in the target context.

***TIP**: create a comprehensive database of stakeholder contact information (contact persons, email addresses, phone numbers etc.).*

    - Select stakeholders to directly involve as partners/sponsors of the campaign. Consider their ability to provide suitable locations for implementing the actions.

***Recommendation**: choose stakeholders who can ensure a strategic value in terms of reaching the campaign's final target groups; take into consideration factors such as the geographic coverage of the target area (regional, national and international) and the potential volume of nautical tourists/boaters that can be reached (both as a destination port (point) and/or as stopover port (point)).*

- **Engagement of selected stakeholders**
    - firstly, introduce vision, idea and concept of the campaign to the selected stakeholders (e.g., by email), describing their role in the initiative;
    - establish a direct communication flow (face-to-face or by phone/calls) to make them committed.

***TIP**: as learned from the FRAMESPORT experience, engaging private stakeholders, including marina and port owners/managers, can present challenges due to the perception that sensitisation campaigns on environmental aspects are not their core business. To address this, it is important to highlight the potential benefits of their involvement, such as enhancing reputation and promoting their services to the expanding market segments of environmentally conscious tourists, who are responsive to green marketing strategies.*

- **Planning of the campaign initiatives and specific actions**
    - In accordance with the principles above (vision), organise awareness-raising events at the premises of the involved stakeholders and plan for the distribution of tangible means to convey the message, such as eco-friendly products linked to sea and sailing activities, that are appealing to your target groups.

***Point of Attention**: the distribution of tangible everyday objects of common use, useful for life at sea, composed of entirely eco-friendly materials, represents a significant advantage in order to engage recreational boaters and to contribute to making them more aware of the importance of environmentally sustainable behaviours.*

    - For guidance and advice on implementing this step, you can refer to the **FRAMESPORT tool BD-T4** "Promotional Event Planning Checklist."

***TIP**: since the events will likely take place in port areas, consider scheduling them during the late spring or early summer seasons for ensuring a broad participation of recreational boaters and tourists.*

- **Selection, customisation and production of the campaign branded products**
    - conduct market research and analysis to explore various product options and identify 100% sustainable materials that can be used as "tangible means" for distribution during the campaign;
    - in collaboration with involved stakeholders, define specific customisation requirements (branding, colours, graphics, logos, claims etc.) to effectively convey the message;

- determine the quantity and delivery timeline of the customised products based on the allocated budget, the schedule and number of distribution places and initiatives and the related expected number of audience/recipients from the target groups;
- select service providers for production, prioritising those who adhere to green procurement criteria and sustainable practices.

***TIP**: as an example, in the FRAMESPORT pilot action, plastic-free kits were prepared, each containing 1 cap; 1 aluminium water bottle; 1 bamboo cutlery set; 1 palm leaf plate; 1 t-shirt (in bio-cotton); 1 backpack in eco-friendly material. A total of 400 kits were produced and distributed during three events.*

- **Implementation of the campaign**
  - organise and realise the event in a proper location in which you can meet targeted people.
  - make a sound communication campaign creating a minimum promotional kit: invitation, agenda, presentations, brochures and/or leaflets and gadgets (if any);
  - set up the chosen place for the event by installing all the necessary material such as rollups, posters, leaflets and indications;
  - at the beginning of the event present the initiative with its idea, objectives, main outputs and main results;
  - distribute the "tangible means" to all the participants. Always remember to explain the motivation behind the awareness campaign;
  - be sure to take photos and videos of the event to ensure maximum dissemination of the event. You can use the social media channels of your choice to promote participation. If you can, conduct interviews with some direct stakeholders in order to have material for future dissemination.

***TIP**: Invite the associations directly involved to co-organise the event as they will help you to attract target participants. Call your local press and/or media as an article about the event will increase the impact of the campaign.*

3.1.6 SG-T6 - Practical guidance on e-mobility connection services

SG-T6	Practical guidance on e-mobility connection services
Overview and purpose The tool offers a step-by-step practical guidance and recommendations for implementing e-mobility services aimed to better connect small ports with inland destinations improving the sustainable tourism vocation of the system and at the same time reducing energy consumption and environmental impact.	

The tool is based on and complemented by two case studies resulting from the FRAMESPORT pilot actions led by SVEM in the Marche region and specifically in the ports of Vallugola (Gabicce Mare) and Numana, that illustrate the implementation in real-world scenarios of respectively e-bus and e-bike services. The two case studies are particularly relevant for small ports located near inland areas, islands, protected areas (like Natura 2000 areas, green areas, parks), or other coastal destinations of significant natural or historical value, but with limited transportation connectivity.	
Planning Phase	Operational design and implementation phase
Linked Pilot Actions	- PP4.1 "Sustainable and local mobility interventions in Vallugola (electric bus)" – SVEM - PP4.2 "Sustainable and local mobility interventions in Numana (e-bike service)" – SVEM
Resources (links, annexes…)	Sustainable local mobility interventions – Final report

Description

Following the experiences carried out in FRAMESPORT, the steps for implementing an e-mobility service connecting the port with inland destinations can be summarised as follows, considering the specific context and needs of your port and surrounding area.

The decision to offer sustainable connection services can arise from territorial/urban/port planning instruments (e.g. SUMPs or Port master plans) or as a single initiative of the port manager/owner or of the local authorities or even of economic actors providing tourist/mobility services. Whoever is the initiator, these services must be developed in cooperation with all relevant stakeholders to maximise the impact of the service on the tourist system, its success and feasibility. **Identification and engagement of stakeholders** is therefore the step ZERO to implement. The collaboration of key stakeholders is vital for effective planning, promotion, and successful implementation of mobility services. Key stakeholders include:

- Local Authorities (municipalities, regional authorities) and port management bodies: they play a key role in planning and coordinating the services, managing areas and facilities, and ensuring compliance with regulations.
- Service providers, associations, port companies: these entities manage the ports and provide services, such as berth rentals, to boat owners and nautical tourists; they can actively engage potential users of the e-mobility services.
- Tourism and Information Offices and similar entities: since they manage and disseminate tourist information, they play a crucial role in supporting the communication of mobility services.
- Park authorities and environmental organizations: focusing on preserving and managing the natural environment of the area, they can contribute to the promotion of sustainable mobility options.

- Individual users and communities who benefit from the mobility services: they are the ultimate beneficiaries of the services; their engagement and feedback are crucial for improving the services provided.

Step 1 - Context and Territorial Analysis:

- Conduct a desk analysis and interviews with key stakeholders, including the port manager and local mobility/transport operators, to gather information about the local ports, existing transport connections and mobility services, and relevant stakeholders.

***TIP**: You can use an initial questionnaire to gather information about local ports, existing mobility services, and relevant stakeholders.*

- Define the operational plan of the services:
  - Consider the duration of the service, ensuring it aligns with the needs of the target users (e.g., during the summer season).
  - Determine if the service should be free of charge or if there are funding sources or grants to support it.

Step 2 - Procurement Process for External Services Selection:

5. Engage stakeholders to ensure the feasible execution of mobility services.

***TIP**: consider signing a Framework Convention with ports managers, local municipalities, or other stakeholders involved in the development of the mobility service.*

6. Conduct a preliminary market research to identify potential operators interested in providing the service.
7. Issue a Call for Tenders to select operators for providing the service.

Step 3 - Start and Implementation of Mobility Services:

- Activate the mobility solutions based on the operational plan defined in the previous steps.
- Implement communication campaigns, organizing events, collaborating with local partners, disseminating promotional materials (brochures, flyers, posters, videos, or digital content) through online channels such as websites, social media platforms, and mobile apps, as well as offline channels. Keep users informed about updates, improvements, and any relevant information related to the mobility services.

Step 4 - Monitoring Activities:

- Perform monitoring activities throughout the execution of mobility services.
- Evaluate the effectiveness of the service using both quantitative and qualitative indicators.

***TIP**: For quantitative indicators, you can collect report from operators to track the number of passengers, energy consumption, and distance travelled. For qualitative indicators, you can consider conducting surveys (e.g. by using QR codes linked to Google Forms) to collect feedback from bus and bike service users.*

- Use the collected data to assess the quality of the services, the users' satisfaction and gather suggestions for improvement.

The detailed process described according to the case studies of Vallugola and Numana can be found in the documents: "Sustainable local mobility interventions – Final report".

3.1.7 SG-T7 - Model Framework for a pollutant dispersion forecasting system

SG-T7	**Model Framework for a pollutant dispersion forecasting system**
Overview and purpose The tool provides a reference model for implementing an IT system that predicts the potential geographical spread of pollution resulting from maritime accidents or extraordinary events. Such a system can ensure quick response and appropriate actions, benefiting not only the local community where it is installed but also the entire sea basin. The model involves buoys equipped with sensors, air and underwater drones and a simulation software processing the various collected data to predict the dispersion phenomenon. The tool is based on and complemented by the case study resulting from the FRAMESPORT pilot action carried out by the Port of Šibenik Authority, who validated the system in the real-life scenario of the Šibenik channel.	
Planning Phase	Operational design and implementation phase
Linked Pilot Actions	PP10.2 "Testing IT system for the forecast of possible geographical dispersion of the pollutants in case of accident" - LUS
Resources (links, annexes…)	- IT system _ forecast dispersion - Final report. - Video_Drone1 - Video_Drone2
Description The FRAMESPORT model framework for a pollutant dispersion forecasting system is based on hardware and software technologies integrated to accurately predict the potential geographical spread of different pollutants by taking into account the characteristics of the dispersed material in the water and the meteo-oceanographic conditions. The tool can significantly enhance the ability to respond timely and effectively in the event of maritime accidents that pose a threat to the vulnerable coastal environment, thus improving the overall port	

performance in terms of safety and risk management while reducing operational costs of surveillance at sea.

Given that the Adriatic Sea is a very sensitive area that requires exceptional protection, such a system can help ports to predict the geographical spread of sudden sea pollution, which will greatly contribute to a quick reaction and proper response, resulting in a direct benefit not only for the local community, but and for the entire Adriatic area.

An overview of the system is provided below as a reference model; further details are explained in the document "IT system _ forecast dispersion - Final report" (see "Resources"), which includes a collection of pictures illustrating the installation process (in Annex 1) and the description of the simulation results (in Annex 2).

While an accurate customisation process is crucial to ensure the suitability of the installed system for the specific monitoring area, the components of the system include:

- buoys using built-in sensors to process measurements of various indicators from the environment and to detect pollutants in the sea, such as oil and petroleum, and other substances dissolved in water. Buoys are equipped with sensors of sea currents and sea temperature at depths of 1 to 25 meters; meteo sensors of wind speed and direction, air temperature and humidity, pressure and dew point temperature; sea pollution with hydrocarbons. Buoys should be connected with a land bas consisting of terrestrial meteo sensor of wind speed and direction, air temperature and humidity, pressure and dew point temperature; wi-fi antennas (min RX 200Mbps and TX 200Mbps), Power over Ethernet (poe) distribution with 8 inputs (12-24-48v with voltage regulation), T1w/5m coaxial cable, metal cabinet dim. (300x300x250) ±5%. Land sensors and sensors on buoys should be connected by a web application for mutual data integration;
- these buoys are installed in the sea, on strategic locations identified for an optimal coverage of the area. As an examples, buoys can be placed at the entrance to the port where numerous vessels are expected to pass daily during the summer season, and in protected sea areas, if any, which need additional protection against pollution;
- air drones equipped with cameras, able to produce precise photos in a length of few hundred meters, to detect possible dangerous vehicle and to document it from the air side.;
- underwater drones equipped with cameras, able to produce precise photos in very high resolution, to detect the pollutants on the seabed,

Drones helps to capture video, monitor waves and weather, and inspect ships or infrastructure to spot damages that could cause pollution. They play a significant role in recording professional missions of inspection of water areas and, if necessary, of ship hulls, of aquaculture, scientific, search and rescue activities.

- a simulation software connected to the land base receiving data from the sensors, able to simulate the speed of the pollutant's movement on the surface and underwater and its geographical spread,

for different types of pollutants. The simulation of the dispersion should be based on parameters such as the location, amount, duration of the spill, and type of substance. The simulation should then incorporate data from various sensor systems that monitor wind direction and strength and currents, as well as oceanographic and hydrometeorological conditions.

***TIP**: information collected by the system at the land base can be provided at the port through kiosks and smart waiting stations, allowing the public to access relevant information the quality of the sea.*

3.1.8 SG-T8 - Training Plan on traditional maritime activities and craftmanship

SG-T8	**Training Plan on traditional maritime activities and craftmanship**
Overview and purpose The tool consists of a training plan template and of training resources that can be used to define new courses tailored on local assets, specificities and requirements, incorporating contents developed by ARAP and by the Municipality of Monfalcone as results of the FRAMESPORT pilot actionsthat took place in the Abruzzo region and in Monfalcone (Friuli Venezia Giulia region), on which the tool is based. The tool is if fact complemented by the digital platform https://maestridascia.tempestive.com where the video lessons of the course "Ancient crafts and new technologies: learning the ancient trade of the shipwright" are accessible upon registration, and by the case study of the training course "Ancient crafts and new opportunities" held in a second grade secondary school in San Salvo (Abruzzo).	
Planning Phase	Operational design and implementation phase
Linked Pilot Actions	PP1.1 "Develop / refine professional skills for refitters and shipwrights for the classic and historical boat sector" - MMON PP5.4 "Innovation Lab: training and learning events" - ARAP
Resources (links, annexes…)	- https://maestridascia.tempestive.com/home - https://maestridascia.tempestive.com/workshop/003dddf0-6946-44e4-bdc7-bf5851c2ac2b - Training material ARAP - Develop / refine professional skills for refitters and shipwrights for the classic and historical boat sector – replicability report. - Innovation Lab: training and learning events – replicability report.
Description	

Building on the results of the training courses held in FRAMESPORT, the template for a training plan aimed at building knowledge and skills on traditional maritime activities and craftmanship can start from the following structure, to be tailored to your specific territorial context and enriched with local stakeholders, traditions and cultural assets.

PURPOSE

Developing knowledge, skills and sustainable entrepreneurial activities in sea-related economic sectors by discovering traditional maritime trade and practices.

LEARNING OBJECTIVES

- Understanding the economic and social history of the coastal areas related to maritime activities.
- Exploring the transformations of the coastal landscape over time through documents, direct observations and archaeological remains.
- Discovering the most representative trades of seafaring activity still alive.
- Investigating the potential of sustainable and innovative tourism.
- To raise awareness and expertise on ancient craftmanship.

TARGET AUDIENCE

- Students, young people and professionals of tomorrow

TRAINING METHODS

- Engagement of experts, historians, archaeologists, and practitioners of traditional trades and crafts as facilitators of theorical and practical knowledge.
- Front-end lessons (e-learning, through live streaming or through a platform hosting recorded videos).
- Front-end lessons (face-to-face)
- Site visits and outdoor experiences
- Participatory teaching

TRAINING CONTENTS, ACTIVITIES

Part 1: Ancient Trades and Places in Traditional Fishing and Maritime Trade

Useful additional resources and references can be found here:

- *https://turismoepsicologia.padovauniversitypress.it/system/files/papers/2014_1_03.pdf*
- *https://didattica.uniroma2.it/files/scarica/insegnamento/184022-Management-Degli-Eventi.-Bandi-Progetti-E-Reti-Lm/73464-Lezioni-marketing-territoriale-ed-eventi*

Modules:

- **Maritime Trade in History**

Lessons: Differences and similarities between ancient, medieval, modern and contemporary maritime trade activities. The focus is the knowledge on the ancient economic and social history of the reference area through documents and finds, direct observations and archaeological remains; the overview of the most representative trades of seafaring activity still alive.

Duration: 2 hours of group work in the classroom.

Site visits: study tours to museums and archaeological sites where students can explore – guided by teachers and curators – the fundamental role of the sea in the history of Mediterranean coastal areas by observing historical artifacts recovered during archaeological campaigns (such as marble, ceramics and soapstone finds used to trade goods traded over the sea).

Duration: Full day for each site visits.

***Recommendation**: many civic museums and archaeological sites in the Adriatic region offer educational experiences on site and online resources (e.g. from FRAMESPORT pilot action: Civic Museum Porta della Terra and the Archaeological Park of the Quadrilatero of San Salvo). The plan should identify these local cultural opportunities and arrange guided visits to enrich the learning experience, accompanying tours with theoretical knowledge covered in the classroom.*

- **Ancient vs Modern Port Operations and infrastructures**

  Lessons: How the construction and operation of transportation infrastructure (roads, railways, port facilities) impacted the coastal landscape and the economic activities related to the sea in the regions, in ancient and modern times. The lessons should be based on the study of the documents, direct observations, comparisons of pictures, data elaboration.

  Duration: 4 hours

  Site visits: 1) visits to submerged or unearthed archaeological sites, locations of ancient ports, where students can witness ancient masonry techniques and the function performed by the structures. 2) visits to ports where students can witness the practical aspects of port operations and understand the functioning of a modern infrastructure. Students are guided by port managers and professionals, providing insights into the organization, protocols, and machinery involved in the loading and unloading processes at the port, that they can observe in a real-life experience. The visits enhance their understanding of the concepts covered in the training and allows them to connect theoretical knowledge with real-world applications.

  Duration: half-day for each site visits.

***TIP**: while the visit is taking place, any occurrences in the management of the port should be addressed and discussed in real-time. The students and facilitators will therefore engage in a discussion to analyse the impact of these ordinary or unexpected events on port operations, temporal planning, and financial considerations. The discussion will provide an opportunity to go deeper into problem-solving approaches and strategies within the context of maritime operations.*

- **Traditional fishing industry today**

Lessons: Historical and modern practices of small-scale fishing, with a particular focus on traditional structures and techniques.
Duration: 3 hours
Site visits: visits to traditional fishing platforms (e.g. "trabocchi" in the Abruzzo region) as well as interactions with local fishermen (e.g, in fish markets) can provide students with valuable insights into traditional fishing techniques still in practice today and into the challenges faced by small-scale fishers in meeting evolving market demands. Through demonstrations, students will gain practical knowledge of ancient materials, techniques, methods and a firsthand understanding of how the identity of such activities is threatened by changes of their original functions (e.g. in the case of fishing platforms transformed in restaurants).
Duration: half-day for each site visits.

- **Coastal landscape, natural heritage and sustainable tourism**
  Lessons: The focus is on the-knowledge on the transformations of the coastal landscape of the reference territory through documents, the knowledge of the potential of sustainable and innovative tourism, through analysis of the local flora and fauna; analysis of virtuous experiences that have developed over the years in the tourism fields; reflections, comparison, suggestions.
  Site visits: visits to natural parks, protected areas, gardens and nature trails.

Part 2: Ancient crafts and new technologies; learning the ancient trade of the shipwright

Modules:

- **Historical and economic background of the boats**
  Lessons:
  - History and tradition of boating in the Adriatic areas.
  - Types of wooden sailing and motorboats Boating plans.

  Duration: 1 hour for each lesson
- **The construction materials**
  Lessons:
  - Types of wood for boating - Traditional and historical woodwork.
  - New materials with high ecological sustainability (and the European strategic sustainability goals).

  Duration: 1 hour for each lesson
- **From technique to practice with the wooden boat restoration part**
  Lessons:
  - Restoration of wooden boats (conservative vs. philological restoration) - Wooden boat repairs - Bonding systems - Inspection and determination of damaged and critical parts - Evaluation of restoration interventions.

Duration: 2 hours

- **New technologies (technical & technological skills)**

  Lessons:

  - Insights of wooden boat design. The merits of choosing wood construction. The design of the boat - reading and understanding boating plans.
  - New software for refit design - Use of augmented and virtual reality visors - the case of the Galeb.
  - The enabling technologies and the European strategic goals of digitization and sustainability.
  - Product innovation: from idea to prototype to product and process engineering.
  - Eco-design: design for disassembling and design for dismantling - Innovative materials: technology transfer and sustainability.
  - Traditional restoration techniques with examples made by the Alto Adriatico Custom shipyard.

  Duration: 2 hours for each lesson

- **Communicating and living the tradition**

  Lessons:

  - Events and sport marketing of ancient boats

  Duration: 2 hours for each lesson

- **Site visits in Shipyards**
  - Site visits to shipyards dealing with traditional boats' restoration and building, where the students can witness through a firsthand experience the relationship between innovation and tradition. The shipwrights during site visits can advise on the educational path to follow and guide the students in their professional choices.

  Duration: 2 hours per each visit.

3.1.9 SG-T9 - Database of classic and vintage boats on digital platform "Maestri d'Ascia"

SG-T9	Database of classic and vintage boats on digital platform "Maestri d'Ascia"
Overview and purpose The tool offers a simple and user-friendly interface for accessing and contributing to a database of classic and historic boats, hosted on a digital platform specifically created to foster networking in the realm of traditional craftsmanship (https://maestridascia.tempestive.com), where also the training course "Ancient	

crafts and new technologies; learning the ancient trade of the shipwright" (see SG-T8 at §3.1.8) is presented.
The tool indeed has been developed as part of the FRAMESPORT pilot action led by the Municipality of Monfalcone focusing on the classic and historical boat sector; the database is directly accessible for everyone, upon registration, via this link: https://maestridascia.tempestive.com/pages/boats.html.

Planning Phase	Operational design and implementation phase
Linked Pilot Actions	PP1.1 "Develop / refine professional skills for refitters and shipwrights for the classic and historical boat sector" - MMON
Resources (links, annexes…)	- https://maestridascia.tempestive.com/pages/boats.html - Develop / refine professional skills for refitters and shipwrights for the classic and historical boat sector – replicability report

Description

The database located at https://maestridascia.tempestive.com/pages/boats.html is specifically designed for creating a census of classic and historic boats, built through self-reporting of boat owners and interested parties. It serves as a resource open, upon registration, to anyone interested in the field of traditional craftsmanship and maritime heritage, providing a user-friendly interface for researching and exploring a more and more large database of classic and historic boats, each described by technical specifications and historical information.

Anyone can enrich the database by adding a "new boat" by clicking on the corresponding button and filling out the provided form, which includes the following information:

- Boat type (by choosing the type of boat – sailboat or motorboat - from the dropdown menu).
- Weight (tons).
- Length.
- Length overall.
- Building material (by choosing the type of material – strip planking; steel; cold molded; plywood; traditional planking; fiberglass; aluminium - from the dropdown menu).
- Date of building
- Building boatyard
- Designer
- Owner

It is also possible to upload a picture of the boat by clicking on the "icon" button, which allows you to select a file from your personal device.

3.2 Business development

3.2.1 BD-T1 - Best practices Guide to increase the ports' attractiveness.

BD-T1	Best practices Guide to increase the ports' attractiveness.
Overview and purpose The tool offers an inventory of best practices classified according to key aspects for the sustainable development of a small port. The guide can be used to define the virtual "prototype" of a sustainable, efficient port and therefore the benchmark for investing plans. The tool has been developed by the FRAMESPORT pilot action led by Logoteam involving stakeholders from both Italian and Croatian side of the Adriatic basin.	
Planning Phase	Operational design and implementation phase
Linked Pilot Actions	PP12.1 "Development of small port prototype. Identification of opportunities to be taken in order to develop a single port and convey outcomes to stakeholders for the future development and investment plans" - LOGO
Resources (links, annexes…)	Development of a small port prototype summary
Description The Best practices Guide is a tool for sharing best practices and recommendations between stakeholders such as policymakers, port authorities and other key actors of the value chain and can serve as a valuable initial resource for starting strategic planning processes, by providing a clear overview of possible actions and technologies functional to achieving sustainability and modernization goals. A summary of the document is provided below, while the full version can be found in the document "Development of a small port prototype summary". The Guide is divided in six main sections presenting best practices under the following themes: Ecology, Passenger services, Safety, Informatization, Services for boaters, Infrastructure and superstructure. **Ecology**: The Guide lists several best practices in this section, focusing on leveraging technology to improve small ports' efficiency and sustainability. Digital solutions like automation, AI, and machine learning can optimize operations, reduce waste, and promote renewable energy, enhancing the overall sustainability of the ports and their surrounding areas. Photovoltaic energy is a rapidly growing renewable energy source that reduces greenhouse gas emissions and dependence on non-renewable energy sources. Its adoption in small ports promotes sustainable development and cooperation. Shore-to-ship power supply reduces emissions, noise, and vibration levels of docked vessels, improving air quality and cost-effectiveness. Smart lighting solutions optimize energy consumption, reduce costs, and enhance safety in	

small ports. Smart buoys with sensors improve safety, optimize port operations, and promote energy efficiency by providing real-time data and integrating renewable energy sources. Solar-powered lighting solutions are environmentally friendly and cost-effective, reducing reliance on traditional power sources and promoting sustainability in small ports. Waste removal vessels enhance waste management practices and contribute to the cleanliness and compliance of small ports with regulations and standards. Electric vehicles and charging stations reduce the carbon footprint, attract environmentally conscious visitors and businesses, and promote sustainable transportation. Electric vessels reduce air pollution, greenhouse gas emissions, and operational costs in the shipping industry. Waste management solutions minimize waste production, improve recycling, and ensure proper disposal, reducing environmental impact and promoting economic growth. Alternative energy solutions (waves, tides, and wind) offer renewable and cost-effective options for powering small ports, reducing greenhouse gas emissions, and increasing energy efficiency.

Passenger services: The provision of high-quality passenger services in small ports is crucial for enhancing the visitor experience and attracting and retaining visitors. This includes amenities, accommodations, and transportation options. By focusing on passenger services, ports can contribute to sustainable development and reduce waste, promote renewable energy, and adopt efficient business practices. Mooring services are essential for safe and efficient loading and unloading operations in shipping and transport industries; smart systems with sensors and technology can optimize space and resources, reducing congestion and improving efficiency; moreover, the use of renewable energy sources for operations can contribute to sustainability and environmental goals. Pollution prevention (skimmers and floating dams) measures can significantly benefit the environment and local communities by preventing harm to marine life, ecosystems, and human health, as well as reducing the risk of adverse effects on local economies. Floating waste collectors remove debris and pollutants from bodies of water, preventing harm to ecosystems and human health, contributing to environmental and economic sustainability. Compressed air water barriers prevent pollutants from reaching sensitive areas or protected habitats; deploying these barriers strategically helps prevent debris and pollutants from entering ports and waterways, improving water quality and ecosystem health. Vessels for Oil Spillage Prevention are designed to combat oil spills by preventing oil spread and collecting spilled oil; using them minimises environmental impact and promotes sustainable practices. Cold storage units for fishermen are specialized facilities equipped with cooling systems to store fresh fish and seafood products near fishing ports and markets, enabling efficient transportation and preservation of freshness, reducing waste, increasing profits, and improving fish quality by preventing spoilage. Digital information totems are interactive displays found in public spaces that offer real-time information, services, and directions to assist users, that can provide important updates on weather, navigation, local attractions, and points of interest, enhancing the passenger experience and the overall efficiency of vessel operations. Smart benches are innovative public furniture equipped with high-tech features such as Wi-Fi, charging ports, air quality sensors, and solar panels, providing a convenient and comfortable place to sit while exemplifying sustainable urban infrastructure and contributing to the

goal of modernization and digitalization in cities. Wide range Wi-Fi access points provide reliable internet access, even in remote areas; in ports and marinas they can enhance the tourist/passenger experience, facilitate real-time data access for the crew, and provide boat owners and users with convenient access to information and services, ultimately improving overall customer satisfaction and service quality. Smart waiting rooms and canopies transform traditional waiting spaces into modern, interactive areas with services like Wi-Fi, digital screens, and charging points, offering a seamless and sustainable passenger experience in modern transportation systems. Mobile children's playgrounds are portable equipment that offer safe and engaging play experiences for children in various outdoor locations, promoting physical activity, socialization, and cognitive development while reducing screen time and encouraging healthy habits. ATM services offer convenient access to cash and other banking services, and integrating them within the port area can enhance financial accessibility and convenience for port employees, travellers, and visitors, improving the overall experience for port users.

Safety. Safety is an essential aspect in the Guide, that collects several best practices aimed to protect personnel and passengers, including safety equipment, training programs, and protocols for emergencies. Modern technology like GPS tracking systems is also used to enhance vessel and cargo safety. Social inclusion ensures equal opportunities for all individuals, regardless of their background, fostering fairness, equality, and diversity to create a just society that values everyone; it is not only a moral imperative but also crucial for sustainable development and long-term economic growth, promoting an inclusive and prosperous society for all. Safety in the case of fire is crucial in maritime settings with high fire risks; the use of specialized equipment, such as extinguishers, alarms, detectors, and sprinkler systems, significantly enhances the safety of passengers and crew, while well-trained personnel and regular maintenance ensure their effectiveness in emergencies, contributing to improved safety and sustainability in maritime transportation, preventing accidents and minimizing harm to the environment and human life. Safety ladders provide secure means of escape during emergencies and can aid rescue operations in harsh maritime conditions. First aid kits and training are essential for providing immediate medical care in emergency situations at sea. Automatic external defibrillators (AEDs) can save lives by quickly treating cardiac arrhythmias in maritime environments. Safety gear, such as protective clothing and equipment, ensures worker and passenger safety in hazardous situations. Gear storage crates help transport and store safety gear and emergency equipment efficiently in maritime operations.

Informatization: informatization is the integration of technology and information systems into society, aiming to improve efficiency, productivity, and communication. It involves digitizing processes, creating digital solutions, and making information and technology more accessible. In the context of port operations, informatization plays a crucial role in enhancing efficiency, sustainability, safety, and security. By utilizing digital solutions and information systems, port operators can optimize processes, reduce costs, minimize environmental impact, and track goods, vessels, and personnel. Informatization is an ongoing process that requires investment and training but offers significant benefits, transforming industries and

fostering growth and sustainability. Port community systems (PCS) are digital platforms that streamline information exchange and coordination among stakeholders in a port community. They integrate services like cargo tracking, vessel scheduling, and customs clearance to enhance efficiency. PCS enable real-time communication and data exchange between port operators, shipping lines, freight forwarders, customs brokers, and others. Their main goal is to reduce time and costs associated with port activities, improving competitiveness. PSC facilitates communication and coordination among stakeholders: for instance, it improves waste management by enabling real-time communication between waste removal vessels and port operators. It also enhances vessel scheduling for safety measures like oil spill prevention. Overall, PCS improves information exchange speed, accuracy, and reliability for a more efficient and sustainable port ecosystem.

Services for boaters. In the Guide services for boaters refer to amenities, facilities, and assistance provided at marinas and waterways to enhance the boating experience. These services include fuelling stations, pump-out facilities, docking assistance, security, repairs, showers, laundry, and grocery stores. They attract and retain boaters, stimulating local economies and promoting tourism. Additionally, these services improve safety, security, and environmental sustainability by facilitating proper maintenance and minimizing risks. Drive-in boat wash offers a convenient and efficient way to clean boats, saving time and effort. It helps prevent the spread of invasive species and maintains a clean marine environment. By promoting responsible boating practices, it improves sustainability and the overall boating experience. Meteorologic stations gather and measure atmospheric conditions, providing up-to-date weather data; they can assist boaters and port operators in making informed decisions regarding safety and operations. They support vessel routing, fuel efficiency analysis, and overall efficiency within the port community. Video surveillance enhances safety and security in ports by deterring criminal activities, monitoring traffic flow, tracking cargo, and ensuring compliance with safety regulations. It contributes to the efficient management of port activities, preventing accidents and protecting personnel, cargo, and infrastructure. Wave breakers reduce wave impact on coastlines and waterways, protecting vessels and minimizing coastal erosion and disruption to marine ecosystems. They can help create a safe environment for docking and operation of vessels, enhancing safety and sustainability. Mobile mooring dock offers a flexible and adaptable docking solution for temporary or emergency needs. It improves the efficiency and safety of ports by accommodating more vessels and reducing costs compared to permanent docks. It also promotes eco-friendly practices through modular design, easy cleaning, and potential renewable energy integration. Nautical fuel stations provide safe and reliable access to fuel, reducing the risk of spills and improving fuel delivery efficiency. They play a crucial role in enhancing the safety and sustainability of small ports. Additional services such as fresh water and waste pump-out contribute to the overall experience of boaters.

Infrastructure and superstructure are crucial for ports and harbours in maritime transportation. They include physical and organizational elements like docks, cranes, and warehouses, necessary for efficient

cargo handling. Best practices aim to enhance safety, security, and sustainability while promoting economic development. Effective infrastructure enables faster and safer operations, increasing productivity and competitiveness. It also helps address congestion and pollution challenges.
To address infrastructure challenges, using prefabricated container solutions has emerged as a promising approach. By utilizing shipping containers as building blocks, various facilities such as offices, restrooms, and storage areas can be constructed efficiently and cost-effectively. This method allows for off-site design and assembly, reducing construction time and expenses while ensuring quality control. These innovative solutions can enhance efficiency and sustainability in the maritime industry and offer a cost-effective and eco-friendly approach to infrastructure development.

3.2.2 BD-T2 - Decision Support System STEADFAST

BD-T2	**Decision Support System STEADFAST**
Overview and purpose The tool consists of a Decision Support System – openly accessible at https://framesportdss.eu/ - targeting both nautical tourists and expert stakeholders of the maritime sector and aimed to promote sustainable development of small ports and socio-economic growth of their surrounding areas. The system has been developed through the FRAMESPORT pilot action STEADFAST led by CORILA-University IUAV of Venice, which allowed to validate the capabilities of the DSS tool in supporting decision-making processes in the real-world scenario of the small ports within the Adriatic basin.	
Planning Phase	Operational Design and Implementation Phase
Linked Pilot Actions	LP2 “STEADFAST System fosTEring sustAinable Development oF Adriatic Small porTs (through a Q-GIS tool where data previously collected will be visualized)” - CORILA
Resources (links, annexes…)	https://framesportdss.eu/ STEADFAST System fosTEring sustAinable Development oF Adriatic Small porTs – Replicability Report
Description The DSS STEADFAST is a sophisticated and user-friendly Decision Support System that provides valuable recommendations and information for two groups of users: **simple users** (boaters) and **advanced users** (authorities and experts of the sector). The tool is online and accessible at https://framesportdss.eu/ for both groups, selecting the relevant group (simple user/advanced user) from the home page. Functionalities and features of the tool by group of users are summarised below. **STEADFAST for SIMPLE USER** (https://framesportdss.eu/user)	

The tool is a Nautical Tourism Destination Recommender System, that yachtsmen can use to choose the port of destination among the small ports of the Adriatic space, since STEADFAST suggests the best options according to their needs.

The **search** of the best destination starts entering the **dimension of the boat** from a drop-down menu, to allow the system to suggest all compliant ports. The user then chooses his **traveller profile**, and the system suggests all the ports that match it, combining all the relevant attributes from the STEADFAST database.

STEADFAST addresses three types of travellers, each with their specific preferences for docking ports; for each type, the tool can provide tailored recommendations and assistance in planning the trips by considering their specific needs.

- **Deluxe Travellers** seek comfort, security, and all available amenities. They prefer well-equipped ports and exclusive destinations that offer luxurious experiences. For them, STEADFAST can offer detailed information on luxury docking ports, exclusive destinations, first-class services and suggest high-quality experiences. It can also aid in monitoring bookings, financial transactions, and providing real-time information about services and activities available at the port.
- **Explorer Travellers** love discovering remote places and immerse themselves in local cultures and traditions. They prefer smaller ports that provide opportunities for excursions and culinary experiences while still offering comfort and security. Explorer Travellers can benefit from STEADFAST by accessing information on remote, lesser-known destinations, and activities such as excursions, cultural visits, or local culinary experiences offered in those adventurous areas. STEADFAST can also provide information about weather and safety conditions.
- **Family Travellers** prioritize docking ports with attractions suitable for everyone. They prefer medium-sized ports that offer cultural activities and entertainment for both adults, teenagers and children. Family-friendly facilities and services are essential to meet their needs. STEADFAST can assist them Family Travellers can use a DSS to find docking ports with diverse attractions and accommodations (such as hotels and resorts) suitable for all ages. It can also provide details on cultural activities, childcare services, entertainment and recreational opportunities nearby the port.

The **simple user interface** is designed to provide seamless access to relevant information and insights, enabling the user to make informed decisions and effectively utilize the system's capabilities. The intuitive, user-friendly interface incorporate menus, buttons, and interactive elements and the adopted UX principles ensure a seamless user journey through the system's functionalities regardless of technical skills. Moreover, the interface adapts to user's device characteristics, allowing usage on computers, tablets, or smartphones without compromising the user experience.

STEADFAST for ADVANCED USER (https://framesportdss.eu/advanced)

The tool is a complex and sophisticated **Decision Support System** that integrates data from multiple sources to provide a comprehensive view of Adriatic small ports and their potentials, assisting expert users

(such as port authorities, regional and local administrators, urban planners etc.) in formulating strategies for sustainable development.
Advanced users can view all port information stored in the database and integrated in the unified system based on a georeferenced (PostGIS extension) PostgreSQL, an open-source relational database management system enabling advanced spatial querying and analysis operations.
The **data model** focuses on maritime ports, capturing and organising essential attributes (names, locations, coordinates, operational capacities, infrastructure facilities, and navigational characteristics) and specific attributes (such as handling capabilities, berth availability, vessel size restrictions, and customs regulations) associated with geographical features like coastlines, mountains, and urban areas. This enables a comprehensive understanding of the port's context within its natural and built environment, including its relationship to local economies, transportation networks, and population centres, and offers a standardized and organized approach to managing port-related information, enabling effective decision-making, planning, and operational management, contributing to improve efficiency, safety, and sustainability in maritime operations.
While for consumer users the interface focuses on presenting data and recommendations in a clear and understandable manner, the **advanced user interface** is designed to explore port-related data in depth, conduct complex analyses, and generate detailed reports, offering robust modelling and simulation capabilities, data visualization tools, and advanced analytical functions, predictive models, optimization algorithms. Visualizations represent data through charts of relationships and trends, maps to display geographical data, and interactive dashboards to provide a comprehensive overview that allows users to explore it dynamically, with a clear arrangement of data and a logical organization of visual elements.

STEADFAST has been developed according to a rigorous process of development and validation in the real scenario of the Adriatic basin, involving stakeholders from both groups of users with the objectives of providing a tool that support decision-making processes in the small ports' sustainable development context.
Upscale and replication of the tool in other contexts are both objectives of the FRAMESPORT partnership; therefore, the implemented methodological process complements the STEADFAST tool. The process of development of a DSS using STEADFAST as a **METHODOLOGICAL MODEL** is summarised below, with recommendations resulting from the FRAMESPORT experience. A detailed description of the full process as implemented in FRAMESPORT to develop the STEADFAST tool is provided in the document "FINAL REPORT", while full guidelines and insights for successfully replicating the process and the underlying strategy is provided in the document "REPLICABILITY REPORT".

- **Data Collection and Integration from external databases/sources**
  - Select and collect relevant data from existing databases and available sources.
  - Integrate the data into a single system for allowing a holistic view of all information.

- Harmonize data formats, eliminate duplicates, and assign metadata for ensuring efficient management and accurate interpretation of data.

***Recommendation**: the availability of reliable and comprehensive data is crucial for effective decision-making; however, data scattered across different sources, heterogeneous data quality, and non-standardized data formats can hinder the data collection and integration process. To address these challenges, countermeasures can be implemented, including establishing partnerships with data providers, utilising standardized templates or formats for data collection and aggregation and employing automated data collection techniques or data scraping tools. Ensuring data consistency can be achieved through the adoption of data integration platforms or tools that support multiple data formats and provide automated data mapping capabilities; establishing data governance frameworks and standards can further enhance data integration accuracy.*

- **Data Analysis.**
  - Carry out integration, validation, and normalization of data using an ETL (Extract, Transform, Load) system, to verify data quality, ensure consistency and reliability of information and prepare the data for subsequent analysis phases.

***Recommendation**: if the expertise (statistics, machine learning, and artificial intelligence) to perform complex data analysis, necessary to extract meaningful information/results for decision-makers, is not available internally, options include implementing advanced analytics tools with built-in algorithms, collaborating with data scientists or experts, or investing in training programs to enhance the data analysis skills of team members. Investing in data management systems and technologies that facilitate data sharing, analysis, and reporting significantly enhance the process.*

- **Stakeholder and User Needs Analysis.**
  - Conduct a stakeholder analysis involving key actors, to understand requirements and needs of end users of the DSS system (yachtsmen, decision-makers, industry experts).
  - Carry out targeted analyses on different types of users, to specify their needs.

***Recommendation**: the engagement of stakeholders in a collaborative approach to the shaping of the DSS is crucial to ensure its relevance and usefulness towards target groups. Interviews, surveys and workshops with selected key stakeholders facilitate the exchange of knowledge, best practices, and valuable insights into their needs and requirements. Awareness campaigns to educate stakeholders about the benefits of DSS tools can increase their active participation.*

- **Creation of Visualizations.**
  - Create clear and understandable visualizations with the aim of presenting analysis results intuitively through graphs, maps and interactive dashboards enabling decision-makers to easily understand critical information and draw informed conclusions.
  - Consider carefully the map's size and its usability on different devices, ensuring adaptability to users' needs.

- **Development of User Interface.**
  - Design an intuitive interface for the different functionalities, focusing on user-friendliness and accessibility, ensuring easy access to essential information, in-depth analysis, and intuitive interaction with data visualizations for any kind of users.
- **Testing and Validation.**
  - Conduct thorough testing to ensure reliability and accuracy of results.
  - Implement evaluation frameworks with specific indicators and metrics to assess the outcomes and impacts.
  - Involve key users, such as decision-makers and industry experts, to collect feedback regarding the usability, accessibility, and effectiveness of the DSS tool, ensuring that it meets their specific needs and enhances the decision-making process.
  - Make necessary improvements based on user feedback to meet specific end-user needs and continuously adapt the system to evolving needs and challenges.
  - Regularly monitor and evaluate the effectiveness of the decision support system and use the obtained data to guide future improvements.

***TIP**: organise presentations, workshops, conferences to effectively share the results and gather feedback from key stakeholders.*

3.2.3 BD-T3 - Model framework for a territorial tourism management system

BD-T3	Model framework for a territorial tourism management system

Overview and purpose

The tool provides a reference model for designing and implementing web platforms that leverage the services of small ports while promoting the cultural and natural attractions of inland and coastal areas to users of sailing and nautical centres, with the final goal of enhancing the appeal of the entire tourism system.

The model is based on and complemented by two web platforms resulting from two FRAMESPORT pilot actions, led respectively by the Municipality of Monfalcone and ASSET: the first one addressing the port of Monfalcone in the Friuli Venezia Giulia region (scoprimonfalcone.eu), and the other covering the three ports of Otranto, Vieste, and Trani in the Puglia region (framesportpuglia.eu). Both platforms are available online and each of them is in itself a valuable tool for tourists interested in discovering these territories.

Planning Phase	Operational design and implementation phase
Linked Pilot Actions	- PP1.2 Promotion of the territory linked to Nautical clubs through development of extended reality application (through a web platform reachable through QR Code) - MMON - PP3.2 "Regional ports networking and their connections: Promotion of the territory, ICT app for boat berth booking services, marine connectivity (sailboat)" - ASSET
Resources (links, annexes…)	- www.scoprimonfalcone.eu - www.framesportpuglia.eu

Description

The web platforms Scopri Monfalcone and Framesport Puglia showcase the unique opportunities, services, and attractions of their respective territories and of the small ports they promote. They are aimed to capture the interest of the nautical tourists who are either already approaching the Monfalcone port or the Apulian ports or are still choosing their next trip destination.

The underlying model framework can be easily used and adapted to meet the tourism needs of other territories. However, an accurate **customisation process** is crucial to ensure that the web platform effectively highlights the appealing specificities of the territory and of the ports, presenting them as interconnected and mutually supportive components of the same tourist system.

In fact, the two FRAMESPORT platforms, while sharing the same goal of facilitating the users of sailing and nautical centres in discovering the tourism opportunities of the territories, differ not only in content, but also in their structure, because tailored on the specific assets and identity of their areas and also on the system management scheme they reflect.

A brief overview of the two FRAMESPORT platforms is provided below, to offer tips and examples for customisation. For a more comprehensive understanding, it is highly recommended to visit the respective websites and download the web apps, available for free on Android and iOS app stores.

The "**Monfalcone experience**" platform (www.scoprimonfalcone.eu) consists of a website and app specifically designed to facilitate connections between the small ports and sailing centres of Monfalcone and the cultural and natural tourist attractions in the area. Indeed, ports and marinas are well-developed in terms of nautical tourism, but they are poorly integrated into the overall tourist system of the area. To this end, the platform focuses on **four cultural itineraries**, each featuring **point of interests,** such as monuments, museums, and parks, along the route, that the user can explore through maps, texts, photos and audiovisual contents. Specifically, the videos in the section "Listen a story" help to further enhance the user experience by telling stories about the identity of the Monfalcone area, based on the presence of the port and on the important industrial and economic sector of shipbuilding. This **storytelling** reinforces the message of the strong connection between the port and the surrounding territory.

The platform also provides information about guided tours organised at cultural and natural point of interests ("Excursions" section) and about other opportunities for tourists ("What to do in Monfalcone" section, mapping sport centres and facilities, as well accommodation and food services).
A unique feature of the platform is its integration with a circuit of **touch totems** distributed throughout the territory, that allow access to digital content through a QR Code and also incorporate an augmented reality system.
The "**FRAMESPORT Puglia"** platform (www.framesportpuglia.eu) has been specifically designed to provide a unique and integrated access point to information and services provided by a **network of regional ports** to boaters interested in a tourism experience in Puglia.
The platform showcases the three ports of Vieste, Otranto, and Trani and their respective territories. Each port has its **dedicated pages** focusing on the promotion of the relevant area ("Point of Interest", POI, Section), providing specific information about tourist attractions, sports activities, accommodations, and services available. Users can explore itineraries, events, and unique nautical activities for each port, getting a comprehensive overview of the experiences offered through photos and detailed textual descriptions. Information about boat berth booking at each port are also provided. Despite the differing content, the pages maintain a **consistent structure**, facilitating easy navigation and access to relevant information.
In addition to the pages dedicated to Vieste, Otranto, and Trani, the platform offers boaters **common services**, regardless of the selected mooring port and of general utility for navigation along the Apulian coast and to/from it. Specifically, the platform integrates two of the FRAMESPORT tools (BD-T5 and BD-T6):

- a meteo-marine information services, offering boaters forecasts and conditions regarding wind speed, weather, wavy way, etc, available at www.framesportpuglia.eu/meteomarina (see BD-T5 for further information);
- a ship routing service, providing boaters exploring the Adriatic basin with different types of boats (sailing, vessels, engine load, etc.) with information regarding the route (such as length, duration, speed, route, true wind direction, wind speed, etc.) regarding the route with different types of boats (sailing, vessels, engine load, etc.), available at www.framesportpuglia.eu/ship-routing (FRAME-VISIR, see BD-T6 for further information).

Following the customisation phase, which involves the **preliminary definition of the** desired platform components (what the target users should find in terms of services, specific sections, integration with external portal/applications etc.) aligned with the objectives of the initiative, the **MODEL FRAMEWORK** to design and implement a tourism management system for promoting small ports leveraging the territorial natural and cultural attractions can be summarised in the following phases.

- **Brand Identity Definition**

This phase involves designing graphic and communication elements to establish guidelines for an effective and functional brand identity project. All "products" envisaged in the web platform must be

declined according to that; the brand identity should also be declined for products not directly implemented in the web platform but linked to the initiative, both in digital and physical contexts.

- **Definition of Points of Interest (POI) and Contents**

This phase involves the selection of the points of interest to showcase in the platform, in cooperation with local stakeholders, and the collection, creation and adaptation of textual, photographic, audiovisual contents for website and web app. The adaptation process includes translating the content for a multilingual platform, developing accessibility features (such as voice-over texts) and optimising it for various device capabilities/applications. The creation of contents can include for example the realisation of photographic campaign of 360° shots, video interviews of key actors, and so on.

- **Development of the web platform (website and mobile app)**

This phase of production of the interactive multimedia applications involves the process of defining requirements, design of information structures through wireframes and graphic layouts based on usability (UX) guidelines and proper arrangement of the user interface (UI).

The entire design phase should be collaborative, with shared documentation including commented graphics summarising functionality, navigation, and interface aspects. A common content management system (CMS) can be used for both the website and app, with data entry based on the content resulting for the previous phase, including geolocation data for all points of interest.

The platform should be designed to enable effective coordination between the website and the mobile app. GPS technology should be employed for geolocation functionality so that users of the app can receive notification and suggestions to explore the website and access related content through the app during their visit.

- The final phase involves defining the **domain and hosting requirements**, followed by **the online publication** of the website and the distribution of the app on the Android Stores.

3.2.4 BD-T4 - Promotional event planning Checklist

BD-T4	Promotional event planning Checklist

Overview and purpose

The tool offers a checklist for planning initiatives aimed at promoting and valorising the diversified small ports' values towards tourists and citizens within a territorial marketing perspective.

The tool is based on the two case studies resulting from the FRAMESPORT pilot actions that took place in Emilia-Romagna and in Abruzzo: the event "Ti porto al porto" organised by ITL with the Rimini Nautical Club on the 9th and 10th of April 2022 within the area adjacent to the Canal Port of Rimini, and the three-events campaign carried out by ARAP along the coast of Abruzzo in 2021, 2022 and 2023, in cooperation with stakeholders such as Legambiente and the Sottocosta - Middle Adriatic Boat Show.

Planning Phase	Operational design and implementation phase
Linked Pilot Actions	- PP2.3 “Realization of initiatives for the promotion of the canal port activities” - ITL - PP5.2 “Innovation Lab: valorising natural and cultural unexploited capital of the ports' areas” - ARAP
Resources (links, annexes…)	- Ti Porto al Porto 2023 – video - Innovation Lab: valorizing natural and cultural unexploited capital of the ports' areas – replicability report. - Realization of initiatives for the promotion of the canal port activities - replicability report.

Description

The basic checklist presented below provides a starting point for planning events aimed at:

- promoting the diversified range of activities and operators based in a small port area, to strengthen the attractiveness of the port and its potential for the whole territory where is located (purpose of the event);
- nautical tourists, citizens and even potential visitors not directly involved in the Port’s primary functions (target audience of the event).

Whether it is a large-scale or small-scale event, the planning process can be structured in the following steps.

- **Identify and engage key stakeholders (and sponsors).**
  - draft a preliminary characterization of the event as a starting point to present the concept to key stakeholders of the port area, to involve them from the beginning and carefully assess their inputs, needs and priorities; provide them with a clear overview of the possible allocation of budget, also with the aim of identifying potential sponsors, partners and opportunities for financial support.

***Recommendation**: carefully adapt activities to implement during the event to the actual needs and characteristics of the port, instead of presenting stakeholders with a programme already “set in stone”.*

  - organise meetings with the key stakeholders interested in active participation in the event to co-create conceptualisation and planning of promotional activities/spaces (e.g., dedicated stands).

***TIP**: organising in-person operational meetings with stakeholders significantly mitigates the risk of low participation and administrative burdens.*

- **Define dates, time, duration and venue of the event.**
  - Analyse seasonal trends of tourist flows and annual major events and fairs attracting visitors in the area, to determine the most suitable period that maximise the impact of the event according to your promotional objectives/activities and the availability of venues and key actors to involve.

***TIP**: to highlight the potential of the port for the area even in low-peak seasons and for the local population, consider dates outside of the periods when the presence of tourists and other attracting events is lower.*

- Analysis the calendar of major events in the area to ensure there is no overlap or, conversely, identify potential events that align with your promotional objectives, which can be the hosting venue of your event; coordinate with the organisers to determine suitable dates and time slots complementing their schedule and activities.

- **Select the organisation/team in charge of the management of the event.**
  - select the organisation/team in charge of coordinating activities, logistics and administrative procedures to obtain all the necessary permits (e.g., for occupation of public land or security plan).

***Recommendation**: If the organisation in charge of the event management could be selected among the stakeholders of the port, consider that many associations that operate in small ports are not equipped with the administrative and personnel capacity needed to carry out such tasks: carefully select subjects that can demonstrate experience and capacity.*

- **Finalise the programme of the event and launch of the promotional campaign.**
  - select and design the activities to be organised during the event through the participations of key stakeholders; some examples of activities include: Guided tours on boats; Exhibitions showcasing the history, culture, or development of the port area. Demonstrations of traditional or historical activities related to the port, such as fishing techniques or shipbuilding. Displays of boats, maritime equipment, or artifacts related to the port's history. Guided tours of fishing boats or vessels. Exhibitions of traditional fishing tools or techniques. Promotional spaces for local businesses or operators based in the port area. Food stands or gastronomic showcases featuring local products. Promotion of maritime connections from the port to other destinations. Photo exhibitions highlighting significant locations or events in the area. Demonstrations of water sports, such as surfing, windsurfing, or sailing. Exhibitions and initiatives featuring marine life and its conservation.
  - Plan and execute a promotional campaign to attract visitors, including a launching press conference and dissemination through social media, online and printed press.

***Recommendation**: prepare an online survey to gather opinions and feedback from participants, to assess the success of the event, identify areas for improvement and consider the opportunity to replicate the event as an annual appointment in the future.*

3.2.5 BD-T5 - Meteo-oceanographic forecasting model to support navigation

BD-T5	Meteo-oceanographic forecasting model to support navigation
Overview and purpose The tool provides information regarding meteo-oceanographic conditions and forecast, based on a high-resolution model covering the Adriatic Sea. It offers valuable assistance to boaters, contributing to the improvement of safety conditions in harbours and navigation. The tool has been developed and validated by CMCC in the FRAMESPORT pilot action focusing on the ports of Otranto, Vieste and Trani in the Apulia region and is available at https://otranto.cmcc.it (Otranto) and at https://soap.oceanity.eu (Vieste and Trani). it is also offered as a service via the FRAMESPORT Puglia web platform (www.framesportpuglia.eu). Meteorological forecasts are available on the website https://ecmwf.oceanity.eu The website provides wind, atm pressure, rain and air temperature for the areas of interest.	
Planning Phase	Operational design and implementation phase
Linked Pilot Actions	PP13.1 "Development of a meteo-oceanographic forecasting system for sea shipping activities" – CMCC
Resources (links, annexes…)	- https://otranto.cmcc.it - https://soap.oceanity.eu - https://www.framesportpuglia.eu/meteomarina - Development of a meteo-oceanographic forecasting system for sea shipping activities – Final report
Description The tool is based on a high resolution meteo-oceanographic model that provides information regarding currents, wave characteristics (height and period), sea level, temperature, and salinity up to a 4-day forecast period. The model is running operatively for ports of Otranto, Trani and Vieste and is openly accessible via web at https://otranto.cmcc.it; https://soap.oceanity.eu; https://www.framesportpuglia.eu/meteomarina/; https://ecmwf.oceanity.eu. Users can visualise real-time and forecasted data on a map, which includes various layers and variables: - currents (according to three different data representations); - sea level; - salinity;	

- temperature;
- wave-period;
- wave-height;
- wind;
- atm pressure at sea level;
- cloud cover;
- atm temperature;
- precipitation.

For each variable, the model provides data analysis (e.g, timeseries in figures and graphs), allowing to customise and personalise data views.

An overview of the **technical aspects and setup of the meteo-oceanographic model** is provided below; further details are explained in the document "Development of a meteo-oceanographic forecasting system for sea shipping activities - Final report".

- Starting from the regional scale MFS (Mediterranean Forecasting System, from European Copernicus-CMEMS https://marine.copernicus.eu/), CMCC has developed a high spatial resolution modelling system on the Apulian sub-regional and coastal scale, by enhancing the hydrodynamic forecasting system SANIFS (Southern Adriatic Northern Ionian Coast Forecasting System, http://sanifs.cmcc.it).
- The model has been initialised and nested in the MFS prediction system, forced to the boundary conditions by MFS and OTPS (OSU Tidal Prediction Software, code capable of providing the tide signal) and forced to the surface by the ECMWF fields.

The complete model set up implements: (i) initial conditions: temperature, salinity, sea level, currents; (ii) surface boundary conditions: dew point at 2m, air temperature at 2m, wind speed at 10m, atmospheric pressure, cloud cover and total precipitation; (iii) open boundary conditions: currents, temperature and salinity (from MFS), sea level; (iv) climatology of river flows.

3.2.6 BD-T6 - Weather routing and navigation IT application (FRAME-VISIR)

BD-T6	Weather routing and navigation IT application (FRAME-VISIR)
Overview and purpose The tool offers a decision support system for leisure boats in the Adriatic Sea, with the main purpose of providing least-time routes for sailboats and least-CO2 routes for motorboats.	

The tool has been validated by CMCC in the FRAMESPORT pilot action which developed a meteo-oceanographic model focusing on the ports of Otranto, Vieste and Trani, underlying its development through the software VISIR- 2, and is available at www.frame-visir.eu- It is also offered as a service via the FRAMESPORT Puglia web platform (www.framesportpuglia.eu).

Planning Phase	Operational design and implementation phase
Linked Pilot Actions	PP13.1 "Development of a meteo-oceanographic forecasting system for sea shipping activities" – CMCC
Resources (links, annexes…)	- https://www.frame-visir.eu/ - Development of a meteo-oceanographic forecasting system for sea shipping activities – Final report

Description

The ship routing system Frame-Visir is an operational **web application**, available at www.frame-visir.eu, based on a software called VISIR-2 (www.cmcc.it/models/visir), a numerical model that uses dynamic meteo-oceanographic fields for computing optimal maritime tracks.

Through its **user-friendly interface**, Frame-Visir allows a wide range of users engaged in sea shipping activities (including sport and tourist sailing, competitions like regattas, as well as sailing schools and nautical license providers) to access valuable information about 44 oriented routes between 21 ports in the Adriatic Sea, carefully selected to ensure ample coverage of the area, identifying options that minimise emissions for motorboats and optimise travel time for sailboats. It provides information about the meteorological and sea-state condition as well as the most relevant metrics, such as sailing distance, navigation time and CO2 emissions; this tool may also help users avoid extreme conditions by sailing for another destination or at different times.

From the home page, users should firstly define visualisation settings (Route, Date and Time, Vessel Type: Sailboat/Flybridge, Sailboat Type/Engine Load, Linechart) to immediately access analytical data and views about the route selected. Specifically, users receive different information according to the selected Vessel Type: for motorboats, the focus is on sea-state conditions, including current and wave information, with emphasise on the environmental impact of the trip in terms of CO2 emissions, with the aim of raising awareness about the ecological consequences. On the other hand, sailboat information primarily focuses on wind conditions, to assist sail boaters in making informed decisions considering distance travelled and navigation time.

The website includes a dedicated "Help" section that provides detailed guidelines on how to use FrameVisir effectively, with explanations and step-by-step instructions on "general functioning" and "advanced use" of the tool, ensuring that users can make the most of its functionalities. It also provides technical information about the model ("background information" section).

The VISIR-2 ship routing software can be used in any geographic region. However, incomplete documentation poses challenges to operational development, hindering effective operational feature implementation. A thorough understanding of the model is crucial for informed decision-making and development. The Frame-Visir web application can serve as a valuable case study for facilitating the learning of a **systematic approach to development** of a user-friendly web application capable of presenting the results generated by the model in a consolidated manner, facilitating user access and consultation of data. The main steps and requirements of the process are summarized below, while a detailed examination of the technical implementation process is provided in the document "Replicability report".

- Creation of a graph representing the area of interest, defining order of connectivity and spacing between nodes.
- Interpolation of the environmental data onto the grid of the graph at a predefined common time step.
- Incorporation of specialised dataset that describe vessels dynamics and performance to train an AI system and fill in the missing operating conditions to simulate the characteristics of the maritime behaviour of ships.
- Identification of least distance, time, and emissions routes using an adaptation of Dijkstra's algorithm to identify optimal paths. Collection and compilation of all relevant details about the voyage plans.
- Integration and implementation of VISIR-2 functionalities in the webapp.
- Testing, to ensure the accuracy, reliability, and usability of the VISIR-2 model, regarding the performance of the model and identification/resolution of any potential problems or discrepancies.
- Preparation of comprehensive documentation to provide clear instructions, guidelines, and insights into the VISIR-2 model, its components, enabling users to understand and use the model effectively.

3.2.7 BD-T7 - IT application for booking berths

BD-T7	IT application for booking berths

Overview and purpose

The tool offers marina operators and yachtsmen a multichannel, multilingual platform consisting of a web application and a mobile application, for managing booking of berths in touristic ports and marinas. On one side, port and marinas operators can easily manage berths, moorings and bookings; on the other side, yachtsmen can book the best berth space for their needs and find out all the information to enjoy the tourist attractions in the surrounding area.

<table>
<tr><td colspan="2">The tool (the FramesPort app, available at https://framesport.afasystems.it) has been developed and validated by AAST in the FRAMESPORT pilot action which firstly addressed the touristic ports of the Molise region, specifically the port of Termoli, with the aim of widening its implementation in the whole Adriatic area.</td></tr>
<tr><td>Planning Phase</td><td>Operational design and implementation phase</td></tr>
<tr><td>Linked Pilot Actions</td><td>PP6.1 “Development of a prototype of a software application for the identification, booking and payment of available spots at Adriatic small ports. Testing phase at Port of Termoli” - AAST</td></tr>
<tr><td>Resources (links, annexes…)</td><td>- https://play.google.com/store/apps/details?id=com.framesport.framesport
- https://framesport.afasystems.it</td></tr>
<tr><td colspan="2">Description
The FramesPort App is a free multilingual platform to book and manage berths and moorings in touristic ports and marinas. The platform has been implemented in Marina di San Pietro, the tourist port of Termoli in the Molise region, and is now being extensively promoted across the Adriatic basin with the goal of creating a wide network of ports and marinas using the same app to offer their customers (yachtsmen) a unique access point for booking berths and accessing other services, including online payment as well as information on local tourist opportunities. In fact, the platform is capable of collecting real-time occupancy data from each spot at every connected port/marina and making this information available to registered users of the app. This allows yachtsmen to identify available spots in nearby small ports/marinas and book their preferred one in advance, thus helping to decrease waiting times and to prevent overcrowding.
The tool consists of two components:
- a web platform designed for operators and staff of ports/marinas, allowing them to manage berths and moorings, optimising check-in/check-out operations;
- a mobile app, designed for yachtsmen, allowing them to check berth availability and make bookings prior to their arrival at the port/marina.
The WEB PLATFORM is available at https://framesport.afasystems.it as a testing version (APK), under registration.
The user-friendly interface of the web site ensures a smooth navigation between the various sections of the platform, consisting of:
- Dashboard: port managers can access an overview of key information, including the number of available and booked berths at the current time, as well as the number of boats in the check-in and check-out process ("incoming today" and "leaving today").
- Marina profile: this section allows managers to provide details about the marina, including its characteristics such as the number of berths, maximum draft and boat length allowed, specific rules and policies (e.g., cancellation policy), and featured amenities such as Wi-Fi connection and nautical facilities (water, fuel, electricity).</td></tr>
</table>

- Berth Space: within this section, port managers can add and handle berth spaces using the map of the docks' layout. Each berth space can be described with its physical features (length, width, depth) and status, indicating whether it is available, unavailable, reserved, occupied, or under maintenance.
- Users: the section provides the users directory, including personal information and details about the boat.
- Bookings: this section enables the management of booking requests from registered platform users, handling the status of them, including pending, approved, and completed bookings.

The **MOBILE APP** is available at https://app-framesport.afasystems.it as a Progressive Web App" (PWA), namely capable of being used on a smartphone without the need for any installation; it has been also published on the Android stores and will be soon be available on Apple stores as well.

The app allows, accessible for free under registration, yachtsmen to book berths in ports/marinas present on the Framesport platform through a user-friendly interface.

Once logged in, the user can access the home screen and from there utilise the search feature to find and book a berth by filling in the following fields:

- Port/marina of destination ("Where are you going?").
- Date and time for check-in and check-out.
- Details and characteristics of the boat, including name, type (e.g., motor yacht, catamaran, etc.), country flag, length, draft, and width. Additionally, users have the option to upload a picture of the boat. The entered data can be saved for future use, making it easily accessible for subsequent bookings. Boat details and personal details (name and contacts) can be managed from the "profile" screen.

On the "booking" screen, the user can check the status of their pending booking requests as well as review past activities (upcoming and past bookings).

Recommendations for ports/marinas considering the adoption of the Framesport App

The app can effectively contribute to the business development of each port/marina joining the network, allowing to easily substitute a "manual" approach to booking handling by introducing a digital management system.

The services provided by the FrameSport app, as described above, can be offered even without the implementation of a local digital network. However, to fully exploit the app's potential, integration with additional services is recommended, including boat monitoring and video surveillance, boat tracking, and communication system between marina crew and yachtsmen. To this end, ports and marinas should be equipped with a **high-performance Wi-Fi network**, that serves as an "enabling infrastructure" for future services. Wi-Fi technologies play a crucial role in improving connectivity, enhancing operational efficiency

and safety and facilitating real-time data exchange and communication. This leads to a better experience for customers as well.

Besides technologies, another key factor for a successful adoption of the app is the **training of the port staff** in using it and collecting/uploading data, both regarding the port/marina and external tourist opportunities in the area. The pilot experience of FRAMESPORT showed that a significant obstacle is the lack of digital skills among personnel responsible for using the app. It is therefore essential to address resistance to change through training and support of the port crew, especially targeting senior staff, to make them aware of the potential of these digital services.

3.3 System Management

3.3.1 SM-T1 - Small ports (system) master planning Guidelines

SM-T1	Small ports system master planning Guidelines
Overview and purpose The tool offers a Strategic Planning Guidance illustrating the common methodological framework for drafting a System Master Plan, including criteria for classification and development of small ports. The tool is based on and complemented by the two Master plans developed by the Port Authorities of Zadar and Senj as results from the FRAMESPORT pilot actions which addressed the cases of ports open to Public Traffic in Zadar County and in the area of the Port of Senj.	
Planning Phase	Strategic planning phase
Linked Pilot Actions	- 9.1 "Development of Master Plan for the development of a county-level port system in Zadar County" – ZLUZ - 14.1 "Development of Master Plan for the development of a county-level port system in Ličko-Senjska County" - LUZE
Resources (links, annexes…)	- Master Plan for development of ports open to public traffic under jurisdiction of the County Port Authority of Zadar. - Master Plan for development of ports open to public traffic of County and local importance in the area of the Port Authority of Senj.
Description The system master plan is a basic strategic document based on which the sustainable development of ports can be planned, and future projects and investments implemented. The present step-by-step guidance follows the structure and content of a master plan consisting of interconnected units that, by analysing the legislation, the current state of ports, and their environment, and by elaborating the development opportunities and guidelines of each individual port, can support a systematic approach to sustainable efficiency of the small ports in the area, positively affecting the local economy and social life as well. The guidance can be applied to ports on the Adriatic, both from the Croatian and Italian sides, by making necessary adjustments based on the different legislative frameworks and tailoring content to specific infrastructural, organizational, and economic aspects of the addressed systems and each port. The steps shaping the logical structure of a System Master plan are illustrated below. - **Legal framework and strategic documents** o Describe and analyse the legal sources such as maritime codes, laws on maritime property and seaports, laws on transportation and concessions, and regulations on port services	

and environmental impact assessment. Consider legislative frameworks at national, regional, local, and EU levels.
  - list the applicable provisions that directly or indirectly regulate the port area, as well as operations management and basic rights and obligations.
  - Review and analyse strategic planning documents such as transport and spatial plans, national/regional and local development strategies.

- **Analysis and assessment of the condition of the ports**
  - Provide an overview of the current situation in the ports, focusing on selected port areas.
  - Analyse key elements for each port, such as: geographical location and port area, activities and services provided, technical operational characteristics and equipment, mooring capacity, current and future traffic demand, and navigational and meteorological-oceanological conditions.
  - Provide a summary assessment of each port area, considering qualitative and quantitative factors, to identify development potential and needs.

  ***Recommendation**: consider surrounding areas, regardless of their location within the boundaries of the port, as the immediate environment can impact/enable its development.*
  - Classify ports into different categories based on their level of regulation, quality of infrastructure, and the extent of services provided.

- **Port Evaluation Criteria**
  - Set-up evaluation criteria using separate sets for classification and development criteria, to assess qualitatively and quantitatively the potential of ports within the system, considering multifunctional factors:
    - traffic and technological conditions, transport connectivity;
    - influence on economic and social activities in urban centres and the need for environmental protection of surrounding areas and localities near areas
    - socio-economic criteria to assess overall impact and sustainability.
    - Master Plan of the Port Authority of Senj - summary 8
    - Master Plan of County Port Authority of Zadar – summary (section “Analysis and assessment of the state of ports open to public traffic of county and local importance”)

  ***Recommendation**: extract relevant sub-criteria from legal, strategic, and other documents related to maritime and transport systems, port regulations, coastal regular transport, nautical tourism, fisheries, and port-related characteristics.*
  - Group criteria into two main categories that describe the overall goals and development orientation of ports:

- traffic-technical functionality (to assess existing capacities, port facilities, services, and potential for quality improvements in transport connections and port operations);
- social acceptability and sustainability (to assess safety, environmental and spatial aspects, and relevant protection levels for sustainable development, and financial aspects for sustainability of potential investment projects)

***Point of Attention**: the full sets of classification and development criteria developed in Framesport are illustrated in the master plans.*

- **Evaluation results and classification of ports according to the existing state**
  - Apply a multi-criteria decision-making method (e.g. PROMETHE and Analytical Hierarchy Process (AHP) methods used in Framesport Master plans) to classify ports according to the established classification criteria and differentiate them based on regional/county and local importance.
- **Development criteria and guidelines for port planning**
  - Evaluate all factors that affect the functioning of ports, including location, neighbouring ports, and the overall port system and analyse the current state and activities to determine future development direction.
  - Adopt a functional approach to port development, recognizing the multiplier effect of the port on socio-economic development of the surrounding area.
  - Analyse the spatial and functional characteristics of ports, including accommodation within the construction area, traffic connections with the hinterland, bordering structures and potential conflicts, and public facilities related to the port.
  - Assess the port area itself, including boundaries and functional structure of the port area, land and sea valorisation, port infrastructure and supra-infrastructure and adherence to prescribed standards.
- **Evaluation results and classification of ports according to development criteria**
  - Apply a multi-criteria decision-making method (e.g. PROMETHE and Analytical Hierarchy Process (AHP) methods used in Framesport Master plans) to compare and evaluate scenarios based on the established set of development criteria and weighting coefficients
  - Prioritise development projects and investments using the evaluation results as initial guidance.

The complete guidelines, including methods and results, developed for the ports in the areas of Zadar and Senj can be found in the documents:

- *Master Plan for the Development of Ports Open to Public Traffic in Zadar County.*
- *Master Plan for development of ports open to public traffic of County and local importance in the area of the Port Authority of Senj.*

3.3.2 SM-T2 - Model framework for a video surveillance monitoring system

SM-T2	**Model framework for a video surveillance monitoring system**
Overview and purpose The tool provides an operational approach for designing and implementing an IT system to improve the monitoring of port areas, based on surveillance technologies such as cameras, sensors, drones and other potential solutions, integrated to ensure the safe and efficient performance of port operations both on the water and on the land side and of management of public events at the port area. The tool is based on and complemented by the case study resulting from the FRAMESPORT pilot action which took place in the Canal Port of Rimini, that illustrates the entire implementation process – from analysis of requirements to the go-live of the solution – in a real-world scenario.	
Planning Phase	Operational design and implementation phase
Linked Pilot Actions	PP2.2 “Development of monitoring system for port operations and public events in the canal port's area” - ITL
Resources (links, annexes…)	Development of monitoring system for port operations and public events in the canal port's area – Replicability report.
The steps necessary to implement the monitoring system are: **Step 1**: identification and classification by relevance of stakeholders active in the operational-management scenario of the Port. **Step 2**: analysis of the existing surveillance systems, if any, including planimetry, technical specifications of equipment, location of existing instruments, information about the cabling plan, information regarding the data gathering after the equipment installation. **Step 3**: analysis of the technological solutions to be adopted: • definition of functional requirements, • definition of non-functional requirements, • comparison of the solutions identified, • choice of technological solution. ***Point of Attention****: the FRAMESPORT model framework considers two options:* • *Installation of new cameras: in terms of surveillance and monitoring of outdoor areas. This is the most used technology because ensures the needed business continuity; other technologies (e.g. drones) needs to be manned and cannot work h24. The timely reaction to emergencies is possible when an agent views video streaming, that makes this option not feasible because of costs. On the contrary, the system allows to get information in case of need (e.g. for security/safety reasons), thanks to the video*	

storage feature. It therefore acts as deterrent in case of public order problems of for retrieving videos afterwards.

- *Acquisition of a video analysis system to be used on existing cameras: video analysis consists of a set of software modules capable of processing the images acquired by the cameras to obtain a description of the video content. Video analysis systems have evolved a lot in recent years, thanks to artificial intelligence techniques. This technology allows to process a large amount of video streams in near real-time and to produce alarms in case of unexpected events occur. The system can also be trained to effectively react to peculiar contexts. The pros of this system is that without continuous presence of an agent, it allows for timely interventions thanks to alarm management features.*

Step 4: definition of technical specifications for the acquisition of equipment

Step 5: procurement, installation, configuration of equipment and HW/SW components

Step 6: test and go live.

MODEL FRAMEWORK

- **Functionalities of the system:**
  - Centralized management and global supervision from the operational centre of the Authority in charge (e.g., local police, port authority, etc.);
  - Display from the operational centres:
  - Video recording of all video signals from each camera, in compliance with European certifications, personal data protection regulations and privacy provisions;
  - Compatibility with the recording functionalities of the servers of the stakeholders in charge of operational management of the port area;
  - Ability to view recorded images, to extract footage and zoom in on them;
- **Technical Specifications (e.g., to be used for tendering supply, configuration and installation of the equipment)**

  Requirements to be taken in consideration:

  Functional requirements:
  - Management, visualization and recording system.
  - Possibility of remote viewing on multiple control centres.
  - Event and alarm detection.

  Non-functional requirements:
  - Reliability, Robustness, and Redundancy: the system should guarantee reliability and robustness at both hardware and software levels, minimizing service disruptions. Alarm utilities should be provided for preventive measures.

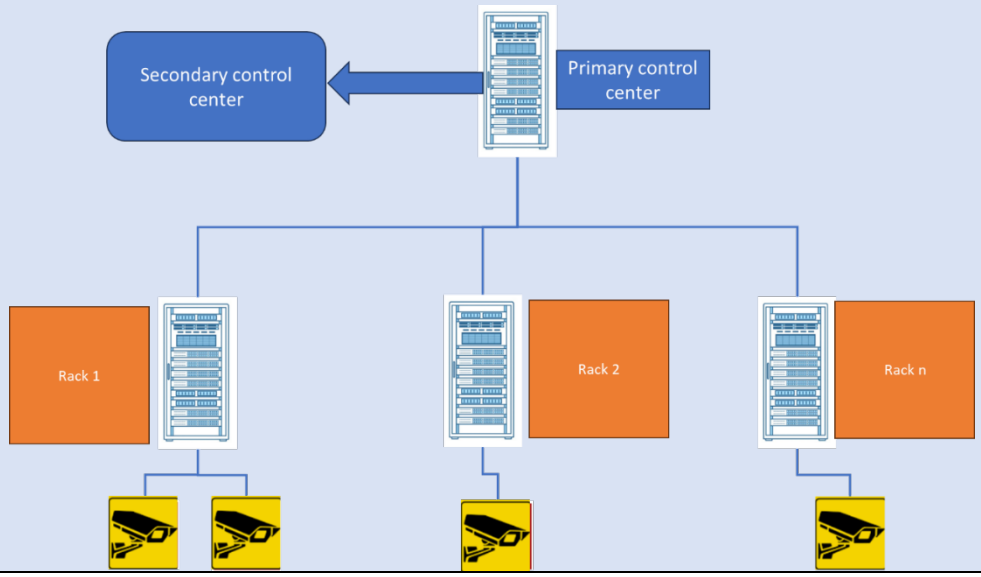
- Expandability, Flexibility, Scalability, and Modularity: The system should be capable of expansion, flexibility, and scalability through modular and standard architectures. It should allow future modifications and integrations while maintaining the main components.
- Compatibility with International Standards and Openness: the equipment must be compatible with international standards, certified by recognized organizations/laboratories. It should also be open to hardware and software integrations.
- Integrability, Interoperability, Operability, and Ease of Commands: The system should be user-friendly, utilizing web-oriented, multichannel architectures. It should employ tools like menus and computer graphics for intuitive and easy operation. Full integration and interoperability with existing systems are crucial.
- Maintainability: The systems must be easily maintainable, with a strategy for control, assistance, warranty, and planned maintenance. Self-diagnostic features should be provided for rapid malfunction detection. Network-connected devices should have monitoring and management capabilities.

Typical components of the system

- Cameras: these are the primary devices that capture video footage. Cameras can be analog or digital, and they come in various types such as dome cameras, bullet cameras, PTZ (Pan-Tilt-Zoom) cameras, and more. They are strategically placed to cover desired areas for surveillance.
- Video Management System (VMS): the VMS is responsible for managing the video feeds from multiple cameras. It allows users to view, record, and analyse the video footage. The VMS provides a user interface for controlling cameras, accessing recordings, setting up motion detection, and managing other system settings.
- Digital Video Recorder (DVR) or Network Video Recorder (NVR): these devices are used to record and store the video footage from the cameras. DVRs are typically used in analog systems, while NVRs are used in IP (Internet Protocol) systems. They provide storage capacity and allow for easy retrieval of recorded footage.
- Network Infrastructure: in IP-based systems, a reliable network infrastructure is required to connect the cameras, NVRs, and other components. This includes routers, switches, Ethernet cables, and network connections to enable data transmission between the devices.
- Power Supply: cameras and recording devices require power to operate. Depending on the system, power may be supplied through electrical outlets or using Power over Ethernet (PoE) technology, where both power and data are transmitted through a single Ethernet cable.

- Storage Devices: in addition to the DVR or NVR, additional storage devices may be used to increase the storage capacity of the system. This can include external hard drives, network-attached storage (NAS) devices, or cloud storage options.
- Video Analytics Software: advanced video surveillance systems may include video analytics software that uses algorithms to analyse the video footage in real-time. This software can detect and alert users about specific events or behaviours, such as motion detection, facial recognition, object tracking, or abnormal activity.

GENERIC SCHEME OF A VIDEO SURVEILLANCE SYSTEM:



3.3.3 SM-T3 - Model framework for gate access control system

SM-T3	Model framework for gate access control system

Overview and purpose

The tool offers an operational approach to design and implement an Automatic Number Plate Recognition (ANPR) system for monitoring vehicular traffic in a port area, aimed to enhance the management of access/exit flows on the land side and leading to improved security and overall efficiency of port operations.

The tool is based on and complemented by the case study resulting from the FRAMESPORT pilot action which took place in Vasto, led by ARAP, that validated and integrated an ANPR system for gate access control into the port's digital management platform “LANDSCAPE SEAPORT”.

Planning Phase	Operational design and implementation phase
Linked Pilot Actions	PP5.3 "Innovation Lab: ICT Platform for monitoring and supervision of freights/passenger" - ARAP
Resources (links, annexes…)	Innovation Lab: ICT Platform for monitoring and supervision of freights/passenger – replicability report.

Description

Automatic Number Plate Recognition (ANPR) systems are technologies based on optical character recognition (OCR), designed to quickly and automatically identify the registration plate numbers of vehicles passing through specific points, such as entry and exit gates, by using specialised cameras and image processing algorithms. They can provide accurate and unambiguous information about the license plate, date, and time of vehicle transit at the point on real-time and are capable of operating effectively in diverse conditions, including day and night, as well as adverse weather conditions.

For these reasons, ANPR systems can significantly contribute to increased efficiency, service levels, and security in the day-to-day operations of the port, facilitating efficient vehicular traffic control and monitoring, and management of critical scenarios like traffic congestion or emergencies.

Following the **model framework** resulting from the case study of the Port of Vasto, the operational steps to implement an ANPR system specifically aimed at controlling access gates are:

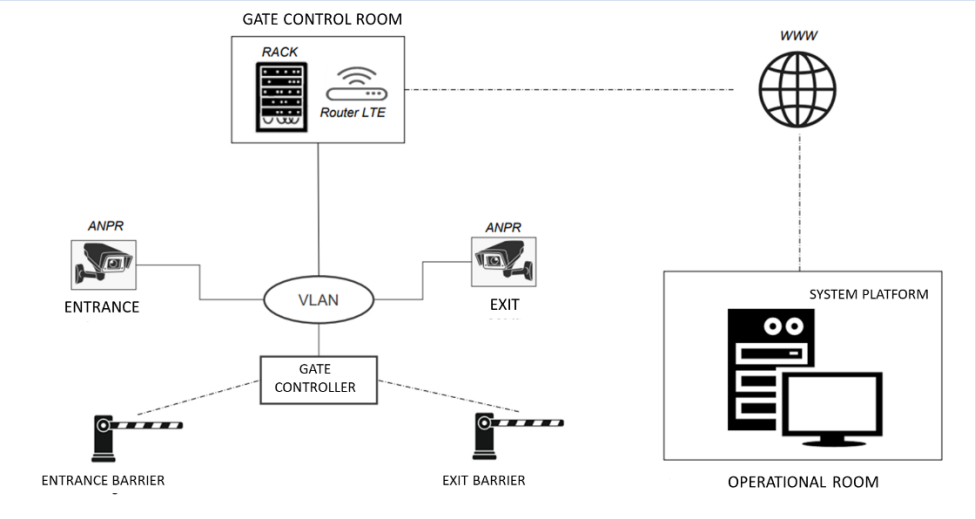
Step 1: Installation of video surveillance stations equipped with AXIS Bullet cameras at the access gates to the Port, enabling the detection of license plates on both lanes.

Step 2: Loading a database of authorized plates into the system to activate the opening of automatic motorised gates such as barriers or sliding gates.

Step 3: Monitoring of real-time information provided by the system about vehicular presence on the port area.

Step 4: Analysis of the data gathered from the system relating to daily, weekly, and monthly attendance, duration of each vehicle's stay, and other statistical information related to vehicle flows on the site.

GENERIC SCHEME OF AN ANPR SYSTEM



Recommendation: *To effectively address the digitalisation process of ports, aiming at integrated, innovative, sustainable, and robust safety, physical, and logical systems, it is crucial to develop an ICT platform ensuring monitoring, verification, and reporting of anomalies in the transfer paths of vehicles within the port area, capable of integrating the extremely complex and heterogeneous technological infrastructure supporting the various port operations. Therefore, the ANPR system for access control should be integrated in such a cohesive and unified platform, as well as all various critical infrastructure components, including CCTV, intrusion detection, thermoregulation, power distribution, elevators, waste handling, communication, lighting and so on. By adopting this holistic approach, the interconnection of these components within the complex system can enhance protection of assets and effective management of operations within the port.*

3.3.4 SM-T4 - Model Framework for system management platform

SM-T4	Model Framework for system management platform

Overview and purpose

The tool offers an operational design model for implementing an ICT system platform for management and monitoring of small port operations, aimed at enhancing business processes as well as services for customers, while increasing general security and traffic safety.

The tool is based on and complemented by two case studies resulting from the pilot actions carried out in the ports of Rab (by Primorje-Gorski Kotar County) and Umag (by Umag-Novigrad Port Authority), where operational platforms were validated in real-life conditions and are now being adopted for port management.

Planning Phase	Operational design and implementation phase
Linked Pilot Actions	- PP7.1 "Improvement of the available technologies for port management (berths booking system, service payment, information on user's service)" – LUUN - PP8.1 "Improvement of the small ports monitoring system (mooring management, billing system, analysis of customer habits) through real time data collection and delivery" - PGZ
Resources (links, annexes…)	- http://smartport.luun.hr/demo.html - Instruction-of-SMARTPORT-PLATFORM-ver1 - Improvement of the available technologies for port management (Umag-Novigrad) – Replicability report. - Improvement of the small ports monitoring system (Primorje-Gorski Kotar) – Replicability report.

Description

The FRAMESPORT model framework for a management system platform for small touristic ports integrates several connected modules and applications, including video surveillance and berth monitoring systems, as well as IT communication and payment functionalities.

A brief overview of the platform hardware and software components is provided below, while full details can be found in the "Replicability reports" of the pilot actions provided as supporting resources.

a. **Surveillance Cameras.** Cameras equipped with machine learning capabilities strategically placed within the port area capture real-time video footage of berths and vessels and analyse the images to identify occupied and unoccupied berths. The footage collected by the cameras provides valuable data for visualizing berth status and tracking vessel movements, improving monitoring accuracy and efficiency.

b. **Bluetooth equipment**. Bluetooth devises (beacons) installed on port vessels and Bluetooth gateways installed within the port area allow identification and tracking of the vessels, providing additional data for monitoring and management purposes: beacons emit unique codes detected by Bluetooth gateways; by triangulating signals from multiple gateways, the approximate location of vessels can be determined.
    - ***Recommendation**: devices should be designed to withstand maritime conditions.*

c. **Software system (ICT application)**: the system integrates, processes and analyses the data collected from the cameras and Bluetooth devices, enabling **real-time monitoring** for efficient data management and decision-making processes, such as for efficient allocation of berths, and coordination of port operations. From the SW interface, it is in fact possible to access real-time information on berth availability, vessel presence, administrative data and visualise berth status and tracking of vessel movements.

In addition to those components, the platform also includes improved **communication functionalities** between customers and port staff, based on up-to-date information resulting from a **berth monitoring system** enabled by smart sensors accompanied by service-providing cabinets. The integration of the information system with the financial system makes the service more accessible and convenient for customers, while facilitating the work of the port managers; the use of **mobile phones and Bluetooth mini thermal printers** can, for example, facilitate **online payment** of the berth fees through web services, streamlining the overall acceptance/invoicing process.

As a **REFERENCE MODEL**, the demo of the SW system developed for ports under the Port Authority of Umag-Novigrad is available at http://smartport.luun.hr/demo.html. This web application provides a user-friendly interface for visualizing port data on a georeferenced map. It covers multiple ports and zones, which are also listed by name for easy navigation and quick positioning on the map (by clicking on the "Zones" button). For each port/zone, the map displays the status of each berth, indicating whether it is occupied or unoccupied. Additionally, it provides administrative information regarding the relevant occupancy contract and, by clicking on the "vessel" sign, users can access details about the boat and its owner. The map also includes other information, such as real-time data collected from sensors installed at some berths and electrical cabinets and nautical navigation signalling, and marks the position of the Porth Authority office, which, when clicked, provides basic contact details. All elements are organised into layers, that can be turned off and on on the map, enabling different views.
The demo is complemented by the document "Instruction of SMARTPORT PLATFORM", that explains the various elements visualised on the map and their corresponding symbols or colours, serving as a guide for interpreting the representation of the port data.
The elements currently included on the demo web application will be further enriched in the next months, to integrate other valuable information and data; for example, several points of interest (such as the current position of the Port Authority office) can be added, even outside the port areas, to promote the tourist offer of the county. The installation of additional sensors in berths and facilities points (water cabinets, fire extinguishers, defibrillator, etc.) can also enhance the overall management of port services.

Moreover, the system is designed to be upgraded with new modules and functionalities, allowing for seamless data exchange with other systems already implemented in the port ICT infrastructure.

Following the FRAMESPORT experience, steps and recommendations for the **implementation process** of a system management platform like the one described above are provided below.

a. **Current state analysis**. Conduct an in-depth analysis of the existing management and monitoring systems implemented at the port, to identify areas for improvement and optimisation.

b. **Development of alternative conceptual solutions.** Identify possible variants for the new monitoring system, based on previous analysis and market research of best practices and industry standards. Perform SWOT and risk analyses for each conceptual solution.

c. **Selection and development of the solution.** Select the optimal conceptual solution based on the analysis results and elaborate the implementation project, including technical specifications for the required equipment and cost estimations, based on thorough market research.

d. **Procurement and installation of technical equipment.** Procure the technical equipment, including surveillance cameras, Bluetooth devices and smart sensors. Develop the necessary infrastructure for the installation of hardware and software components. Install and configure surveillance cameras, Bluetooth beacons and hubs, smart sensors for checking the presence of vessels (including service-providing cabinets).

Recommendations for construction and installation phase:

- *Construction works: prepare a project defining the positions of camera columns, DTK route, well construction, and cabinet installation. Construct the DTK infrastructure, then the wells along the DTK route and the foundations for communication cabinet installation. Finally anchor and install columns on piers at designated positions.*
- *Structured cabling: perform cabling according to the newly installed DTK infrastructure; use CAT.7 cables designed for outdoor installation and resistant to weather conditions. Install communication cabinets with necessary equipment for connecting active devices and ensure appropriate protection against external factors.*
- *Installation of surveillance cameras: mount surveillance cameras on galvanized poles at a height of 4 meters from the pier tread/sidewalk. Connect the cameras to the network and configure them as per the defined frames covering the berths. Verify the functionality and framing of the cameras.*
- *Installation of Bluetooth Hubs: mount Bluetooth hubs on galvanized poles at a height of 4 meters from the pier tread/sidewalk. Connect the hubs to the network via switches in the communication cabinets. Verify the functionality of the Bluetooth hubs.*
- *Installation of Bluetooth Beacons on port vessels: mount Bluetooth beacons on vessels in visible and easily legible places, typically at the front of the vessels facing the pier. Secure the beacons to the vessels using a UV-stable and salt-resistant three-component resin. Place a sensor on the vessel wall beneath the beacon for alarm activation in case of intentional removal.*

***TIP**: The installation and configuration of equipment can be challenging due to technical issues: conduct smaller-scale pilot tests before full-scale implementation to identify and address them early on and collaborate with experts in the field and technology providers to ensure optimal installation and configuration of the equipment and overcome technical challenges during implementation.*

e. **Software System Development.** Design and develop a SW solution including:

- an application for collecting, processing, and analysing data from surveillance cameras and receiving data from Bluetooth sensors;
- a web-based application for visualising the status of berths and vessels in the port area in real-time, adaptable for viewing on desktop computers and mobile devices.

Recommendations for testing and Error Correction:

- *Write tests to ensure the correctness and functionality of the system.*
- *Test each module individually, considering real situations and possible events in the port area.*
- *Correct any errors found during the testing process.*

Real-time testing of system functionality and accuracy through real-time scenarios: Conduct real-time testing of the system by simulating real environments and events. Set devices to initial values through the information system and test with vessels sailing out of range. Verify the status of the collected information and compare it with actual conditions. Repeat the testing procedure multiple times, re-verifying and comparing obtained and actual data.

3.3.5 SM-T5 - Alternative mooring systems guidance

SM-T5	**Alternative mooring systems guidance**
Overview and purpose The tool provides guidance on alternative mooring models to enhance the technical performance of the port system and increase its overall mooring capacity, even in relation with electrically powered ships. The purpose is to contribute to the development of the tourism potential of small ports and the surrounding areas, in response to the changing demands of cruise ship passenger traffic. The tool is based on and complemented by the feasibility study resulting from the FRAMESPORT pilot action carried out by the Port of Šibenik Authority, who developed the preliminary planning documentation for implementing the system in the real case of Šibenik.	
Planning Phase	Strategic planning phase
Linked Pilot Actions	PP10.1 “Feasibility Studies on alternative moorings for ship and on the use of electric ro-ro passenger ships” - LUS
Resources (links, annexes…)	- Studija izvodljivosti alternativnih načina priveza brodova u luci Šibenik / Feasibility Study of Alternative Ways of Mooring Ships in the Port of Šibenik. - Studija izvodljivosti opskrbe brodova električnom energijom / Feasibility Study of Supplying Ships with Electricity.
Description Various alternative mooring models can be implemented to increase port capacity while ensuring safety and environmental sustainability in touristic small ports. This guidance provides an overview of three	

models (automatic mooring systems, mooring buoys, mobile pontoon piers) thar can help to address a limited mooring capacity in relation to the potential increased demand of passenger traffic in the adriatic small ports. This includes improving the technical performance of the existing mooring system and increasing the overall mooring capacity as well, to create the conditions to handle larger numbers of cruisers, an increased intensity of cruise ship arrivals and even the ability to accommodate larger cruise ships.

A summary of the technical features and advantages of the models identified by FRAMESPORT is provided below, while further information regarding the various solutions, including market research findings based on technical specifications, can be found in the document "Feasibility Study of Alternative Ways of Mooring Ships in the Port of Šibenik". The Study also presents financial, economic, environmental and risk analyses that, although conducted for the specific case of the port of Šibenik, can be used as guidelines to set the prerequisites for the development of a full implementation project; in fact, it provides valuable insights into technologies and planning methodologies applicable to all ports in Croatia, Italy, and at the European level as well, especially since the solutions analysed have the potential to become the standard for enhancing port performance in terms of passenger and tourist offerings.

1. **Automatic mooring systems**

Automatic mooring systems offer a faster, safer, and more efficient alternative to traditional rope mooring methods, with potential benefits for ports dealing with increased traffic demand and larger ships. They apply a technology for securing ships without the traditional use of ropes by utilising vacuum or magnetic plates that automatically attach to the ship's side upon its approach to the wharf. This prevents the ship from freely moving.

Compared to the standard rope mooring method, automatic mooring systems provide several advantages. Firstly, they significantly reduce the time required for mooring, with the entire process taking less than a minute instead of 10 to 30 minutes. This leads to increased efficiency and higher throughput of ships at docks. Additionally, automatic mooring systems enhance safety by eliminating the risks associated with manual mooring using ropes. The systems operate autonomously, relying on fully automated processes. They do not require long piers and can be installed in any port, making them flexible and adaptable. Automatic mooring systems also enable the docking of autonomous ships. The reduced workforce needed for mooring operations is another benefit. In terms of ship positioning, the precise alignment with the dock is not necessary, as the robotic arm attached to the ship compensates for any misalignment. This reduces the reliance on bow thrusters for ideal positioning.

The main components of automatic mooring systems include vacuum or magnetic plates, mechanical connection devices, transmission devices, and management systems. The vacuum mooring devices create a vacuum by removing trapped air between the vacuum plate and the ship's surface, preventing the ship from moving. Rubber seals on the vacuum plates prevent outside air from entering. On the other hand, magnetic mooring devices use magnets to attach to the ship's side, eliminating the need for vacuum

pumps. Vacuum mooring devices are more prevalent in the market compared to magnetic ones. The market for automatic mooring systems is relatively limited, with only a few manufacturers and models available. The full Feasibility Study provides a detailed market research section with illustrations of manufacturers' products and their technical specifications.

***Recommendation**:*

The installation of automatic mooring devices should be considered for upgrading existing traditional mooring systems, that are not technically optimal: their design, relying on cylindrical and V-shaped rubber bumpers, hinders quick mooring and unmooring activities. Furthermore, the intensive use of bow thrusters during mooring and unmooring procedures by cruise ships leads to damage to the moorings. Implementing automatic mooring devices would enhance efficiency and mitigate these challenges.

***Recommendation**:*

*To improve the existing mooring system, the installation of **sensor lighting on operating shores** during ship arrivals and departures is recommended. This contributes to increase safety and attractiveness in passenger terminals. Different models of lighting fixtures can be selected. Underwater lighting fixtures offer an attractive visual experience but require extensive waterproofing and higher investment. Lighting fixtures mounted on the outer side of the coastal wall provide a higher level of safety by illuminating the space between the ship and the operational shore. They are easier to install and maintain, with lower overall costs compared to underwater lighting. Lighting fixtures mounted on the coastal wall offer the simplest installation and maintenance, requiring the lowest investment. However, it is crucial to choose models that do not obstruct the movement of passengers and staff. The installation methods for port lighting can include sensors and luxomats to maximize electricity savings, making them a recommended choice.*

2. Mooring buoys

Mooring buoys represent stable mooring equipment that consists of the buoy itself on the water's surface, a weight at the bottom (such as an anchor or concrete block), and connecting chains, steel cables, or ropes. They serve the fundamental purpose of ensuring the safe and stable position of ships, preventing uncontrolled movement and potential threats to people (crew and passengers), property (ship, cargo and other objects), and the environment, for example in the event of a maritime accident. In fact, they are crucial in accepting and absorbing external forces, such as wind, waves, and sea currents, that act on a ship during mooring. It is essential for the total forces to be evenly distributed among the mooring equipment to prevent overloading and potential damage. The specific design and configuration of the system (the size, number of mooring buoys, weight of the anchor block, and length of the chain) must be determined based on calculations considering factors such as sea depth, ship size, weather conditions, geographical location, and safety considerations. Various models of mooring to one, two, or more buoys can be utilised. The Feasibility Study proposes some examples and operational schemes.

The installation of mooring buoys offers several advantages for improving mooring systems and enhancing port sustainability. They increase mooring capacity, improve safety, and prevent damage caused by ship anchor systems to the marine environment. Additionally, mooring buoys enable the mooring of ships in ports where direct pier mooring is not feasible due to limitations such as water depth. This equipment can be made of various materials, such as polyurethane, copolymer, or synthetic foam, with excellent buoyancy and resistance to atmospheric conditions being crucial features.

***Recommendation**:*

Self-anchoring methods (ship anchor systems) can damage marine flora and fauna due to the 'ploughing' of the anchor on the seabed as the ship moves. The installation of stable buoys instead of self-anchoring eliminate this problem, contributing to a higher level of environmental protection.

3. Mobile pontoon piers

As cruise ships continue to grow in size, many ports face limitations in their existing mooring infrastructure (piers) to accommodate these larger vessels. The port of Šibenik, for example, cannot accept cruise ships longer than 230 meters due to navigational constraints. To address this challenge and actively participate in the evolving cruise market, alternative mooring options outside the port basin can be explored and one potential solution is the use of mobile pontoon piers, primarily designed for cruise ship passenger embarkation and disembarkation.

These mobile piers can be installed in any locations, require minimal coastal space, and can be easily relocated if needed. Inspired by technology used in the oil industry, they offer durability even in challenging weather conditions. Constructed with steel structures divided into articulated sections floating on pontoons, they provide a reliable system. To allow passengers to safely embark or disembark, the cruise ship is secured to multiple buoys, and a landing ramp is deployed on the ship's side. The pontoon pier, equipped with a built-in thrust drive, is maneuverer closer to the ship until the ship's ramp rests on the pier itself. The size of the pier can be customised to suit the specific requirements of each port, and when not in use, it can be folded for storage. The full Feasibility Study provides examples and best practices in use.

***Recommendation**:*

The market of larger and larger cruise ships offers significant opportunities for ports and their surrounding areas, often limited by infrastructural constraints. Mobile pontoon piers can facilitate the development of small ports by allowing the acceptance of larger ships and the disembarkation of passengers in locations where the sea depth does not permit direct mooring along the coast, without the need for significant financial investments in constructing new extended operational coastlines.

Moreover, an additional part of the feasibility study is the **conceptual electrotechnical project** about reconstruction **of the power connections for ships** at the Vrulje terminal in the port of Šibenik (see “Studija izvodljivosti opskrbe brodova električnom energijom / Feasibility Study of Supplying Ships with

Electricity"). Such a solution can significantly improve the port infrastructure, increase the quality level of the port service and ensure the offer of alternative fuels that have a lower impact on the environment and ensure the sustainability of the port systems. The project can be used as a **reference model** by ports facing the same shortcomings of the port of Šibenik, including:

- Insufficient power availability of low-voltage connections on operational shores;
- Inadequate land connections for the needs of electrically powered ships;
- Absence of low-voltage and high voltage connections on operational shores;

Insufficient available power in existing substations.